Final Technical Memorandum for Groundwater Investigation at Parcel E-2

Hunters Point Shipyard
San Francisco, California

February 2009

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Certification

Final Technical Memorandum for Groundwater Investigation at Parcel E-2

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I certify that the work presented in this report was performed under my supervision. To the best of my knowledge, the data contained herein are true and accurate and the work was performed in accordance with professional standards.

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2/12/2009

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Abbreviations and Acronyms

APPL	Agriculture and Priority Pollutants Laboratory, Inc.
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure
CE2	CE2 Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
Cs-137	Cesium-137
Co-60	Cobalt-60
DOT	Department of Transportation
DPT	Direct-Push Technology
DQO	Data Quality Objective
DTSC	(California) Department of Toxic Substances Control
EPA	(United States) Environmental Protection Agency
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft	feet
HDPE	high-density polyethylene
HPS	Hunters Point Shipyard
IDW	investigation-derived waste
JV	Joint Venture
Kleinfelder	Kleinfelder, Inc.
L	liter
MS	matrix spike
MSD	matrix spike duplicate
MDL	method detection limit
µg/L	micrograms per Liter
mL	milliliter
msl	mean sea level
NAVFAC Southwest	Naval Facilities Engineering Command Southwest
NAVFAC ESC	Naval Facilities Engineering Service Center
Navy	United States Department of the Navy
NNP	non-Navy Property
NPL	National Priorities List
PID	photoionization detector
PARCCS	Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity
PCBs	polychlorinated biphenyls
PMO	(BRAC) Project Management Office
PPE	personal protective equipment
ppmv	parts per million by volume
QC	quality control
QCSR	quality control summary report
Ra-226	radium-226b

Abbreviations and Acronyms
(continued)

RPD	Relative Percent Difference
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPM	(Navy) Remedial Project Manager
RTC	Response to Comments
RWQCB	California Regional Water Quality Control Board – San Francisco Bay Region
SAP	Sampling and Analysis Plan
Sr-90	strontium-90
TC	terrain conductivity
TPH	Total Petroleum Hydrocarbons
TSA	Technical System Audits
TtECI	Tetra Tech EC, Inc.
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plans
USC	United States Code
USCS	Unified Soil Classification System
VMG	vertical magnetic gradient
VOA	volatile organic analysis
VOC	volatile organic compound

Executive Summary

CE2-Kleinfelder Joint Venture (CE2-Kleinfelder JV) has prepared this Technical Memorandum for a supplemental groundwater investigation for a portion of Parcel E-2, Hunters Point Shipyard (HPS), San Francisco, California (Figure 1). This work was performed for the U.S. Department of the Navy (Navy), Base Realignment and Closure (BRAC) Project Management Office West, in accordance with Contract No. N62473-07-C-3001.

The Navy is in the process of preparing a Remedial Investigation/Feasibility Study (RI/FS) for the contiguous area consisting of the closed Industrial Landfill (hereafter identified as the "Parcel E-2 Landfill") and areas immediately adjacent to the landfill. Through comments on the Parcel E-2 RI/FS, the Base Realignment and Closure (BRAC) Cleanup Team (BCT) consisting of representatives from the Navy, the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board – San Francisco Bay Region (RWQCB) requested that additional analytical data be obtained. The approach to obtaining the necessary additional groundwater analytical data was developed in the August 2007 BCT meeting. The identified contaminants of concern are:

- Total petroleum hydrocarbons (TPH) - purgeables.
- TPH - extractables.
- Ammonia (as nitrogen).
- Polychlorinated biphenyls (PCBs).
- Dissolved metals.

The specific goals of this study presented below are intended to provide supplemental data for the Feasibility Study (FS) for Parcel E-2:

1. Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the shoreline.
2. Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the upper panhandle.
3. Provide data from the A-Aquifer to evaluate the effectiveness of the PCB Hot Spot Area soil removal action.
4. Provide data to evaluate whether A-Aquifer groundwater beneath the metal slag excavation area of the Parcel E-2 panhandle has been impacted by dissolved metals.

To meet these objectives, the following scope of work was performed:

1. A geophysical survey was conducted to identify potential subsurface obstructions.
2. 61 temporary wells were installed in the A-Aquifer using Direct Push Technology (DPT).

3. Grab groundwater samples were collected from the 61 temporary wells and 7 previously installed A-Aquifer piezometers using a peristaltic pump.
4. A location and elevation survey was conducted for the temporary well locations and to update horizontal coordinates and elevations of the seven piezometers.

Data collected under this investigation are intended to be incorporated as necessary into the remedial alternative evaluation and selection process for Parcel E-2. Analytical data generated by this investigation are presented in Section 7.0 of this report.

Additional Scope of Work – Groundwater Sampling for Radionuclides

An additional groundwater sampling event was conducted between June 27 and July 1, 2008 to collect samples for select radionuclide analysis. The scope of this work was initially presented in the *Final Addendum 1 to the Work Plan for Groundwater Investigation at Parcel E-2* (June 2008).

Groundwater samples were collected from the 61 temporary wells and 7 A-Aquifer piezometers using a peristaltic pump. Samples form all 68 locations were analyzed for cesium-127, radium-226, and strontium-90. Samples from 11 temporary well locations were also analyzed for cobalt-60.

The sampling methods and analytical results from this sampling event are presented in their entirety in Appendix J of this Final Technical Memorandum.

1.0 Introduction

CE2-Kleinfelder Joint Venture (CE2-Kleinfelder JV) has prepared this Technical Memorandum to present the results of a chemical data gap investigation conducted in the shallow groundwater within Parcel E-2, Hunters Point Shipyard (HPS), San Francisco, California (Figure 1). This work was performed for the U.S. Department of the Navy (Navy), Base Realignment and Closure (BRAC) Project Management Office West, in accordance with Contract No. N62473-07-C-3001.

The investigation was conducted by the CE2-Kleinfelder JV with portions of the work subcontracted to a geophysical survey firm, a temporary well point installation (drilling) firm, analytical laboratories, a third-party data validation company, and a land surveyor. The project was conducted in accordance with the following documents:

- *Work Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California* (CE2-Kleinfelder JV, 2008a).
- *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Groundwater Investigation at Parcel E-2* (CE2-Kleinfelder JV, 2008b). This document was published as an appendix A to the Work Plan.

In February 2008, the Environmental Protection Agency (EPA), Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board (RWQCB) provided the Navy with comments on the above documents. The Response to Comments (RTC) is included as Appendix A. As part of the response to comments, an additional six temporary wells were installed during the implementation of work scope under the above-referenced Work Plan and Final Sampling and Analysis Plan (SAP). Groundwater samples were collected for chemical analysis from these locations and the results are reported in this Technical Memorandum.

Prior to implementing the work under the above documents, key personnel reviewed the Final SAP as indicated in the project personnel sign-off sheets included in Appendix B.

1.1 Project Objectives

The Data Quality Objectives (DQOs) for this investigation were developed in accordance with the seven-step process presented in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP) guidance (EPA, 2005). The DQO process was described in the SAP and includes the problem and the temporal, spatial, and resource boundaries; defines the decisions to be made during the project; and identifies data and other inputs required for decision-making. These objectives have, in turn, identified the sampling and analytical methods and quality assurance procedures that were followed during the investigation.

The Navy is currently in the process of preparing an RI/FS report for the contiguous area consisting of the closed Industrial Landfill (hereafter identified as the "Parcel E-2 Landfill") and the immediate adjacent areas. Through comments on the FS, the BCT requested that additional analytical data be obtained. The approach to obtaining the necessary additional groundwater

analytical data was developed in the August 2007 BCT meeting. The identified contaminants of concern are:

- Total petroleum hydrocarbons (TPH) - purgeables.
- Total petroleum hydrocarbons - extractables.
- Ammonia (as nitrogen).
- PCBs.
- Dissolved metals.

This groundwater investigation is part of ongoing efforts by the Navy to address contamination at HPS Parcel E-2 in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) by providing data for use in preparing the Parcel E-2 Feasibility Study (FS) report. The FS is a mechanism for characterizing the nature and extent of site risks and evaluating potential remedial alternatives.

The specific goals of this study presented below are intended to provide supplemental data for the evaluation of remedial alternatives in the FS for Parcel E-2:

1. Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the shoreline.
2. Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the upper panhandle.
3. Provide data from the A-Aquifer to evaluate the effectiveness of the PCB Hot Spot Area soil removal action.
4. Provide data to evaluate whether A-Aquifer groundwater beneath the metal slag excavation area of the Parcel E-2 panhandle has been impacted by dissolved metals.

1.2 Scope of Work

The site investigation consisted of the following field activities:

1. A geophysical survey was conducted to identify potential subsurface obstructions.
2. 61 temporary wells were installed in the A-Aquifer using DPT.
3. Grab groundwater samples were collected from the 61 temporary wells and 7 previously installed A-Aquifer piezometers.
4. A location and elevation survey was conducted for the temporary well locations and to update horizontal coordinates and elevations of the seven piezometers.

Temporary well and piezometer locations are shown on Figure 2. In response to regulatory request, installation and groundwater sampling of six temporary wells (TW056, TW057B, TW058, TW059, TW060, and TW061) were included in the above scope of work subsequent to the issuance of the Final SAP. The addition of these locations is included in the June 2008

Addendum 1 to the Final SAP. Sampling of these wells for chemical analysis was consistent with the procedures described in the Final SAP. One of the total 62 planned temporary wells was not installed because uneven terrain and observed surface obstructions made the location inaccessible to the drill rig.

Additionally, field measurements of temperature, specific conductance, and pH were collected during this investigation.

In February 2008, the BCT requested the addition of groundwater sampling and analysis for the following radionuclides:

- Cesium-137 (Cs-137).
- Cobalt-60 (Co-60).
- Radium-226 (Ra-226).
- Strontium-90 (Sr-90).

Sampling for these radionuclides will be conducted upon approval of Addendum 1 to the Final SAP and the results will be reported in a Supplemental Technical Memorandum.

1.3 Regulatory Framework

The following section presents the project regulatory framework.

1.3.1 Principal Decision Makers

Ongoing base closure work at HPS is overseen by the Navy's Base Realignment and Closure (BRAC) Program Management Office (PMO) West, in San Diego, California. As the lead agency under Executive Order 12580, the Navy has authority over evaluation of risk, remedy selection alternative, and overall public participation at HPS. The Navy is coordinating with the U.S. EPA, DTSC, and the RWQCB.

1.3.2 Technical or Regulatory Standards

This groundwater investigation was conducted under the auspices of a Federal Facilities Agreement (FFA) that provides a procedural framework and schedule for the CERCLA cleanup process at HPS.

1.3.3 Permitting Requirements

In accordance with Section 121(e) of CERCLA 1980 [CERCLA, 42 United States Code, Section 9621(e)], as amended, which states that no federal, state, or local permits shall be required for the portion of any removal or remedial action conducted entirely onsite, the work activities to be conducted do not require permits.

1.4 Boundaries of the Study

The lateral boundary of this investigation extended from the southern/southwestern edge of the landfill through the Parcel E-2 panhandle, along the shoreline, and to the southeast into the

former PCB Hot Spot area.. Figure 2 shows the location of the temporary wells and piezometers from which groundwater samples were collected for analysis for this investigation.

The vertical boundary is the bottom of the A-Aquifer beneath Parcel E-2 approximately 10-20 feet below ground surface.

The temporal boundary for this investigation was the first quarter of 2008. The well installation, coring, and groundwater sampling was conducted during the first quarter of 2008. Well and piezometer location surveying was conducted in the first week of April 2008. Temporary well decommissioning is on hold pending completion of additional groundwater sampling for radionuclide analysis under Addendum 1 to the Final SAP.

1.5 Performance or Acceptance Criteria

Because a judgmental sampling strategy was used, statistically derived acceptance criteria on sampling design error are not quantifiable. Groundwater sampling was conducted using the field sampling and handling methods in accordance with procedures presented in the SAP. The data quality indicators (precision, accuracy, representativeness, comparability, completeness, and sensitivity [PARCSS]) were evaluated in accordance with the PARCSS parameters defined in the SAP. A quality control summary report (QCSR) is presented as Appendix I of this technical memorandum.

2.0 Site History and Description

The location of HPS and its parcel divisions are shown in Figure 1. Figure 2 shows Parcel E-2 and the investigation locations where this scope of was performed.

2.1 Hunters Point Shipyard Parcel E-2 Background

HPS was owned and operated as a commercial dry dock facility until 1939, when the Navy purchased the property from Bethlehem Steel. Upon the entry of the U.S. into World War II in 1941, the Navy immediately began to expand HPS into a naval shipyard. The Navy began excavation of the hills surrounding the shipyard, using the resulting spoils to expand the shoreline into the Bay. Quays, docks, and support buildings were built on an expedited wartime schedule to support the shipyard's mission of fleet repair and maintenance.

Parcel E-2 is part of an area created by the Navy in the 1940s, 1950s, and 1960s by filling in the Bay margin with a variety of material, including soil, crushed bedrock, dredged sediments, and debris. From 1976 to 1986, most of Parcel E-2 was leased to and occupied by Triple A Machine Shop, Inc. a privately held ship repair company, after which the Navy resumed occupancy.

HPS was identified as a National Priorities List (NPL) site by the EPA in 1989. As a result, the Navy is conducting investigations in accordance with CERCLA (Title 42 *United States Code* [USC] Sections [§§] 9601-9675) at a number of sites at HPS where releases of CERCLA hazardous substance have occurred. As a management tool to accelerate site investigation, cleanup, and reuse, HPS was divided into geographic parcels and Installation Restoration sites within each parcel that are evaluated concurrently.

At the time of this groundwater sampling event in March 2008, HPS was divided into six parcels; Parcels B, C, D, E, E-2, and F (Figure 1). In 1992, the Navy divided HPS into five contiguous parcels (A, B, C, D, and E) to aid in coordination and tracking of environmental investigation and cleanup. In 1996, the Navy added a sixth parcel (Parcel F), also known as the offshore area that encompasses an area of about 465 acres extending under the San Francisco Bay. In September 2004, the Navy divided Parcel E into two parcels (Parcels E and E-2) to facilitate the closure of the Parcel E-2 Landfill and its adjacent areas. In December 2004, the Navy transferred Parcel A to the San Francisco Redevelopment Agency who subsequently transferred a portion of the former Parcel A to Lennar/BVHP in 2005. The former Parcel A area is referred to herein as non-Navy property (NNP).

2.2 Site Description and Physical Setting

Parcel E-2 consists of 47.4 acres of shoreline and lowland coast along the southwestern portion of HPS (Figure 1). Parcel E-2 is bounded by:

- Property owned by the University of California, City of San Francisco, and a portion of Parcel E to the north.
- San Francisco Bay to the south.

- Portions of Parcel E to the east.
- Non-Navy property (NNP) to the west outside the HPS perimeter.

The maximum ground surface elevation in Parcel E-2 is approximately 20 feet above mean sea level (msl). The Parcel E-2 Landfill is covered with either several feet of soil or a multilayer interim landfill cap composed of geosynthetic materials with a soil vegetative cover.

The area of this investigation extends from the southern/southwestern limit of the landfill cover throughout the upper panhandle area and along a line about 100-150 feet landward from the Parcel E-2 shoreline from the upper panhandle extending southwest. The southeastern side of the PCB Hot Spot area located near the southern edge of the landfill was also included in this investigation with five temporary well locations.

The area of this investigation has a relatively flat, general topography, and is covered by fill that contains non-contiguous pockets of solid waste. The ground surface is hummocky and mounds of rip-rap are located discontinuously along the shoreline. Saline emergent wetlands (approximately 2.38 acres) are present along the Parcel E-2 shoreline. In addition, a 1.3-acre seasonally ponded area is located in the Panhandle Area of Parcel E-2

No buildings or paved roads are present in the area of this investigation. There are several dirt/gravel access roads. No known underground utilities are in the area of current investigation temporary well installations. An approximately 500-foot long sheet-pile wall, installed by the Navy in 1997, extends along the shoreline to the south of the Parcel E-2 Landfill cap.

The former Metal Slag Area is an open field located near the southwest end of the panhandle extending about 50-200 feet landward from the shoreline. Part of this area was subject to a Time-Critical Removal Action for removal of radiological contamination in 2005-2006.

A former Experimental Ship Shielding Area is an open field located on the east end of the panhandle located adjacent and northeast of the Metal Slag Area. There are three parts to the Experimental Ship Shielding Area encompassing a total of about 1.7 acres.

The PCB Hot Spot area is oriented generally parallel with the Parcel E-2 southeastern shoreline. It is set back from the shoreline between about 50 and 120 feet. The majority of the area is between 200 and 300 feet wide with it tapering to about a 30-foot wide corridor along the northern portion of the sheetpile wall. A soil removal action to mitigate PCB contamination was conducted within the PCB Hot Spot area in 2006.

An intertidal zone, about 25 to 75 feet in width, extends along the length of the Bay shoreline (referred to as the "Shoreline area" on Figure 2). This zone contains areas covered with concrete riprap, exposed shoreline sediments, and emergent saline wetlands.

2.3 Site Use

Previous investigations document that Parcel E-2 was primarily used as a landfill for municipal-type waste and construction debris. Solid waste, including wood, paper, plastic, metal, glass, asphalt, concrete, and bricks is mixed with sand, clay, and gravel fill. Historic

information indicates that industrial wastes were also disposed of in or around the landfill including sandblast grit, radioluminescent devices, asbestos-containing debris, paint sludge, solvents, and waste oils.

2.4 Hydrogeology

A conceptual summary of the site hydrogeology is presented in the following sections. More detailed information about the site hydrogeology is available in the *Draft Parcel E-2 Remedial Investigation/Feasibility Study Hunters Point Shipyard San Francisco, California* (Engineering/Remediation Resources Group, Inc and Shaw Environmental, Inc., 2007).

The hydrostratigraphic units relevant to this data gap investigation are:

A-Aquifer - The unconfined A-Aquifer extends across all of Parcel E-2 and consists primarily of heterogeneous artificial fill and marine sediments comprised of fine sand, clay, silt, and silty and clayey sands. In some places the groundwater in shallow fractured bedrock is in hydraulic connection with the A-Aquifer. The A-Aquifer in Parcel E-2 extends from first encountered groundwater a few feet below grade up to between about 10 feet to 20 feet below ground surface.

Bay Mud Aquitard - The A-Aquifer is underlain by a thick, relatively impermeable layer of Bay Mud deposits (mostly clays and silty clays), which range in thickness from about 45 feet at the shoreline to about 10 feet under the central portion of the landfill. The Bay Mud Aquitard extends across most of Parcel E-2 except where it pinches out in the northernmost part of the parcel.

Most groundwater recharge occurs by direct infiltration of precipitation falling on the upland areas of non-Navy property (NNP) and by precipitation falling on unpaved areas onsite, especially in Parcels E and E-2. Most precipitation typically occurs November through April.

Across most of Parcel E-2, groundwater elevations in the A-Aquifer generally range from sea level to 7 feet above msl. A-Aquifer groundwater in the area of this investigation flows toward the San Francisco Bay where it discharges along a tidal mixing zone.

Groundwater elevations in the A-Aquifer are influenced by tidal fluctuations that create a sinusoidal pressure wave near the shoreline. Tidal influence in the A-Aquifer decreases with increasing distance from the shoreline.

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3.0 Geophysical Survey

Norcal Geophysical Consultants, Inc. (Norcal) performed a geophysical study over the areas of planned temporary well installation on September 13th and 14th and November 15th and 16th, 2007. Appendix C contains the geophysical survey report including a full discussion of methodology and findings.

The objectives of the geophysical survey included:

- Locate potential underground utilities.
- Assessing if proposed drilling locations would be precluded by subsurface obstructions.

3.1 Methodology

Norcal chose to divide the study area into five survey units as shown in Plate 1 of their report. In each survey unit, they established a grid to provide horizontal position control and performed a series of traverses using both vertical magnetic gradient (VMG) and terrain conductivity (TC) survey methods. Data acquisition consisted of a series of parallel traverses spaced 10 feet apart. Magnetic data were acquired along the grid lines at approximately 5-foot intervals. TC data were acquired along the northing grid lines at approximately 10-foot intervals.

3.2 Findings

There were numerous VMG and TC anomalies suggesting shallow subsurface debris. Existing monitoring wells and the sheet pile wall located near the shoreline in the southeast portion of Parcel E-2 were also evident on the anomaly map.

Strong TC anomalies were detected without corresponding VMG anomalies at several locations near the shoreline which may be due to the close proximity of saline water of the Bay.

No underground utilities were located. With the exception of the sheet pile wall and existing monitoring wells, none of the VMG or TC anomalies were viewed as precluding drilling at those locations. Therefore, drilling locations were not adjusted based on the geophysical survey.

Details of area-specific findings are provided in Appendix C.

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4.0 Soil Coring and Temporary Well Installation

This section discusses the methodologies for borehole soil coring, installation of temporary wells, and elevation/location surveying of the temporary wells and the previously installed piezometers.

4.1 Preparatory Activities

Prior to beginning drilling, the following preparatory activities were conducted:

- The Navy Remedial Project Manager (RPM), Resident Officer in Charge of Construction (ROICC) and the appropriate HPS security and fire department personnel were notified regarding the anticipated work.
- Personnel leading field activities reviewed the appropriate sections of the Sampling and Analysis Plan (SAP) and signed the project sign-off sheet.
- The affected personnel read the Accident Prevention Plan (APP) and associated Site-Specific Safety and Health Plan (SSHP) and signed an acknowledgement form. They also attended required HPS Radiation Awareness Training conducted by the Navy's radiation contractor: Tetra Tech EC, Inc. (TtECI).
- Underground Service Alert was notified at least two full working days in advance of drilling.

4.2 Borehole Installation and Soil Coring

Drilling and associated temporary well installation was conducted between February 13 and 29, 2008 by Vironex of Pacheco, California (California C57 license #705927) under the supervision of the CE2-Kleinfelder JV field manager Tom Sayre, a California Professional Geologist. The locations of the temporary wells are shown in Figure 2. Graphical logs of boreholes where soil cores were collected are presented in Appendix D.

The temporary well boreholes were advanced using DPT, using a truck-mounted hydraulic/percussion rig.

The temporary well boreholes (except at the six locations where soil coring was conducted) were advanced using 1.75-inch diameter, steel drive rods with a sacrificial tip. This method displaced soil as the drive rods were advanced and produced no soil cuttings. Upon reaching total borehole depth, temporary well casings were installed through the drill rods. The drill rods were fully removed from the borehole, and the sand pack and bentonite seal were installed (see Section 4.3 below).

Sub-surface obstructions were encountered at six proposed temporary well locations (TW002, TW006, TW008, TW009, TW011, and TW043). These obstructions caused either drilling refusal above the borehole targeted depth or deviation of the borehole such that the well casing could not be properly installed. In these instances, additional boreholes were drilled

approximately 5 feet laterally from the initial location until the temporary well could be installed successfully.

One drilling location proposed in the SAP, between temporary wells TW048 and TW051, near the shoreline of the upper panhandle, was not accessible due to uneven terrain and observed surface obstructions and therefore not included in the sampling program.

Continuous soil cores were collected at six temporary well locations: TW001, TW002, TW003, TW004, TW031, and TW033 as shown on Figure 2. Boreholes at these locations were advanced at 5-foot intervals using a 1.75-inch diameter, steel sampling barrel lined with opaque acetate sleeves. Soil was pushed into the sampling sleeves as the drill string was advanced. Upon retrieval, the acetate sleeves were cut open, and soil cores were screened using a photoionization detector (PID) and described by the field geologist using the Unified Soil Classification System (USCS) on borehole logs. The borehole logs are presented in Appendix D. Temporary wells were subsequently installed at these six locations.

Soil cores from these locations were stored as composited waste in a 55-gallon Department of Transportation (DOT) approved drum for waste profiling and disposal. To allow for potential depth-specific radionuclide analysis by another Navy contractor, another set of companion borehole of equal or greater depth were advanced within about five feet of the six soil coring locations on March 11, 2008. Soil cores were retrieved from these boreholes using the same method. To maintain sample integrity, the acetate sleeves were not cut open and soil description was logged based on observations made at the end of each 5-foot coring run. These logs are also included in Appendix D. The core sleeves from the March 11 drilling were capped, labeled, and after passing radioactive screening at the drilling location, were stored in a locked storage container located within the Parcel E-2 boundaries. These cores are awaiting possible transfer to another Navy contractor for radionuclide analysis, reporting, and disposal.

Table 1 presents borehole drilling dates and total depths. Laboratory analysis of soil samples was not conducted as part of the scope of work.

4.3 Temporary Well Installation

Temporary wells were installed at each location immediately following borehole advancement. Temporary wells were constructed by manually emplacing 0.75-inch outer diameter PVC well casing in the drill rods, followed by removing the drill rods and emplacing annular filter pack (#2/16 sand) from well total depth to no more than two feet above the well screen. The annular space above the san pack was backfilled using bentonite chips to approximately 1.0 to 0.5-feet below grade. The annular space above the bentonite chips was sealed using hydrated bentonite powder to prevent surface materials or surface water from entering the borehole. Table 1 summarizes the construction details of the temporary wells.

Over the weekend of March 8 and 9, five temporary wells; TW026, TW027, TW028, TW030, and TW057, located in the southern half of the panhandle were vandalized. This occurred before these locations were either sampled or surveyed. On March 10, these wells were replaced with the same construction specifications as the originals within about five feet from the original locations, and were named TW026B, TW027B, TW028B, TW030B, and TW057B

respectively. The original temporary wells were decommissioned by pulling out remaining casing to the extent possible and backfilling the boreholes to surface with Portland Type I/II cement.

4.4 Temporary Well and Piezometer Surveying

On April 3, 2008, Espinosa Surveyors, Easton, California, a California-licensed professional land surveyor, surveyed the elevation and location of the 61 temporary wells and 7 piezometers (elevation and location). Appendix E contains the surveyor's report.

Table 2 summarizes the construction details of the seven piezometers including the updated survey data. Ground surface and top-of-casing elevations were different than the original survey data obtained in 1998 when these piezometers were installed. Copies of the original 1998 logs with elevation, location, and construction depth revisions based on the 2008 survey are included in Appendix D. Ground surface elevation was higher at each of the seven locations ranging from a 0.10 to 3.59 feet increase. This is likely attributed to additional soil placement related to the landfill fill cap installation conducted in August 2000 since six of the piezometers lie near the cap edge and one (PZ-138F) is within the cap. Differences in top-of-casing elevations ranged from a decrease of 0.48 feet to an increase of 3.56 feet from measurements taken in 1998. The cause(s) of discrepancies between top-of-casing elevations is not known.

4.4.1 Vertical Coordinates

The surveyor reported the elevation at ground surface for each temporary well location to a precision of 0.01 ft, based on the borehole center. The elevations were surveyed relative to the 1929 National Geodetic Vertical Datum Vertical coordinates, and were reported as feet relative to mean sea level (msl).

4.4.2 Geographic Coordinates

The surveyor reported the geographic coordinates at the center of each temporary well to a precision of plus or minus 0.1 ft. The geographic coordinates of the temporary wells were surveyed using the 1927 North American Datum State Plane Coordinate System, California, Zone 3.

The seven piezometers were also surveyed according to the above procedures, and also included elevation surveying of the top of well casing in addition to ground elevation.

4.5 Temporary Well Decommissioning

The temporary surface seal and well screens removal has been postponed until after additional groundwater sampling for radionuclides is conducted under Addendum 1 to the Work Plan for Groundwater Investigation at Parcel E-2. Well decommissioning will be accomplished by using a winch to pull the PVC casing out of the boreholes. Boreholes will then be backfilled with neat Portland Type I/II cement grout.

4.6 Equipment Decontamination

Reusable drilling and sampling equipment was decontaminated prior to and after use. This included soil core barrels and drive rods. Decontamination was conducted by Vironex personnel.

5.0 Groundwater Sampling Methodology

Groundwater samples were collected from the temporary wells and seven piezometers as shown on Figure 2. Table 3 summarizes sampling information including location and sample IDs, dates of sampling, analytical suite, and field measurements of temperature, specific conductivity, and pH.

Prior to sampling, depth to water was measured with an electric water level indicator, relative to top of casing.

Groundwater samples were collected from temporary wells once water levels were at least three feet above the well bottom. Groundwater samples were collected from existing piezometers regardless of initial water level. Samples were collected using a peristaltic pump located at ground surface with well-specific, disposable, Teflon-lined, plastic tubing lowered to within one foot of the bottom of each temporary well or piezometer. If the well/piezometer ran dry during the initial sampling attempt, samples were collected on subsequent days as water recharged into the well/piezometer.

Groundwater samples were collected by purging the wells/piezometers at a rate of $\leq$ 500 mL/minute to minimize turbidity and potential volatilization of lighter petroleum hydrocarbons. Stabilization parameter monitoring was not applicable to this sampling technique. However, pH, specific conductance, and temperature were measured once at each location during sampling.

Samples were collected directly into pre-cleaned, laboratory-supplied sample containers. The volatile organic analysis (VOA) vials (for TPH-purgeables) were filled to a positive meniscus and were inspected for air bubbles. If air bubbles were detected, the vial was discarded and a replacement vial was filled. If air bubbles persisted, VOAs without preservative were used and a notation was made to the chain of custody.

Samples for dissolved metals analyses were collected in containers without preservative. The analytical laboratory filtered the samples using a 0.45 micron filter and added nitric acid preservative within 24 hours of receipt and prior to analysis.

Samples were collected at each well/piezometer, as applicable to each location, in the following order:

1. TPH-purgeables.
2. TPH-extractables.
3. PCBs.
4. Dissolved metals.
5. Ammonia, as nitrogen.

The sample containers were placed in an ice-filled cooler for transport to the analytical laboratory Agriculture and Priority Pollutants Laboratory, Inc. (APPL) of Fresno, California following chain-of-custody protocol. The chain-of-custody records are presented in Appendix F.

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6.0 Management of Investigation-Derived Waste

Investigation-derived waste (IDW) generated by this project included equipment decontamination water (rinsate), soil cores, used personal protective equipment (PPE), and drilling-related solid waste (such as used temporary well casings and acetate sleeves from soil coring).

Equipment decontamination rinsate was collected in DOT-approved 55-gallon drums and transported to the CE2-Kleinfelder JV field office where it was transferred into the 4,000-gallon storage tank used for storing purgewater from the Basewide Groundwater Monitoring Program. That water was managed according to the IDW Management Plan for that Program.

Soil cores were generated from two sources; (1) boreholes advanced for installation of temporary wells TW001, TW002, TW003, TW004, TW031, and TW033, and (2) boreholes advanced at these six locations to collect soil core samples.

The cores from the well installation were placed within one DOT-approved 55-gallon steel drum, labeled, and stored in Parcel E-2. This soil was screened for radioactivity by another Navy contractor. Pending receipt of the screening results, the soil will be profiled and disposed of off-site. Profiling and disposal will be reported as a part of the future groundwater radiological data addendum to this technical memorandum.

The soil core samples collected were retained in the acetate sampling sleeves, capped, labeled, and stored in the on-site CE2-Kleinfelder JV storage container located in Parcel E-2. This core was screened for elevated radioactivity by another Navy contractor during drilling. No elevated radioactivity was detected. These samples are awaiting possible transfer to another Navy contractor for radionuclide analysis.

Regular trash and PPE were placed in waste bins for offsite disposal as non-hazardous waste.

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7.0 Groundwater Analytical Results

The groundwater samples were analyzed by APPL for:

- TPH-purgeables by EPA Method 8015B.
- TPH-extractables by EPA Method 8015B.
- Ammonia (as nitrogen) by EPA Method 350.1.
- PCBs by EPA Method 8082.
- Dissolved metals by EPA Method 6010B with EPA Method 7470A for mercury.

Table 3 shows the analyses performed for each sampling location. Tables 4 though 7 present the analytical results for the samples collected during this investigation, including field duplicates and trip blanks. Plate 1 shows the analytical results for the non-metal analytes and for selected metals (copper, lead, mercury, nickel, and zinc). The laboratory analytical reports TPH-purgeables as TPH gasoline. TPH-extractables is reported as (1) TPH diesel and (2) TPH motor oil.

Executed chain-of-custody documents are included as Appendix F.

Laboratory analytical reports are incorporated into the data validation report and included as Appendix G.

7.1 Total Petroleum Hydrocarbons

Groundwater samples for TPH-gasoline, TPH-diesel, and TPH-motor oil analysis were collected from 53 temporary wells and 7 piezometers. Location-specific concentration values for TPH as gasoline, diesel, and motor oil are presented in Table 4.

TPH-gasoline was detected in groundwater at 25 of the 60 sampled locations. Concentrations ranged from an estimated value of 11 micrograms per liter (µg/L) ("J"-qualified) to 230 µg/L.

TPH-diesel was detected in groundwater 58 of the 60 sampled locations. Concentrations ranged from 56 µg/L to 7,100 µg/L.

TPH-motor oil was detected in groundwater at 55 of the 60 sampled locations. Concentrations ranged from an estimated value of 270 µg/L to 9,200 µg/L.

A visible sheen and hydrocarbon odor was observed on soil collected between 10 and 15 feet below grade from the borehole for TW031 (BH039) and the adjacent second borehole BH039B.

7.2 Ammonia

Groundwater samples for ammonia analysis were collected from 48 temporary wells and 7 piezometers.

Ammonia was detected in groundwater at 54 of the 55 sampled locations. Concentrations ranged from an estimated value of 140 µg/L ("J"-qualified) to 31,700 µg/L. Location-specific concentration values for ammonia are presented in Table 5.

7.3 PCBs

Groundwater samples for PCBs (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260) analysis were collected from 53 temporary wells and 7 piezometers.

PCBs were detected in groundwater water from 10 of the 60 sampled locations. Concentrations ranged from an estimated value of 0.27 µg/L to 7.2 µg/L. The project quantitation limit for each analyte was 0.5 µg/L. There were no locations with more than one Aroclor detected.

Aroclor 1016 was detected in groundwater samples from four locations at concentrations ranging from an estimated value of 0.92 µg/L to 2.6 µg/L.

Aroclor 1254 was detected in one groundwater sample at a concentration of 7.2 µg/L.

Aroclor 1260 was detected in groundwater samples from four locations at concentrations ranging from an estimated value of 0.27 µg/L to 1 µg/L.

Location-specific concentration values for PCBs are presented in Table 6.

7.4 Dissolved Metals

Groundwater samples for dissolved metals analysis were collected from 56 temporary wells and 7 piezometers.

Multiple metals were detected in groundwater samples in each of the 62 locations. Concentration ranges were analyte-specific. Location-specific concentration values for dissolved metals are presented in Table 7.

8.0 Data Quality, Verification, and Validation

A Quality Control Summary Report (QCSR) is included in Appendix I. This summarizes the QC sampling procedures and analytical results, the findings of the data validation process relative to the SAP-defined data quality indicators, and the data storage process. The data quality indicators either met or exceeded the acceptance criteria as defined in the SAP and is therefore meets the project Data Quality Objectives.

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9.0 References

CE2-Kleinfelder JV. 2008a. *"Work Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California*. February 5.

CE2-Kleinfelder JV. 2008b. *"Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California*. February 4.

Engineering/Remediation Resources Group, Inc and Shaw Environmental, Inc., 2007. *"Draft Parcel E-2 Remedial Investigation/Feasibility Study, Hunters Point Shipyard, San Francisco, California."* March.

Kleinfelder, 2004. *"Draft Investigation-Derived Waste Management Plan, Basewide Groundwater Monitoring Program, HPS, San Francisco, California."* April 5.

EPA. 1999. *"National Functional Guidelines for Organic Data Review."* Office of Emergency and Remedial Response. Washington, DC. EPA-540/R-99-008. October.

EPA. 2000. *"Data Quality Objectives Process for Hazardous Waste Site Investigations (EPA QA/G-4HW)."* Office of Environmental Information. Washington, DC. EPA/600/R-00/007. January.

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Figures

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Northern Reach

Parcel B

Parcel UC-2

Parcel UC-1

Parcel C

Parcel D-2

Parcel E-2

Parcel G

Parcel E

Parcel D-1

Parcel F

Southwest Shoreline

Candlestick Point

San Francisco Bay

N

0 645 1,290 1,935 2,580 ft

0 0.25 0.5 Miles

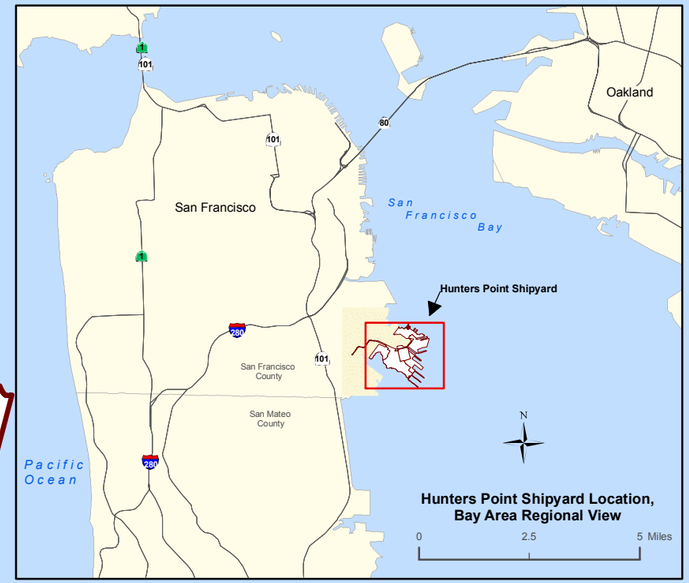

Figure 1.
Site Vicinity and Parcel Locations

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 Hunters Point Shipyard February 2009

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N. Cook CE2Corp: plot 12/05/08

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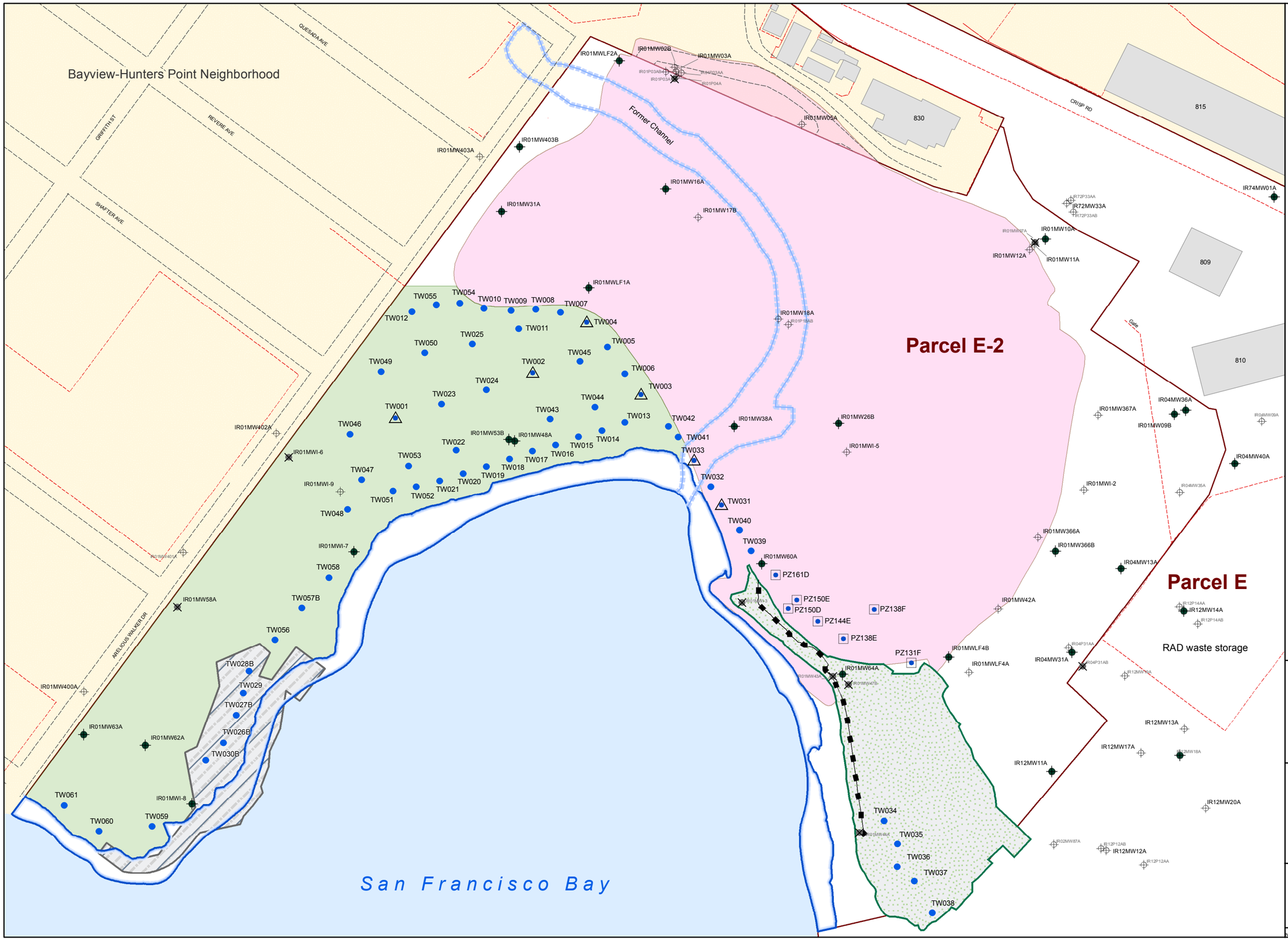

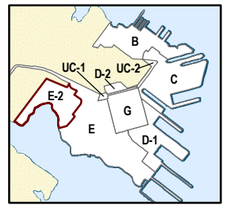

HPS Parcel Locations

Legend

- Monitoring well
- Monitoring well, decommissioned
- Monitoring well, other
- Temporary well
- Piezometer
- Temporary well and coring location
- Former Channel 1969
- Fence
- Sheetpile wall
- Roads, boundaries approximate
- 134 Buildings
- Metal slag area
- PCB Hot Spot area
- Landfill area
- Panhandle area
- Shoreline area
- Parcel E
- Parcel E-2
- Non - Navy property
- San Francisco Bay

N

0 50 100 150 200 250 300 ft

Figure 2.
Temporary Well and Piezometer Sampling Locations
Parcel E-2

Final
Technical Memorandum for Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
February 2009

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Tables

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Table 1. Temporary well construction details.

Investigation goal # [1]	Installation location area [2]	Temporary Well ID	Borehole ID	Date installed	Grade elevation (ft above MSL)	Total boring depth (ft below grade)	Total boring depth (ft above MSL)	Top of casing (ft above grade)	Top of screen (ft below grade)	Bottom of screen (ft below grade)	Top of screen (ft above MSL)	Bottom of screen (ft above MSL)	Top of sand pack (ft below grade)	Bottom of sand pack (ft below grade)	Top of sand pack (ft above MSL)	Bottom of sand pack (ft above MSL)	Comments
2	panhandle	TW001	BH020	02/13/08	7.49	15.0	(7.5)	1.1	4.0	14.0	3.5	(6.5)	2.0	15.0	5.5	(7.5)	Soil coring location.
2	panhandle	boring only	BH020B	03/11/08	NS	15.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW001. Soil core retained.* Grouted borehole.
2	panhandle	boring only	BH023	02/13/08	NS	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Soil coring location. 1st attempt, refusal at 6.5 ft. Grouted borehole.
2	panhandle	TW002	BH023B	02/13/08	7.15	15.0	(7.9)	1.5	3.8	13.8	3.4	(6.7)	1.8	14.8	5.4	(7.7)	Soil coring location. 2nd attempt. Well installed.
2	panhandle	boring only	BH023C	03/11/08	NS	15.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW002. Soil core retained.* Grouted borehole.
2	panhandle	TW003	BH034	02/14/08	6.94	15.0	(8.1)	1.4	1.2	11.2	5.7	(4.3)	0.5	11.2	6.4	(4.3)	Soil coring location.
2	panhandle	boring only	BH034B	03/11/08	NS	9.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW003. 1st return attempt for collecting soil core. Refusal at 9 ft. Grouted borehole.
2	panhandle	boring only	BH034C	03/11/08	NS	14.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW003. 2nd return attempt for collecting soil core. Refusal at 14.5 ft. Grouted borehole.
2	panhandle	boring only	BH034D	03/11/08	NS	15.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW003. 3rd return attempt for collecting soil core. Soil core retained.* Grouted borehole.
2	panhandle	TW004	BH031	02/14/08	6.67	15.0	(8.3)	1.4	0.8	10.8	5.9	(4.1)	0.2	11.2	6.5	(4.5)	Soil coring location.
2	panhandle	boring only	BH031B	03/11/08	NS	15.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW004. Soil core retained.* Grouted borehole.
2	panhandle	TW005	BH032	02/14/08	7.07	11.0	(3.9)	1.0	1.0	11.0	6.1	(3.9)	0.5	11.0	6.6	(3.9)	
2	panhandle	boring only	BH033	02/14/08	NS	8.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1st attempt. Refusal at 8 ft. Grouted borehole.
2	panhandle	boring only	BH033B	02/14/08	NS	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2nd attempt. Refusal at 5 ft. Grouted borehole.
2	panhandle	TW006	BH033C	02/14/08	7.01	10.0	(3.0)	2.6	0.0	10.0	7.0	(3.0)	0.2	10.0	6.8	(3.0)	3rd attempt. Well installed.
2	panhandle	TW007	BH047	02/14/08	7.49	10.5	(3.0)	1.8	0.5	10.5	7.0	(3.0)	0.2	10.5	7.3	(3.0)	
2	panhandle	boring only	BH048	02/14/08	NS	10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1st attempt. Obstruction deviates rods preventing well installation. Grouted borehole.
2	panhandle	boring only	BH048B	02/14/08	NS	10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2nd attempt. Obstruction deviates rods preventing well installation. Grouted borehole.
2	panhandle	TW008	BH048C	02/14/08	7.74	11.0	(3.3)	1.6	1.0	11.0	6.7	(3.3)	0.5	11.0	7.2	(3.3)	3rd attempt. Well installed.
2	panhandle	boring only	BH049	02/15/08	NS	11.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1st attempt. Rods clogged preventing well installation. Grouted borehole.
2	panhandle	boring only	BH049B	02/15/08	NS	9.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2nd attempt. Total depth 9 ft, but obstruction deviates rods at 5.5 ft. Grouted borehole.
2	panhandle	TW009	BH049C	02/15/08	7.80	8.6	(0.8)	1.2	3.6	8.6	4.2	(0.8)	1.6	8.6	6.2	(0.8)	3rd attempt. Still meeting obstruction. Shorter-screened well installed.
2	panhandle	TW010	BH050	02/15/08	7.02	10.8	(3.8)	1.5	0.8	10.8	6.2	(3.8)	0.3	10.8	6.7	(3.8)	
2	panhandle	boring only	BH025	02/15/08	NS	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1st attempt. Refusal at 6.5 ft. Grouted borehole.
2	panhandle	TW011	BH025B	02/15/08	8.20	10.7	(2.5)	2.0	0.7	10.7	7.5	(2.5)	0.5	10.7	7.7	(2.5)	2nd attempt. Well installed.
2	panhandle	TW012	BH029	02/15/08	7.05	10.6	(3.6)	2.1	0.6	10.6	6.5	(3.6)	0.3	10.6	6.8	(3.6)	
1	panhandle	TW013	BH013	02/15/08	10.05	18.3	(8.3)	1.5	8.3	18.3	1.8	(8.3)	3.4	18.3	6.7	(8.3)	
1	panhandle	TW014	BH012	02/15/08	11.05	19.1	(8.1)	0.9	9.1	19.1	2.0	(8.1)	3.3	19.1	7.8	(8.1)	
1	panhandle	TW015	BH011	02/19/08	10.21	18.8	(8.6)	1.2	8.8	18.8	1.4	(8.6)	6.8	18.8	3.4	(8.6)	
1	panhandle	TW016	BH010	02/19/08	8.30	18.6	(10.3)	1.4	8.6	18.6	(0.3)	(10.3)	6.6	18.6	1.7	(10.3)	
1	panhandle	TW017	BH009	02/19/08	10.27	19.2	(8.9)	0.8	9.2	19.2	1.1	(8.9)	4.3	19.2	6.0	(8.9)	
1	panhandle	TW018	BH008	02/19/08	10.63	17.2	(6.6)	1.5	7.2	17.2	3.4	(6.6)	5.2	17.2	5.4	(6.6)	
1	panhandle	TW019	BH007	02/19/08	9.53	15.4	(5.9)	1.5	5.4	15.4	4.1	(5.9)	3.4	15.4	6.1	(5.9)	

Table 1. Temporary well construction details.

Investigation goal # [1]	Installation location area [2]	Temporary Well ID	Borehole ID	Date installed	Grade elevation (ft above MSL)	Total boring depth (ft below grade)	Total boring depth (ft above MSL)	Top of casing (ft above grade)	Top of screen (ft below grade)	Bottom of screen (ft below grade)	Top of screen (ft above MSL)	Bottom of screen (ft above MSL)	Top of sand pack (ft below grade)	Bottom of sand pack (ft below grade)	Top of sand pack (ft above MSL)	Bottom of sand pack (ft above MSL)	Comments
1	panhandle	TW020	BH006	02/19/08	8.25	13.9	(5.7)	1.1	3.9	13.9	4.4	(5.7)	2.0	13.9	6.3	(5.7)	600 lbs sand used to fill annulus.
1	panhandle	TW021	BH005	02/20/08	7.43	13.0	(5.6)	2.0	3.0	13.0	4.4	(5.6)	1.0	13.0	6.4	(5.6)	
2	panhandle	TW022	BH016	02/20/08	6.29	11.7	(5.4)	3.0	1.7	11.7	4.6	(5.4)	0.5	11.7	5.8	(5.4)	
2	panhandle	TW023	BH021	02/20/08	5.28	11.5	(6.2)	1.5	1.5	11.5	3.8	(6.2)	0.5	11.5	4.8	(6.2)	
2	panhandle	TW024	BH022	02/20/08	6.90	11.1	(4.2)	3.0	1.1	11.1	5.8	(4.2)	0.5	11.1	6.4	(4.2)	
2	panhandle	TW025	BH026	02/20/08	8.54	11.2	(2.7)	3.0	1.2	11.2	7.3	(2.7)	0.5	11.2	8.0	(2.7)	
4	metal slag	TW026B	BH055	03/10/08	5.42	12.7	(7.3)	2.3	2.7	12.7	2.7	(7.3)	0.7	12.7	4.7	(7.3)	TW026 (installed 02/20/08) was vandalized & reinstalled as TW026B.
4	metal slag	TW027B	BH054	03/10/08	5.65	13.6	(8.0)	1.4	3.6	13.6	2.1	(8.0)	1.6	13.6	4.1	(8.0)	TW027 (installed 02/20/08) was vandalized & reinstalled as TW027B.
4	metal slag	TW028B	BH052	03/10/08	5.29	13.2	(7.9)	1.8	3.2	13.2	2.1	(7.9)	1.2	13.2	4.1	(7.9)	TW028 (installed 02/20/08) was vandalized & reinstalled as TW028B.
4	metal slag	TW029	BH053	02/20/08	4.89	11.8	(6.9)	3.1	1.8	11.8	3.1	(6.9)	0.5	11.8	4.4	(6.9)	
4	metal slag	TW030B	BH056	03/10/08	5.49	12.5	(7.0)	2.5	2.5	12.5	3.0	(7.0)	0.5	12.5	5.0	(7.0)	TW030 (installed 02/20/08) was vandalized & reinstalled as TW030B.
1	landfill area	TW031	BH039	02/21/08	7.80	20.0	(12.2)	3.0	1.8	11.8	6.0	(4.0)	0.8	11.8	7.0	(4.0)	Soil coring location.
1	landfill area	boring only	BH039B	03/11/08	NS	20.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW031. Soil core retained.* Grouted borehole.
1	landfill area	TW032	BH038	02/21/08	7.63	12.4	(4.8)	2.6	2.4	12.4	5.2	(4.8)	0.5	12.4	7.1	(4.8)	
1	landfill area	TW033	BH037	02/21/08	7.87	20.0	(12.1)	2.6	2.1	12.1	5.8	(4.2)	0.5	12.1	7.4	(4.2)	Soil coring location.
1	landfill area	boring only	BH037B	03/11/08	NS	20.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Adjacent to TW033. Soil core retained.* Grouted borehole.
3	PCB Hot Spot	TW034	BH042	02/22/08	7.50	19.5	(12.0)	0.9	9.5	19.5	(2.0)	(12.0)	2.0	19.5	5.5	(12.0)	
3	PCB Hot Spot	TW035	BH043	02/22/08	7.52	18.1	(10.6)	1.9	8.1	18.1	(0.6)	(10.6)	1.0	18.1	6.5	(10.6)	
3	PCB Hot Spot	TW036	BH044	02/22/08	7.59	14.3	(6.7)	0.7	4.3	14.3	3.3	(6.7)	1.0	14.3	6.6	(6.7)	
3	PCB Hot Spot	TW037	BH045	02/22/08	7.75	11.9	(4.2)	3.2	1.9	11.9	5.9	(4.2)	0.9	11.9	6.9	(4.2)	
3	PCB Hot Spot	TW038	BH046	02/22/08	8.00	12.3	(4.3)	2.8	2.3	12.3	5.7	(4.3)	1.0	12.3	7.0	(4.3)	
1	landfill area	TW039	BH041	02/25/08	11.49	13.2	(1.7)	1.8	3.2	13.2	8.3	(1.7)	1.2	13.2	10.3	(1.7)	
1	landfill area	TW040	BH040	02/25/08	10.28	14.3	(4.0)	0.7	4.3	14.3	6.0	(4.0)	0.7	14.3	9.6	(4.0)	
1	panhandle	TW041	BH036	02/25/08	6.87	12.5	(5.6)	2.5	2.5	12.5	4.4	(5.6)	0.5	12.5	6.4	(5.6)	
1	panhandle	TW042	BH035	02/25/08	6.05	11.7	(5.7)	3.0	1.7	11.7	4.4	(5.7)	0.5	11.7	5.6	(5.7)	
2	panhandle	boring only	BH015	02/25/08	NS	6.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1st attempt. Refusal at 6 ft. Grouted borehole.
2	panhandle	boring only	BH015B	02/25/08	NS	6.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2nd attempt. Refusal at 6 ft. Grouted borehole.
2	panhandle	TW043	BH015C	02/25/08	6.99	12.1	(5.1)	2.9	2.1	12.1	4.9	(5.1)	0.5	12.9	6.5	(5.9)	3rd attempt. Well installed.
2	panhandle	TW044	BH014	02/25/08	6.66	11.0	(4.3)	3.0	1.0	11.0	5.7	(4.3)	0.5	11.0	6.2	(4.3)	
2	panhandle	TW045	BH024	02/25/08	7.47	11.4	(3.9)	3.0	1.4	11.4	6.1	(3.9)	0.5	11.4	7.0	(3.9)	
2	panhandle	TW046	BH019	02/26/08	7.06	12.0	(4.9)	3.0	2.0	12.0	5.1	(4.9)	0.5	12.0	6.6	(4.9)	
2	panhandle	TW047	BH018	02/26/08	6.85	12.4	(5.6)	2.6	2.4	12.4	4.5	(5.6)	0.5	12.4	6.4	(5.6)	
1	panhandle	TW048	BH001	02/26/08	9.22	15.2	(6.0)	0.2	5.2	15.2	4.0	(6.0)	1.9	15.2	7.3	(6.0)	
2	panhandle	TW049	BH028	02/26/08	6.17	11.9	(5.7)	3.1	1.9	11.9	4.3	(5.7)	0.9	11.9	5.3	(5.7)	Sheen on water surface and hydrocarbon odor.
2	panhandle	TW050	BH027	02/26/08	5.90	11.4	(5.5)	1.5	1.4	11.4	4.5	(5.5)	0.7	11.4	5.2	(5.5)	

Table 1. Temporary well construction details.

Investigation goal # [1]	Installation location area [2]	Temporary Well ID	Borehole ID	Date installed	Grade elevation (ft above MSL)	Total boring depth (ft below grade)	Total boring depth (ft above MSL)	Top of casing (ft above grade)	Top of screen (ft below grade)	Bottom of screen (ft below grade)	Top of screen (ft above MSL)	Bottom of screen (ft above MSL)	Top of sand pack (ft below grade)	Bottom of sand pack (ft below grade)	Top of sand pack (ft above MSL)	Bottom of sand pack (ft above MSL)	Comments
1	panhandle	TW051	BH003	02/27/08	4.71	11.0	(6.3)	3.0	1.0	11.0	3.7	(6.3)	0.5	11.0	4.2	(6.3)	
1	panhandle	TW052	BH004	02/27/08	4.06	11.0	(6.9)	3.0	1.0	11.0	3.1	(6.9)	0.5	11.0	3.6	(6.9)	
2	panhandle	TW053	BH017	02/27/08	4.31	11.0	(6.7)	3.0	1.0	11.0	3.3	(6.7)	0.5	11.0	3.8	(6.7)	
2	panhandle	TW054	BH051	02/27/08	6.93	11.0	(4.1)	3.0	1.0	11.0	5.9	(4.1)	0.5	11.0	6.4	(4.1)	
2	panhandle	TW055	BH030	02/27/08	7.05	11.4	(4.4)	3.0	1.4	11.4	5.7	(4.4)	0.5	11.4	6.6	(4.4)	
1	panhandle	TW056	BH057	02/27/08	5.47	14.3	(8.8)	0.7	4.3	14.3	1.2	(8.8)	2.3	14.3	3.2	(8.8)	
1	panhandle	TW057B	BH058	03/10/08	6.10	14.5	(8.4)	0.5	4.5	14.5	1.6	(8.4)	0.5	14.5	5.6	(8.4)	TW057 (installed 02/27/08) was vandalized & reinstalled as TWO57B.
1	panhandle	TW058	BH059	02/27/08	5.89	14.8	(9.0)	3.0	4.8	14.8	1.1	(9.0)	1.8	14.8	4.1	(8.9)	
4	panhandle	TW059	BH060	03/10/08	4.12	13.5	(9.4)	1.5	3.5	13.5	0.6	(9.4)	1.5	13.5	2.6	(9.4)	
4	panhandle	TW060	BH061	03/10/08	8.38	18.1	(9.7)	6.4	8.1	18.1	0.3	(9.7)	6.1	18.1	2.3	(9.7)	
4	panhandle	TW061	BH062	03/10/08	8.74	17.3	(8.6)	2.4	7.3	17.3	1.4	(8.6)	5.3	17.3	3.4	(8.6)	
		NA	BH002	NA													Location inaccessible. No well installed at proposed location.

Notes:
[1] = Investigation goal #'s based on the four goals presented in Worksheet #17 of the Sampling and Analysis Plan, February 2008 as follows:
#1: Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the shoreline.
#2: Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the upper panhandle.
#3: Provide data from the A-Aquifer to evaluate the effectiveness of the PCB Hot Spot Area removal action.
#4: Provide data to evaluate whether A-Aquifer groundwater beneath the metal slag excavation area of the Parcel E-2 panhandle has been impacted by metals.
[2] = Installation location area identifies the physical location of the well/borehole as shown on Figure 2 and Plate 1.
* = Soil core for potential future analytical use by RASO collected from boreholes drilled on 03/11/08 at locations between 5.5 and 7 laterally away from corresponding temporary wells.
Top of casing: height above ground taken from post-installation notes 02/29 and 03/03; reinstalled wells (labelled "B") as noted after reinstallation. Elevations not surveyed.
NA = not applicable
NS = not surveyed

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Table 2. Piezometer construction details.

Piezometer ID	Date installed	Piezometer diameter (inches)	Grade elevation (ft above MSL)	Total boring depth (ft below grade)	Total boring depth (ft above MSL)	Top of casing (ft above MSL)	Top of screen (ft below grade)	Bottom of screen (ft below grade)	Top of screen (ft above MSL)	Bottom of screen (ft above MSL)
PZ-131F	01/05/98	1.25	11.07	8.2	2.9	13.37	3.2	8.2	7.9	2.9
PZ-138E	01/26/98	1.25	12.01	13.4	(1.4)	14.22	5.4	10.4	6.6	1.6
PZ-138F	01/26/98	1.25	16.99	19.6	(2.6)	19.30	12.6	17.6	4.4	(0.6)
PZ-144E	01/26/98	1.25	12.59	16.2	(3.6)	14.91	8.2	13.2	4.4	(0.6)
PZ-150D	01/26/98	1.25	12.02	17.5	(5.5)	14.82	12.5	17.5	(0.5)	(5.5)
PZ-150E	01/29/98	1.25	12.34	13.3	(1.0)	14.91	8.3	13.3	4.0	(1.0)
PZ-161D	01/29/98	1.25	12.10	17.1	(5.0)	14.66	11.1	16.1	1.0	(4.0)

Notes:

Construction details from boring logs generated by International Technology Corporation (International Technology Corporation [IT], 2001, "Draft, Groundwater Control System Evaluation Report, Hunters Point Shipyard, San Francisco, California" July 26.) were adjusted based on elevation survey performed under this investigation by Espinosa Surveying, April 3, 2008.

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Table 3. Sampling information.

Temporary Well ID	Investigation goal # [1]	Installation location area [2]	Sample ID	Sample Date	Sample Time	Sample Type	Comments	TPH-purgeables	TPH-extractables	Ammonia as nitrogen EPA350.1	PCBs	Dissolved Metals EPA6010B 7470A	Temp C	SpC	pH
TW001	2	panhandle	0810G011	3/5/2008	1415	N		X	X	X	X	X	16.40	21.150	7.00
TW002	2	panhandle	0810G019	3/7/2008	0937	N		X	X	X	X	X	14.38	2.179	8.31
TW003	2	panhandle	0810G024	3/7/2008	1155	N		X	X	X	X	X	15.45	3.694	8.97
TW004	2	panhandle	0810P014	3/7/2008	1115	N		X	X	X	X	X	15.31	0.992	7.71
TW005	2	panhandle	0810P016	3/7/2008	1218	N		X	X	X	X	X	14.56	0.634	7.28
TW006	2	panhandle	0810G025	3/7/2008	1218	N		X	X	X	X	X	14.40	3.883	6.91
TW007	2	panhandle	0810P013	3/7/2008	1050	N		X	X	X	X	X	14.08	1.881	7.93
TW008	2	panhandle	0810P012	3/7/2008	1018	N		X	X	X	X	X	13.74	2.064	7.83
TW009	2	panhandle	0810P007	3/6/2008	1422	N		X	X	X	X	X	13.95	2.459	7.92
TW010	2	panhandle	0810P006	3/6/2008	1347	N		X	X	X	X	X	14.27	5.257	8.03
TW011	2	panhandle	0810P010	3/7/2008	0937	N		X	X	X	X	X	14.02	3.561	8.83
TW011	2	panhandle	0810P011	3/7/2009	0942	FD		X	X	X	X	X			
TW012	2	panhandle	0810G014	3/5/2008	1516	N		X	X	X	X	X	14.42	12.750	6.91
TW013	1	panhandle	0810G022	3/7/2008	1102	N		X	X	X	X	X	15.93	10.520	7.97
TW014	1	panhandle	0810G021	3/7/2008	1038	N		X	X	X	X	X	14.84	7.980	7.78
TW015	1	panhandle	0810G020	3/7/2008	1015	N		X	X	X	X	X	12.87	1.114	7.50
TW016	1	panhandle	0810W006	3/6/2008	1428	N		X	X	X	X	X	13.65	2.159	7.75
TW017	1	panhandle	0810W005	3/6/2008	1358	N		X	X	X	X	X	13.84	0.468	7.77
TW018	1	panhandle	0810W004	3/6/2008	1317	N		X	X	X	X	X	13.54	2.384	7.38
TW019	1	panhandle	0810W003	3/6/2008	1242	N		X	X	X	X	X	13.33	2.443	7.40
TW020	1	panhandle	0810W002	3/6/2008	1156	N		X	X	X	X	X	12.52	2.264	7.18
TW021	1	panhandle	0810G009	3/5/2008	1343	N		X	X	X	X	X	13.39	1.561	7.16
TW021	1	panhandle	0810G010	3/5/2008	1348	FD		X	X	X	X	X			
TW022	2	panhandle	0810G016	3/6/2008	1042	N	MS/MSD	X	X	X	X	X	12.89	2.653	7.14
TW023	2	panhandle	0810P002	3/6/2008	1045	N		X	X	X	X	X	13.30	2.534	8.19
TW024	2	panhandle	0810G018	3/7/2008	0909	N		X	X	X	X	X	14.09	2.238	8.39
TW025	2	panhandle	0810P005	3/6/2008	1301	N		X	X	X	X	X	14.46	5.043	8.23
TW026B	4	metal slag	0811P029	3/11/2008	1005	N						X	14.48	9.651	7.43
TW027B	4	metal slag	0811P025	3/10/2008	1521	N						X	16.36	2.999	9.00
TW028B	4	metal slag	0811P024	3/10/2008	1359	N	MS/MSD					X	15.70	5.601	8.85
TW029	4	metal slag	0811P019	3/10/2008	0856	N						X	14.60	5.729	6.87
TW030B	4	metal slag	0811P028	3/11/2008	0948	N						X	14.56	8.688	8.36
TW031	1	landfill area	0811D007	3/10/2008	1412	N		X	X	X	X	X	15.34	3.275	6.67
TW031	1	landfill area	0811D008	3/10/2008	1417	FD		X	X	X	X	X			
TW032	1	landfill area	0811D010	3/11/2008	0925	N		X	X	X	X	X	14.89	3.690	6.89

Table 3. Sampling information.

Temporary Well ID	Investigation goal # [1]	Installation location area [2]	Sample ID	Sample Date	Sample Time	Sample Type	Comments	TPH-purgeables	TPH-extractables	Ammonia as nitrogen EPA350.1	PCBs	Dissolved Metals EPA6010B 7470A	Temp C	SpC	pH
TW033	1	landfill area	0811D011	3/11/2008	0950	N		X	X	X	X	X	13.74	3.441	6.86
TW033	1	landfill area	0811D012	3/11/2008	1000	FD		X	X	X	X	X			
TW034	3	PCB Hot Spot	0811P017	3/7/2008	1450	N	Slow recharge – TPH samples only	X	X						
TW034	3	PCB Hot Spot	0811P017	3/10/2008	1018	N	Slow recharge – PCBs sample only				X				
TW034	3	PCB Hot Spot	0811P017	3/11/2008	0908	N	Slow recharge – water quality parameters						15.60	18.830	7.25
TW035	3	PCB Hot Spot	0811D003	3/10/2008	1000	N	Slow recharge – TPH purgeable collected, partial volume for TPH extractable sample collected	X	X						
TW035	3	PCB Hot Spot	0811D003	3/11/2008	0900	N	Slow recharge – additional volume collected for TPH extractable sample (one analysis run)		X						
TW035	3	PCB Hot Spot	0811D003	3/12/2008	0935	N	Slow recharge – PCBs sample and water quality parameters only				X		NM	NM	NM
TW036	3	PCB Hot Spot	0811D002	3/10/2008	0928	N		X	X		X		14.38	8.244	6.44
TW037	3	PCB Hot Spot	0811G027	3/7/2008	1448	N	Slow recharge – TPH samples only	X	X						
TW037	3	PCB Hot Spot	0811G027	3/10/2008	1507	N	Slow recharge – PCBs sample only				X				
TW037	3	PCB Hot Spot	0810G027	3/11/2008	0845	N	Slow recharge – water quality parameters						13.96	9.311	6.97
TW038	3	PCB Hot Spot	0811G026	3/7/2008	1413	N	Slow recharge – TPH samples only	X	X						
TW038	3	PCB Hot Spot	0811G026	3/10/2008	1502	N	Slow recharge – PCBs sample only				X				
TW038	3	PCB Hot Spot	0810G026	3/11/2008	0840	N	Slow recharge – water quality parameters						14.19	5.758	6.83
TW039	1	landfill area	0811D004	3/10/2008	1045	N		X	X	X	X	X	16.41	3.175	6.72
TW040	1	landfill area	0811D005	3/10/2008	1325	N		X	X	X	X	X	17.21	3.115	6.78
TW040	1	landfill area	0811D006	3/10/2008	1330	FD		X	X	X	X	X			
TW041	1	panhandle	0811D013	3/11/2008	1020	N		X	X	X	X	X	17.15	3.233	6.60
TW042	1	panhandle	0811D014	3/11/2008	1050	N		X	X	X	X	X	16.66	3.044	6.62
TW043	2	panhandle	0810W007	3/6/2008	1456	N		X	X	X	X	X	13.51	2.209	7.78
TW044	2	panhandle	0810G023	3/7/2008	1128	N		X	X	X	X	X	15.01	1.556	7.02
TW045	2	panhandle	0810P015	3/7/2008	1139	N		X	X	X	X	X	15.43	2.699	7.42
TW046	2	panhandle	0810G002	3/4/2008	1346	N		X	X	X	X	X	15.69	2.768	6.89
TW047	2	panhandle	0810G003	3/4/2008	1430	N		X	X	X	X	X	18.43	2.020	7.38
TW048	1	panhandle	0810G004	3/4/2008	1445	N		X	X	X	X	X	17.83	17.140	6.43
TW049	2	panhandle	0810G012	3/5/2008	1446	N		X	X	X	X	X	14.56	5.654	8.40
TW049	2	panhandle	0810G013	3/5/2008	1450	FD		X	X	X	X	X			
TW050	2	panhandle	0810P009	3/7/2008	0907	N		X	X	X	X	X	12.90	4.367	6.93
TW051	1	panhandle	0810G005	3/4/2008	1517	N	sheen detected and stained tubing	X	X	X	X	X	12.80	4.040	7.00
TW052	1	panhandle	0810G007	3/5/2008	1224	N		X	X	X	X	X	13.93	4.064	7.05
TW053	2	panhandle	0810G008	3/5/2008	1255	N	MS/MSD	X	X	X	X	X	13.76	4.122	7.25
TW054	2	panhandle	0810P004	3/6/2008	1220	N		X	X	X	X	X	14.53	3.168	7.30

Table 3. Sampling information.

Temporary Well ID	Investigation goal # [1]	Installation location area [2]	Sample ID	Sample Date	Sample Time	Sample Type	Comments	TPH-purgeables	TPH-extractables	Ammonia as nitrogen EPA350.1	PCBs	Dissolved Metals EPA6010B 7470A	Temp C	SpC	pH
TW055	2	panhandle	0810P003	3/6/2008	1133	N		X	X	X	X	X	13.59	4.379	7.71
TW056	1	panhandle	0811P020	3/10/2008	0921	N		X	X	X	X	X	13.33	3.389	7.31
TW057B	1	panhandle	0811P023	3/10/2008	1327	N		X	X	X	X	X	16.97	4.732	7.91
TW058	1	panhandle	0811P021	3/10/2008	1112	N		X	X	X	X	X	15.45	3.904	7.80
TW058	1	panhandle	0811P022	3/10/2008	1124	FD		X	X	X	X	X			
TW059	4	panhandle	0811P027	3/11/2008	0928	N						X	13.67	21.310	7.75
TW060	4	panhandle	0811P030	3/11/2008	1051	N						X	16.36	25.100	8.33
TW061	4	panhandle	0811P031	3/11/2008	1122	N						X	16.41	0.059	7.99
PZ131F	1	landfill area	0811D015	3/11/2008	1300	N		X	X	X	X	X	13.61	0.674	6.73
PZ138E	1	landfill area	0811D019	3/12/2008	1135	N		X	X	X	X	X	12.69	0.621	6.48
PZ138F	1	landfill area	0811P033	3/11/2008	1407	N		X	X	X	X	X	15.46	1.455	6.74
PZ144E	1	landfill area	0811P034	3/11/2008	1455	N		X	X	X	X	X	13.63	1.049	6.90
PZ150D	1	landfill area	0811D016	3/11/2008	1350	N	MS/MSD	X	X	X	X	X	16.68	6.150	6.55
PZ150E	1	landfill area	0811D017	3/11/2008	1445	N		X	X	X	X	X	15.36	1.588	6.57
PZ161D	1	landfill area	0811P032	3/11/2008	1331	N		X	X	X	X	X	16.61	2.461	6.61
Trip Blank			0810G001	3/4/2008	1330	TB		X							
Trip Blank			0810G006	3/5/2008	1145	TB		X							
Trip Blank			0810P001	3/6/2008	0900	TB		X							
Trip Blank			0810W001	3/6/2008	1215	TB		X							
Trip Blank			0810G015	3/6/2008	1015	TB		X							
Trip Blank			0810G017	3/7/2008	0830	TB		X							
Trip Blank			0810P008	3/7/2008	0900	TB		X							
Trip Blank			0811P018	3/10/2008	0830	TB		X							
Trip Blank			0811D001	3/10/2008	0800	TB		X							
Trip Blank			0811D009	3/11/2008	0822	TB		X							
Trip Blank			0811P026	3/11/2008	0849	TB		X							
Trip Blank			0811D018	3/12/2008	0800	TB		X							

Notes:
[1] = Investigation goal #'s based on the four goals presented in Worksheet #17 of the Sampling and Analysis Plan, February 2008 as follows:
#1: Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the shoreline.
#2: Provide data to evaluate whether landfill contaminants are present in A-Aquifer groundwater at the upper panhandle.
#3: Provide data from the A-Aquifer to evaluate the effectiveness of the PCB Hot Spot Area removal action.
#4: Provide data to evaluate whether A-Aquifer groundwater beneath the metal slag excavation area of the Parcel E-2 panhandle has been impacted by metals.
[2] = Installation location area identifies the physical location of the well/borehole as shown on Figure 2 and Plate 1.
FD = Field Duplicate
MS/MSD = Matrix Spike Duplicate
N = Normal sample

PCBs = Polychlorinated biphenyls
PZ = Piezometer
SpC = Specific conductance
TB = Trip blank
TPH = Total petroleum hydrocarbons
TW = Temporary well

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Table 4. Analytical results for total petroleum hydrocarbons as gasoline, diesel, and motor oil in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	TPH-G	Laboratory Quantitation Limit (TPH-G)	Method Detection Limit (TPH-G)	TPH-D	Laboratory Quantitation Limit (TPH-D)	Method Detection Limit (TPH-D)	TPH-MO	Laboratory Quantitation Limit (TPH-MO)	Method Detection Limit (TPH-MO)
				EPA Method 8015B_G (µg/L)			**EPA Method 8015B_D (µg/L)**			**EPA Method 8015B_D (µg/L)**		
PZ131F	0811D015	3/11/08	N	20 U	20	8.6	**3700 J**	50	40.4	**9200**	2500	106.0
PZ138E	0811D019	3/12/08	N	**45**	20	8.6	**960**	50	40.4	**1300 J**	500	106.0
PZ138F	0811P033	3/11/08	N	**15 J**	20	8.6	**3900 J**	50	40.4	**8100**	1000	106.0
PZ144E	0811P034	3/11/08	N	**37**	20	8.6	**1100**	50	40.4	**1500**	500	106.0
PZ150D	0811D016	3/11/08	N	**93**	20	8.6	**2300**	50	40.4	**2000**	500	106.0
PZ150E	0811D017	3/11/08	N	**94**	20	8.6	**3200**	50	40.4	**4900**	500	106.0
PZ161D	0811P032	3/11/08	N	**140 J**	20	8.6	**1900**	50	40.4	**1400**	500	106.0
TW001	0810G011	3/5/08	N	20 U	20	8.6	**280**	50	40.4	**290 J**	500	106.0
TW002	0810G019	3/7/08	N	20 U	20	8.6	**740**	50	40.4	**1400**	500	106.0
TW003	0810G024	3/7/08	N	**120**	20	8.6	**1100**	50	40.4	**2000**	500	106.0
TW004	0810P014	3/7/08	N	20 U	20	8.6	**830**	50	40.4	**2000**	500	106.0
TW005	0810P016	3/7/08	N	20 U	20	8.6	**360**	50	40.4	**900**	500	106.0
TW006	0810G025	3/7/08	N	**17 J**	20	8.6	**1400**	50	40.4	**3000**	500	106.0
TW007	0810P013	3/7/08	N	20 U	20	8.6	**340**	50	40.4	**930**	500	106.0
TW008	0810P012	3/7/08	N	**16 J**	20	8.6	**260**	50	40.4	**350 J**	500	106.0
TW009	0810P007	3/6/08	N	**54**	20	8.6	**440 J**	100	40.4	**1000**	1000	106.0
TW010	0810P006	3/6/08	N	20 U	20	8.6	**1100 J**	50	40.4	**2600**	500	106.0
TW011	0810P010	3/7/08	N	**48**	20	8.6	**860**	50	40.4	**2000**	500	106.0
TW011	0810P011	3/7/08	FD	**72**	20	8.6	**630**	50	40.4	**1700**	500	106.0
TW012	0810G014	3/5/08	N	20 U	20	8.6	**220**	50	40.4	500 U	500	106.0
TW013	0810G022	3/7/08	N	20 U	20	8.6	**1800**	50	40.4	**3200**	500	106.0

Table 4. Analytical results for total petroleum hydrocarbons as gasoline, diesel, and motor oil in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	TPH-G	Laboratory Quantitation Limit (TPH-G)	Method Detection Limit (TPH-G)	TPH-D	Laboratory Quantitation Limit (TPH-D)	Method Detection Limit (TPH-D)	TPH-MO	Laboratory Quantitation Limit (TPH-MO)	Method Detection Limit (TPH-MO)
				EPA Method 8015B_G (µg/L)			**EPA Method 8015B_D (µg/L)**			**EPA Method 8015B_D (µg/L)**		
TW014	0810G021	3/7/08	N	20 U	20	8.6	**980**	50	40.4	**2500**	500	106.0
TW015	0810G020	3/7/08	N	20 U	20	8.6	**550**	50	40.4	**1400**	500	106.0
TW016	0810W006	3/6/08	N	20 U	20	8.6	**1400 J**	50	40.4	**2900 J**	500	106.0
TW017	0810W005	3/6/08	N	20 U	20	8.6	**160 J**	50	40.4	**440 J**	500	106.0
TW018	0810W004	3/6/08	N	20 U	20	8.6	**200 J**	50	40.4	**540**	500	106.0
TW019	0810W003	3/6/08	N	20 U	20	8.6	**240 J**	50	40.4	**690**	500	106.0
TW020	0810W002	3/6/08	N	20 U	20	8.6	**120**	50	40.4	**300 J**	500	106.0
TW021	0810G009	3/5/08	N	20 U	20	8.6	**82**	50	40.4	500 U	500	106.0
TW021	0810G010	3/5/08	FD	20 U	20	8.6	**74**	50	40.4	500 U	500	106.0
TW022	0810G016	3/6/08	N	20 U	20	8.6	**220**	50	40.4	**460 J**	500	106.0
TW023	0810P002	3/6/08	N	20 U	20	8.6	**1700**	250	40.4	**3500**	2500	106.0
TW024	0810G018	3/7/08	N	20 U	20	8.6	**890**	50	40.4	**1800**	500	106.0
TW025	0810P005	3/6/08	N	**37**	20	8.6	**770 J**	250	40.4	**2100 J**	2500	106.0
TW031	0811D007	3/10/08	N	**190 J**	20	8.6	**1800**	50	40.4	**1600**	500	106.0
TW031	0811D008	3/10/08	FD	**180 J**	20	8.6	**1800**	50	40.4	**1400**	500	106.0
TW032	0811D010	3/11/08	N	**67**	20	8.6	**7100**	100	40.4	**8500**	1000	106.0
TW033	0811D011	3/11/08	N	**48**	20	8.6	**3300**	50	40.4	**4800**	500	106.0
TW033	0811D012	3/11/08	FD	**39**	20	8.6	**3400 J**	50	40.4	**5000 J**	500	106.0
TW034	0810P017	3/7/08	N	20 U	20	8.6	50 U	50	40.4	500 U	500	106.0
TW035	0811D003	3/10/08	N	20 U	20	8.6	**310**	50	40.4	**270 J**	500	106.0
TW036	0811D002	3/10/08	N	50 U	50	8.6	**870**	50	40.4	**950**	500	106.0

Table 4. Analytical results for total petroleum hydrocarbons as gasoline, diesel, and motor oil in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	TPH-G	Laboratory Quantitation Limit (TPH-G)	Method Detection Limit (TPH-G)	TPH-D	Laboratory Quantitation Limit (TPH-D)	Method Detection Limit (TPH-D)	TPH-MO	Laboratory Quantitation Limit (TPH-MO)	Method Detection Limit (TPH-MO)
				EPA Method 8015B_G (µg/L)			**EPA Method 8015B_D (µg/L)**			**EPA Method 8015B_D (µg/L)**		
TW037	0810G027	3/7/08	N	20 U	20	8.6	**290**	50	40.4	**640**	500	106.0
TW038	0810G026	3/7/08	N	**18 J**	20	8.6	**5200**	50	40.4	**2500**	500	106.0
TW039	0811D004	3/10/08	N	**190 J**	20	8.6	**2300**	50	40.4	**1700**	500	106.0
TW040	0811D005	3/10/08	N	**200 J**	20	8.6	**2300**	50	40.4	**1800**	500	106.0
TW040	0811D006	3/10/08	FD	**220 J**	20	8.6	**2200**	50	40.4	**1600**	500	106.0
TW041	0811D013	3/11/08	N	**47**	20	8.6	**4400 J**	50	40.4	**6700**	1000	106.0
TW042	0811D014	3/11/08	N	**21**	20	8.6	**4400 J**	50	40.4	**5900**	1000	106.0
TW043	0810W007	3/6/08	N	20 U	20	8.6	**350 J**	50	40.4	**770**	500	106.0
TW044	0810G023	3/7/08	N	**18 J**	20	8.6	**980**	50	40.4	**1300**	500	106.0
TW045	0810P015	3/7/08	N	**11 J**	20	8.6	**1600**	50	40.4	**4100**	500	106.0
TW046	0810G002	3/4/08	N	**230**	20	8.6	**560**	50	40.4	**860**	500	106.0
TW047	0810G003	3/4/08	N	20 U	20	8.6	**240**	50	40.4	**530**	500	106.0
TW048	0810G004	3/4/08	N	20 U	20	8.6	**56**	50	40.4	500 U	500	106.0
TW049	0810G012	3/5/08	N	**18 J**	20	8.6	**1200**	50	40.4	**2600**	500	106.0
TW049	0810G013	3/5/08	FD	**16 J**	20	8.6	**1300**	50	40.4	**2800**	500	106.0
TW050	0810P009	3/7/08	N	20 U	20	8.6	**370**	50	40.4	**790**	500	106.0
TW051	0810G005	3/4/08	N	20 U	20	8.6	**110**	50	40.4	**310 J**	500	106.0
TW052	0810G007	3/5/08	N	20 U	20	8.6	**120**	50	40.4	**250 J**	500	106.0
TW053	0810G008	3/5/08	N	20 U	20	8.6	**170**	50	40.4	**290 J**	500	106.0
TW054	0810P004	3/6/08	N	**74**	20	8.6	**350**	50	40.4	**760**	500	106.0
TW055	0810P003	3/6/08	N	20 U	20	8.6	**240**	50	40.4	**470 J**	500	106.0

Table 4. Analytical results for total petroleum hydrocarbons as gasoline, diesel, and motor oil in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	TPH-G	Laboratory Quantitation Limit (TPH-G)	Method Detection Limit (TPH-G)	TPH-D	Laboratory Quantitation Limit (TPH-D)	Method Detection Limit (TPH-D)	TPH-MO	Laboratory Quantitation Limit (TPH-MO)	Method Detection Limit (TPH-MO)
				EPA Method 8015B_G (µg/L)			**EPA Method 8015B_D (µg/L)**			**EPA Method 8015B_D (µg/L)**		
TW056	0811P020	3/10/08	N	20 U	20	8.6	**340**	50	40.4	**780**	500	106.0
TW057B	0811P023	3/10/08	N	20 U	20	8.6	**270**	50	40.4	**600**	500	106.0
TW058	0811P021	3/10/08	N	20 U	20	8.6	50 U	50	40.4	500 U	500	106.0
TW058	0811P022	3/10/08	FD	20 U	20	8.6	50 U	50	40.4	500 U	500	106.0
TB	0810G001	3/4/08	TB	20 U	20	8.6						
TB	0810G006	3/5/08	TB	20 U	20	8.6						
TB	0810P001	3/6/08	TB	20 U	20	8.6						
TB	0810W001	3/6/08	TB	20 U	20	8.6						
TB	0810G015	3/6/08	TB	20 U	20	8.6						
TB	0810G017	3/7/08	TB	20 U	20	8.6						
TB	0810P008	3/7/08	TB	20 U	20	8.6						
TB	0811D001	3/10/08	TB	50 U	50	8.6						
TB	0811P018	3/10/08	TB	20 U	20	8.6						
TB	0811D009	3/11/08	TB	20 U	20	8.6						
TB	0811P026	3/11/08	TB	20 U	20	8.6						
TB	0811D018	3/12/08	TB	20 U	20	8.6						

Table 4. Analytical results for total petroleum hydrocarbons as gasoline, diesel and motor oil in groundwater.

Notes: Bolded values are results detected above the method detection limit

Abbreviations:
- FD: Field Duplicate
- N: Normal
- PZ: Piezometer
- TB: Trip Blank
- TPH-D: Total Petroleum Hydrocarbons as diesel
- TPH-G: Total Petroleum Hydrocarbons as gasoline
- TPH-MO: Total Petroleum Hydrocarbons as motor oil
- µg/L: Micrograms per liter

Validation Qualifiers:
- J: Estimated value
- U: Not detected at the laboratory quantitation limit

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Table 5. Analytical results for ammonia as nitrogen in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Ammonia as nitrogen	Laboratory Quantitation Limit	Method Detection Limit
				← EPA method 350.1 (µg/L) →		
PZ131F	0811D015	3/11/08	N	350 U	350	122
PZ138E	0811D019	3/12/08	N	**2000**	350	122
PZ138F	0811P033	3/11/08	N	**5700**	350	122
PZ144E	0811P034	3/11/08	N	**3500**	350	122
PZ150D	0811D016	3/11/08	N	**31700**	1750	122
PZ150E	0811D017	3/11/08	N	**10500**	350	122
PZ161D	0811P032	3/11/08	N	**16200**	350	122
TW001	0810G011	3/5/08	N	**31700**	1750	122
TW002	0810G019	3/7/08	N	**5000**	350	122
TW003	0810G024	3/7/08	N	**14300**	350	122
TW004	0810P014	3/7/08	N	**770**	350	122
TW005	0810P016	3/7/08	N	**640**	350	122
TW006	0810G025	3/7/08	N	**3000**	350	122
TW007	0810P013	3/7/08	N	**3100**	350	122
TW008	0810P012	3/7/08	N	**860**	350	122
TW009	0810P007	3/6/08	N	**8000**	350	122
TW010	0810P006	3/6/08	N	**3100**	350	122
TW011	0810P010	3/7/08	N	**9300**	350	122
TW011	0810P011	3/7/08	FD	**10500**	350	122
TW012	0810G014	3/5/08	N	**6400**	350	122
TW013	0810G022	3/7/08	N	**7600**	350	122
TW014	0810G021	3/7/08	N	**9700**	350	122
TW015	0810G020	3/7/08	N	**910**	350	122
TW016	0810W006	3/6/08	N	**5700**	350	122
TW017	0810W005	3/6/08	N	**570**	350	122
TW018	0810W004	3/6/08	N	**170 J**	350	122
TW019	0810W003	3/6/08	N	**220 J**	350	122
TW020	0810W002	3/6/08	N	**410**	350	122
TW021	0810G009	3/5/08	N	**590**	350	122
TW021	0810G010	3/5/08	FD	**550**	350	122
TW022	0810G016	3/6/08	N	**690**	350	122
TW023	0810P002	3/6/08	N	**5300**	350	122
TW024	0810G018	3/7/08	N	**4900**	350	122
TW025	0810P005	3/6/08	N	**5600**	350	122
TW031	0811D007	3/10/08	N	**20900**	350	122
TW031	0811D008	3/10/08	FD	**21000**	350	122
TW032	0811D010	3/11/08	N	**14600**	350	122
TW033	0811D011	3/11/08	N	**11800**	350	122
TW033	0811D012	3/11/08	FD	**12200**	350	122
TW039	0811D004	3/10/08	N	**16700**	350	122
TW040	0811D005	3/10/08	N	**20100**	350	122

Table 5. Analytical results for ammonia as nitrogen in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Ammonia as nitrogen	Laboratory Quantitation Limit	Method Detection Limit
				← **EPA method 350.1 (µg/L)** →		
TW040	0811D006	3/10/08	FD	**16000**	350	122
TW041	0811D013	3/11/08	N	**18800**	350	122
TW042	0811D014	3/11/08	N	**17100**	350	122
TW043	0810W007	3/6/08	N	**4000**	350	122
TW044	0810G023	3/7/08	N	**4000**	350	122
TW045	0810P015	3/7/08	N	**4600**	350	122
TW046	0810G002	3/4/08	N	**5000**	350	122
TW047	0810G003	3/4/08	N	**2800**	350	122
TW048	0810G004	3/4/08	N	**1900**	350	122
TW049	0810G012	3/5/08	N	**1700**	350	122
TW049	0810G013	3/5/08	FD	**140 J**	350	122
TW050	0810P009	3/7/08	N	**3500**	350	122
TW051	0810G005	3/4/08	N	**360**	350	122
TW052	0810G007	3/5/08	N	**5800**	350	122
TW053	0810G008	3/5/08	N	**6800**	350	122
TW054	0810P004	3/6/08	N	**1100**	350	122
TW055	0810P003	3/6/08	N	**5100**	350	122
TW056	0811P020	3/10/08	N	**2600**	350	122
TW057B	0811P023	3/10/08	N	**4100**	350	122
TW058	0811P021	3/10/08	N	**500**	350	122
TW058	0811P022	3/10/08	FD	**560**	350	122

Notes: Bolded values are results detected above the method detection limit

Abbreviations:
- FD: Field Duplicate
- N: Normal
- PZ: Piezometer
- TW: Temporary Well
- µg/L: micrograms per liter

Validation Qualifiers:
- J: Estimated value
- U: Not detected at the laboratory quantitation limit

Table 6. Analytical results for polychlorinated biphenyls in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
				← EPA Method 8082 (µg/L) →						
PZ131F	0811D015	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**7.2**	0.5 U
PZ138E	0811D019	3/12/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
PZ138F	0811P033	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PZ144E	0811P034	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PZ150D	0811D016	3/11/08	N	**1.1**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PZ150E	0811D017	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
PZ161D	0811P032	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW001	0810G011	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW002	0810G019	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW003	0810G024	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW004	0810P014	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW005	0810P016	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.64**
TW006	0810G025	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW007	0810P013	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW008	0810P012	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW009	0810P007	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW010	0810P006	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW011	0810P010	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW011	0810P011	3/7/08	FD	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW012	0810G014	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW013	0810G022	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW014	0810G021	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 6. Analytical results for polychlorinated biphenyls in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
				← EPA Method 8082 (µg/L) →						
TW015	0810G020	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW016	0810W006	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW017	0810W005	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW018	0810W004	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW019	0810W003	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW020	0810W002	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW021	0810G009	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.27 J**
TW021	0810G010	3/5/08	FD	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW022	0810G016	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW023	0810P002	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW024	0810G018	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW025	0810P005	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW031	0811D007	3/10/08	N	**0.99 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW031	0811D008	3/10/08	FD	**0.92 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW032	0811D010	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW033	0811D011	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW033	0811D012	3/11/08	FD	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW034	0810P017	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW035	0811D003	3/10/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW036	0811D002	3/10/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	**0.28 J**
TW037	0810G027	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW038	0810G026	3/7/08	N	**2.6 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

Table 6. Analytical results for polychlorinated biphenyls in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
				← EPA Method 8082 (µg/L) →						
TW039	0811D004	3/10/08	N	**0.92 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW040	0811D005	3/10/08	N	**2 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW040	0811D006	3/10/08	FD	**2 J**	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW041	0811D013	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW042	0811D014	3/11/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW043	0810W007	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW044	0810G023	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW045	0810P015	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW046	0810G002	3/4/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW047	0810G003	3/4/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**1**
TW048	0810G004	3/4/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW049	0810G012	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW049	0810G013	3/5/08	FD	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW050	0810P009	3/7/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW051	0810G005	3/4/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW052	0810G007	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW053	0810G008	3/5/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW054	0810P004	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW055	0810P003	3/6/08	N	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TW056	0811P020	3/10/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW057B	0811P023	3/10/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
TW058	0811P021	3/10/08	N	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

Table 6. Analytical results for polychlorinated biphenyls in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
				←		**EPA Method 8082 (µg/L)**			→	
TW058	0811P022	3/10/08	FD	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ

Notes: Bolded values are results detected above the method detection limit

Abbreviations:
FD: Field Duplicate
N: Normal
PZ: Piezometer
TW: Temporary Well
µg/L: micrograms per liter

Validation Qualifiers:
J: Estimated value
U: Not detected at the laboratory quantitation limit
UJ: Estimated non-detected value

Table 7. Analytical results for dissolved metals in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
				← EPA Method 6010B, except mercury by EPA Method 7470A (µg/L) →																
PZ131F	0811D015	3/11/08	N	100 U	**38.3**	5 U	**96.3 J**	2 U	**11.7**	**3.1 J**	**18.9**	**1630**	**12.6**	**2000**	**1**	**196**	5 U	1 U	5 UJ	**5530**
PZ138E	0811D019	3/12/08	N	32.3 U	**2.7 J**	5 U	**150 J**	2 U	5 U	**2.2 J**	5 U	2.2 U	5 U	**625**	0.2 U	**8.1**	5 U	**0.74 J**	5 U	3.4 U
PZ138F	0811P033	3/11/08	N	100 U	3 U	5 U	**623 J**	2 U	5 U	**14.2**	5 U	5 U	5 U	**473**	0.061 U	5 U	5 U	1 U	5 UJ	50 U
PZ144E	0811P034	3/11/08	N	100 U	5 U	5 U	**208 J**	2 U	5 U	**2.2 J**	5 U	5 U	5 U	**392**	0.2 U	**4.6 J**	5 U	1 U	5 UJ	50 U
PZ150D	0811D016	3/11/08	N	100 U	8.8 U	5 U	**659 J**	2 U	5 U	**4 J**	5 U	6.7 U	5 U	**118**	0.071 U	5 U	**3.6 J**	**0.71 J**	5 UJ	50 U
PZ150E	0811D017	3/11/08	N	100 U	5 U	5 U	**335 J**	2 U	5 U	**4.1 J**	5 U	5 U	5 U	**211**	0.2 U	**4.7 J**	5 U	1 U	5 UJ	50 U
PZ161D	0811P032	3/11/08	N	100 U	5 U	5 U	**424 J**	2 U	5 U	**3.7 J**	5 U	5 U	5 U	**216**	0.066 U	**9.6**	5 U	1 U	5 UJ	50 U
TW001	0810G011	3/5/08	N	100 U	5 U	4.1 U	**303 J**	2 U	5 U	5 U	**3 J**	5 U	5 U	**886 J**	0.2 U	**8.1**	**6.2**	**1.1**	5 U	50 U
TW002	0810G019	3/7/08	N	100 U	3.3 U	5 U	**118 J**	2 U	5 U	**1.7 J**	5 U	3 U	5 UJ	**72.1 J**	0.2 U	5 U	**12.1**	1 U	5 UJ	50 U
TW003	0810G024	3/7/08	N	100 U	4.3 U	5 U	**148 J**	2 U	5 U	5 U	5 U	5 U	5 UJ	**227 J**	0.075 U	5 U	**13.9**	1 U	5 UJ	50 U
TW004	0810P014	3/7/08	N	**151**	7.2 U	**10.1**	**154 J**	2 U	5 U	**1.7 J**	**1.9 J**	**1580**	**15.2 J**	**988 J**	0.13 U	**18.6**	**11.1**	1 U	5 UJ	**26.9 J**
TW005	0810P016	3/7/08	N	100 U	7.5 U	5 U	**246 J**	2 U	5 U	5 U	**0.63 J**	**31.1**	5 UJ	**662 J**	0.11 U	**13.4**	**9.5**	1 U	5 UJ	**51.5**
TW006	0810G025	3/7/08	N	100 U	2.8 U	5 U	**112 J**	2 U	5 U	5 U	**5.3**	4.9 U	5 UJ	**3110 J**	0.2 U	**32.9**	**10.3**	1 U	5 UJ	**105**
TW007	0810P013	3/7/08	N	100 U	5 U	5 U	**96.7 J**	2 U	5 U	5 U	5 U	1.9 U	5 UJ	**144 J**	0.067 U	5 U	**10.8**	1 U	5 UJ	50 U
TW008	0810P012	3/7/08	N	100 U	5 U	**3.2 J**	**60.6 J**	2 U	5 U	5 U	5 U	6 U	5 UJ	**124 J**	0.2 U	**6.9**	**9.5**	1 U	5 UJ	50 U
TW009	0810P007	3/6/08	N	100 U	5 U	5 U	**118 J**	2 U	5 U	**4.4 J**	5 U	2.3 U	5 U	**291**	0.2 U	**6.8**	**12.6**	1 U	5 U	50 U
TW010	0810P006	3/6/08	N	100 U	5 U	5 U	**276 J**	2 U	5 U	**2.4 J**	**0.66 J**	5 U	5 U	**354**	0.2 U	**12.9**	**6.8**	1 U	5 U	50 U
TW011	0810P010	3/7/08	N	100 U	2.7 U	**2.6 J**	**90.8 J**	2 U	5 U	**3 J**	**0.67 J**	**17.1**	5 UJ	**38.4 J**	0.2 U	**7.7**	**12.8**	1 U	5 UJ	**34.8 J**
TW011	0810P011	3/7/08	FD	100 U	1.8 U	**2.9 J**	**110 J**	2 U	5 U	**3.1 J**	5 U	**9.7**	5 UJ	**24.4 J**	0.2 U	**7.2**	**17.1**	1 U	5 UJ	**32.8 J**
TW012	0810G014	3/5/08	N	100 U	5 U	5 U	**991 J**	2 U	5 U	5 U	**8**	5 U	5 U	**11300 J**	0.2 U	**31.7**	5 U	**2.2**	5 U	50 U
TW013	0810G022	3/7/08	N	100 U	5 U	5 U	**769 J**	2 U	5 U	5 U	5 U	5 U	5 UJ	**655 J**	0.13 U	5 U	5 U	1 U	5 UJ	2.8 U
TW014	0810G021	3/7/08	N	100 U	5 U	5 U	**571 J**	2 U	5 U	5 U	5 U	5 U	5 UJ	**444 J**	0.2 U	5 U	**4.7 J**	1 U	5 UJ	50 U
TW015	0810G020	3/7/08	N	100 U	3.6 U	5 U	**114 J**	2 U	5 U	5 U	5 U	2.5 U	5 UJ	**406 J**	0.2 U	5 U	**8.9**	1 U	5 UJ	8.3 U
TW016	0810W006	3/6/08	N	100 U	5 U	5 U	**143 J**	2 U	5 U	5 U	5 U	4.5 U	5 U	**419**	0.2 U	5 U	**11.6**	1 U	5 U	50 U
TW017	0810W005	3/6/08	N	100 U	5 U	2.7 U	**96.6 J**	2 U	5 U	5 U	5 U	1.6 U	5 U	**240**	0.2 U	5 U	**8.6**	1 U	5 U	**3 J**
TW018	0810W004	3/6/08	N	100 U	3 U	5 U	**77.2 J**	2 U	5 U	**1.5 J**	5 U	**41.6**	5 U	**37**	0.2 U	**19.4**	**13.2**	1 U	5 U	**3.6 J**
TW019	0810W003	3/6/08	N	100 U	2.3 U	5 U	**99.6 J**	2 U	**0.85 J**	**1.8 J**	5 U	**57.5**	5 U	**318**	0.2 U	**26.8**	**12.1**	1 U	5 U	**42.4 J**
TW020	0810W002	3/6/08	N	100 U	**17.2**	5 U	**79.5 J**	2 U	**1.1 J**	**2.5 J**	**1.3 J**	**41.4**	5 U	**275**	**0.064 J**	**37.4**	**9.7**	**0.85 J**	5 U	**98.6**
TW021	0810G009	3/5/08	N	100 U	4.2 U	5 U	**61.5 J**	2 U	**0.61 J**	**3.4 J**	**0.72 J**	**25.4**	**25.5**	**194 J**	**0.064 J**	**18.5**	**9.7**	1 U	5 U	**105**
TW021	0810G010	3/5/08	FD	100 U	3.6 U	5 U	**61.6 J**	2 U	**0.58 J**	**3.5 J**	**0.75 J**	**24.9**	**23.1**	**196 J**	**0.11 J**	**18.6**	**9**	1 U	5 U	**30.5 J**
TW022	0810G016	3/6/08	N	100 U	3 U	5 U	**113 J**	2 U	5 U	**4.3 J**	**1.7 J**	**27.5**	**8**	**519**	0.2 U	**16.9**	**13.8**	1 U	5 U	**21.3 J**
TW023	0810P002	3/6/08	N	**220**	5 U	5 U	**140 J**	2 U	5 U	**2.4 J**	**1 J**	2.9 U	5 U	**66.6**	0.2 U	**5.7**	**11.6**	**0.78 J**	5 U	**5.7 J**
TW024	0810G018	3/7/08	N	100 U	3.2 U	5 U	**111 J**	2 U	5 U	**2 J**	5 U	4.1 U	5 UJ	**86.2 J**	0.2 U	5 U	**12.7**	1 U	5 UJ	50 U

Table 7. Analytical results for dissolved metals in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
				← EPA Method 6010B, except mercury by EPA Method 7470A (µg/L) →																
TW025	0810P005	3/6/08	N	100 U	5 U	5 U	**242 J**	2 U	5 U	**3 J**	5 U	1.8 U	5 U	**166**	0.2 U	**10.5**	**6.8**	1 U	5 U	50 U
TW026B	0811P029	3/11/08	N	100 U	5 U	5 U	**50.3 J**	2 U	5 U	5 U	**2 J**	1.2 U	5 U	**3750**	0.2 U	**7**	**6.1**	**0.83 J**	2.1 UJ	50 U
TW027B	0811P025	3/10/08	N	100 U	5 U	5 U	**1490**	2 U	5 U	5 U	5 U	5 U	5 U	**12.9**	**0.068 J**	5 U	5 U	1 U	5 U	50 U
TW028B	0811P024	3/10/08	N	**178**	**2.9 J**	5 U	**166 J**	2 U	5 U	**1.8 J**	5 U	**18.1**	**27.2**	**123**	**0.12 J**	5 U	**3.3 J**	1 U	5 U	**48.3 J**
TW029	0811P019	3/10/08	N	**22600**	**26.4**	**19.9**	**510 J**	**0.2 J**	5 U	**115**	**9.5**	**528**	**1110**	**1230**	**0.95**	**93.2**	5 U	1 U	5 U	**1280**
TW030B	0811P028	3/11/08	N	100 U	5 U	5 U	**479 J**	2 U	5 U	5 U	5 U	5 U	5 U	**432**	0.2 U	5 U	**4.3 J**	1 U	5 UJ	50 U
TW031	0811D007	3/10/08	N	100 U	5 U	5 U	**566**	2 U	5 U	**6.1**	5 U	5 U	5 U	**254**	**0.084 J**	**44.6**	5 U	1 U	5 U	50 U
TW031	0811D008	3/10/08	FD	100 U	5 U	5 U	**562**	2 U	5 U	**6.2**	5 U	5 U	5 U	**255**	**0.064 J**	**42.6**	**3.4 J**	1 U	5 U	50 U
TW032	0811D010	3/11/08	N	100 U	4.6 U	5 U	**471 J**	2 U	5 U	**6.4**	**1.8 J**	2.3 U	5 U	**1320**	0.2 U	**24.3**	**5**	1 U	5 UJ	50 U
TW033	0811D011	3/11/08	N	100 U	4.7 U	5 U	**337 J**	2 U	5 U	**5.2**	**10**	2.6 U	5 U	**1940**	0.063 U	**47.1**	**3.2 J**	1 U	5 UJ	50 U
TW033	0811D012	3/11/08	FD	100 U	4.9 U	5 U	**325 J**	2 U	5 U	**5**	**9.7**	2.5 U	5 U	**1860**	0.069 U	**44.6**	**4.7 J**	1 U	5 UJ	50 U
TW039	0811D004	3/10/08	N	100 U	5 U	5 U	**494**	2 U	5 U	**5**	5 U	5 U	5 U	**156**	**0.067 J**	**19.9**	**3.5 J**	1 U	5 U	50 U
TW040	0811D005	3/10/08	N	100 U	**2.2 J**	5 U	**499**	2 U	5 U	**6**	**2.2 J**	5 U	5 U	**216**	**0.07 J**	**117**	5 U	1 U	5 U	50 U
TW040	0811D006	3/10/08	FD	100 U	5 U	5 U	**506**	2 U	5 U	**6**	**2.1 J**	5 U	5 U	**209**	**0.089 J**	**115**	5 U	1 U	5 U	50 U
TW041	0811D013	3/11/08	N	100 U	4 U	5 U	**555 J**	2 U	5 U	**4.3 J**	**1 J**	5 U	5 U	**125**	0.11 U	**15.3**	**3.5 J**	**1.1**	5 UJ	50 U
TW042	0811D014	3/11/08	N	100 U	3.2 U	5 U	**552 J**	2 U	5 U	**4.2 J**	5 U	5 U	5 U	**483**	0.093 U	**13.4**	**3.4 J**	1 U	5 UJ	50 U
TW043	0810W007	3/6/08	N	100 U	5 U	5 U	**184 J**	2 U	5 U	5 U	5 U	4.6 U	5 U	**304**	0.2 U	**5.3**	**12.7**	1 U	5 U	**26.1 J**
TW044	0810G023	3/7/08	N	100 U	**6.6**	5 U	**273 J**	2 U	5 U	5 U	**1.4 J**	**8.6**	5 UJ	**548 J**	0.075 U	**10.3**	**8**	1 U	5 UJ	**53.4**
TW045	0810P015	3/7/08	N	100 U	5.5 U	**9.5**	**503 J**	2 U	**0.5 J**	**1.4 J**	**6**	**224**	5 UJ	**1640 J**	0.079 U	**27.9**	**4.3 J**	1 U	5 UJ	**71.3**
TW046	0810G002	3/4/08	N	**160**	2.3 U	6.8 U	**356 J**	2 U	5 U	**4.5 J**	5 U	3.9 U	5 U	**87.4 J**	0.2 U	**25.7**	**13.3**	1 U	5 U	**5.6 J**
TW047	0810G003	3/4/08	N	**66.2 J**	5 U	5 U	**181 J**	2 U	5 U	**1.5 J**	5 U	3.8 U	5 U	**232 J**	0.2 U	**12.1**	**11.9**	1 U	5 U	50 U
TW048	0810G004	3/4/08	N	100 U	5 U	2.7 U	**202 J**	2 U	5 U	5 U	**5.3**	**10.4**	5 U	**14200 J**	0.2 U	**14.5**	**3.8 J**	**1.3**	5 U	**21.6 J**
TW049	0810G012	3/5/08	N	100 U	5 U	5 U	**228 J**	2 U	5 U	**4 J**	5 U	5 U	5 U	**108 J**	0.2 U	**10.3**	**13**	**1.1**	5 U	**43.1 J**
TW049	0810G013	3/5/08	FD	100 U	5 U	5 U	**240 J**	2 U	5 U	**4.2 J**	5 U	5 U	5 U	**113 J**	0.2 U	**10.6**	**15.1**	1 U	5 U	50 U
TW050	0810P009	3/7/08	N	100 U	5 U	5 U	**73.4 J**	2 U	5 U	**4.1 J**	5 U	5 U	5 UJ	**305 J**	0.2 U	**10.6**	**17**	1 U	5 UJ	50 U
TW051	0810G005	3/4/08	N	**20.1 J**	4.2 U	5 U	**99.5 J**	2 U	5 U	**3.9 J**	5 U	**8.9**	5 U	**700 J**	0.2 U	**6.9**	**6.9**	1 U	5 U	**3.3 J**
TW052	0810G007	3/5/08	N	100 U	2.3 U	5.6 U	**141 J**	2 U	5 U	**4.6 J**	**1.3 J**	**15**	**10.7**	**483 J**	0.2 U	**9.6**	**12.7**	1 U	5 U	50 U
TW053	0810G008	3/5/08	N	100 U	5 U	8 U	**169 J**	2 U	5 U	**4.3 J**	**1.1 J**	6.6 U	**7.3**	**1370 J**	0.2 U	**7**	**12.5**	1 U	5 U	50 U
TW054	0810P004	3/6/08	N	**33.6 J**	5 U	6 U	**148 J**	2 U	5 U	**2.2 J**	5 U	1.1 U	5 U	**2020**	0.2 U	**9.1**	**13.9**	**0.84 J**	5 U	50 U
TW055	0810P003	3/6/08	N	**94.6 J**	5.2 U	5.9 U	**157 J**	2 U	5 U	5 U	5 U	1.4 U	**5.9**	**1140**	0.2 U	**11.1**	**16.7**	**1.2**	5 U	50 U
TW056	0811P020	3/10/08	N	100 U	5 U	**7**	**203**	2 U	5 U	5 U	5 U	5 U	5 U	**346**	**0.066 J**	**7.5**	5 U	1 U	5 U	50 U
TW057B	0811P023	3/10/08	N	100 U	5 U	**9.2**	**287**	2 U	5 U	5 U	5 U	5 U	5 U	**335**	0.2 U	**10.9**	**3.2 J**	1 U	5 U	50 U
TW058	0811P021	3/10/08	N	100 U	5 U	**8.4**	**127**	2 U	5 U	5 U	5 U	5 U	5 U	**484**	0.2 U	5 U	5 U	1 U	5 U	50 U

Table 7. Analytical results for dissolved metals in groundwater.

Well ID	Sample ID	Sample Date	Sample Type	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
				← EPA Method 6010B, except mercury by EPA Method 7470A (µg/L) →																
TW058	0811P022	3/10/08	FD	100 U	5 U	**8.7**	**124**	2 U	5 U	5 U	5 U	1.6 U	5 U	**497**	**0.061 J**	5 U	5 U	1 U	5 U	50 U
TW059	0811P027	3/11/08	N	100 U	5 U	5 U	**195 J**	2 U	5 U	5 U	5 U	5 U	5 U	**129**	0.2 U	5 U	**6.1**	**1**	5 UJ	50 U
TW060	0811P030	3/11/08	N	100 U	5 U	5 U	**237 J**	2 U	5 U	5 U	5 U	1.2 U	5 U	**378**	0.2 U	5 U	5 U	**2.5**	5.7 UJ	50 U
TW061	0811P031	3/11/08	N	100 U	5 U	5 U	**166J**	2 U	5 U	5 U	**1.4 J**	2.8 U	5 U	**567**	0.2 U	**8.2**	5 U	1 U	5 UJ	50 U

Notes: Bolded values are results detected above the method detection limit

Abbreviations:
FD: Field Duplicate
N: Normal
PZ: Piezometer
TW: Temporary Well
µg/L: micrograms per liter

Validation Qualifiers:
J: Estimated value
U: Not detected at the laboratory quantitation limit
UJ: Estimated non-detected value

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TW049	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**18 J / 16 J**
TPH-D	**1200 / 1300**
TPH-MO	**2600 / 2800**
Ammonia as Nitrogen	**1700 / 140 J**
PCBs	
Aroclor 1016	0.5 U / 0.5 U
Aroclor 1221	0.5 U / 0.5 U
Aroclor 1232	0.5 U / 0.5 U
Aroclor 1242	0.5 U / 0.5 U
Aroclor 1248	0.5 U / 0.5 U
Aroclor 1254	0.5 U / 0.5 U
Aroclor 1260	0.5 U / 0.5 U
Select Dissolved Metals	
Copper	5 U / 5 U
Lead	5 U / 5 U
Mercury	0.2 U / 0.2 U
Nickel	**10.3 / 10.6**
Zinc	**43.1 J / 50 U**

TW012	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**220**
TPH-MO	500 U
Ammonia as Nitrogen	**6400**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**31.7**
Zinc	50 U

TW055	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**240**
TPH-MO	**670 J**
Ammonia as Nitrogen	**5100**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	1.4 U
Lead	**5.9**
Mercury	0.2 U
Nickel	**11.1**
Zinc	50 U

TW025	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**37**
TPH-D	**770 J**
TPH-MO	**2100 J**
Ammonia as Nitrogen	**5600**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	1.8 U
Lead	5 U
Mercury	0.2 U
Nickel	**10.8**
Zinc	50 U

TW024	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**850**
TPH-MO	**1800**
Ammonia as Nitrogen	**4900**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	4.1 U
Lead	5 U
Mercury	0.2 U
Nickel	5 U
Zinc	50 U

TW023	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**1700**
TPH-MO	**3600**
Ammonia as Nitrogen	**5300**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	2.9 U
Lead	5 U
Mercury	0.2 U
Nickel	**5.7**
Zinc	**57 J**

TW050	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**370**
TPH-MO	**760**
Ammonia as Nitrogen	**3500**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**10.6**
Zinc	50 U

TW001	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**280**
TPH-MO	**290 J**
Ammonia as Nitrogen	**31700**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**8.1**
Zinc	50 U

TW022	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**220**
TPH-MO	**460 J**
Ammonia as Nitrogen	**690**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**27.5**
Lead	**8**
Mercury	0.2 U
Nickel	**16.9**
Zinc	**51.3 J**

TW045	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**230**
TPH-D	**560**
TPH-MO	**860**
Ammonia as Nitrogen	**5000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	3.5 U
Lead	5 U
Mercury	0.2 U
Nickel	**25.7**
Zinc	**58 J**

TW053	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**170**
TPH-MO	**280 J**
Ammonia as Nitrogen	**6800**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	6.6 U
Lead	**7.3**
Mercury	0.2 U
Nickel	**7**
Zinc	50 U

TW051	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**110**
TPH-MO	**310 J**
Ammonia as Nitrogen	**300**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	5 U
Zinc	50 U

TW009	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**54**
TPH-D	**440 J**
TPH-MO	**1000**
Ammonia as Nitrogen	**5800**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	2.3 U
Lead	5 U
Mercury	0.2 U
Nickel	**6.8**
Zinc	50 U

TW054	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**74**
TPH-D	**350**
TPH-MO	**760**
Ammonia as Nitrogen	**1100**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	1.1 U
Lead	5 U
Mercury	0.2 U
Nickel	**9.1**
Zinc	50 U

TW010	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**1100 J**
TPH-MO	**2600**
Ammonia as Nitrogen	**3100**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**12.9**
Zinc	50 U

TW002	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**740**
TPH-MO	**1400**
Ammonia as Nitrogen	**5000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	3 U
Lead	5 U
Mercury	0.2 U
Nickel	5 U
Zinc	50 U

TW007	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**340**
TPH-MO	**930**
Ammonia as Nitrogen	**3100**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	1.9 U
Lead	5 U
Mercury	0.067 U
Nickel	5 U
Zinc	50 U

TW011	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**48 / 72**
TPH-D	**860 / 630**
TPH-MO	**2000 / 1700**
Ammonia as Nitrogen	**9300 / 10000**
PCBs	
Aroclor 1016	0.5 U / 0.5 U
Aroclor 1221	0.5 U / 0.5 U
Aroclor 1232	0.5 U / 0.5 U
Aroclor 1242	0.5 U / 0.5 U
Aroclor 1248	0.5 U / 0.5 U
Aroclor 1254	0.5 U / 0.5 U
Aroclor 1260	0.5 U / 0.5 U
Select Dissolved Metals	
Copper	**17.1 / 9.7**
Lead	5 U / 5 U
Mercury	0.2 U / 0.2 U
Nickel	**7.7 / 7.2**
Zinc	**34.8 J / 32.8 J**

TW045	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**11 J**
TPH-D	**1800**
TPH-MO	**4100**
Ammonia as Nitrogen	**4600**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**224**
Lead	5 U
Mercury	0.079 U
Nickel	**27.9**
Zinc	**71.5**

TW004	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**530**
TPH-MO	**2000**
Ammonia as Nitrogen	**770**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	6 U
Lead	5 U
Mercury	0.13 U
Nickel	**6.9**
Zinc	50 U

TW006	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**17 J**
TPH-D	**1400**
TPH-MO	**3000**
Ammonia as Nitrogen	**3000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	4.9 U
Lead	5 U
Mercury	0.2 U
Nickel	**32.9**
Zinc	**105**

TW005	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**900**
TPH-MO	**640**
Ammonia as Nitrogen	
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**8.6**
Lead	5 U
Mercury	0.073 U
Nickel	**10.3**
Zinc	**63.4**

TW003	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**130**
TPH-D	**1100**
TPH-MO	**2000**
Ammonia as Nitrogen	**14300**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**10.3**
Zinc	50 U

TW042	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**21**
TPH-D	**4400 J**
TPH-MO	**8900**
Ammonia as Nitrogen	**17100**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.080 U
Nickel	**13.4**
Zinc	50 U

TW044	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**19 J**
TPH-D	**500**
TPH-MO	**1300**
Ammonia as Nitrogen	**4000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.073 U
Nickel	**10.3**
Zinc	**63.4**

TW043	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**350 J**
TPH-MO	**770**
Ammonia as Nitrogen	**4000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	4.6 U
Lead	5 U
Mercury	0.2 U
Nickel	**9.3**
Zinc	**36.1 J**

TW041	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**47**
TPH-D	**4400 J**
TPH-MO	**6700**
Ammonia as Nitrogen	**18800**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.11 U
Nickel	**15.3**
Zinc	50 U

TW033	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**40 / 39**
TPH-D	**3300 / 3400 J**
TPH-MO	**4800 / 5000 J**
Ammonia as Nitrogen	**11800 / 12200**
PCBs	
Aroclor 1016	0.5 U / 0.5 U
Aroclor 1221	0.5 U / 0.5 U
Aroclor 1232	0.5 U / 0.5 U
Aroclor 1242	0.5 U / 0.5 U
Aroclor 1248	0.5 U / 0.5 U
Aroclor 1254	0.5 U / 0.5 U
Aroclor 1260	0.5 U / 0.5 U
Select Dissolved Metals	
Copper	2.6 U / 2.5 U
Lead	5 U / 5 U
Mercury	0.063 U / 0.069 U
Nickel	**47.1 / 44.6**
Zinc	50 U / 50 U

TW032	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**47**
TPH-D	**7100**
TPH-MO	**8500**
Ammonia as Nitrogen	**14600**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	2.3 U
Lead	5 U
Mercury	0.2 U
Nickel	**24.3**
Zinc	50 U

TW031	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**150 J / 180 J**
TPH-D	**1800 / 1800**
TPH-MO	**1600 / 1400**
Ammonia as Nitrogen	**20000 / 21000**
PCBs	
Aroclor 1016	**0.99 J / 0.92 J**
Aroclor 1221	0.5 U / 0.5 U
Aroclor 1232	0.5 U / 0.5 U
Aroclor 1242	0.5 U / 0.5 U
Aroclor 1248	0.5 U / 0.5 U
Aroclor 1254	0.5 U / 0.5 U
Aroclor 1260	0.5 U / 0.5 U
Select Dissolved Metals	
Copper	5 U / 5 U
Lead	5 U / 5 U
Mercury	**0.084 J / 0.064 J**
Nickel	**44.9 / 42.8**
Zinc	50 U / 50 U

TW040	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**200 J / 220 J**
TPH-D	**2300 / 2200**
TPH-MO	**1800 / 1600**
Ammonia as Nitrogen	**20100 / 19000**
PCBs	
Aroclor 1016	**3 J / 5 J**
Aroclor 1221	0.5 U / 0.5 U
Aroclor 1232	0.5 U / 0.5 U
Aroclor 1242	0.5 U / 0.5 U
Aroclor 1248	0.5 U / 0.5 U
Aroclor 1254	0.5 U / 0.5 U
Aroclor 1260	0.5 U / 0.5 U
Select Dissolved Metals	
Copper	5 U / 5 U
Lead	5 U / 5 U
Mercury	**0.07 J / 0.059 J**
Nickel	**117 / 115**
Zinc	50 U / 50 U

TW039	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**190 J**
TPH-D	**2300**
TPH-MO	**1700**
Ammonia as Nitrogen	**16700**
PCBs	
Aroclor 1016	**0.93 J**
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	**0.067 J**
Nickel	**19.9**
Zinc	50 U

PZ161D	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**93**
TPH-D	**2000**
TPH-MO	**2000**
Ammonia as Nitrogen	**31700**
PCBs	
Aroclor 1016	**1.1**
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	6.7 U
Lead	5 U
Mercury	0.071 U
Nickel	5 U
Zinc	50 U

PZ138F	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**10 J**
TPH-D	**3900 J**
TPH-MO	**8100**
Ammonia as Nitrogen	**9700**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.061 U
Nickel	5 U
Zinc	50 U

PZ160E	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**94**
TPH-D	**3300**
TPH-MO	**4900**
Ammonia as Nitrogen	**16900**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**4.7 J**
Zinc	50 U

PZ161D	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**140 J**
TPH-D	**1900**
TPH-MO	**1400**
Ammonia as Nitrogen	**16200**
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**15.3**
Zinc	50 U

TW030	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	50 U
TPH-D	**870**
TPH-MO	**950**
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

TW038	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**18 J**
TPH-D	**5200**
TPH-MO	**2000**
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	**2.6 J**
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

TW037	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**290**
TPH-MO	**640**
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

TW035	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**310**
TPH-MO	**570 J**
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

PZ161E	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**45**
TPH-D	**960**
TPH-MO	**1300 J**
Ammonia as Nitrogen	**2000**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	2.2 U
Lead	5 U
Mercury	0.2 U
Nickel	**8.1**
Zinc	3.4 U

PZ131F	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-D	**3700 J**
TPH-MO	**9200**
Ammonia as Nitrogen	**3501 U**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	**7.2**
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**1630**
Lead	**12.6**
Mercury	**1**
Nickel	**196**
Zinc	**6630**

PZ141E	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	**37**
TPH-D	**1100**
TPH-MO	**1600**
Ammonia as Nitrogen	**3500**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	5 U
Lead	5 U
Mercury	0.2 U
Nickel	**4.6 J**
Zinc	50 U

TW034	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	50 U
TPH-MO	500 U
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

TW035	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**310**
TPH-MO	**570 J**
Ammonia as Nitrogen	NA
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	NA
Lead	NA
Mercury	NA
Nickel	NA
Zinc	NA

TW019	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**240 J**
TPH-MO	**630**
Ammonia as Nitrogen	**220 J**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**57.5**
Lead	5 U
Mercury	0.2 U
Nickel	**28.6**
Zinc	**42.4 J**

TW018	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20 U
TPH-D	**200 J**
TPH-MO	**540**
Ammonia as Nitrogen	**170 J**
PCBs	
Aroclor 1016	0.5 U
Aroclor 1221	0.5 U
Aroclor 1232	0.5 U
Aroclor 1242	0.5 U
Aroclor 1248	0.5 U
Aroclor 1254	0.5 U
Aroclor 1260	0.5 U
Select Dissolved Metals	
Copper	**41.6**
Lead	5 U
Mercury	0.2 U
Nickel	**19.4**
Zinc	**3.6 J**

TW013	
Analyte	**ug/L**
Total Petroleum Hydrocarbons	
TPH-G	20

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Appendix A.
Response to Comments
on
Work Plan and Final Sampling and Analysis Plan

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U.S Navy Responses to Regulatory Comments on the Work Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California, February 2008

August 1, 2008

Environmental Protection Agency Comments (submitted by Mark Ripperda)

Comment 1. I would like to see several well points along the border of the landfill and also near the ship-shielding area sampled for radiological constituents. I understand from our phone conversation [referring to conversation with Mark Walden, CIV NAVFAC SW] that this is planned pending the radiological addendum from RASO.

Response: Radiological sampling of groundwater has been conducted under Addendum 1 to the Work Plan (and associated Addendum 1 to the Final SAP) dated June 2008. As requested, samples along the border of the landfill and near the ship shielding area are being analyzed for radionuclides and at all other planned sampling locations in the Parcel E-2 Groundwater Investigation Work Plan. Including the six new temporary well locations added as discussed in response to comment #2 below, the 61 temporary wells and the 7 piezometers are being analyzed for the following radionuclides:

- Cesium-137 (Cs-137).
- Radium-226 (Ra-226).
- Strontium-90 (Sr-90).

Additionally, samples have been collected from the 11 most southerly temporary well locations, including the 6 new locations, for Cobalt-60 (Co-60) analysis.

Comment 2. I would like to see several (4-6) wellpoints moved from the top of the panhandle to the middle and bottom. While this is not in the current DQOs, it would completely cover the shoreward migration of the entire parcel, since you already have wellpoints planned in the metal slag area.

Response: Six additional temporary well locations were added and installed in conjunction with the other temporary well installations under the Final SAP. Three (TW056, TW057B, and TW058) are located between the metal slag area and monitoring well IR01MWI-7. Groundwater samples from these locations were collected in March 2008 and analyzed for the same chemical suite as the northern/central panhandle locations with results reported in the Technical Memorandum. A second set of groundwater samples was collected from these locations between June 30 and July 1, 2008 and are being analyzed d for Cs-137, Co-60, Ra-226, and Sr-90.

The other three added temporary wells (TW059, TW060, and TW061) were installed along the southwestern end of the panhandle between the metal slag area and the property line. Groundwater samples from these locations will be analyzed for the list of dissolved metals already planned for the metal slag area and also for Cs-137, Co-60, Ra-226, and Sr-90.

Groundwater from these temporary wells was sampled for chemical constituents during the same sampling period as the other Parcel E-2 temporary wells and consistent with the Final

SAP. The addition of these temporary wells and associated sample analyses for both chemical and radiological analytes has been incorporated into Addendum 1 to the Work Plan and Addendum 1 to the Final SAP for the Parcel E 2 Groundwater Investigation, June 2008.

Department of Toxic Substances Control Comments (submitted by Tom Lanphar)

Comment 1. First, please add radiological constituents to the analyte list.

Response: Radiological sampling of groundwater was conducted between June 27 and July 1, 2008 under Addendum 1 to the Work Plan (and associated Addendum 1 to the Final SAP). As requested, samples along the border of the landfill and near the ship shielding area are being analyzed for radionuclides and at all other sampling locations installed under the Parcel E-2 Groundwater Investigation Work Plan. Including the six new temporary well locations added as discussed in response to comment #2 below, the 61 temporary wells and the 7 piezometers are being analyzed for the following radionuclides:

- Cesium-137 (Cs-137).
- Radium-226 (Ra-226).
- Strontium-90 (Sr-90).

Additionally, samples were collected from the 11 most southerly temporary well locations, including the 6 new locations, for Cobalt-60 (Co-60) analysis.

Comment 2. Second, this is a good opportunity to better characterize the groundwater at the shoreline of the pan-handle. Could we spread out the temporary well locations to cover more of the shoreline or can a few additional wells be added to the project? Current well spacing is about 50-80 feet; maybe we can have a greater spacing in the panhandle. By adding these wells we can better characterize the groundwater in the panhandle and perhaps put to rest any issues for groundwater containment in that area.

Response: Six additional temporary well locations were added and installed in conjunction with the other temporary well installations under the Final SAP. Three (TW056, TW057B, and TW058) are located between the metal slag area and monitoring well IR01MWI-7. Groundwater samples from these locations will be analyzed for the same chemical suite as the northern/central panhandle locations and also for Cs-137, Co-60, Ra-226, and Sr-90.

The other three added temporary wells (TW059, TW060, and TW061) were installed along the southwestern end of the panhandle between the metal slag area and the property line. Groundwater samples from these locations will be analyzed for the list of dissolved metals already planned for the metal slag area and also for Cs-137, Co-60, Ra-226, and Sr-90.

Groundwater from these temporary wells was sampled for chemical constituents during the same sampling period as the other Parcel E-2 temporary wells and consistent with the Final SAP. The addition of these temporary wells and associated sample analyses for both chemical and radiological analytes has been incorporated into Addendum 1 to the Work Plan and Addendum 1 to the Final SAP for the Parcel E 2 Groundwater Investigation, June 2008.

Regional Water Quality Control Board Comments (submitted by Erich Simon)

Comment 1. Section 1.1 - Page 1-1 – List of analytes – Please discuss why other contaminants of concern associated with the landfill at Parcel E-2 are not included in the proposed list of analytes.

Response: The list of analytes for the Parcel E-2 investigations was determined to be the contaminants of concern that drive the risks and potential remedies for Parcel E-2. This list was the outcome of joint discussions with Navy/contractor staff and regulators. After reviewing the Draft Feasibility Study for Parcel E-2, a new field investigation was proposed for analytes having incomplete geographic coverage for a proper evaluation of remedial alternatives.

Comment 2. Section 1.1 – Page 1-2 – Specific Goals List item #3 – Please describe how the effectiveness of the PCB hot spot removal will be evaluated using the data collected in this data gap investigation.

Response: The investigation will provide data that will need to be supplemented with regular ground water monitoring to evaluate the long-term effectiveness of the removal action. The Navy's Feasibility Study team will use the data collected in this investigation as a post-excavation baseline against which to evaluate if PCB concentrations in groundwater have or will meet cleanup objectives over time without further active remediation in the PCB Hot Spot area. The revised Basewide Groundwater Monitoring Plan SAP (in preparation) includes a process for adding groundwater monitoring at locations deemed by the Feasibility Study team as requiring long-term groundwater monitoring to support the cleanup objectives.

Comment 3. Worksheet #15 – This worksheet indicates that only 3 PCB congeners (1248, 1254, 1260) will be analyzed for. Please include justification for analyzing these 3 congeners. The California Toxics Rule (CTR) criteria apply to total PCBs. The total PCB calculation specified in the CTR (See footnotes u and v in the CTR table) includes the sum of 7 congeners (1248, 1254, 1260, 1242, 1221, 1232, and 1016).

Response: The proposed analysis, EPA Method 8082, includes the seven PCB Aroclors cited in the CTR. These data are reported in the Technical Memorandum. The Addendum 1 to the Final SAP for Parcel E-2 indicates Aroclor-1016, -1221, -1232, and -1242.

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Appendix B.
Project personnel sign-off sheets

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SAP Worksheet #4 – Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931	Mark Walden	Complete SAP	2/14/08
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301	Ed Kilduff	Complete SAP	2/05/08
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301	Robert Ferry	Complete SAP	2/05/08
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000	Gary Goodemote	all	2/8/08
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000	Patricia Walters	Complete SAP	2/10/2008
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

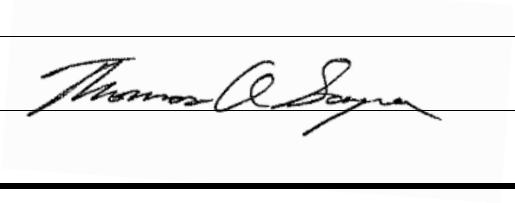
SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175	Diane Anderson	3, 4, 5, 6, 7, 14, 15, 16, 20 -29 30, 34	2/15/08
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437	[signature]	COMPLETE SAP	2/14/08
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Mark Walden	Navy / RPM	619-532-0931			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Robert Ferry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Patricia Walters	CE2-Kleinfelder JV / Project Chemist	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000		complete SAP	02/14/08
TBD	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Appendix C.
Geophysical survey report

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NORCAL GEOPHYSICAL CONSULTANTS, INC.

February 7, 2008

Mr. Tom Sayre
Kleinfelder
1970 Broadway
Suite 710
Oakland, California 94612

Subject: Geophysical Investigation at Hunters Point Shipyard, San Francisco, California
NORCAL Project No. 07-177.153

Dear Mr. Sayre:

This report presents the findings of a geophysical investigation performed by NORCAL Geophysical Consultants, Inc. at the Hunters Point Shipyard site, located in San Francisco, California. NORCAL geophysicists David Hagin and geophysical technician Travis Black conducted the field investigation on September 13th and 14th and November 15th and 16th, 2007. Background information, site logistics and safety information were provided on site by Mr. Tom Sayre.

SITE DESCRIPTION AND PURPOSE

The geophysical survey areas are in Parcel E-2, and consist of 5 locations along the San Francisco Bay (Plate 1). Numerous proposed temporary wells are planned as part of the remediation of the site prior to new construction. The purpose of this investigation is to assess the potential for the existence of any remaining landfill material through geophysical methods; drill hole locations may be modified by the results of this survey.

METHODOLOGY

The geophysical methods used for this investigation are vertical magnetic gradient (VMG), and terrain conductivity (TC) methods. The VMG is designed to locate localized ferrous sources, such as metallic debris. Variations in soil type and moisture content can be detected and mapped using TC; landfill material characteristically affects the conductivity of the subsurface, allowing for detection by the TC method. A more detailed discussion of these methods, data analysis, geophysical instrumentation, and limitations is presented in Appendix A.

321A BLODGETT STREET • COTATI, CA 94931 • TELEPHONE (707) 796-7170 • FAX (707) 796-7175
www.norcalgeophysical.com

FIELD INVESTIGATION

Area 1

Initially, a survey grid was established in each area to provide horizontal position control for data acquisition. Data acquisition consisted of a series of parallel traverses spaced 10 feet apart. Magnetic data were acquired along the grid lines at approximately 5-foot intervals. TC data were acquired along the northing grid lines at approximately 10-foot intervals.

DATA ANALYSIS

Magnetic Data

Magnetic data are carefully evaluated and edited, then contoured as VMG and MAG for review and interpretation. These contour maps are then assessed for magnetic variations which cannot be explained by known magnetic sources; strong unexplained variations in the magnetic field are referenced as VMG anomalies, and interpreted as potential areas for further exploration. Groups of proximal anomalies which may be associated have been hachured for the purpose of illustration.

Terrain Conductivity Data

Terrain conductivity data are reviewed for quality control, edited and contoured for interpretation. TC contour maps are interpreted based on variation in TC values and the potential causes for these variations. Strong unexplained variations in the TC values are referenced as TC anomalies. Groups of proximal anomalies which may be associated have been hachured for the purpose of illustration.

RESULTS and CONCLUSIONS

The VMG and TC data are presented as contour maps on Plates 2 through 6. The following discussion details the findings for each area.

Area 1

Significant VMG variation on the western portion of the grid is noted on Plate 2; however, a sheetpile wall in this area provides an apparent source for these variations. A small, isolated VMG anomaly is hachured; the character of this anomaly suggests that it is caused by isolated shallow sub-surface ferromagnetic debris. TC data also shows marked variation in the sheetwall area; however the remainder of the site shows gradual variation, typically indicating varying soil type and moisture content.

Area 2

The VMG map on Plate 3 shows high variation and numerous elongate closed contours in this area. The sheetwall traverses directly beneath this area, and several monitoring wells and/or piezometers are also located here. It is likely that these numerous large magnetic sources are responsible for the high variation seen on the VMG map. As the TC map shows similar variation, it is interpreted that the same sources which caused the VMG anomalies are responsible for the TC anomalies.

Area 3

This area shows numerous tightly closed contours on the VMG map (Plate 4). Although abundant metallic debris is noted at the surface, it appears that there are more magnetic anomalies than can be accounted for by the surface debris. These anomalies tend to be grouped in areas, possibly suggesting relatively large accumulations of buried debris in these locations. These areas cover approximately half of this site, and have been hachured for emphasis. The TC map indicates several areas of interest, which have been hachured. The hachured anomaly near the southwest corner is especially strong. Since there is no magnetic correlation, this is possibly due to the proximity to saline waters of the San Francisco Bay.

Area 4

This area also shows numerous tightly closed contours on the VMG map (Plate 5). These anomalies are grouped on the western portion of the map. As no apparent magnetic sources were noted at the surface, this indicates buried ferromagnetic objects in this area. These areas cover over half of this site, and have been hachured for emphasis. TC values show significant variation over the entire area. This type of variation is characteristic of zones that are in close proximity to saline waters, such as the San Francisco Bay.

Area 5

The southern portion of this area shows strong VMG values; however it is our understanding that the sheetpile wall exists in this area, providing an explanation for these anomalous values. The hachured section in the northern portion of the site is adjacent to Area 3, and is interpreted to be a continuation of the anomalies noted there.

STANDARD CARE AND WARRANTY

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the shallow subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the level of skill ordinarily exercised

by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide our services to Kleinfelder

Sincerely,

NORCAL Geophysical Consultants, Inc.

David T. Hagin
Geophysicist GP-1033

DTH/KGB/tt

Enclosures: Plates 1-6

Appendix A - Geophysical Methodology, Instrumentation, Data Analysis, and Limitations

Appendix A

GEOPHYSICAL METHODOLOGY

Appendix A

VERTICAL MAGNETIC GRADIENT (VMG)

Methodology

Vertical magnetic gradient surveys are used to determine the presence of buried ferrous objects. A magnetic gradiometer measures the vertical gradient of the earth's magnetic field. It consists of two total field magnetic sensors separated vertically by one-half meter. The magnetic field strength is measured simultaneously at both of these sensors. The difference in magnetic intensity between these measurements is proportional to the vertical gradient of the earth's magnetic field. Because the vertical gradient is constant with respect to time, the effect of diurnal variations is eliminated. Therefore, a gradiometer provides higher sensitivity and better resolution of near surface sources than total field magnetometers. Areas with significant amounts of buried metal typically produce anomalously steep magnetic gradients. Since it is sensitive to ferrous metal sources both above and below ground, site and vicinity surface conditions can affect survey results.

A Geometrics G-858 cesium vapor magnetometer or a SCINTREX ENVI-MAP proton precession magnetometer is typically used to obtain vertical magnetic gradient data. These instruments feature a built-in memory that stores the vertical magnetic gradient and survey grid information. The information can be down loaded to a computer for further processing.

Data Analysis

Computer Processing

The VMG data are down loaded to a lap-top computer and converted it into a format for contouring. The contouring program (SURFER Version 8.0 by Golden Software) calculates an evenly spaced array of values (grid) based on the observed field data. Finally, these gridded values are contoured to produce a VMG contour map.

Contour Map Interpretation

The VMG contour map illustrates the variations in the vertical magnetic gradient across the site. Areas without below or above ground ferrous metal are characterized by very low magnetic gradients. In these areas, there are very few contours. In areas with above or below ground ferrous metal, the magnetic gradient is relatively steep. These areas are characterized by numerous closely spaced contours and are considered anomalous. If the source of the anomaly is linear (e.g. underground utilities or fence lines), then the contours tend to be parallel and evenly distributed. If the source of the anomaly is localized (e.g. sign post, buried drum, etc.), then the contours tend to form circular or elliptical closures

proportional to the size of the object. The larger the object and the closer it is to the magnetometer, the denser the concentrations of contours. Magnetic anomalies that cannot be attributed to above ground objects (fences, vehicles, buildings, etc.) are probably caused by buried objects.

USTs are often characterized by circular to elliptical contour closures. These closures have magnitudes ranging from several hundred to several thousand nano-Tesla per meter (nT/m) depending on the size and depth of the tank. If the UST is cylindrical and lying horizontally, it will often produce a bi-polar VMG anomaly. This consists of two adjacent contour closures. One has VMG values that increase towards the center of the closure and is referred to as a positive lobe. The second has VMG values that decrease towards the center of the closure and is referred to as a negative lobe. Typically, the positive lobe is situated directly above the UST and the negative lobe is to the north of the UST. Utilities and scattered metal debris, on the other hand, are generally characterized by single circular or irregular shaped negative lobes, or a group of alternating positive and negative lobes (closures). These closures typically have magnitudes ranging from less than fifty to several hundred nano-Tesla per meter (nT/m) depending on the size, depth, and amount of utilities and debris in a given area.

Limitations

Below ground metal ferrous objects produce localized variations in the earth's magnetic field. The magnetic intensity associated with buried metal depends on the mass of the metal and the distance the metal object is from the magnetometer sensor. As the distance between the object and the magnetometer sensor increases, the intensity of the associated field decreases, thereby making detection more difficult. In addition, the ability to detect a buried metal object is based on the intensity of these variations versus the intensity of the background variations. Background variations can be caused by other nearby above or below ground metallic sources. Cultural features such as chain link fences, buildings, debris, railroad spurs, utilities, above ground electric lines, etc. typically produce numerous magnetic variations with high intensities. These variations may mask effects from buried metal objects, or make it very difficult to determine whether the magnetic variations are associated with below ground metal or above/below ground cultural features.

ELECTROMAGNETIC TERRAIN CONDUCTIVITY (TC)

Methodology

The electromagnetic method is used to measure variations in subsurface electrical conductivity that may be due to buried foreign objects or changes in subsurface materials. The electromagnetic system utilizes two coils separated by a specified distance. One of

these coils transmits a time-varying electromagnetic signal (primary magnetic field) which induces current flow in the earth. This in turn creates a secondary magnetic field which is detected by the receiver coil. The secondary signal is complex and has both quadrature and in-phase components. The amplitude of the quadrature component is proportional to the electrical conductivity of the subsurface materials. The in-phase component is proportional to conductivity, but is also affected by electrical properties associated with metal objects. The instrument displays the quadrature component in units of milliSiemens/meter (mS/m). Since this measurement represents the conductivity of the volume of material sampled, rather than individual layers, it is an apparent value and is referred to as terrain conductivity.

Electromagnetic surveys are typically conducted using a Geonics EM31-DL ground conductivity meter connected to an Omnidata data recorder. The EM31 has a fixed coil separation of 12 feet, which results in a total depth of investigation of approximately 10 to 15 feet depending upon local site conditions. The data recorder automatically stores EM values as well as station locations and annotations regarding cultural features.

Data Analysis

Computer Processing

The TC data are down loaded to a lap-top computer and converted it into a format for contouring. The contouring program (SURFER Version 8.0 by Golden Software) calculates an evenly spaced array of values (grid) based on the observed field data. Finally, these gridded values are contoured to produce a TC contour map.

Contour Map Interpretation

The TC contour map shows the variations in the electromagnetic terrain conductivity values within the survey area. The contour map is characterized by a series of contour lines that represent specific values. Areas that lack contour lines, or where the contours are spaced far apart, indicate a minimal change or variation in the respective values. This is indicative of relatively uniform conditions. Areas where contours are closely spaced indicate variations that are not uniform and probably caused by local sources.

In areas where there are significant quantities of above or below ground metal objects, the measured values are relatively large. These areas are characterized by numerous closely spaced contours. If the source of the anomaly is linear (e.g. underground utilities, railroad spurs, culvert, etc.), then the contours tend to parallel the object, and are closely spaced in close proximity to the object. If the below ground source is localized (e.g. buried drum, isolated metal debris, etc.), then the contours tend to form circular or elliptical closures that enclose the object. The larger the object and the closer it is to the geophysical instrument,

the more contours there are in a given area. Variations that cannot be attributed to known above and/or below ground objects (metal well casings, reinforced concrete surface drain, above ground 55 gallon drums, utilities, etc.) are caused by unknown buried objects and are considered anomalous.

Buried landfill material is often characterized by circular to elliptical contour closures. These closures can vary from large circular closures that cover broad areas, to clusters of small closures that occur in zones. If the composition of the landfill is generally homogenous and nonmetallic, the contours tend to form large closures representing low values. If the fill material consists of both nonmetallic and metallic debris that varies significantly throughout the landfill, the contours tend to occur as numerous small closures representing both high and low values.

Limitations

There are inherent limitations associated with TC techniques that may not allow for the detection of all subsurface features of interest. These limitations are related to the composition of the subsurface feature, its size and depth of burial, and its proximity to other above or below ground features. In general, as the distance between a subsurface object and the respective geophysical instrument increases, the intensity of the associated field decreases, thereby making detection more difficult. In addition, above and below ground objects, such as buildings, debris, utilities, above ground electric lines, etc., typically produce interference that may mask effects from nearby buried features (targets).

Apart from the physical limitations of the instruments and the unwanted effects from secondary objects, the ability to detect subsurface features is also dependent upon the density of data acquisition points. If the distance between data acquisition points is significantly larger than the size of the subsurface feature, then this object may not be detectable.

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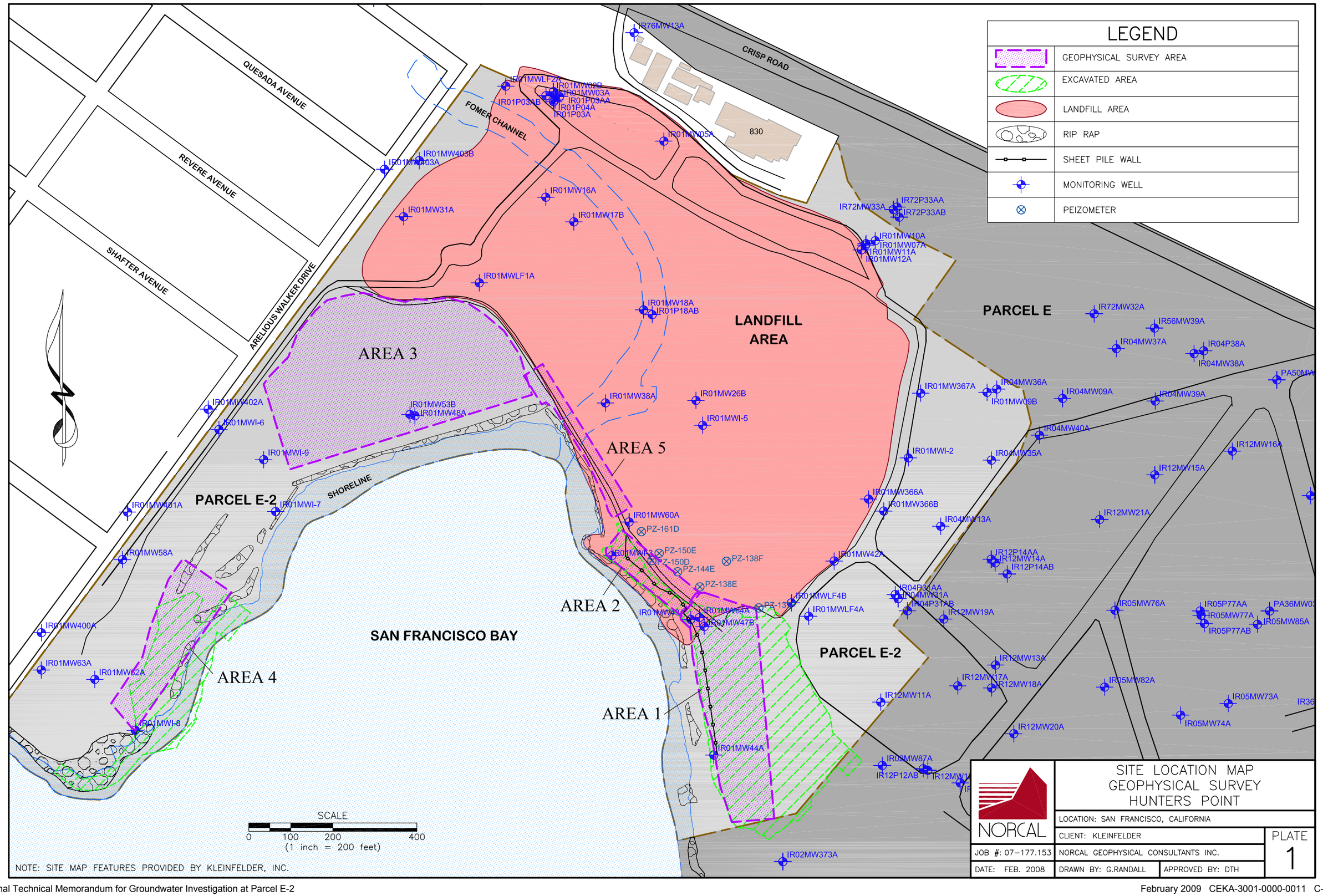
LEGEND
GEOPHYSICAL SURVEY AREA
EXCAVATED AREA
LANDFILL AREA
RIP RAP
SHEET PILE WALL
MONITORING WELL
PEIZOMETER
QUESADA AVENUE
REVERE AVENUE
SHAFTER AVENUE
ARELIOUS WALKER DRIVE
CRISP ROAD
FOMER CHANNEL
SHORELINE
830
LANDFILL AREA
PARCEL E
PARCEL E-2
SAN FRANCISCO BAY
AREA 1
AREA 2
AREA 3
AREA 4
AREA 5
IR76MW13A
IR01MWLF2A
IR01MW02B
IR01MW03A
IR01P03AB
IR01P03AA
IR01P04A
IR01P03A
IR01MW05A
IR01MW403B
IR01MW403A
IR01MW16A
IR01MW31A
IR01MW17B
IR01MWLF1A
IR01MW18A
IR01P18AB
IR72MW33A
IR72P33AA
IR72P33AB
IR01MW10A
IR01MW07A
IR01MW11A
IR01MW12A
IR72MW32A
IR56MW39A
IR04MW37A
IR04P38A
IR04MW38A
PA50MW
IR01MW367A
IR04MW36A
IR01MW09B
IR04MW09A
IR04MW39A
IR04MW40A
IR01MWI-2
IR04MW35A
IR12MW16A
IR12MW15A
IR01MW366A
IR01MW366B
IR04MW13A
IR12MW21A
IR12P14AA
IR12MW14A
IR12P14AB
IR01MW42A
IR04P31AA
IR04MW31A
IR04P31AB
IR12MW19A
IR05MW76A
IR05P77AA
IR05MW77A
IR05P77AB
IR05MW85A
PA36MW03
IR12MW13A
IR12MW17A
IR12MW18A
IR05MW82A
IR05MW73A
IR05MW74A
IR12MW11A
IR12MW20A
IR03MW87A
IR12P12AB
IR01MW402A
IR01MW53B
IR01MW48A
IR01MWI-6
IR01MWI-9
IR01MW401A
IR01MWI-7
IR01MW58A
IR01MW400A
IR01MW63A
IR01MW62A
IR01MWI-8
IR01MW60A
PZ-161D
IR01MWI-3
PZ-150E
PZ-150D
PZ-144E
PZ-138F
PZ-138E
PZ-137
IR01MW64A
IR01MW47B
IR01MWLF4B
IR01MWLF4A
IR01MW38A
IR01MW26B
IR01MWI-5
IR01MW44A
IR02MW373A
SCALE
0 100 200 400
(1 inch = 200 feet)
NOTE: SITE MAP FEATURES PROVIDED BY KLEINFELDER, INC.
NORCAL
SITE LOCATION MAP
GEOPHYSICAL SURVEY
HUNTERS POINT
LOCATION: SAN FRANCISCO, CALIFORNIA
CLIENT: KLEINFELDER
JOB #: 07-177.153
NORCAL GEOPHYSICAL CONSULTANTS INC.
DATE: FEB. 2008
DRAWN BY: G.RANDALL
APPROVED BY: DTH
PLATE
1

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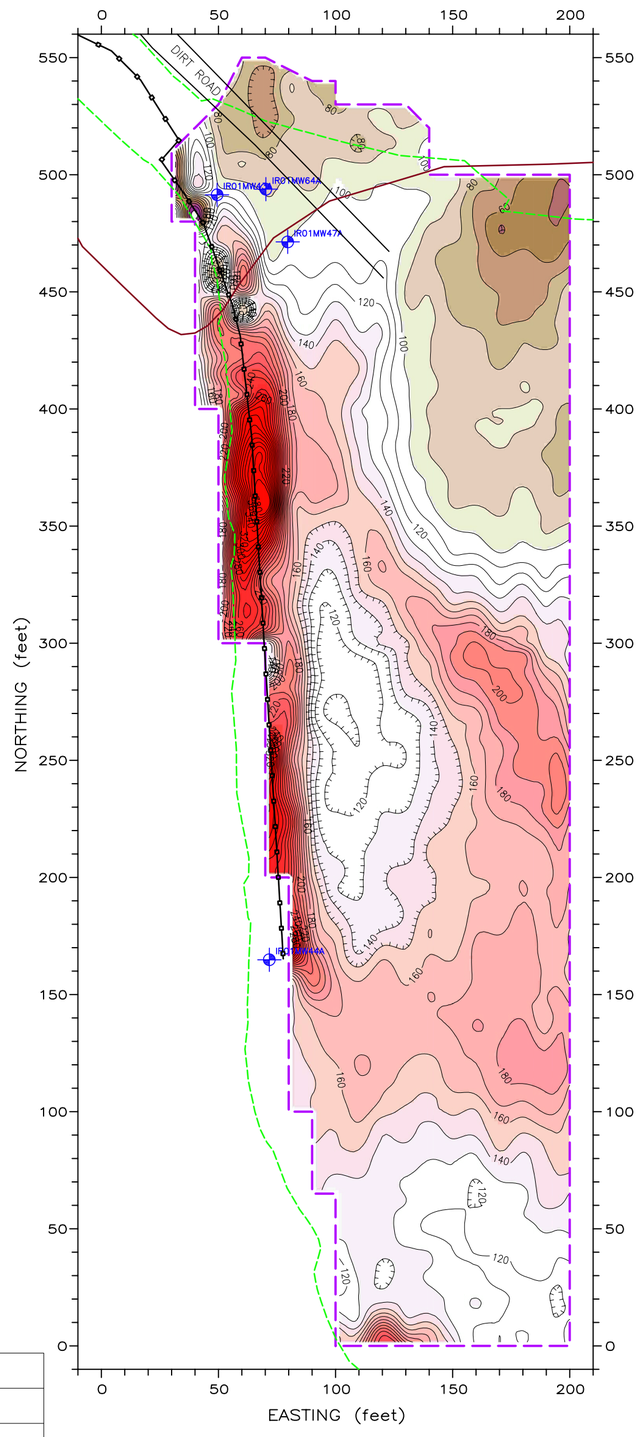
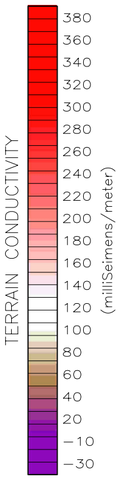
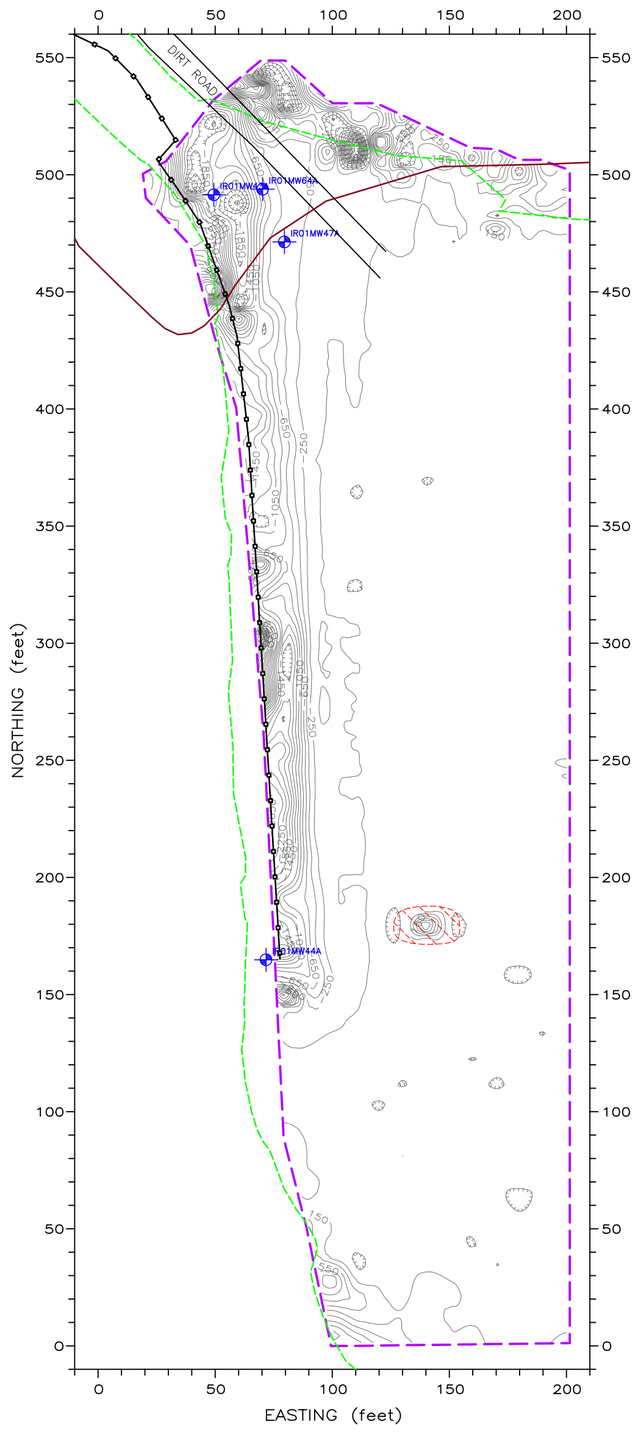
TERRAIN CONDUCTIVITY CONTOUR MAP





VERTICAL MAGNETIC GRADIENT CONTOUR MAP



LEGEND

	LIMITS OF GEOPHYSICAL SURVEY
0	TERRAIN CONDUCTIVITY CONTOUR (CONTOUR INTERVAL = 10 mS/m)
0	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 200 nT/m)
	VERTICAL MAGNETIC GRADIENT ANOMALY
	LIMITS OF EXCAVATED AREA
	LIMITS OF LANDFILL AREA
	SHEET PILE WALL
	MONITORING WELL

NOTE: SEE PLATE 1, SITE LOCATION MAP, FOR REFERENCING AREA FEATURES

SCALE
0 25 50 100
(1 inch = 50 feet)

NORCAL

AREA 1 – TERRAIN CONDUCTIVITY & VERTICAL MAGNETIC GRADIENT CONTOUR MAPS – HUNTERS POINT

LOCATION: SAN FRANCISCO, CALIFORNIA

CLIENT: KLEINFELDER

JOB #: 07-177.153

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: FEB. 2008

DRAWN BY: G.RANDALL

APPROVED BY: DTH

PLATE 2

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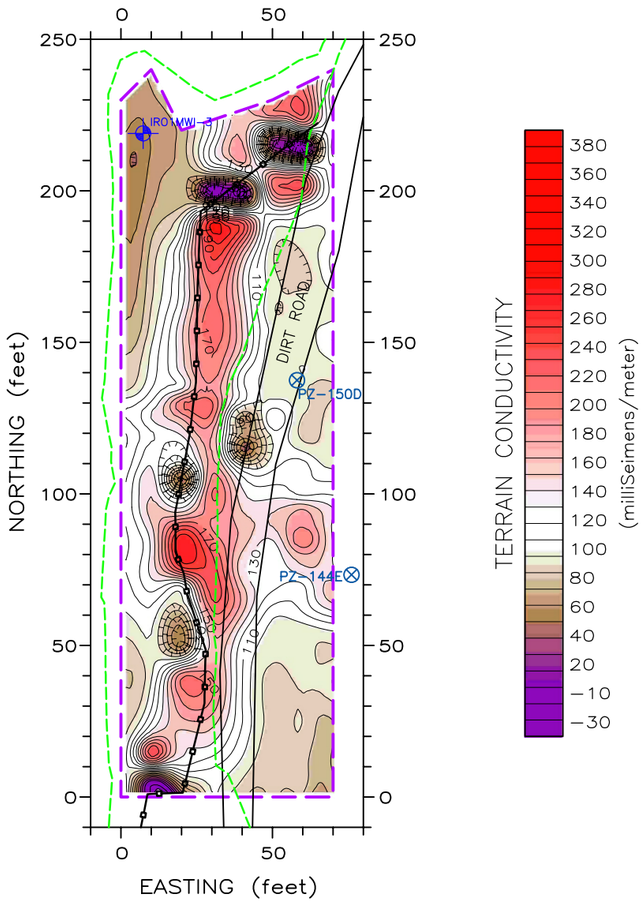
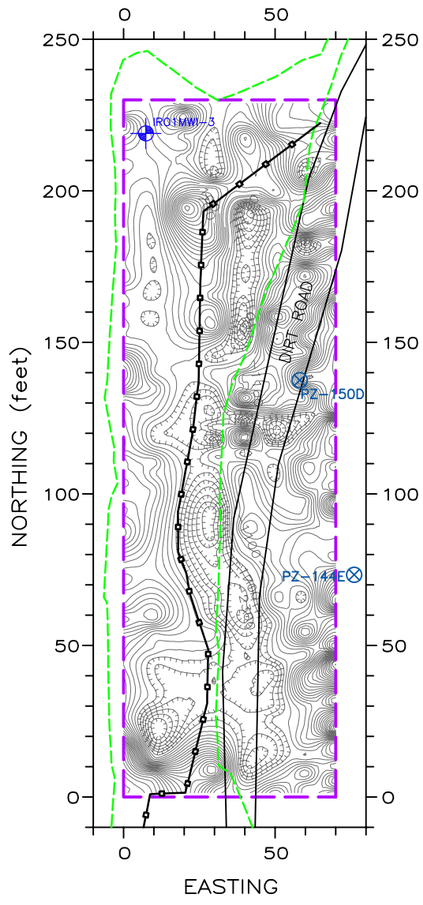
TERRAIN CONDUCTIVITY CONTOUR MAP



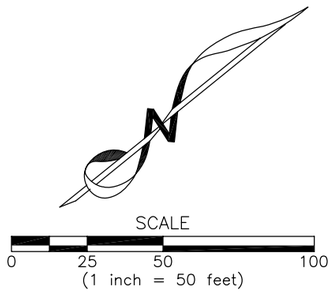
VERTICAL MAGNETIC GRADIENT CONTOUR MAP



LEGEND

— — —	LIMITS OF GEOPHYSICAL SURVEY
0	TERRAIN CONDUCTIVITY CONTOUR (CONTOUR INTERVAL = 10 mS/m)
0	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 200 nT/m)
- - - - -	LIMITS OF EXCAVATED AREA
	SHEET PILE WALL
	MONITORING WELL
⊗	PIEZOMETER

NOTE: SEE PLATE 1, SITE LOCATION MAP, FOR REFERENCING AREA FEATURES



NORCAL

AREA 2 – TERRAIN CONDUCTIVITY & VERTICAL MAGNETIC GRADIENT CONTOUR MAPS – HUNTERS POINT

LOCATION: SAN FRANCISCO, CALIFORNIA

CLIENT: KLEINFELDER

JOB #: 07–177.153

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: FEB. 2008

DRAWN BY: G.RANDALL

APPROVED BY: DTH

PLATE 3

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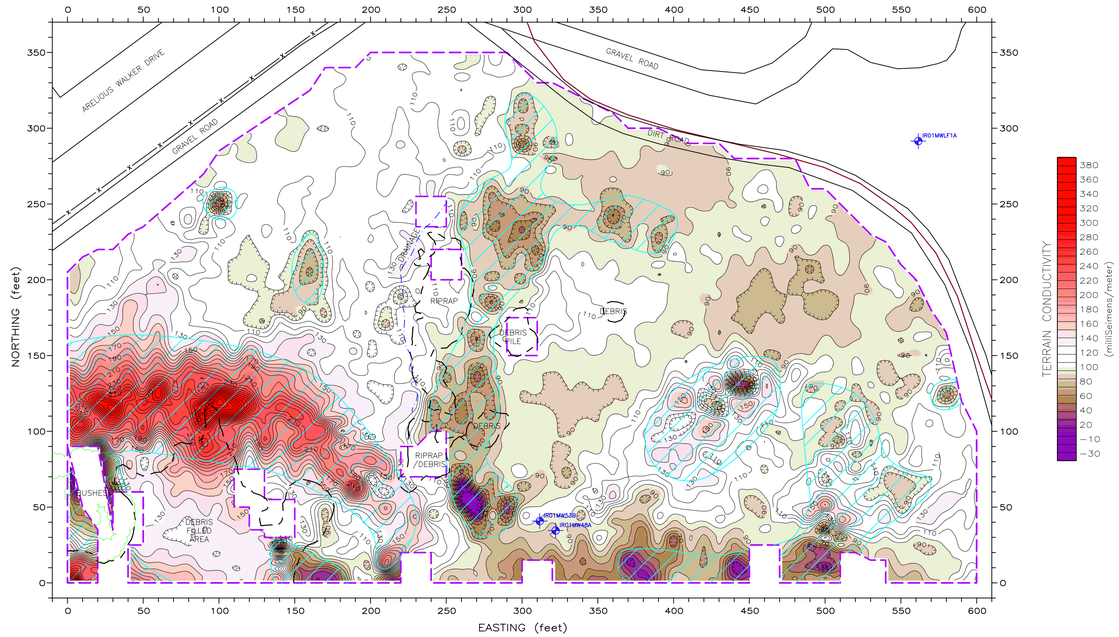
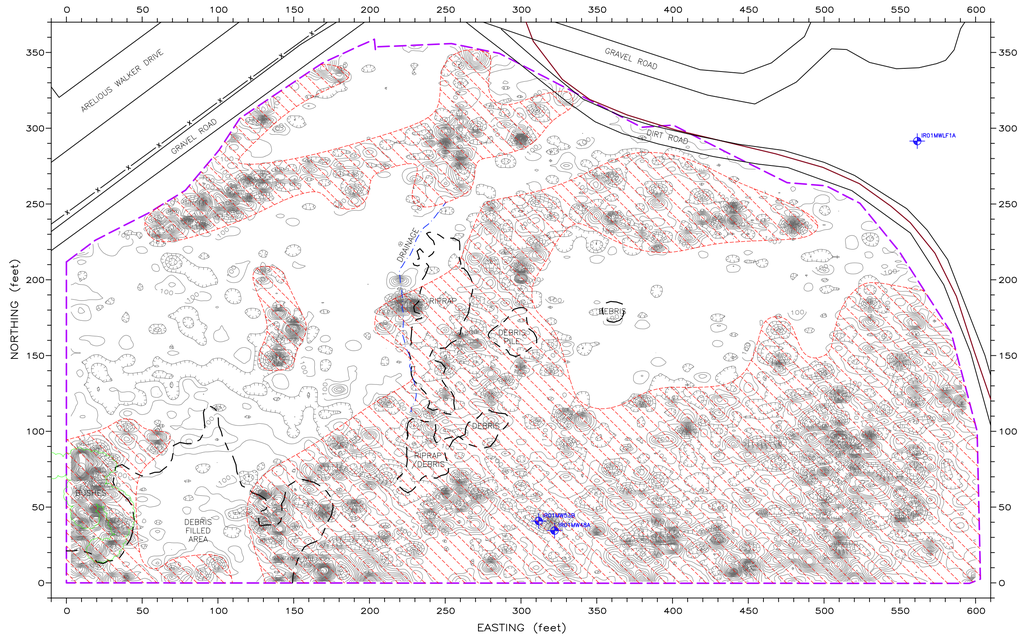
TERRAIN CONDUCTIVITY
CONTOUR MAP



VERTICAL MAGNETIC GRADIENT
CONTOUR MAP



LEGEND

	LIMITS OF GEOPHYSICAL SURVEY
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0	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 200 nT/m)
	TERRAIN CONDUCTIVITY ANOMALY
	VERTICAL MAGNETIC GRADIENT ANOMALY
x	FENCE
	LIMITS OF LANDFILL AREA
	MONITORING WELL

NOTE: SEE PLATE 1, SITE LOCATION MAP, FOR REFERENCING AREA FEATURES

AREA 3 – TERRAIN CONDUCTIVITY & VERTICAL MAGNETIC GRADIENT CONTOUR MAPS – HUNTERS POINT

NORCAL

LOCATION: SAN FRANCISCO, CALIFORNIA
CLIENT: KLEINFELDER
JOB #: 07-177.153 | NORCAL GEOPHYSICAL CONSULTANTS INC.
DATE: FEB. 2008 | DRAWN BY: G.RANDALL | APPROVED BY: DTH

PLATE 4

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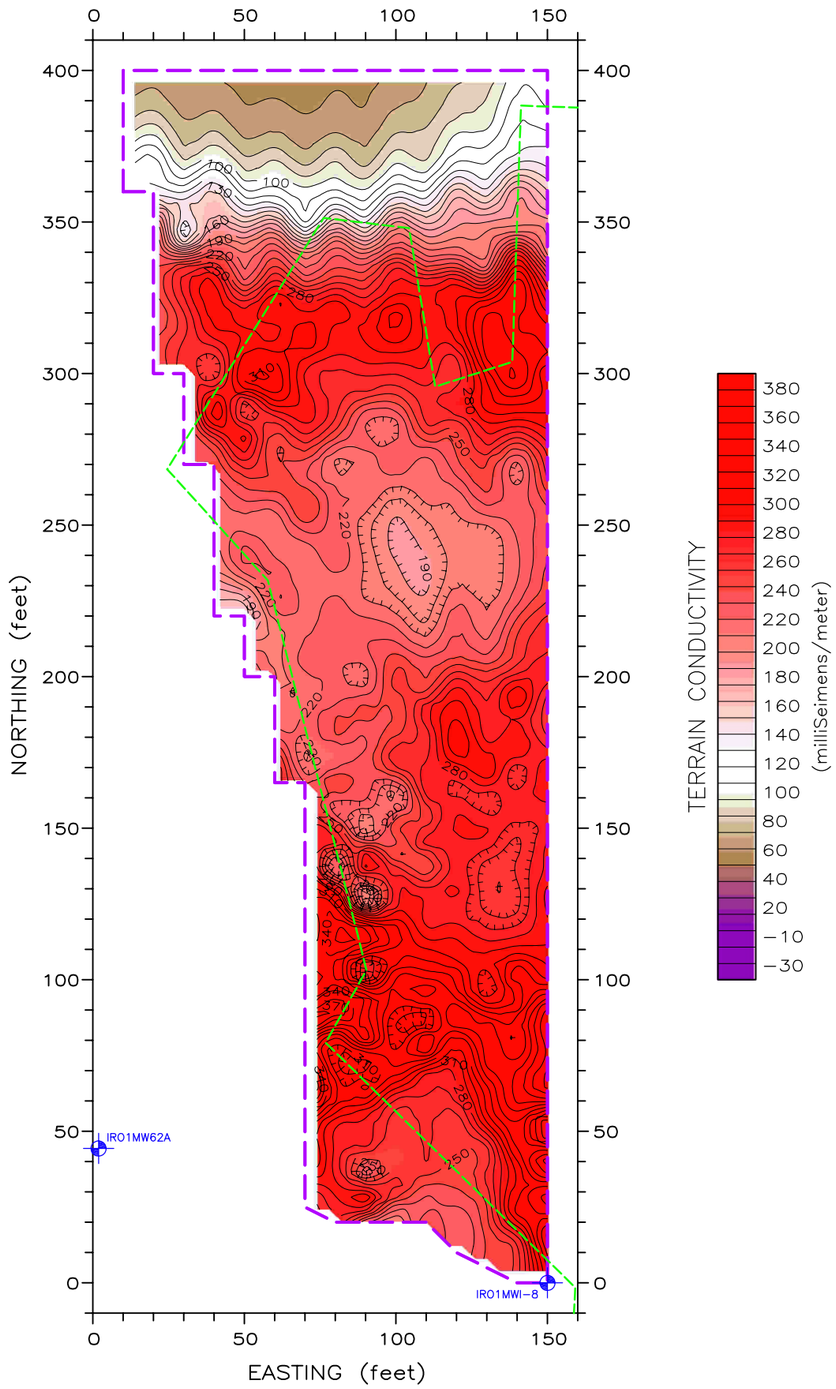
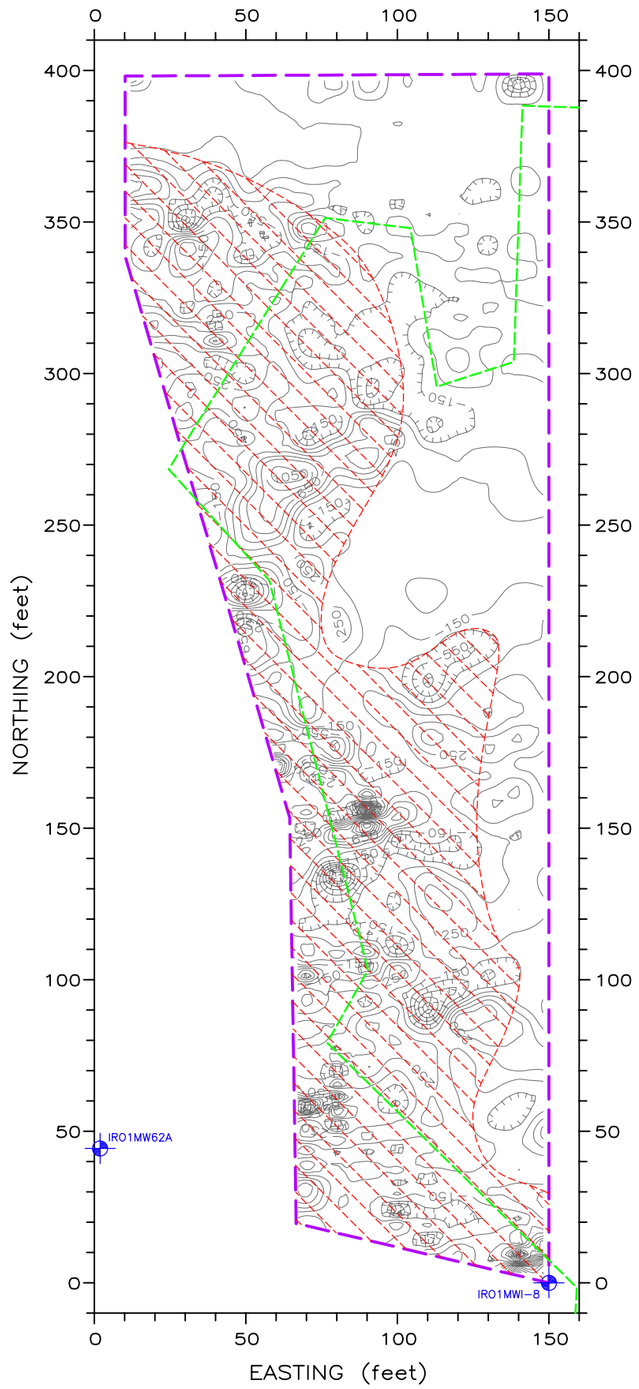
TERRAIN CONDUCTIVITY CONTOUR MAP



VERTICAL MAGNETIC GRADIENT CONTOUR MAP



LEGEND

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	VERTICAL MAGNETIC GRADIENT ANOMALY
	LIMITS OF EXCAVATED AREA
	MONITORING WELL

NOTE: SEE PLATE 1, SITE LOCATION MAP, FOR REFERENCING AREA FEATURES

NORCAL

AREA 4 – TERRAIN CONDUCTIVITY & VERTICAL MAGNETIC GRADIENT CONTOUR MAPS – HUNTERS POINT

LOCATION: SAN FRANCISCO, CALIFORNIA

CLIENT: KLEINFELDER

JOB #: 07–177.153

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: FEB. 2008

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APPROVED BY: DTH

PLATE 5

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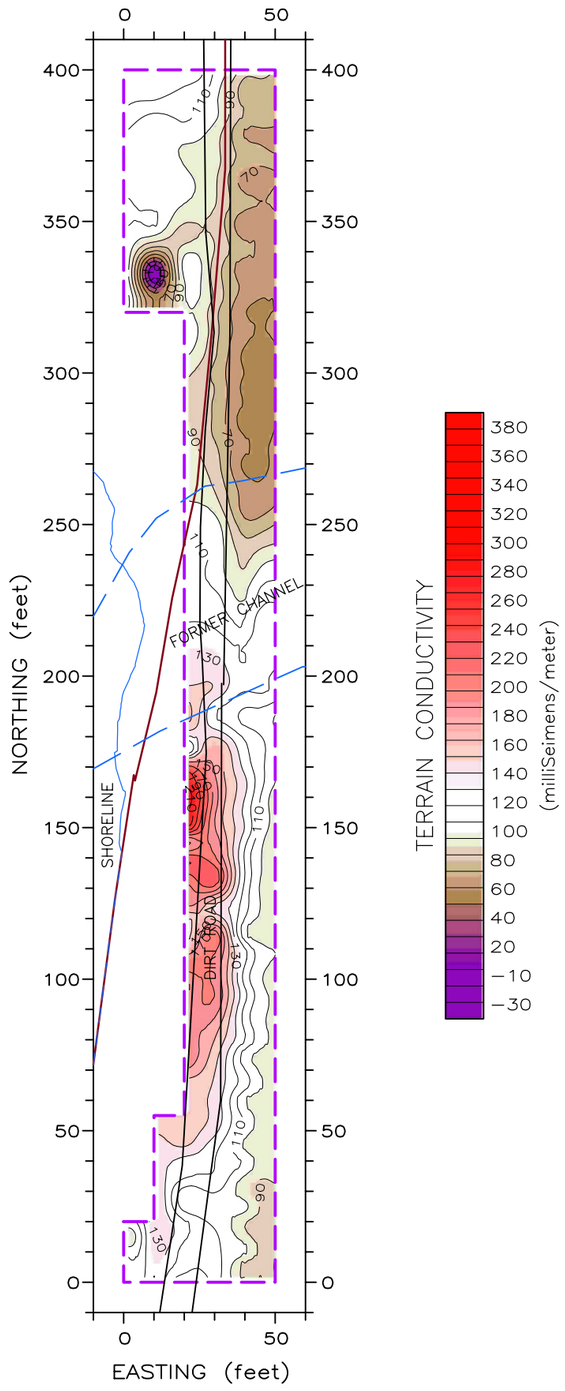
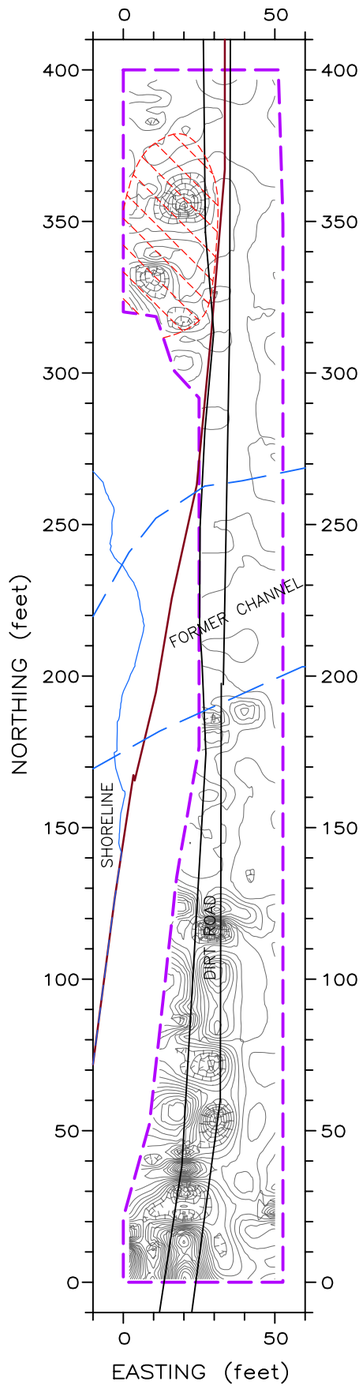
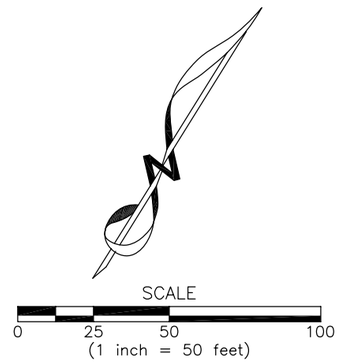
TERRAIN CONDUCTIVITY CONTOUR MAP



VERTICAL MAGNETIC GRADIENT CONTOUR MAP





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0	VERTICAL MAGNETIC GRADIENT CONTOUR (CONTOUR INTERVAL = 200 nT/m)
	VERTICAL MAGNETIC GRADIENT ANOMALY
	LIMITS OF LANDFILL AREA

NOTE: SEE PLATE 1, SITE LOCATION MAP, FOR REFERENCING AREA FEATURES

NORCAL

AREA 5 – TERRAIN CONDUCTIVITY & VERTICAL MAGNETIC GRADIENT CONTOUR MAPS – HUNTERS POINT

LOCATION: SAN FRANCISCO, CALIFORNIA

CLIENT: KLEINFELDER

JOB #: 07–177.153

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: FEB. 2008

DRAWN BY: G.RANDALL

APPROVED BY: DTH

PLATE 6

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Appendix D.
Borehole logs

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CE² KLEINFELDER

Borehole Log

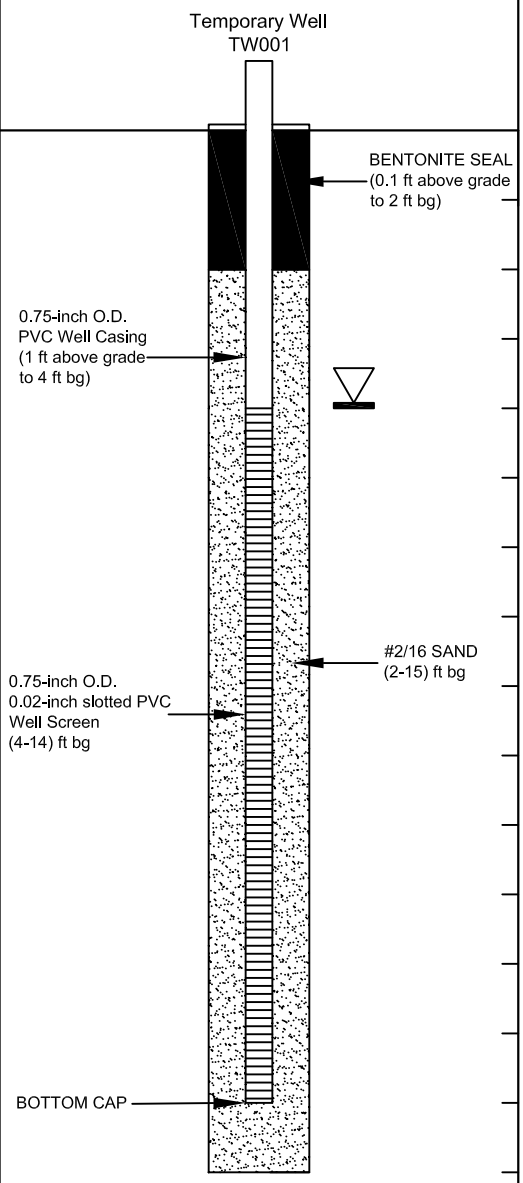
Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH020 / TW001

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/13/08	Date Finished: 2/13/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: hummocky, uneven, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 15.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 4.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451282.78	Easting 1456897.49	Surface Elevation: 7.5 ft MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)
0	SC	Clayey Sand (SC), yellow brown, moist, fine sand, trace silt, (Fill).	55	1.1
		Woven Material (~4" thick) at 4 ft, possibly burlap.		
5		Clayey Sand (SC), black, wet, weakly cemented, fine-medium sand, wood, hydrocarbon odor, (Fill).		104
		Clayey Sand (SC), black, wet, fine-medium grained sand, wood, cement fragments, (Fill).	62	0.4
	GP	Sandy Gravel (GP), black, wet, wood and cement fragments, (Fill).		
10	SC	Clayey Sand (SC), black, wet, some gravel, fine-medium grained sand, (Fill).	38	0.4
	CL	Inorganic Clay (CL), black, wet, low plasticity.		
15		Bottom of borehole at 15 ft bg		
20				

Sample Collected for Lab Analysis



CE² KLEINFELDER

Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH020B

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition:	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Suveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC		Clayey Sand (SC), yellow brown, fine grained sand.		50		
5	SC		Clayey Sand (SC), black, wet, fine-grained sand, hydrocarbon odor.		87	0.7 0.0	
10			Trace gravel		27	0.0 0.0	
15	CL		Sandy Clay (CL), black, wet, fine-grained sand.		3	0.0 0.0	
20	SC		Clayey Sand (SC), black, wet, fine to medium grained sand.			0.0	
			Bottom of borehole at 20 ft bg				

CE² KLEINFELDER

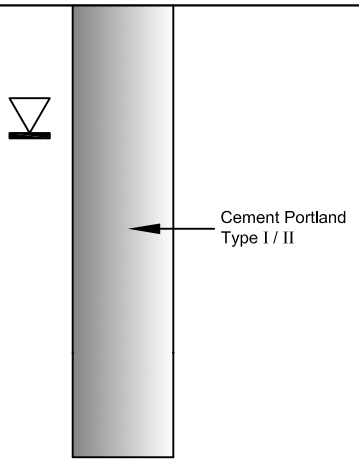
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH023

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/13/08	Date Finished: 2/13/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: fairly level, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 6.5 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 2.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SP		Poorly Graded Sand with Clay and Gravel (SP), with gravel, light-brown, moist, medium to coarse grained sand, (Fill).			0.0	
	CL		Inorganic clay (CL)with gravel, dark brown, moist, (Fill).			0.0	
	SC		Clayey Sand (SC), black, moist/wet, medium to fine grained sand, (Fill).		48		
5						0.1	
			Clayey Sand with gravel and wood (SC), black, wet, medium to fine sand, gravel and wood fragment, (Fill).		100	0.2	
			Refusal at 6.5 ft bg				
10							
15							
20							



CE² KLEINFELDER

Borehole Log

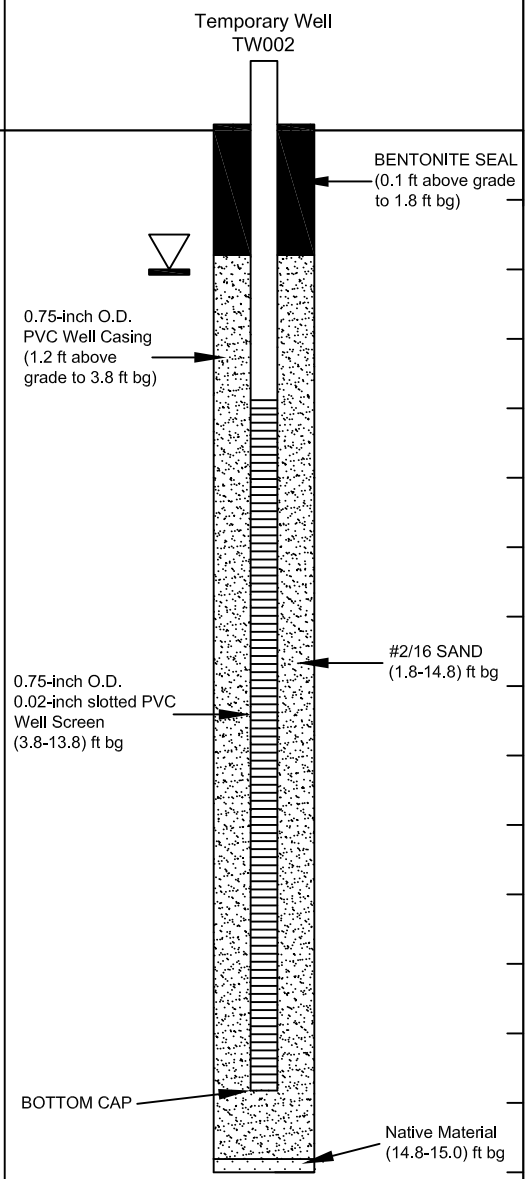
Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH023B / TW002

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/13/08	Date Finished: 2/13/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: Fairly level grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 15.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 2.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451376.11	Easting 1457180.28	Surface Elevation: 7.2 ft MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)
0	SP	Poorly Graded Sand (SP), light brown, moist, coarse to medium grained sand, (Fill).	58	0.0
	CL	Inorganic Clay (CL) with gravel, dark green cobble/boulder fragments, (Fill).		
	SP	Poorly Graded Sand (SP), dark gray, moist/wet, medium to fine-grained sand, (Fill).		
	CL	Inorganic Clay (CL), dark gray, moist, brick and cement fragment, (Fill).		0.0
5	SP	Poorly Graded Sand (SP), dark gray, wet, medium to fine-grained sand, (Fill).		
		Fine-grained sand, slight hydrocarbon odor, (Fill).	57	0.0
10		Poorly-Graded Sand with Gravel (SP), black, wet, fine-grained sand, trace clay, slight hydrocarbon odor (Fill).	33	0.0
15		Bottom of borehole at 15 ft bg		0.0
20				

Sample Collected for Lab Analysis



CE² KLEINFELDER

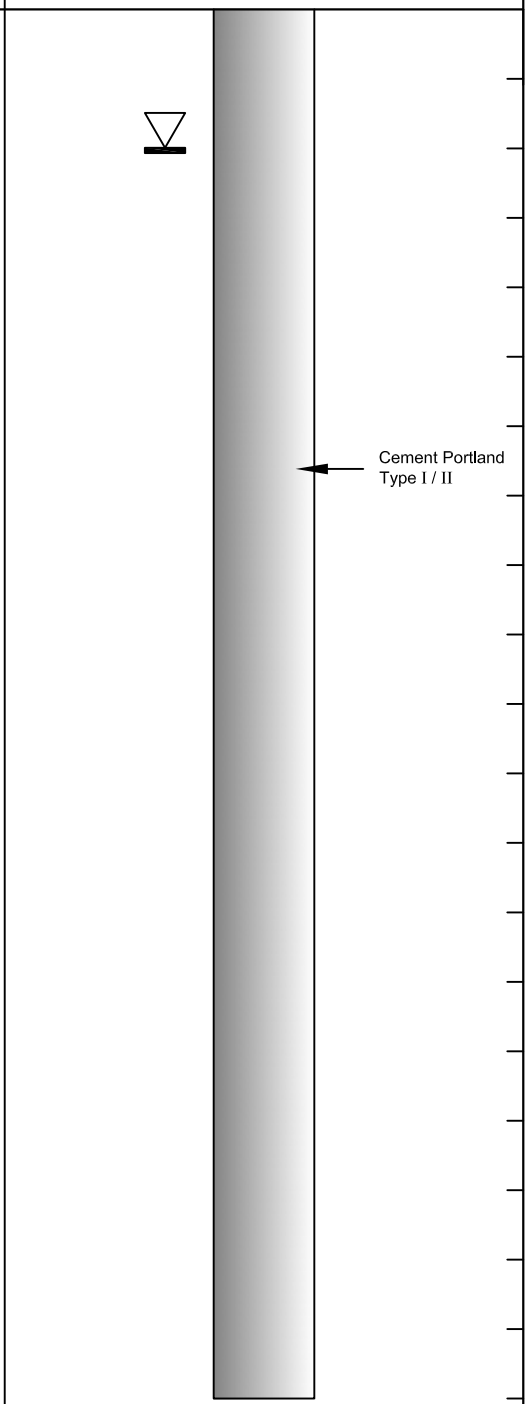
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH023C

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition:	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 2.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC		Clayey Sand (SC) with gravel, brown, moist, fine-grained sand. Concrete fragments, (Fill).		68	0.0	
5	SP		Poorly-Graded Sand (SP), wet, dark gray, medium-grained sand.		60	0.0 0.0	
10			With gravel		35	0.0 0.0	
15	CL		Inorganic Clay (CL), black		78	0.0 0.0	
20	CL		Inorganic Clay (CL), dark gray.			0.0	
			Bottom of borehole at 20 ft bg				



CE² KLEINFELDER

Borehole Log

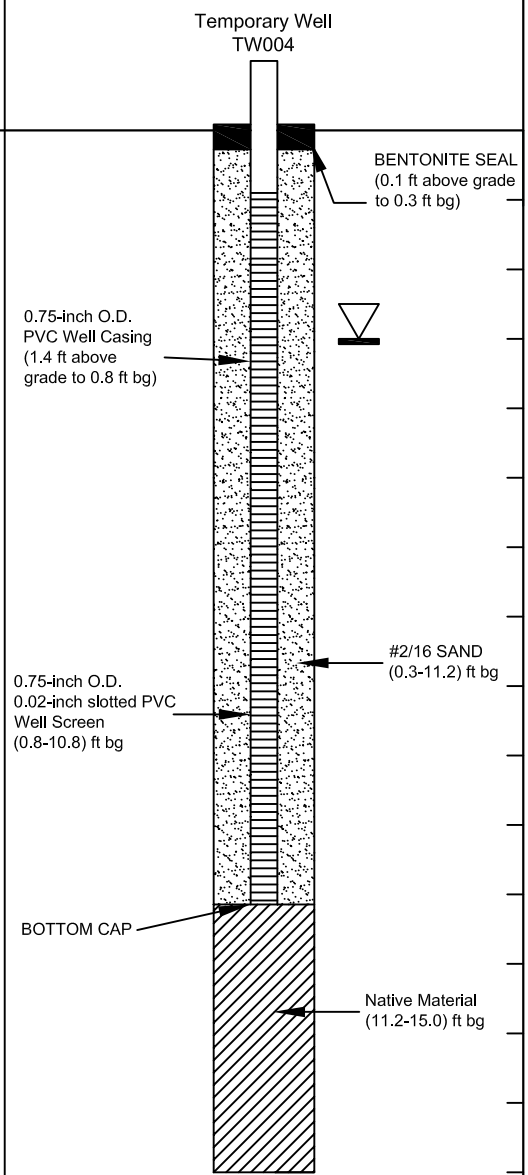
Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH031 / TW004

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/14/08	Date Finished: 2/14/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: relatively flat, grassy	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 15.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 3.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451480.35	Easting 1457292.24	Surface Elevation: 6.7 ft MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)
0	SC	Poorly Graded Sand (SC) with gravel, light brown, moist, medium to coarse-grained sand, (Fill).		0.0
	CL	Inorganic Clay (CL), light brown, moist, low plasticity, (Fill).		
	SP	Poorly Graded Sand (SP) with gravel, dark brown, moist, fine to medium grained sand, (Fill).	73	0.0
	CL	Inorganic Clay (CL), some sand, some gravel, dark brown, moist, fine-grained sand, (Fill).		0.0
	SC	Clayey Sand (SC), dark gray, wet, fine-grained sand		0.0
5	CL	Inorganic Clay (CL) with sand, dark gray, moist, fine-grained sand, (Fill).		0.0
	SP	Poorly Graded Sand (SP), light brown, wet, medium to coarse grained sand, (Fill).	48	0.0
	CL	Sandy Clay (CL), olive gray, wet, fine grained sand, trace gravel, (Fill).		90.2
10			5	
15		Bottom of borehole at 15 ft bg		
20				

Sample Collected for Lab Analysis



CE² KLEINFELDER

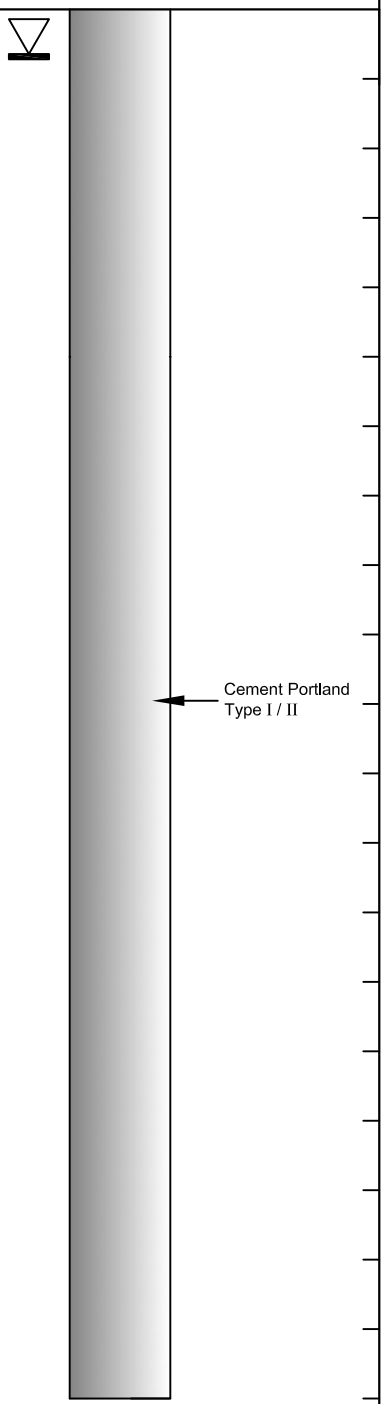
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH031B

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: Level, grassy	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 0.5 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SP		Poorly Graded Sand (SP)		70	0.0	
5	SC		Clayey Sand (SC), dark gray, wet.		60	0.1 0.1	
10	CL		With gravel Inorganic Clay (CL), black, wet.		35	0.1 0.0	
15	CL		Inorganic Clay (CL), dark gray, wet.		80	0.0 0.0	
20			Bottom of borehole at 20 ft bg			0.0	



CE² KLEINFELDER

Borehole Log

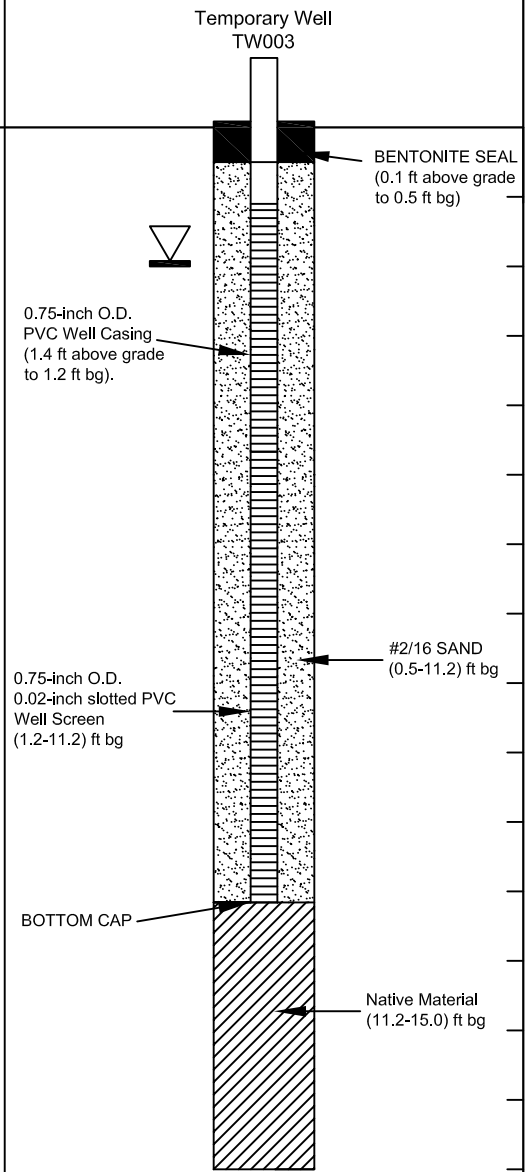
Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH034 / TW003

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/14/08	Date Finished: 2/14/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: Relatively flat, grassy	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 15.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 2.0 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451331.07	Easting 1457404.00	Surface Elevation: 6.9 ft MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)
0	CL	Sandy Clay (CL), dark brown, moist, fine to medium-grained sand, trace gravel, (Fill).		0.0
	SC	Clayey Sand (SC) with gravel, dark gray, moist, fine to medium-grained sand, (Fill).		
	CL	Inorganic Clay (CL), dark red-brown, moist, trace gravel, trace wood fragments, slight hydrocarbon odor, buff/tan cobble/boulder, (Fill).	70	0.0
5	SC	Clayey Sand (SC) with gravel, gray, wet, fine to medium-grained sand, (Fill).		0.0
	GW	Well-Graded Gravel (GW) with sand and clay, light gray dark gray, wet, fine to medium-grained sand, (Fill).	57	0.1
	SC	Clayey Sand (SC) with gravel, dark gray, moist, fine-grained sand, (Fill).		0.8
10	CL	Inorganic Clay, black, wet, moderately plastic, slight hydrocarbon odor, (Fill).	63	
15		Bottom of borehole at 15 ft bg		
20				

Sample Collected for Lab Analysis



CE² KLEINFELDER

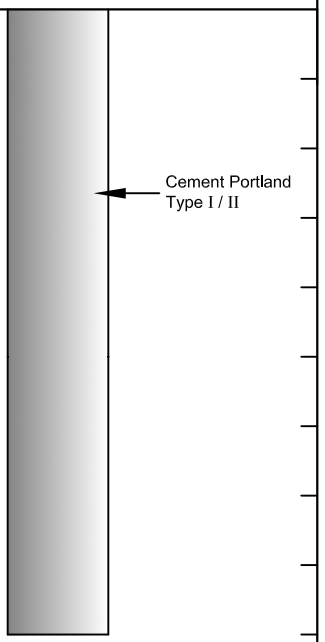
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH034B

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: hummocky, uneven, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 9.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0						0.0	
					67		
	SC		Clayey Sand (SC), dark gray, wet, fine-medium grained sand, (Fill).			0.0	
5						0.0	
					93		
	SP		Poorly-Graded Sand (SP), dark brown, trace gravel, concrete fragments, (Fill).			0.6	
			Refusal at 9 ft bg				
10							
15							
20							



CE² KLEINFELDER

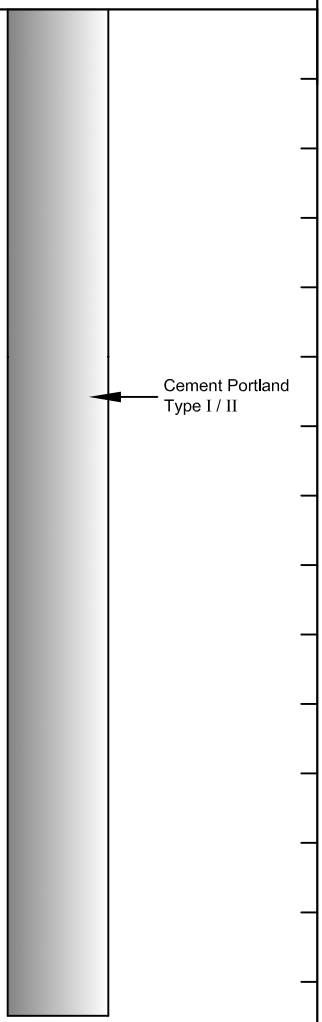
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH034C

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: hummocky, uneven, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 14.5 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC		Clayey Sand (SC), dark brown, moist, brick fragments, (Fill).		65	0.1	
5	CL		Sandy Clay (CL) some gravel, dark gray, moist, (Fill).			0.1	
10	SP		Poorly Graded Sand (SP) with gravel, black, moist, (Fill).		88	0.5 0.1	
	SC		Sandy Clay (SC), dark gray, moist, concrete fragments, (Fill).			0.3	
15			Refusal at 14.5 ft bg				
20							



CE² KLEINFELDER

Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH034D

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: fairly level, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC		Clayey Sand (SC), brown, moist.		63	0.1	
5	CL		Inorganic Clay (CL), olive gray, moist, trace gravel.		52	0.1 0.1	
10	GW		Well Graded Gravel (GW), black, wet, hydrocarbon odor.		38	0.1 0.0	
15	CL		Inorganic Clay (CL), black, wet, hydrocarbon odor.		52	0.1	
20	CL		Inorganic Clay (CL), dark gray, wet. Bottom of borehole at 20 ft bg			0.1	

CE² KLEINFELDER

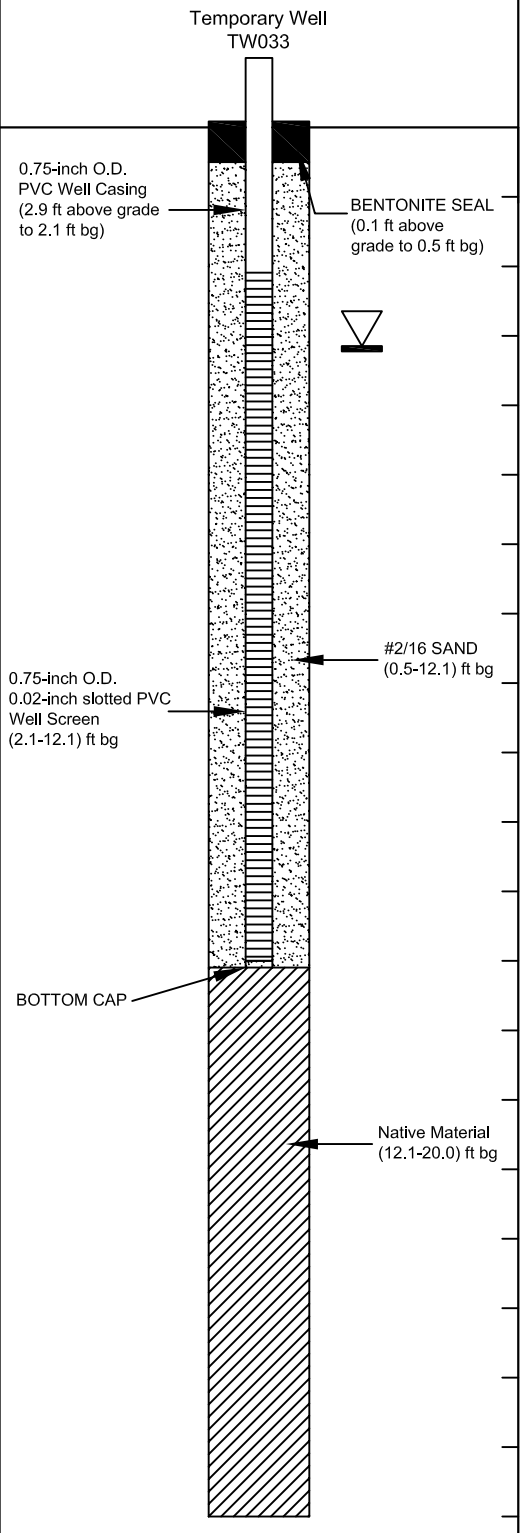
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH037 / TW033

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/21/08	Date Finished: 2/21/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: grassy, sloping to south	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: 3.3 ft bg	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451195.05	Easting 1457513.43	Surface Elevation: 7.9 ft. MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC	Sandy Clay (SC) with gravel, red-brown, moist, fine-grained sand, (Fill).		0.0	
	CL	Inorganic Clay (CL), light brown, moist, trace gravel, (Fill).		0.0	
	GW	Sandy Gravel (GW), dark brown, moist, 70% angular to sub-angular gravel, 20% fine-grained sand, 10% plastic fines, (Fill).	47	0.0	
	SC	Clayey Sand (SC) with gravel, brown, wet, fine grained sand, sub-angular to sub-rounded gravel, (Fill).			
5		Sandy Clay (CL) with gravel, gray, wet, fine grained sand, angular to rounded gravel, (Fill).		0.0	
			20	0.0	
	CL				
10				0.0	
			10	0.0	
15		Inorganic Clay (CL), dark green, wet, hydrocarbon odor, (Fill). Thick white, flakes/fragments		0.0	
	CL			0.0	
			42	0.0	
20		Bottom of borehole at 20 ft bg			



CE² KLEINFELDER

Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH037B

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: hummocky, uneven, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	SC		Clayey Sand (SC), dark brown, moist.		53	0.0	
5			Trace gravel		43	0.1 0.0	
10	GW		Gravel (GW) with fine sand, black, wet.		57	0.1 0.0	
15	CL		Inorganic Clay (CL), black, wet.		50	0.0 0.0	
20	CL		Inorganic Clay (CL), dark gray, wet, shell fragment.			0.0	
			Bottom of borehole at 20 ft bg				

CE² KLEINFELDER

Borehole Log

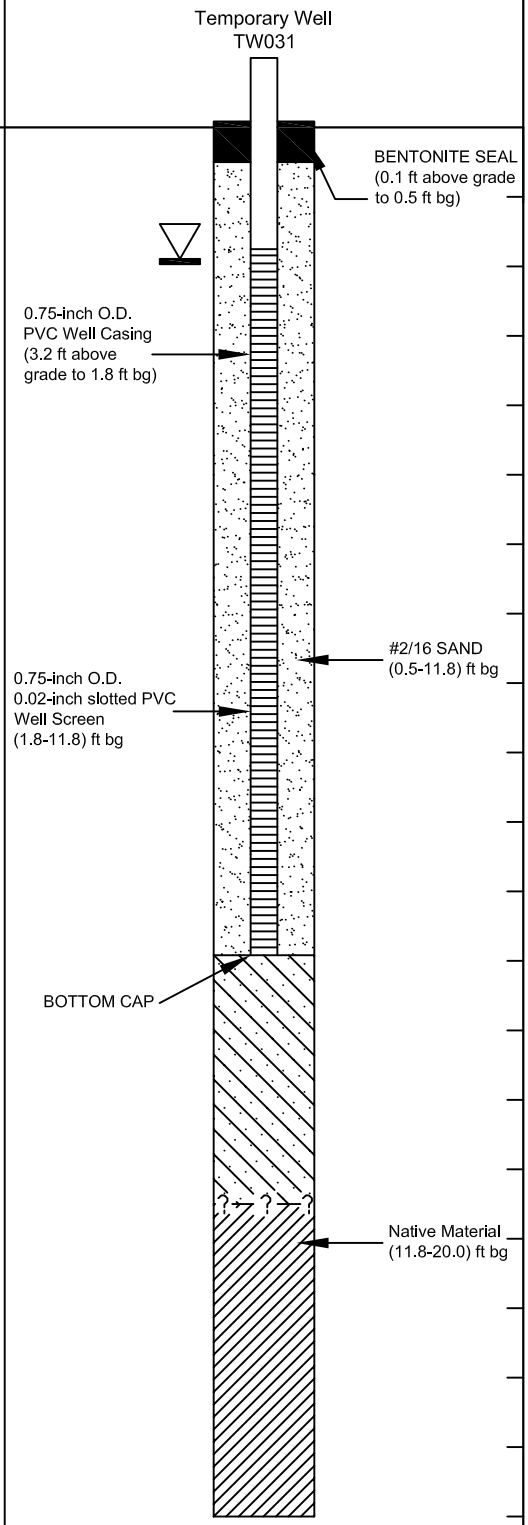
Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH039 / TW031

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 2/21/08	Date Finished: 2/21/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: grassy, sloping to south	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: N/A	Drilling Fluid: None	Depth Water First Encountered: 2.2 ft.	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Northing 451103.49	Easting 1457570.29	Surface Elevation: 7.8 ft MSL	

Depth (feet)	USCS Soil Type	Description	Recovery (%)	PID (PPMV)
0	SC	Clayey Sand (SC), brown, moist, fine grained sand, trace gravel, (Fill).		0.0
	GC	Clayey Gravel (GC), brown, moist/wet, (Fill).		
	SP	Gravelly Sand (SP) with clay, brown, moist, fine grained sand, (Fill).	72	0.0
	GC	Gravelly Sand (SP) some clay, olive-gray, moist, fine grained sand, (Fill). Clayey Gravel (GC) some sand, dark brown, moist, fine grained sand, angular to subangular gravel, (Fill).		0.0
5				0.0
	SC	Clayey Sand (SC) with wood, black, wet, fine-grained sand, trace, subrounded gravel, slight hydrocarbon odor, (Fill).	20	0.0
10	SC	Clayey Sand (SC) with wood, black, wet, fine to medium grained sand, trace gravel, visible sheen, hydrocarbon odor, (Fill).	20	0.0 3.7
15	CL	Inorganic Clay (CL) with wood, dark grey, wet, (Fill).	20	1.4 0.0
20		Bottom of borehole at 20 ft bg		

Sample Collected for Lab Analysis



CE² KLEINFELDER

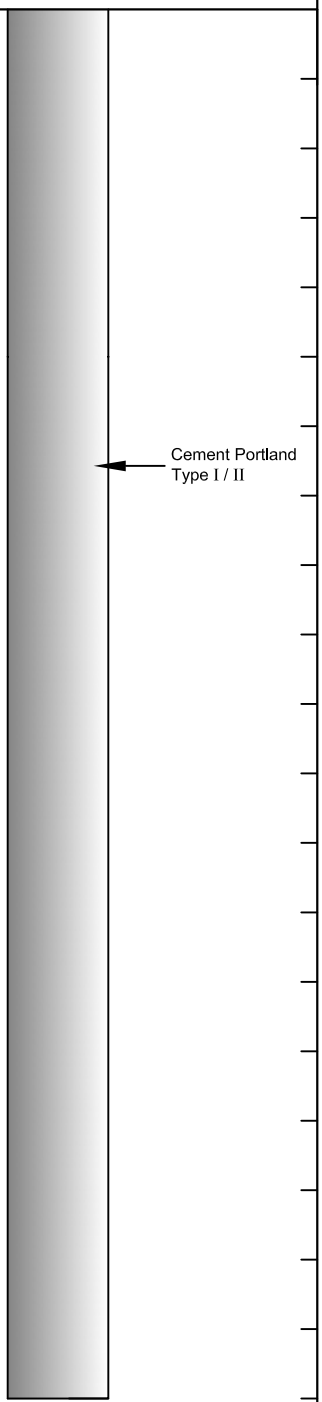
Borehole Log

Project Name: Groundwater Investigation at Parcel E-2
Hunters Point Shipyard
San Francisco, California

Borehole / Well ID: BH039B

Borehole Location: Hunters Point Shipyard - Parcel E-2		Date Started: 3/11/08	Date Finished: 3/11/08
Drilling Contractor: Vironex	Driller: Josh Ryken	Surface Condition: hummocky, uneven, grass covered	
Drilling Rig: Geoprobe 6600 DT	Borehole Diameter: 1.75 in.	Total Depth: 20.0 ft.	
Sampling Method: Acetate Sleeve	Drilling Fluid: None	Depth Water First Encountered: Not Measured	
Drilling Method: Direct Push	Logged By: Gabe Fuson, Kleinfelder		
Coordinates: Not Surveyed		Surface Elevation: Not Surveyed	

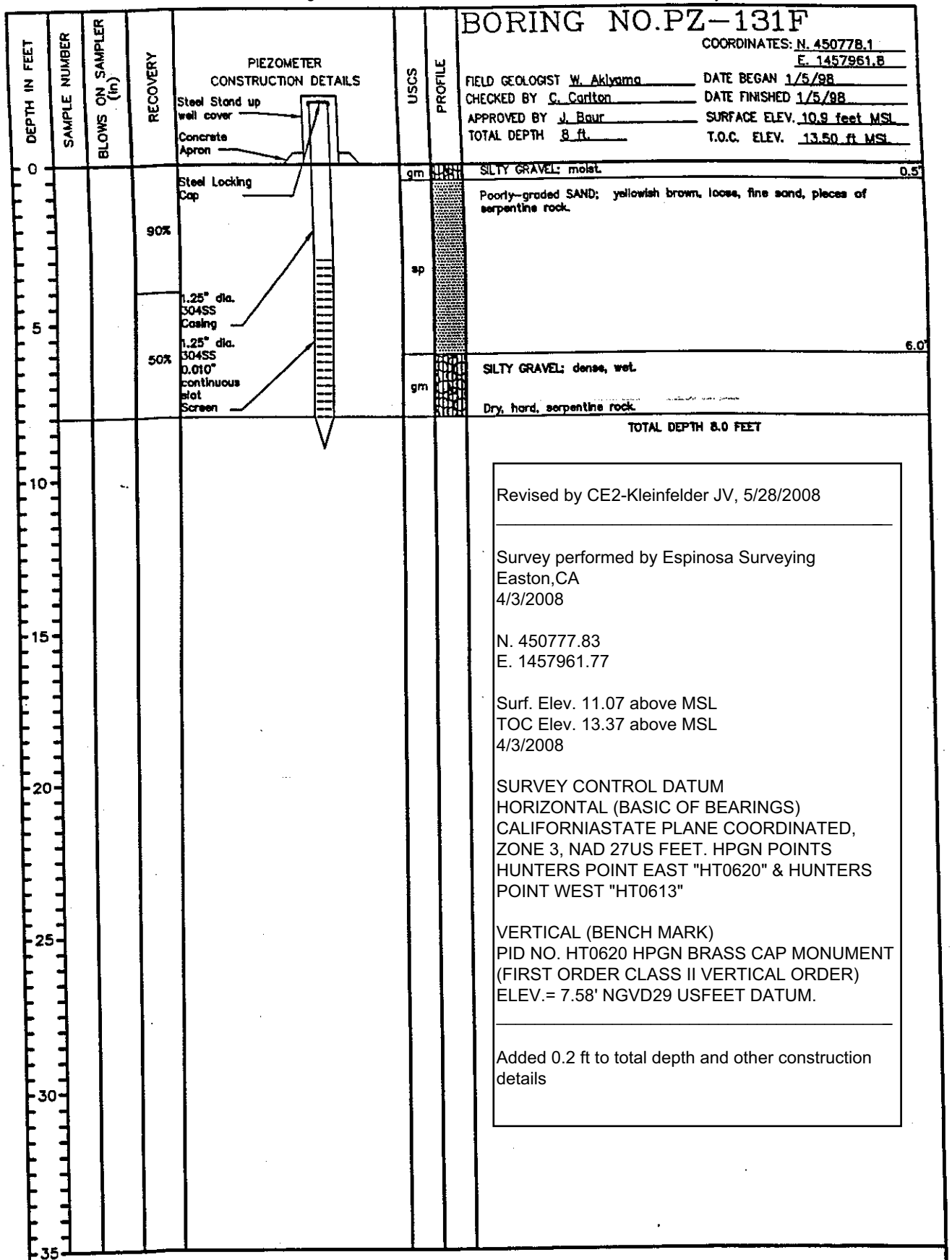
Depth (feet)	USCS Soil Type	Graphic Log	Description	Drive Interval	Recovery (%)	PID (PPMV)	Sample Collected for Lab Analysis
0	CL		Sandy Clay (CL), red-brown, moist.		62	0.0	
5	CL		Inorganic Clay (CL), black, moist, some gravel.		25	0.2 0.0	
10			Wood fragments, black		17	0.0 0.2	
15			Wood fragments, black, wet, sheen; strong hydrocarbon odor.		42	0.0 0.2	
20	CL		Inorganic Clay (CL), olive gray/dark gray, wet, shell fragments.			0.0	
			Bottom of borehole at 20 ft bg				



BORING NO.PZ-131F

COORDINATES: N. 450778.1
E. 1457961.8

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/5/98
CHECKED BY C. Carlton — DATE FINISHED 1/5/98
APPROVED BY J. Baur — SURFACE ELEV. 10.9 feet MSL
TOTAL DEPTH 8 ft. — T.O.C. ELEV. 13.50 ft MSL



Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450777.83
E. 1457961.77

Surf. Elev. 11.07 above MSL
TOC Elev. 13.37 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED,
ZONE 3, NAD 27US FEET. HPGN POINTS
HUNTERS POINT EAST "HT0620" & HUNTERS
POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT
(FIRST ORDER CLASS II VERTICAL ORDER)
ELEV.= 7.58' NGVD29 USFEET DATUM.

Added 0.2 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : Geoprobe/ Direct Push
SAMPLING METHOD : 4 ft MACRO Core Sampler
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

DRAWN BY	T.R.S.	CHECKED BY	9.23.98	FILE NAME & DISK NUMBER HPPZ131F (HP43)
DATE	9/23/98	APPROVED BY	DWB 11.4.98	

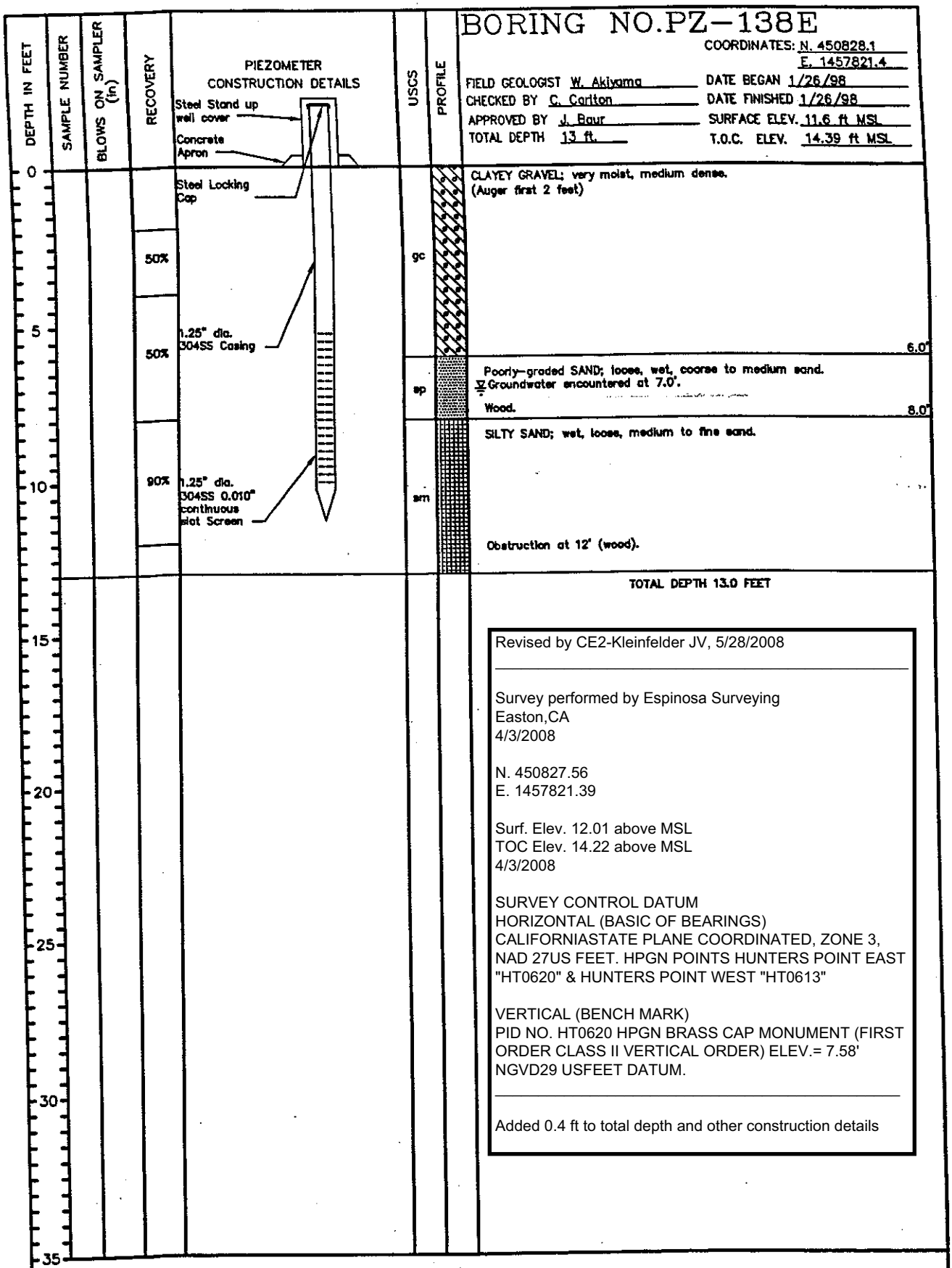
INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO.PZ-138E

COORDINATES: N. 450828.1
E. 1457821.4

FIELD GEOLOGIST W. Akiyama
CHECKED BY C. Carlton
APPROVED BY J. Baur
TOTAL DEPTH 13 ft.

DATE BEGAN 1/26/98
DATE FINISHED 1/26/98
SURFACE ELEV. 11.6 ft MSL
T.O.C. ELEV. 14.39 ft MSL



CLAYEY GRAVEL; very moist, medium dense. (Auger first 2 feet)

6.0'

Poorly-graded SAND; loose, wet, coarse to medium sand.
▽ Groundwater encountered at 7.0'.
Wood.

8.0'

SILTY SAND; wet, loose, medium to fine sand.

Obstruction at 12' (wood).

TOTAL DEPTH 13.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450827.56
E. 1457821.39

Surf. Elev. 12.01 above MSL
TOC Elev. 14.22 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3,
NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST
"HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58'
NGVD29 USFEET DATUM.

Added 0.4 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : Geoprobe/ Direct Push
SAMPLING METHOD : 4 ft MACRO Core Sampler
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

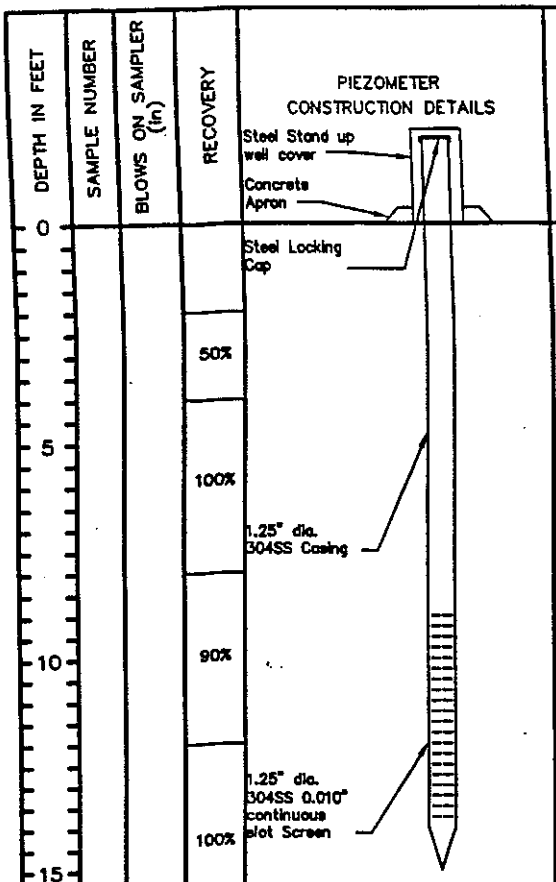
DRAWN BY	T.R.S.	CHECKED BY	9.23.98	FILE NAME & DISK NUMBER	HPPZ138E (HP44)
DATE	9/23/98	APPROVED BY	11.4.98		

INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO.PZ-138F

COORDINATES: N. 450889.0
E. 1457884.8

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/26/98
CHECKED BY C. Carlton — DATE FINISHED 1/26/98
APPROVED BY J. Baur — SURFACE ELEV. 13.4 feet MSL
TOTAL DEPTH 16 ft. — T.O.C. ELEV. 15.76 ft MSL



CLAYEY GRAVEL; dark gray to dark brown, slightly moist clay, hard drilling. (Auger first 2 feet)

Wood. 8.0'

CLAY; dark brown, stiff. 10.0'

Poorly-graded SAND; dark gray, wet, medium sand, shell fragments. 14.0'

CLAY; plastic, wet, BAY MUD.

TOTAL DEPTH 16.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450888.27
E. 1457884.95

Surf. Elev. 16.99 above MSL
TOC Elev. 19.30 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3,
NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST
"HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58'
NGVD29 USFEET DATUM.

Added 3.6 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : Geoprobe/ Direct Push
SAMPLING METHOD : 4 ft MACRO Core Sampler
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

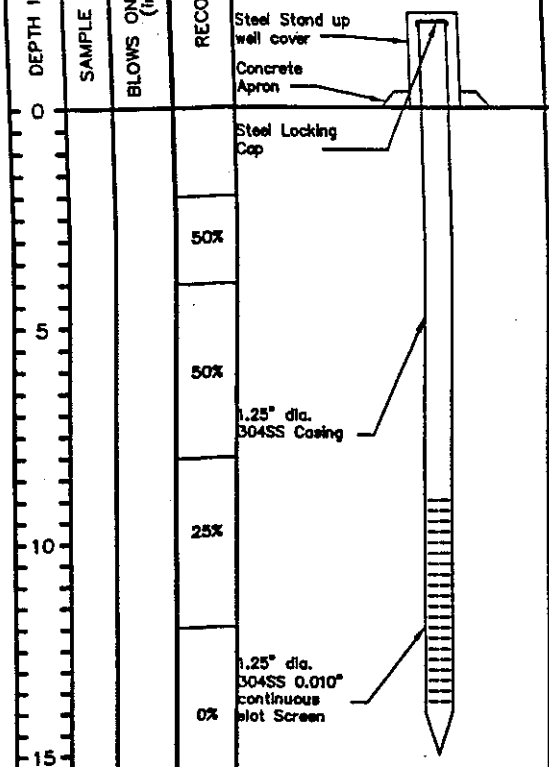
DRAWN BY	T.R.S.	CHECKED BY	9.23.98	FILE NAME & DISK NUMBER	HPPZ138F (HP44)
DATE	9/23/98	APPROVED BY	11-4-98		

INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO.PZ–144E

COORDINATES: N. 450864.1, E. 1457768.5

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/26/98
CHECKED BY C. Carlton — DATE FINISHED 1/26/98
APPROVED BY J. Baur — SURFACE ELEV. 12.4 ft MSL
TOTAL DEPTH 16 ft. — T.O.C. ELEV. 15.08 ft MSL



CLAY; very dark gray, moist, firm, concrete. — 4.0'

CLAYEY SAND; dense, wood (1.5" thick).

At 10': Wood. — 14.0'

CLAY; gray, soft, wet, BAY MUD.

TOTAL DEPTH 16.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450863.48
E. 1457768.64

Surf. Elev. 12.59 above MSL
TOC Elev. 14.91 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3,
NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST
"HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST
ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58'
NGVD29 USFEET DATUM.

Added 0.2 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : Geoprobe/ Direct Push
SAMPLING METHOD : 4 ft MACRO Core Sampler
PROJECT NAME: Site IR–1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

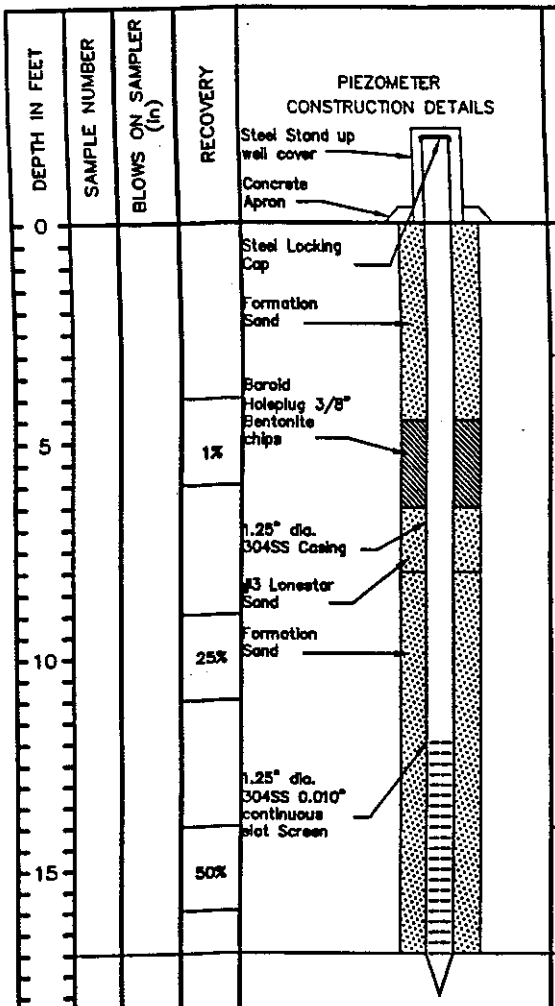
DRAWN BY	T.R.S.	CHECKED BY	10-12-98	FILE NAME & DISK NUMBER	HPPZ144E (HP44)
DATE	9/28/98	APPROVED BY	11-4-98		

INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO. PZ-150D

COORDINATES: N. 450890.5, E. 1457707.3

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/26/98
CHECKED BY C. Carlton — DATE FINISHED 1/26/98
APPROVED BY J. Baur — SURFACE ELEV. 11.5 feet MSL
TOTAL DEPTH 17 ft. — T.O.C. ELEV. 15.15 ft MSL



SILTY SAND; light brown. — 3.0'

Poorly-graded SAND; black.
At 4': Wood pieces.
At 7': Wire, diamond shaped metal grating.
At 9': Light brown, 50% wood pieces. — 14.0'

Well-graded SAND; black, coarse to fine sand, 25% wood pieces, black water.

TOTAL DEPTH 17.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450889.70
E. 1457707.58

Surf. Elev. 12.02 above MSL
TOC Elev. 14.82 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3, NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST "HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58' NGVD29 USFEET DATUM.

Added 0.5 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : 6.25" O.D. Hollow-stem Auger
SAMPLING METHOD : California Modified Split-spoon Sampler
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

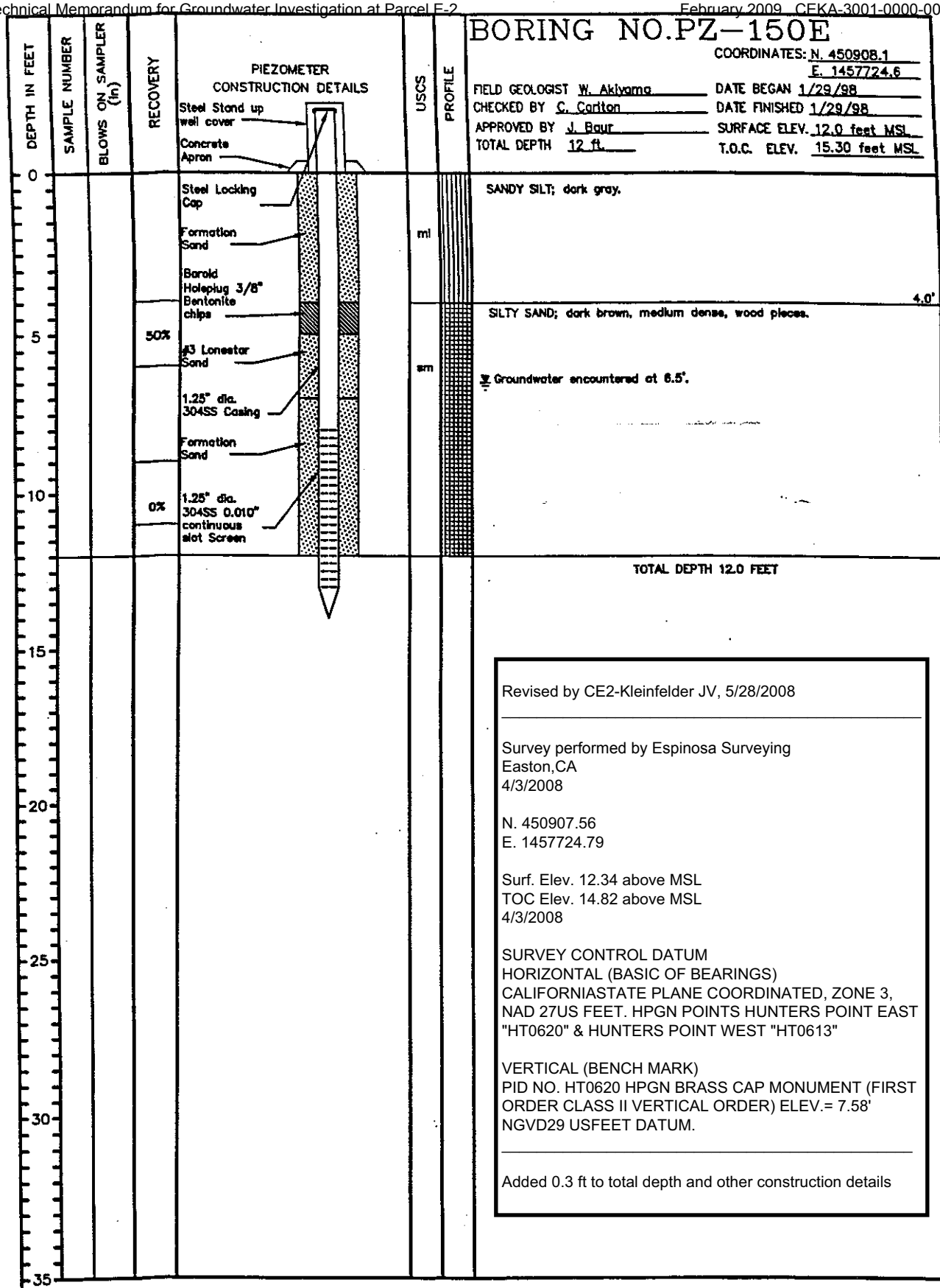
DRAWN BY	T.R.S.	CHECKED BY	TRS 10-12-98	FILE NAME & DISK NUMBER	HPPZ150D(HP45)
DATE	9/28/98	APPROVED BY	JWB 11-4-98		

INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO.PZ-150E

COORDINATES: N. 450908.1
E. 1457724.6

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/29/98
CHECKED BY C. Carlton — DATE FINISHED 1/29/98
APPROVED BY J. Baur — SURFACE ELEV. 12.0 feet MSL
TOTAL DEPTH 12 ft. — T.O.C. ELEV. 15.30 feet MSL



SANDY SILT; dark gray.

4.0'

SILTY SAND; dark brown, medium dense, wood pieces.

Groundwater encountered at 6.5'.

TOTAL DEPTH 12.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450907.56
E. 1457724.79

Surf. Elev. 12.34 above MSL
TOC Elev. 14.82 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3, NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST "HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58' NGVD29 USFEET DATUM.

Added 0.3 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : R. Nessinger
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : 6.25" O.D. Hollow-stem Auger
SAMPLING METHOD : California Modified Split-Spoon Sampler.
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

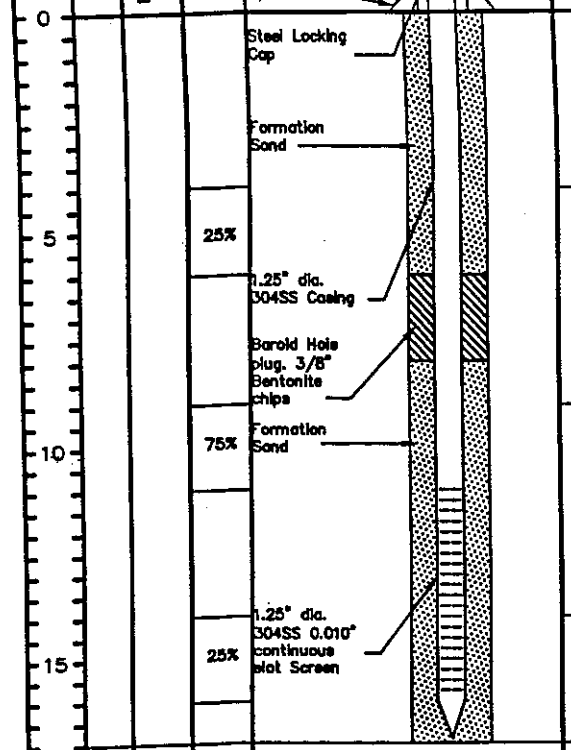
DRAWN BY	T.R.S.	CHECKED BY	10.12.98	FILE NAME & DISK NUMBER	HPPZ150E(HP45)
DATE	9/28/98	APPROVED BY	DWB 11.4.98		

INTERNATIONAL TECHNOLOGY CORPORATION

BORING NO. PZ-161D

COORDINATES: N. 450959.5
E.1457682.2

FIELD GEOLOGIST W. Akiyama — DATE BEGAN 1/29/98
CHECKED BY C. Carlton — DATE FINISHED 1/29/98
APPROVED BY J. Baur — SURFACE ELEV. 12.0 feet MSL
TOTAL DEPTH 17 ft. — T.O.C. ELEV. 13.28 ft MSL



USCS	PROFILE	
cl		CLAY; brown, slightly moist. Sandy gravelly clay, wood pieces. — 4.0'
sc		CLAYEY SAND; very moist, medium dense, wood pieces. ▽ Groundwater encountered at 8.0' — 9.0'
sp		Poorly-graded SAND, dark brown, fine sand. — 14.0'
sw		Well-graded SAND, black, fine to coarse sand.

TOTAL DEPTH 17.0 FEET

Revised by CE2-Kleinfelder JV, 5/28/2008

Survey performed by Espinosa Surveying
Easton,CA
4/3/2008

N. 450958.99
E. 1457768.64

Surf. Elev. 12.10 above MSL
TOC Elev. 14.66 above MSL
4/3/2008

SURVEY CONTROL DATUM
HORIZONTAL (BASIC OF BEARINGS)
CALIFORNIASTATE PLANE COORDINATED, ZONE 3,
NAD 27US FEET. HPGN POINTS HUNTERS POINT EAST
"HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK)
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER) ELEV.= 7.58'
NGVD29 USFEET DATUM.

Added 0.1 ft to total depth and other construction details

PAGE 1 OF 1

DRILLER : Gregg Drilling Co.
DRILLING CO. : Gregg Drilling Co.
DRILLING METHOD : 6.25" O.D. Hollow-stem Auger
SAMPLING METHOD : California Modified Split-spoon Sampler.
PROJECT NAME: Site IR-1/21 D.O. 60
LOCATION : Hunters Point Shipyard
PROJECT NO. : 767497.02106000

DRAWN BY	T.R.S.	CHECKED BY	YLL 9.23.98	FILE NAME & DISK NUMBER	HPPZ161D(HP38)
DATE	9/23/98	APPROVED BY	DJB 11.4.98		

INTERNATIONAL TECHNOLOGY CORPORATION

Appendix E.
Well location survey report

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ESPINOSA SURVEYING

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Easton, CA 93706

Tel. 559.442.0883
Fax 559.442.0884

www.espls.com

HUNTERS POINT SHIPYARD

Survey Notes-Parcel E-2 Monitor Well Survey

1. All coordinates are CCS NAD 27, in US Survey feet.

2. All elevations are NGVD 29, in US Survey feet.

3. The horizontal datum is based on the California State Plane Coordinate System, Zone III, North American Datum, 1927 (NAD 27). Found bronze disk in concrete and in monument well, PID Number HT 0620 (Hunter East) and HT 0613 (Hunter West 1) as per National Geodetic Survey Data Sheet, see Coordinate Table 'A'.

4. The vertical datum is based on National Geodetic Vertical Datum 1929 (NGVD 29), found bronze disk in concrete and in monument well, PID Number HT 0620 (elevation = 7.58 US ft, NGVD 29) as per National Geodetic Survey Data Sheet, see Coordinate Table 'A'.

5. The field survey was performed on April 3, 2008.

6. The field survey was performed using
   - Trimble S6 Robotic Total Station
   - Trimble 5800 GPS RTK.
   - Topcon Digital Level DL102.

COORDINATE TABLE 'A'

PID #	NORTHING (LAT) NAD27	EASTING (LONG) NAD27	ELEV. (NGVD29)
HT0613 (ESP #5000)	452606.451' N37°43'42.17100"	1,461,800.750' W122°21'39.78600"	
HT0620 (ESP #5001)	452,846.995' N37°43'44.71900"	1,462,667.060' W122°21'29.06400"	7.58' US FT

Prepared by me or under my direct supervision on May 8, 2008.

PROFESSIONAL LAND SURVEYOR
MAURO R. WEYANT
NO. 7773
EXP. 12/31/09
STATE OF CALIFORNIA

5/9/08

Mauro R. Weyant, P.L.S.
R:\LP\08051MX HUNTERS MW AREA E-2\Hps_MonWell_Parcel E-2.doc

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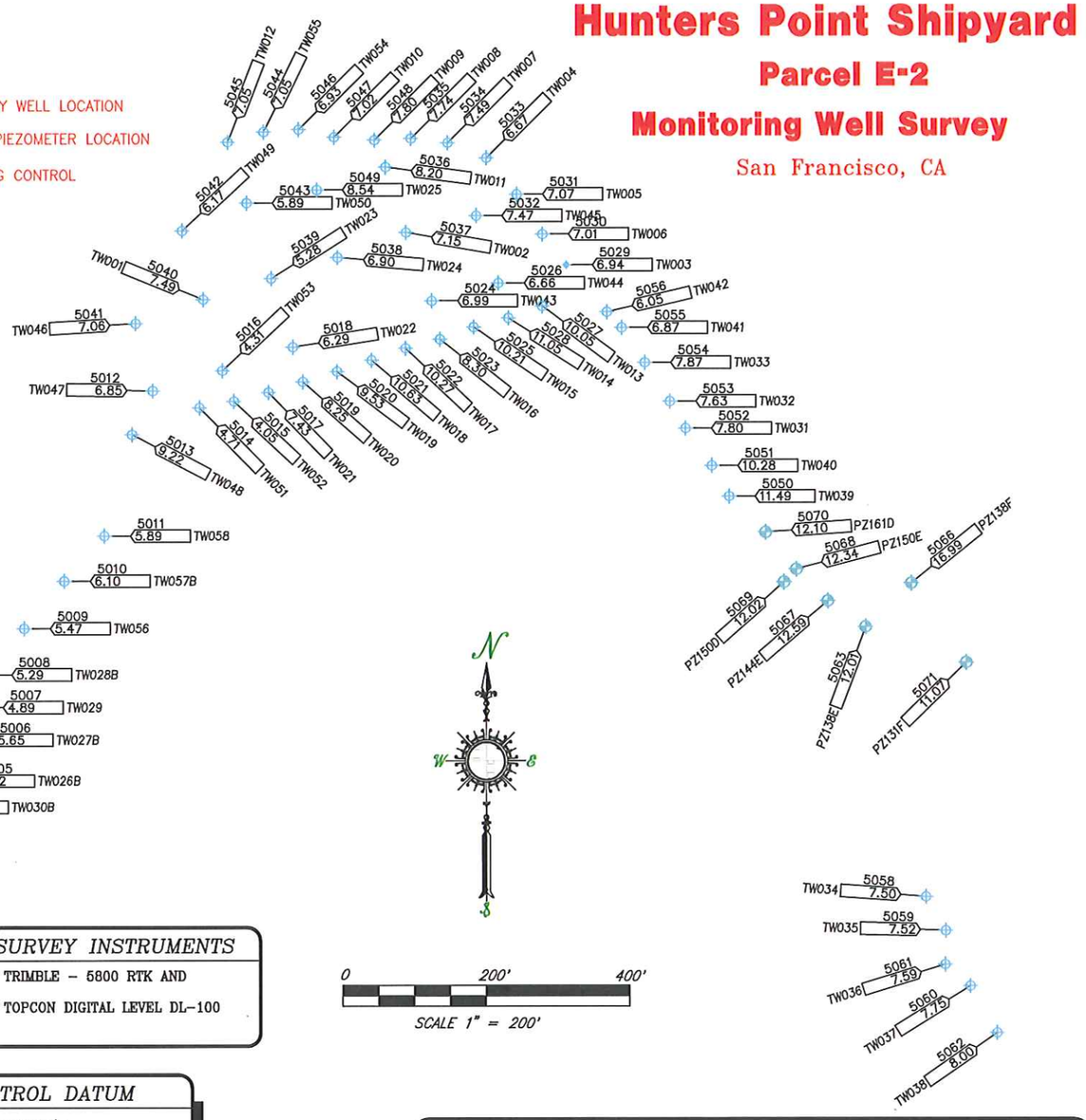
ESP No.	Northing	Easting	Elevation TOP OF CASING	Elevation GROUND SURFACE	Latitude	Longitude	Description
5001	450484.22	1456213.91		8.74	37°43'20.08822"N	122°22'48.78465"W	TW061
5002	450430.51	1456285.56		8.38	37°43'19.57152"N	122°22'47.87951"W	TW060
5003	450440.59	1456395.21		4.12	37°43'19.69295"N	122°22'46.51752"W	TW059
5004	450576.90	1456505.97		5.49	37°43'21.06239"N	122°22'45.17333"W	TW030B
5005	450613.31	1456542.57		5.42	37°43'21.42959"N	122°22'44.72694"W	TW026B
5006	450669.99	1456568.46		5.65	37°43'21.99500"N	122°22'44.41893"W	TW027B
5007	450715.33	1456582.87		4.89	37°43'22.44603"N	122°22'44.25088"W	TW029
5008	450760.88	1456594.85		5.29	37°43'22.89875"N	122°22'44.11325"W	TW028B
5009	450825.06	1456648.38		5.47	37°43'23.54373"N	122°22'43.46307"W	TW056
5010	450891.07	1456704.15		6.10	37°43'24.20733"N	122°22'42.78560"W	TW057B
5011	450953.83	1456760.00		5.89	37°43'24.83888"N	122°22'42.10627"W	TW058
5012	451155.69	1456827.19		6.85	37°43'26.84755"N	122°22'41.32058"W	TW047
5013	451094.86	1456798.53		9.22	37°43'26.24060"N	122°22'41.66206"W	TW048
5014	451132.09	1456892.35		4.71	37°43'26.62723"N	122°22'40.50372"W	TW051
5015	451141.06	1456940.29		4.06	37°43'26.72537"N	122°22'39.90937"W	TW052
5016	451183.75	1456924.21		4.31	37°43'27.14424"N	122°22'40.12015"W	TW053
5017	451153.38	1456988.84		7.43	37°43'26.85680"N	122°22'39.30838"W	TW021
5018	451216.38	1457022.68		6.29	37°43'27.48625"N	122°22'38.90287"W	TW022
5019	451168.13	1457036.77		8.25	37°43'27.01212"N	122°22'38.71555"W	TW020
5020	451182.47	1457084.57		9.53	37°43'27.16334"N	122°22'38.12430"W	TW019
5021	451198.25	1457132.65		10.63	37°43'27.32890"N	122°22'37.52984"W	TW018
5022	451214.87	1457179.90		10.27	37°43'27.50253"N	122°22'36.94602"W	TW017
5023	451227.35	1457227.75		8.30	37°43'27.63539"N	122°22'36.35364"W	TW016
5024	451280.86	1457216.22		6.99	37°43'28.16209"N	122°22'36.51052"W	TW043
5025	451244.31	1457274.70		10.21	37°43'27.81239"N	122°22'35.77367"W	TW015
5026	451305.71	1457309.23		6.66	37°43'28.42615"N	122°22'35.35919"W	TW044
5027	451273.66	1457370.40		10.05	37°43'28.12140"N	122°22'34.59007"W	TW013
5028	451257.01	1457323.40		11.05	37°43'27.94750"N	122°22'35.17071"W	TW014
5029	451331.07	1457404.00		6.94	37°43'28.69562"N	122°22'34.18624"W	TW003
5030	451373.84	1457370.63		7.01	37°43'29.11182"N	122°22'34.61220"W	TW006
5031	451429.55	1457334.73		7.07	37°43'29.65539"N	122°22'35.07282"W	TW005
5032	451399.67	1457278.01		7.47	37°43'29.34875"N	122°22'35.77125"W	TW045
5033	451480.35	1457292.24		6.67	37°43'30.14911"N	122°22'35.61426"W	TW004
5034	451501.35	1457237.99		7.49	37°43'30.34591"N	122°22'36.29465"W	TW007
5035	451507.48	1457186.85		7.74	37°43'30.39635"N	122°22'36.93255"W	TW008
5036	451467.47	1457151.63		8.20	37°43'29.99395"N	122°22'37.36087"W	TW011
5037	451376.11	1457180.28		7.15	37°43'29.09653"N	122°22'36.98156"W	TW002
5038	451341.31	1457085.00		6.90	37°43'28.73357"N	122°22'38.15861"W	TW024
5039	451311.99	1456992.42		5.28	37°43'28.42543"N	122°22'39.30343"W	TW023
5040	451282.78	1456897.49		7.49	37°43'28.11780"N	122°22'40.47747"W	TW001
5041	451249.37	1456803.32		7.06	37°43'27.76884"N	122°22'41.64097"W	TW046
5042	451378.67	1456867.85		6.17	37°43'29.05985"N	122°22'40.87024"W	TW049
5043	451417.32	1456957.79		5.90	37°43'29.45974"N	122°22'39.76064"W	TW050
5044	451516.51	1456981.57		7.05	37°43'30.44497"N	122°22'39.48946"W	TW055
5045	451502.34	1456931.26		7.05	37°43'30.29486"N	122°22'40.11202"W	TW012
5046	451519.75	1457030.31		6.93	37°43'30.48663"N	122°22'38.88376"W	TW054
5047	451509.21	1457079.90		7.02	37°43'30.39234"N	122°22'38.26397"W	TW010
5048	451505.13	1457136.09		7.80	37°43'30.36315"N	122°22'37.56364"W	TW009
5049	451435.61	1457055.84		8.54	37°43'29.66000"N	122°22'38.54504"W	TW025
5050	451008.80	1457631.14		11.49	37°43'25.55494"N	122°22'31.27919"W	TW039
5051	451051.47	1457607.03		10.28	37°43'25.97197"N	122°22'31.58982"W	TW040
5052	451103.49	1457570.29		7.80	37°43'26.47889"N	122°22'32.06005"W	TW031
5053	451141.02	1457548.32		7.63	37°43'26.84556"N	122°22'32.34285"W	TW032
5054	451195.05	1457513.43		7.87	37°43'27.37275"N	122°22'32.79041"W	TW033
5055	451243.66	1457481.01		6.87	37°43'27.84680"N	122°22'33.20603"W	TW041
5056	451265.48	1457460.42		6.05	37°43'28.05840"N	122°22'33.46775"W	TW042
5058	450451.97	1457905.69		7.50	37°43'20.10500"N	122°22'27.72378"W	TW034
5059	450404.84	1457933.37		7.52	37°43'19.64458"N	122°22'27.36760"W	TW035
5060	450327.83	1457967.80		7.75	37°43'18.89013"N	122°22'26.91983"W	TW037
5061	450357.66	1457932.62		7.59	37°43'19.17808"N	122°22'27.36509"W	TW036
5062	450262.47	1458005.16		8.00	37°43'18.25147"N	122°22'26.43867"W	TW038
5063	450827.56	1457821.39	14.22	12.01	37°43'23.80105"N	122°22'28.86637"W	PZ138E
5066	450888.27	1457884.95	19.30	16.99	37°43'24.41378"N	122°22'28.09054"W	PZ138F
5067	450863.48	1457768.64	14.91	12.59	37°43'24.14562"N	122°22'29.53182"W	PZ144E
5068	450907.56	1457724.79	14.91	12.34	37°43'24.57267"N	122°22'30.08852"W	PZ150E
5069	450889.70	1457707.58	14.82	12.02	37°43'24.39272"N	122°22'30.29820"W	PZ150D
5070	450958.99	1457681.86	14.66	12.10	37°43'25.07266"N	122°22'30.63553"W	PZ161D
5071	450777.83	1457961.77	13.37	11.07	37°43'23.33723"N	122°22'27.10712"W	PZ131F

LEGEND

TW — TEMPORARY WELL LOCATION

PZ — EXISTING PIEZOMETER LOCATION

ESP-1 — SURVEYING CONTROL



Hunters Point Shipyard

Parcel E-2

Monitoring Well Survey

San Francisco, CA

SURVEY INSTRUMENTS

TRIMBLE – 5800 RTK AND

TOPCON DIGITAL LEVEL DL-100

SURVEY CONTROL DATUM

HORIZONTAL (BASIS OF BEARINGS):
CALIFORNIA STATE PLANE COORDINATES, ZONE 3, NAD 27 US FEET. HPGN POINTS HUNTERS POINT EAST "HT0620" & HUNTERS POINT WEST "HT0613"

VERTICAL (BENCH MARK):
PID NO. HT0620 HPGN BRASS CAP MONUMENT (FIRST ORDER CLASS II VERTICAL ORDER)
ELEV. = 7.58' NGVD29 US FEET DATUM.

ESPINOSA SURVEYING

5654 S. Elm Ave.
Easton, CA 93706

Tel. 559.442.0883
Fax 559.442.0884

EMAIL
info@espls.com

DATE OF SURVEY	04/03/08
ESP JOB Path	R:\LP\08051MX
DRAWN BY	N.Sahota
REVISION DATE	05/09/08
DRAWING NAME	MW-Area_E2.dwg

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Appendix F.
Chain-of-custody forms

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CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26693

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder\Ce2	Phone: 415-822-2253	Company Name: Kleinfelder\Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2189762	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015B)	TPH-e (EPA 8015B)	PCB's (EPA 6082)	NH3-N (EPA 350.1)	Diss. Metals (EPA 6010B/7470)
0810G001	Trip Blank	3/4/08	1330	L	3	X				
0810G002	TW046		1346		7	X	X	X	X	X
0810G003	TW047		1430		7	X	X	X	X	X
0810G004	TW048		1445		7	X	X	X	X	X
0810G005	TW051	↓	1517	↓	7	X	X	X	X	X

Analysis Requested/Method Number

PW 3/4/08

PW 3/4/08

PW 3/4/08

Date Shipped:
Carrier:
Waybill No.:
Comments: please filter & acidify metal samples

VOAs unpreserved (7-day HT)

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE ★10 TAT★
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/4/08	1553					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					03/05/08	0810	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26716

Report to: (PLEASE PRINT)	Invoice to: (PLEASE PRINT)
Company Name: Kleinfelder West	Company Name: Kleinfelder West
Phone: 415-822-2253	Phone:
Address:	Address:
Fax:	Fax:
Attn:	Attn:

Project Name/Number	Sampler (Print)	Date Shipped:
E-2/89762	Patricia Walters	Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
89762	Patricia Walters	Comments: please filter & acidify metal samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015B)	NH_3-N (EPA 350.1)	Diss. Methane (EPA 6000/7000)	Analysis Requested/Method Number	Comments
0810G006	Trip Blank	3/5/08	1145	L	3	X			PW 3/5/08	
0810G007	TW052		1224		5	X	X	X	VOAs unpreserved (5 work hold time)	~~PW 3/5/08~~
0810G008	TW053		1255		15	X	X	X		MS/MSD
0810G009	TW021		1343		5	X	X	X		
0810G010	TW021		1348		5	X	X	X		
0810G011	TW001		1415		5	X	X	X		VOAs unpreserved (short holding time)
0810G012	TW049		1446		3	X				
0810G013	TW049		1450		3	X				
0810G014	TW012	↓	1516	↓	3	X				VOAs unpreserved
									PW 3/5/08	

Shuttle Temperature: 2.0°C

Turnaround Requested: MUST CHECK ONE *10 Day TAT*
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/5/08	1559					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-6-08	0810	Anne Guelff

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26717

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder/CE2	Phone: 415-822-2253	Company Name: Kleinfelder/CE2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Date Shipped:
E-2/89762	Patricia Walters	Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
89762	Patricia Walters	Comments: ~~Please filter & acidify Metals Samples~~ PW 3/5/08

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-D (EPA 8015B)	PCBs (EPA 8082)	Comments
0810G007	TW052	3/5/08	1224	L	2	X	X	
0810G008	TW053		1255		6	X	X	MS/MSD
0810G009	TW021		1343		2	X	X	
0810G010	TW021	↓	1348	↓	2	X	X	
~~0810G011~~	~~TW001~~	~~3/5/08~~	~~1415~~	PW	3/5/08			

TW 3/5/08

PW 3/5/08

TW 3/5/08

Analysis Requested/Method Number

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ★10 day TAT★	Sample Disposal:
2.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/5/08	1605					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-6-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26718

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder/Cal	Phone: 415-822-2253	Company Name: Kleinfelder/Cal	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Date Shipped:
E-2189762	Patricia Walters	Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
89762	Patricia Walters	Comments: please filter & acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-d (EPA 8015B)	PCBs (EPA 8082)	Diss Metals (EPA 6010B/7470A)	NH3-N (EPA 350.1)
0810G011	TWC01	3/5/08	1415	L	2	X	X		
0810G012	TW049		1446		4	X	X	X	X
0810G013	TW049		1450		4	X	X	X	X
0810G014	TW012		1516		4	X	X	X	X

PW 3/5/08

PW 3/5/08

PW 3/5/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE * 10 day TAT *	Sample Disposal:
2.5°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/5/08	1609					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-6-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26726

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name	Kleinfelder/CE2	Company Name	Kleinfelder/CE2
Phone:	415-822-2253	Phone:	415-822-2253
Address		Address	
Fax:	415-822-1329	Fax:	415-822-1329
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2, 89762/3	Patricia Walters	PCBs (EPA 8082) TPH-D (EPA 8015B)	Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
0810P00C	TW010	3/6/08	1347	L	2
0810W005	TW017	3/6/08	1358	L	2
0810P007	TW009		1422		2
0810W006	TW016		1428		2
0810W007	TW043	↓	1456	↓	2

PW 3/6/08

PW 3/6/08

PW 3/6/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ★10 day TAT★	Sample Disposal:
2.0°C	☑ Standard (2-3 week) PW 3/6/08 ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1600					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-7-08	0810	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. Nº 26731

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/CE2	Phone: 415-822-2253	Company Name: Kleinfelder/CE2	Phone: 415-822-2253
Address:	Fax: 415-822-1329	Address:	Fax: 415-822-1329
Attn:		Attn:	

Project Name/Number: E2, 89762/3

Purchase Order Number: 89762

Sampler (Print): Gabriel Fuson

Sampler (Signature): Gabriel Fuson

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	PCBs (EPA 8082)	TPH-e (EPA 8015B)
0810P002	TW023	3/6/08	1045	L	2	X	X
0810W002	TW020	3/6/08	1156	L	2	X	X
0810G016	~~TW020~~ TW022 ~~3/6/08~~ 3/6/08	3/6/08	1042	L	6	X	X

Analysis Requested/Method Number

Gabriel Fuson 03/06/08

Sample ID: TW022 MS/MSD

Gabriel Fuson 03/06/08

Date Shipped:

Carrier:

Waybill No.:

Comments:

Shuttle Temperature: 2.0 C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:

☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Gabriel Fuson	03/06/08	1600					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26730

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/CE2	Phone: 415-822-2253	Company Name: Kleinfelder/CE2	Phone: 415-822-2253
Address:	Fax: 415-822-1329	Address:	Fax: 415-822-1329
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2 89762/3	Patricia Walters	PCBs (EPA 8082) / TPH-e (EPA 8015B)	Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
0810P003	TW055	3/6/08	1133	L	2
0810P004	TW054	3/6/08	1220	L	2
0810P005	TW025	3/6/08	1301	L	2
0810W003	TW019	3/6/08	1242	L	2
0810W004	TW018	3/6/08	1317	L	2

PW 3/6/08

PW 3/6/08

PW 3/6/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ~~10 day TAT~~	Sample Disposal:
	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1604					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3/7/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 1 of 2

C.O.C. № 26732

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder	Phone: 415-822-2253	Company Name: Kleinfelder	Phone: 415-822-2253
Address:	Fax: 415-822-1329	Address:	Fax: 415-822-1329
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E2, 89762/3	Patricia Walters	TPH-d (EPA 8015B)	Carrier:
Purchase Order Number: 89762	Sampler (Signature): Patricia Walters	PW 3/6/08	Waybill No.:
		PW 3/6/08	Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-d (EPA 8015B)	Comments
0810P001	Trip Blank	3/6/08	0900	L	3	X	
0810P002	TW023		1045	L	3	X	
0810P003	TW055		1133	L	3	X	
0810P004	TW054		1220	L	3	X	
0810W001	Trip blank		1215	L	3	X	
0810W002	TW020		1156	L	3	X	☆ no preservative ☆
0810 GP16	TW022		1042	L	9	X	MS/MSD
0810P005	TW025		1301	L	3	X	
0810W004	TW018		1317	L	3	X	
0810W003	TW019	↓	1242	L	3	X	

Shuttle Temperature: 2.5°C

Turnaround Requested: MUST CHECK ONE ☆ 10 day TAT ☆

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:

☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1615					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 2 of 2

C.O.C. № 26728

Report to: PLEASE PRINT
Company Name Kleinfelder/CE2 Phone: 415-822-2253
Address _____ Fax: 415-822-1329
Attn: _____

Invoice to: PLEASE PRINT
Company Name Kleinfelder/CE2 Phone: 415-822-2253
Address _____ Fax: 415-822-1329
Attn: _____

Project Name/Number: E-2 89762/3
Purchase Order Number:
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: TPH-g (EPA 8015B)

Date Shipped:
Carrier:
Waybill No.:
Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	
0810P006	TW010	03/06/08	1347	L	3	★ no preservative
~~0810P~~ TRS						
0810W005	TW017	3/6/08	1358	L	3	
0810P007	TW009		1422			
0810W006	TW016		1428			
0810W007	TW043		1456		3	
0810G015	Trip Blank	3/6/08	1015	L	3	

PW 3/6/08

PW 3/6/08

PW 3/6/08

Shuttle Temperature: 2.5C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★ per 3/6/08
☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1615					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 1 of 2

C.O.C. № 26729

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/CE2	Phone: 415-822-2253	Company Name: Kleinfelder/CE2	Phone: 415-822-2253
Address:	Fax: 415-822-1329	Address:	Fax: 415-822-1329
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E289762/3	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss. Metals (EPA 6010B/7470A)	NH_3-N (EPA 350.1)	Analysis Requested/Method Number
0810P002	TW023	3/6/08	1045	L	2	X	X	
0810P003	TW055	3/6/08	1133	L	2	X	X	
0810P004	TW054	3/6/08	1220	L	2	X	X	
0810W002	TW020	3/6/08	1156	L	2	X	X	
0810G016	TW022	3/6/08	1042	L	6	X	X	MS/MSD
0810P005	TW025	3/6/08	1301	L	2	X	X	
0810W004	TW018	↓	1317	L	2	X	X	
0810P006	TW010	↓	1347	L	2	X	X	
0810W003	TW019	3/6/08	1242	L	2	X	X	
0810W005	TW017	3/6/08	1358	L	2	X	X	

PW 3/6/08

PW 3/6/08

Date Shipped:
Carrier:
Waybill No.:
Comments:
please filter & acidify metals samples

Shuttle Temperature: 2.5 °C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★
☑ Standard (2-3 week) per 3/6/08 ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1552					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 2 of 2

C.O.C. № 26724

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name Kleinfelder/CE2	Phone: 415-822-2253	Company Name Kleinfelder/CE2	Phone: 415-822-2253
Address	Fax: 415-822-1329	Address	Fax: 415-822-1329
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
289762/3	Patricia Walters		Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89702	Patricia Walters		Comments: please filter and acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss. Metals (SEPA6010B/7470A)	NH3-N (EPA350.1)
0810P007	TW009	3/6/08	1422	L	2	X	X
0810W006	TW016	↓	1428	L	2	X	X
0810W007	TW043	↓	1456	L	2	X	X

PW 3/6/08

PW 3/6/08

PW 3/6/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
2.5C	☑ PW 3/6/08 Standard (2-3 week) ☐ One week ☐ 24-48 hour — 10 day TAT	☐ Return to client ☐ Disposal by Lab (60-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/6/08	1552					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

c.o.c. № 26695

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/Ce2	Phone: 415-822-2253	Company Name: Kleinfelder/Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2/89762	Patricia Walters	TPCH35 (EPA 8082) / TPH-e (EPA 8015B)	Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPCH35 (EPA 8082)	TPH-e (EPA 8015B)
0810G018	TW024	3/7/08	0909	L	2	X	X
0810P009	TW050		0907		2	X	X
0810G019	TW002		0937		2	X	X
0810G020	TW015		1015		2	X	X
0810P010	TW011	↓	0937	↓	2	X	X

TW 3/7/08

TW 3/7/08

TW 3/7/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ★ 10 day TAT★	Sample Disposal:
3.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (90-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1445					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-8-8	3:02	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 1 of 3

c.o.c. № 26697

Report to: *PLEASE PRINT*	Invoice to: *PLEASE PRINT*
Company Name: Kleinfelder|Ce2	Company Name: Kleinfelder|Ce2
Phone: 415-822-2253	Phone:
Address:	Address:
Fax:	Fax:
Attn:	Attn:

Project Name/Number: E-2/89762	Sampler (Print): Patricia Walters
Purchase Order Number: 89762	Sampler (Signature): Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-D (EPA 8015B)	Analysis Requested/Method Number
0810G018	TW024	3/7/08	0909	L	3	X	TPH-D 8015B
0810P009	TW050	"	0907	"	3	X	
0810G019	TW002	"	0937	"	3	X	*VOAs unpreserved*
0810G020	TW015	"	1015	"	3	X	
0810P010	TW011	"	0937	"	3	X	TPH-D 8015B
0810P011	TW011	"	0942	"	3	X	
0810P012	TW008	"	1018	"	3	X	
0810G021	TW014	"	1038	"	3	X	
0810G022	TW013	"	1102	"	3	X	*VOAs unpreserved*
0810G023	TW044	↓	1123	↓	3	X	*VOAs unpreserved*

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE *10 day TAT*
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1535					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-8-8	3:01	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

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Fresno, CA 93722

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CHAIN OF CUSTODY RECORD

pg 2 of 3

C.O.C. Nº 26701

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/Ce2	Phone: 415-822-2253	Company Name: Kleinfelder/Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/89762	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015M)	Analysis Requested/Method Number
0810G024	TW003	3/7/08	1155	L	3	X	
0810G025	TW006		1218		3	X	★VOAs unpreserved★ sample time = 1050
0810P013	TW007		1429		3	X	
0810P014	TW004		1115		3	X	
0810P015	TW045		1139		3	X	★VOAs unpreserved★
0810P016	TW005		1218		3	X	
0810G017	Trip Blank		0830		3	X	
0810P017	TW034		1452		3	X	
0810P008	Trip Blank		0900		3	X	
0810G026	TW038	↓	1413	↓	3	X	

PW 3/7/08

PW 3/7/08

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1535					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-8-08	3:02pm	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

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4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 3 of 3

C.O.C. № 26719

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder West Co2	Phone: 415-822-7253	Company Name: Kleinfelder West Co2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2189762	Patricia Walters	89462	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Analysis Requested/Method Number: TPH-g (EPA 8015B)	Date Shipped: / Carrier: / Waybill No.: / Comments:
0810G027	TWG37	3/7/08	1448	L	3	X	

PW 3/7/08

PW 3/7/08

PW 3/7/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ☆ 10 day TAT ☆	Sample Disposal:
3.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1535					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-8-8	3:00 pm	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. Nº 26698

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name	Kleinfelder ICe2	Company Name	Kleinfelder ICe2
Phone:	415-822-2253	Phone:	
Address		Address	
Fax:		Fax:	
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/89762	Patricia Walters	89762	Patricia Walters

Analysis Requested/Method Number: EPA 8015M (DRO) TPH-e (EPA 8015B)

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
0810P011	TW011	3/7/08	0942	L	2
0810P012	TW008		1018		2
0810G021	TW014		1038		2
0810G022	TW013		1102		2
0810G023	TW044	↓	1128	↓	2

PW 3/7/08

PW 3/7/08

PW 3/7/08

Sample ID = 0810G023

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 3.0 C

Turnaround Requested: MUST CHECK ONE * 10 day TAT *
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1441					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-8-8	3:02 pm	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

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4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 1 of 2

C.O.C. № 26696

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder\Ce2	Phone: 415-822-2253	Company Name: Kleinfelder\Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2/89762	Patricia Walters		Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments: please filter & acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals (EPA 6010B/7470A)	NH_3-N (EPA 350.1)
0810G018	TW024	3/7/08	0909	L	2	X	X
0810F009	TW050		0907		2	X	X
0810G019	TW002		0937		2	X	X
0810G020	TW015		1015		2	X	X
0810P010	TW011		0937		2	X	X
0810P011	TW011		0942		2	X	X
0810P012	TW008		1018		2	X	X
0810G021	TW014		1038		2	X	X
0810G022	TW013		1102		2	X	X
0810G023	TW044		1128		2	X	X

PW 3/7/08

PW 3/7/08

Shuttle Temperature: 3.5C

Turnaround Requested: MUST CHECK ONE * 10 day TAT ok

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:

☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1500					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-8-8	3:04	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

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Fresno, CA 93722

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CHAIN OF CUSTODY RECORD

Pg 2 of 2

C.O.C. № 26700

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/Ce2	Phone: 415-822-2253	Company Name: Kleinfelder/Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals (EPA 6010B/7470A)	NH3-N (EPA 350.1)
0810G024	TW003	3/7/08	1155	L	2	X	X
0810G025	TW006		1218		2	X	X
0810P013	TW007		1050		2	X	X
0810P014	TW004		1115		2	X	X
0810P015	TW045		1139		2	X	X
0810P016	TW005	↓	1216	↓	2	X	X
			PW 3/7/08				

Analysis Requested/Method Number

PW 3/7/08

PW 3/7/08

Date Shipped:

Carrier:

Waybill No.:

Comments: Please filter & acidify metals samples

Shuttle Temperature: 3.5°C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:

☐ Return to client ☐ Disposal by Lab (60-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1500					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-8-8	3:02pm	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

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4203 W. Swift
Fresno, CA 93722

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C.O.C. Nº 26699

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder West	Phone: 415-822-2253	Company Name: Kleinfelder West	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	PCBs (EPA 8082)	TPH-e (EPA 8015B)
0810G024	TW003	3/7/08	1155	L	2	X	X
0810G025	TW006		1218		2	X	X
0810P013	TW007		1424		2	X	X
0810P014	TW004		1115		2	X	X
0810P015	TW045		1415		2	X	X
0810P016	TW005	↓	1218	↓	2	X	X
			TW 3/7/08				

Analysis Requested/Method Number

TW 3/7/08

TW 3/7/08

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 4.0°C

Turnaround Requested: MUST CHECK ONE: *10 day TAT*
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/7/08	1453					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-8	9:02	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26745

Report to: PLEASE PRINT
Company Name Kleinfelder|Ce2 Phone: 415-822-2258
Address
Fax:
Attn:

Invoice to: PLEASE PRINT
Company Name Kleinfelder|Ce2 Phone:
Address
Fax:
Attn:

Project Name/Number: E-2189762
Purchase Order Number: 89762
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: Diss Metals (EPA 6010B/7470A) | NH3-N (EPA 350.1)

Date Shipped:
Carrier:
Waybill No.:
Comments: please filter & acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals	NH3-N	Comments
0811P020	TW056	3/10/08	0921	L	2	X	X	
0811P019	TW029	3/10/08	0856		2	X	X*	*per client email 3-13-08
0811P021	TW058		1112		2	X	X	
0811P022	TW058		1124		2	X	X	
0811P023	TW057B		1327		2	X	X	
0811P024	TW028B		1359		6	X	X*	MS/MSD
0811D002	TW036		0928		2	X	X*	
0811D004	TW039		1045		2	X	X	
0811D005	TW040		1325		2	X	X	
0811D006	TW040		1330		2	X	X	

TAT 3/10/08

TAT 3/10/08

Shuttle Temperature: 2.0 °C

Turnaround Requested: MUST CHECK ONE
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1640					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/11/08	0810	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26748

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder | CO2	Phone: 415-822-2253	Company Name: Kleinfelder | CO2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2 | 89762	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-e (EPA 8015B)	PCBs (EPA 8082)	Analysis Requested/Method Number	Comments
~~0811P024~~	~~TW028B~~	~~3/4/08~~	~~1359~~	~~L~~	~~6~~	X	X		
0811D002	TW036	↓	0930	|	2	X	X		MS/MSD
0810P017	TW034	3-7-08	1450	|	1	X			limited sample volume
0810P017	TW034	3-10-08	1018	↓	1		X		

PW 3/10/08

PW 3/10/08

PW 3/6/08

* PER client email 3-13-08 (6 containers)

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE * 10 day TAT *	Sample Disposal:
3.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1611					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/10/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. Nº 26746

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder | Cor	Phone: 415-822-2253	Company Name: Kleinfelder | Cor	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015B)	PCBs (EPA 8082)	Diss Metals (EPA 6010B/7470A)	NH3-N (EPA 350.1)	Analysis Requested/Method Number	Date Shipped: / Carrier: / Waybill No.: / Comments:
0811D008	TW031	3/10/08	1417	L	4	X	X	X	X		please filter acetate sample
0811D007	TW031	↓	1412	|	2			X	X		
0810G026	TW038	3/7/08	1423	|	1	X					limited sample volume
0810G026	TW038	3/10/08	1502	|	1		X				
0810G027	TW037	3/7/08	1418	|	1	X					
0810G027	TW037	3/10/08	1507	↓	1		X				
0811P025	TW027B	↓	1521	L	2	X	X				* per client email 3-13-08

PW 3/10/08

PW 3/10/08

PW 3/10/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
3.5 C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1708					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-11-08	0820	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. Nº 26744

PLEASE PRINT

Report to:
Company Name Kleinfelder Co2 Phone: 415-822-2253
Address
Fax:
Attn:

Invoice to:
Company Name Kleinfelder Co2 Phone:
Address
Fax:
Attn:

Project Name/Number: E-2/89762
Purchase Order Number: 89762
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: TPH-D (EPA 8015B); PCBs (EPA 8082)

Date Shipped:
Carrier:
Waybill No.:
Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-D	PCBs	Comments
0811P019	TW029	3/10/08	0956	L	2	X	X	* per client email 3-13-08
0811P020	TW056		0924		2	X	X	
0811P021	TW058		1112		2	X	X	
0811P022	TW058		1124		2	X	X	
0811P023	TW057B		1327		2	X	X	

PW 3/10/08

PW 3/10/08

PW 3/10/08

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE * 10 day TAT *
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1529					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/11/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 26749

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name	Kleinfelder	Company Name	Kleinfelder
Phone	415-8727253	Phone	
Address		Address	
Fax		Fax	
Attn:		Attn:	

Project Name/Number	E-2/89762	Sampler (Print)	Patricia Walters
Purchase Order Number	89762	Sampler (Signature)	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPHd (EPA 8015B)	PCBs (EPA 8082)	Analysis Requested/Method Number
0811D003	TW035	3/10/08	1000	L	1	X		* limited sample volume
0811D004	TW039		1045		2	X	X	
0811D005	TW040		1325		2	X	X	
0811D006	TW040		1330		2	X	X	
0811D007	TW031	↓	1412	↓	2	X	X	

PW 3/10/08

PW 3/10/08

PW 3/10/08

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 2.0°C

Turnaround Requested: MUST CHECK ONE ★ 10 day TAT ★
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1639					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/11/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 1 of 2

C.O.C. № 26743

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name	Kleinfelder	Company Name	Kleinfelder
Phone:	415-822-2253	Phone:	
Address		Address	
Fax:		Fax:	
Attn:		Attn:	

Project Name/Number: E-2/89762	Sampler (Print): Patricia Walters	Analysis Requested/Method Number: TPH-g (EPA 8015B)						Date Shipped:
Purchase Order Number: E-2/89762	Sampler (Signature): Patricia Walters							Carrier:
								Waybill No.:
								Comments:
Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers			
0811D001	Trip Blank	3/10/08	0800	L	3	X		
0811D002	TW036		0928		3	X		
0811D003	TW035		1000		3	X		
0811D004	TW039		1045		3	X		VOAs unpreserved
0811D005	TW040		1325		3	X		
0811D006	TW040		1330		3	X		
0811D007	TW031		1412		3	X		
0811D008	TW031	3/10/08	1417	L	3	X		
				PW 3/10/08				

PW 3/10/08

PW 3/10/08

Shuttle Temperature: 3.0°C	Turnaround Requested: MUST CHECK ONE ☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour			Sample Disposal: ☐ Return to client ☐ Disposal by Lab (30-day retention)				
Relinquished by sampler: Patricia Walters	Date: 3/10/08	Time: 1720	Received by:	Relinquished by:	Date:	Time:	Received by:	
Relinquished by:	Date:	Time:	Received by:	Relinquished by:	Date: 3/11/08	Time: 0800	Received at lab by:	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

Pg 2 of 2

c.o.c. № 26750

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder/Ce2	Phone: 415-822-2253	Company Name: Klein-felder/Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/89762	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015B)	DISS METALS (EPA 6010B/7470)	NH3-N (EPA 350.1)	Analysis Requested/Method Number
0811P018	Trip Blank	3/10/08	0830	L	3	X			
~~0811P019~~	~~TW029~~		0856		3	X			
0811P020	TW056		0921		3	X			
0811P021	TW058		1112		3	X			
0811P022	TW058		1124		3	X			
0811P023	TW057B		1327		3	X			
~~0811P024~~	~~TW028B~~		~~1359~~		~~3~~ 9	X			
0811P025	TW027B	↓	1521	↓	5	X	X	X*	

Rec 3/10/08

Rec 3/10/08

Date Shipped:
Carrier:
Waybill No.:
Comments:
please filter & acidify metals sample

* per client email 3-13-08

MS/MSD 9 containers

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ★ 10 day TAT ★	Sample Disposal:
5.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/10/08	1720					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/11/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 1 of 2

c.o.c. № 27509

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Klenfelder/Co2	Phone: 415-822-2253	Company Name: Klenfelder/Co2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/89762	Patricia Walters	89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Dissolved Sulfide (EPA 9034)	NH_3-N (EPA 350.1)
0811P031	PZ144E	3/4/08	1455	L	2	X	X
0811P032	PZ161B		1331		2	X	X
0811P033	PZ135E		1407		2	X	X
0811D015	PZ131F	↓	1300	↓	2	X	X
	PW 3/4/08						

Analysis Requested/Method Number

PW 3/4/08

PW 3/4/08

Date Shipped:

Carrier:

Waybill No.:

Comments: please filter dissolved metals samples

Sample ID = 0811P034

Shuttle Temperature: 2.0°C

Turnaround Requested: MUST CHECK ONE ★ 10 day TAT

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal: ☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/4/08	1604					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-12-08	0830	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 2 of 2

C.O.C. № 27511

PLEASE PRINT

Report to:
Company Name Kleinfelder (Ce2 Phone: 415-822-2253
Address
Fax:
Attn:

PLEASE PRINT

Invoice to:
Company Name Kleinfelder (Ce2 Phone:
Address
Fax:
Attn:

Project Name/Number: E-2/89762
Purchase Order Number: 89762
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Date Shipped:
Carrier:
Waybill No.:
Comments: ~~please~~ filter 3 acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals (EPA 6010B-7470A)	Nitrate-N (EPA 353.1)	Analysis Requested/Method Number
0811D016	PZ150D	3/4/08	1350	L	6	X	X	MS/MSD
0811D017	PZ130E	↓	1445	↓	2	X	X	

PW 3/4/08

PW 3/4/08

PW 3/4/08

Shuttle Temperature: 2.0°C

Turnaround Requested: MUST CHECK ONE ☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour ☆ 10 day TAT ☆

Sample Disposal: ☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/4/08	1604					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/7/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

pg 1 of 2

C.O.C. № 27505

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder (C62)	Phone: 415-822-2253	Company Name: Kleinfelder (C62)	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2189762	Patricia Walters	TPH-D	Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-D
0811D010	TW032	31k/08	925	L	3	X
0811D011	TW033		950		3	X
0811D012	TW033		1000		3	X
0811D013	TW041		1020		3	X
0811D014	TW042		1050		3	X
0811D009	~~TAP~~ Trip Blank (Per 31k/08)		0822		3	X
0811P032	PZ161B		1331		3	X
0811P033	PZ138F		1407		3	X
0811P034	PZ144E		1455		3	X
0811P026	Trip Blank		849		3	X

Per 31k/08

Per 31k/08

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE ★ 10 day TAT ★

☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal: ☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	31k/08	1600					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-12-08	0820	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26747

PLEASE PRINT

Report to:
Company Name: Kleinfelder Ice 2 Phone: 415-817-2253
Address:
Fax:
Attn:

PLEASE PRINT

Invoice to:
Company Name: Kleinfelder Ice 2 Phone:
Address:
Fax:
Attn:

Project Name/Number	Sampler (Print)
E-2189762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-d (EPA 8015B)	Analysis Requested/Method Number
0811D015	PZ131F	31/08	1300	L	3	X	
0811D016	PZ150D	↓	1350	↓	9	X	MS/MSD
0811D017	PZ130E	↓	1445	↓	3	X	

PW 31/08

PW 31/08

PW 31/08

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 3.0C

Turnaround Requested: MUST CHECK ONE
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	31/08	1600					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-7-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 1 of 2

c.o.c. № 27506

PLEASE PRINT

Report to:
Company Name Kleinfelder (62 Phone: 415-822-2253
Address
Fax:
Attn:

PLEASE PRINT

Invoice to:
Company Name Kleinfelder (62 Phone:
Address
Fax:
Attn:

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Analysis Requested/Method Number

Date Shipped:
Carrier:
Waybill No.:
Comments: ~~please~~ filter's acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals (EPA 6010B/7470A)	NH_3-N (EPA 350.1)	TAT 3/14/08	TAT 3/21/08
0811P027	TW059	3/11/08	0928	L	1	X			
0811P028	TW030B		0948		1	X			
0810P017	TW034		0908		1	X			
0811P029	TW026B		1005		1	X			
0811P030	TW060		1051		1	X			
0811P031	TW061		1122		1	X			
0811D010	TW032		0925		2	X	X		
0811D011	TW033		0950		2	X	X		
0811D012	TW033		1000		2	X	X		
0811D013	TW041	↓	1020	↓	2	X	X		

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE ★ 10 day TAT★
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/14/08	1541					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-12-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 2 of 2

C.O.C. № 27507

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder\Ce2	Phone: 415-822-2253	Company Name: Kleinfelder\Ce2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E2/89762	Patricia Walters	89762	Patricia Walters

Analysis Requested/Method Number: Diss Metals (EPA 6010B) (Hg 7470A); NH3-N (EPA 350.1)

Date Shipped:
Carrier:
Waybill No.:
Comments: please filter & acidify metals samples

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Diss Metals	NH3-N
0811D014	TW042	3/11/08	1050	L	2	X	X
0810G026	TW038		0840		1	X	
0810G027	TW037		0845		1	X	

PW 3/11/08

PW 3/11/08

PW 3/11/08

Shuttle Temperature: 3.0°C

Turnaround Requested: MUST CHECK ONE ★10 day TAT★
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/11/08	154					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3/12/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27510

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder LOC2	Phone: 415-822-2253	Company Name: Kleinfelder LOC2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E2189762	Patricia Walters		Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-e LUFT (8015B)	PCBs (8082)	
0811D016	PZ150D	31/08	1350	L	6	X	X	MS/MSD
0811D017	PZ130E	↓	1445	↓	2	X	X	

PW 31/08

PW 31/08

PW 31/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE ☆ 10 day TAT EA	Sample Disposal:
2.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	31/08	1607					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:
					3-2-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27504

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder	Phone: 415-822-2253	Company Name: Kleinfelder	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
89762	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Analysis Requested/Method Number: PCBs	TPH-e
0811P032	PZ161B	3/11/08	1331	L	2	X	X
0811P033	PZ138F		1407		2	X	X
0811P034	PZ144E		1455		2	X	X
0811D003	TW035		0900		1		X
0811D015	PZ131F		1300		2	X	X

PW 3/11/08

PW 3/11/08

PW 3/11/08

Additional sample volume for TPH-e analysis

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 3.5°C

Turnaround Requested: MUST CHECK ONE
☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (60-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/11/08	1558					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-12-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

C.O.C. № 27508

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder Lee2	Phone: 415-822-2253	Company Name: Kleinfelder Lee2	Phone:
Address:	Fax:	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Analysis Requested/Method Number	Date Shipped:
E-2/89762	Patricia Walters	TPH-g (EPA 8015B) / PCBs (EPA 8082)	Carrier:
Purchase Order Number	Sampler (Signature)		Waybill No.:
89762	Patricia Walters		Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	TPH-g (EPA 8015B)	PCBs (EPA 8082)
0811D010	TW032	3/11/08	0925	L	2	X	X
0811D011	TW033		0950		2	X	X
0811D012	TW033		1000		2	X	X
0811D013	TW041		1020		2	X	X
0811D014	TW042		1050		2	X	X

TW 3/11/08

TW 3/11/08

TW 3/11/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
2.0°C	☐ Standard (2-3 week) ☐ One week ☐ 24-48 hour ★ 10 day TAT ★	☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	3/11/08	1510					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**
					3-12-08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. Nº 27521

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kennedy/JCE2	Phone: 415-822-8253	Company Name: Kennedy/JCE2	Phone:
Address:	Fax: 415-822-1829	Address:	Fax:
Attn:		Attn:	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/ ~~Hunters Point~~ 89762 (3/4/08)	Cynthia Rueles		

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	PCBs	TPH-d	TPH-g	Diss. Metals	NH3-N
0811D003	TW035	3/12/08	0935	L	1	X				
0811D019	PZ138E		1135		7	X	X	X	X	X
0811D018	Trip Blanks		0800		3			X		

CR 3/12/08

CR 3/12/08

Analysis Requested/Method Number

Date Shipped:
Carrier:
Waybill No.:
Comments:

Shuttle Temperature: 2.0

Turnaround Requested: MUST CHECK ONE
☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
	3/12/08	1458					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at Lab by:**
					03/13/08	0800	

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

Appendix G.

Laboratory and data validation reports (CD only)

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LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2L Carlsbad, CA 92009 Phone: 760/634-0437 Fax: 760/634-0439

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612
ATTN: Ms. Tricia Walters

April 15, 2008

SUBJECT: Hunters Point Shipyard, E-2 Investigation, Data Validation

Dear Ms. Walters,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on April 1, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project # 18539:

SDG #	Fraction
55609, 55623, 55636, 55644, 55653, 55667, 55680	Polychlorinated Biphenyls, Dissolved Metals, Ammonia as Nitrogen, Total Petroleum Hydrocarbons as Gasoline, Total Petroleum Hydrocarbons as Extractables

The data validation was performed under EPA Level III and Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, October 2004
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007

Please feel free to contact us if you have any questions.

Sincerely,

Stella S. Cuenco
Project Manager/Senior Chemist

Attachment 1

EDD (15%)

LDC #18539 (CE2-San Diego / Hunters Point Shipyard, E-2 Investigation)

Project #89762

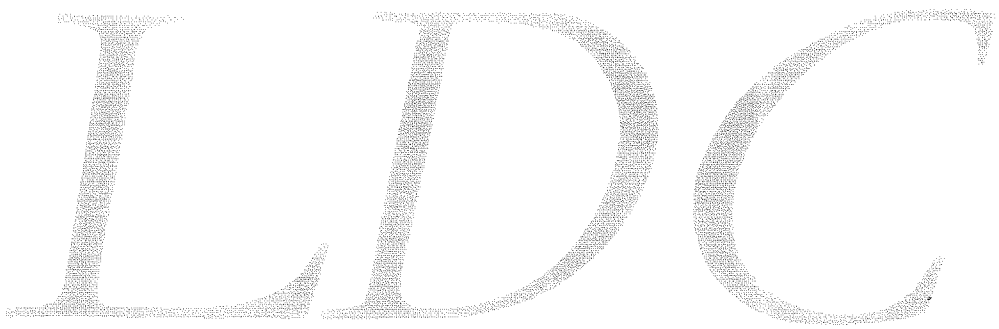
LDC	SDG#	DATE REC'D	(3) DATE DUE	PCBs (8082)		Diss. Metals (SW846)		Diss. Mn (6010B)		TPH-G (8015)		TPH-E (8015)		NH_3 (350.1)																					
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	55609	04/01/08	04/22/08	2	0	2	0	0	0	3	0	2	0	2	0																		
A	55609	04/01/08	04/22/08	2	0	2	0	1	0	2	0	2	0	2	0																		
B	55623	04/01/08	04/22/08	6	0	6	0	1	0	7	0	6	0	7	0																		
B	55623	04/01/08	04/22/08	2	0	2	0	0	0	2	0	2	0	2	0																		
C	55636	04/01/08	04/22/08	10	0	10	0	-	-	13	0	11	0	10	0																		
C	55636	04/01/08	04/22/08	3	0	3	0	-	-	3	0	3	0	3	0																		
D	55644	04/01/08	04/22/08	13	0	13	0	-	-	18	0	13	0	13	0																		
D	55644	04/01/08	04/22/08	3	0	3	0	-	-	3	0	3	0	3	0																		
E	55653	04/01/08	04/22/08	12	0	9	0	-	-	11	0	12	0	7	0																		
E	55653	04/01/08	04/22/08	2	0	3	0	-	-	2	0	2	0	2	0																		
F	55667	04/01/08	04/22/08	11	0	14	0	-	-	12	0	15	0	11	0																		
F	55667	04/01/08	04/22/08	1	0	2	0	-	-	1	0	1	0	1	0																		
G	55680	04/01/08	04/22/08	0	0	0	0	-	-	1	0	0	0	0	0																		
G	55680	04/01/08	04/22/08	1	0	1	0	-	-	1	0	1	0	1	0																		
Total	T/SC			68	0	70	0	2	0	79	0	68	0	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	351

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

18539ST.wpd

Hunters Point Shipyard, E-2 Investigation
Data Validation Reports
LDC# 18539

Polychlorinated Biphenyls



LDC Report# 18539A3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 4, 2008

LDC Report Date: April 9, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55609

Sample Identification

810G002**
810G003
810G004**
810G005

**Indicates sample underwent Level IV review.

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G002
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW046
ARF: 55609
APPL ID: AX74646
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	33.6	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	79.8	30-150		%	3/6/08	3/18/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314054
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:45:35 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G003
Sample Collection Date: 3/4/08

Loc ID: TW047
ARF: 55609
APPL ID: AX74647
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	1.0	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	51.3	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	76.7	30-150		%	3/6/08	3/18/08

EC
4/4/08

Quant Method: PCBSC.M
Run #: 0314055
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:45:35 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G004
Sample Collection Date: 3/4/08

Loc ID: TW048
ARF: 55609
APPL ID: AX74648
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	34.0	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	73.9	30-150		%	3/6/08	3/14/08

BC 4/11/08

Quant Method: PCBSC.M
Run #: 0314011
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:45:35 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G005
Sample Collection Date: 3/4/08

Loc ID: TW051
ARF: 55609
APPL ID: AX74649
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	54.7	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	73.0	30-150		%	3/6/08	3/18/08

BC 4/11/08

Quant Method: PCBSC.M
Run #: 0314056
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:45:35 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539A3b
SDG #: 55609
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/4/08
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ICV ≤ 15%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client specified
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	810G002** W	11	080308WMB	21		31	
2	810G003	12		22		32	
3	810G004**	13		23		33	
4	810G005	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 18539A3b
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Page: 1 of 3
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or ____%R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539A3D
SDG #: R55609

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

LDC #: 18339B-3b
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: W

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238825	17254767	17254767	16	16
			BB (DB-XLB)	10981280	10981300	10871120	10871120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A36
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: LA

METHOD: GC √ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0314005	3/14/08	BB (OB-5MS)	17.255 E6	17.443 E6	17.443 E6	1.1	1.1
			BB (OB-XCB)	10.871 E6	12.174 E6	12.174 E6	12.0	12.0
2	0314053	3/18/08	BB √	17.255 E6	17.203 E6	17.203 E6	0.3	0.3
			BB √	10.871 E6	11.892 E6	11.892 E6	9.4	9.4
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18339A36
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: 1A

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
DCB	DB-XLB	0.286	0.096	33.6	33.6	0
TCMX	✓	✓	0.228	79.8	79.7	0.1

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539B3b
SDG #: 53609

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

_____METHOD: __GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080306W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
B3	1.0	NA	-	0.954	NA	95.4	95.4				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A3b
SDG #: 055609

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1-3 Compound Name ND

Concentration = _____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539B3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 5, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55623

Sample Identification

0810G007
0810G008**
0810G009
0810G010
0810G011
0810G012**
0810G013
0810G014
0810G008MS
0810G008MSD

**Indicates sample underwent Level IV review.

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	RPD (Limits)	Affected Compound	Flag	A or P
0810G008MS/MSD (0810G008**)	PCB-1260	49.8 (50-150)	-	-	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ8 (all non-detects) UJ8 (all non-detects) UJ8 (all non-detects) UJ8 (all non-detects)	A

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 0810G009 and 0810G010 and samples 0810G012** and 0810G013 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810G009	0810G010	
PCB-1260	0.27	0.5U	200

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55623

SDG	Sample	Compound	Flag	A or P	Reason
55623	0810G008**	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ8 (all non-detects) UJ8 (all non-detects) UJ8 (all non-detects) UJ8 (all non-detects)	A	Matrix spike/Matrix spike duplicates (%R)

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G007
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW052
ARF: 55623
APPL ID: AX74761
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	47.6	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	63.9	30-150		%	3/6/08	3/14/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314017
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:21 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G008
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW053
ARF: 55623
APPL ID: AX74762
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected UJ8	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	51.7	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	63.7	30-150		%	3/6/08	3/14/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314024
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G009
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74763
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	0.27 J	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	65.9	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	63.5	30-150		%	3/6/08	3/14/08

BC 4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314025
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G010
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74764
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	64.9	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	62.6	30-150		%	3/6/08	3/14/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314026
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G011
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW001
ARF: 55623
APPL ID: AX74765
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	38.5	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	126	30-150		%	3/6/08	3/18/08

TC
4/4/08

Quant Method: PCBSC.M
Run #: 0314063
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G012
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74766
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	48.3	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	67.3	30-150		%	3/6/08	3/18/08

3/14/08

Quant Method: PCBSC.M
Run #: 0314057
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G013
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74767
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/18/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/18/08
EPA 8082	Surrogate: DECA-PCB	52.5	30-150		%	3/6/08	3/18/08
EPA 8082	Surrogate: TcMX	67.0	30-150		%	3/6/08	3/18/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314058
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G014
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW012
ARF: 55623
APPL ID: AX74768
QCG: $8PHP-080306A-120818

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/6/08	3/14/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/6/08	3/14/08
EPA 8082	Surrogate: DECA-PCB	34.7	30-150		%	3/6/08	3/14/08
EPA 8082	Surrogate: TcMX	61.8	30-150		%	3/6/08	3/14/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314030
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/18/08 12:51:22 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539B3b
SDG #: 55623
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/5/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ICV=1570
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D=3+4. 6+7*
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
* ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All Hg Os

1	0810G007	11	080306W/MB	21		31	
2	0810G008**	12		22		32	
3	0810G009	13		23		33	
4	0810G010	14		24		34	
5	0810G011	15		25		35	
6	0810G012**	16		26		36	
7	0810G013	17		27		37	
8	0810G014	18		28		38	
9	0810G008MS	19		29		39	
10	0810G008MSD	20		30		40	

LDC #: 18539B36
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539B36
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/ RQL				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓	✓	
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

LDC #: 18533B8
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 6 of 7
Reviewer: 9
2nd Reviewer: LA

METHOD: / **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG?

(Y) N N/A Was an MS/MSD analyzed every 20 samples for each matrix or whenever a sample extraction was performed?

Y (N) N/A Were the MS/MSD percent recoveries (%R) and relative percent differences (RPD) within QC limits?

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	9/10	BB	49.8 (50-150)	( )	( )	2 (ND)	J8/UJ8/A(8)
			( )	( )	( )		(Y.2.AA.BB)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 18539B3b
SDG #: 55633

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd reviewer: 1

METHOD: ✓ GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit____	Qualification Parent only / All Samples
	3	4		
PCB-1260	0.27	0.54	200	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 18539B36
SDG #: 35623

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 6

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238825	17254767	17254767	16	16
			BB (DB-XLB)	10981280	10981300	10871120	10871120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B3b
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0314005	3/14/08	BB (DB-5MS)	17.255 26	17.443 26	17.443 26	1.1	1.1
			BB (DB-XLB)	10.871 26	12.174 ✓	12.174 ✓	12.0	12.0
2	03140022	3/14/08	BB	17.255 26	15.125 26	15.125 26	12.3	12.3
			BB	10.871 ↓	10.665 ✓	10.665 26	1.9	1.9
3	0314053	3/18/08	BB	17.255	17.203 26	17.203 26	0.3	0.3
			BB	10.871 ↓	11.892 ✓	11.892 ✓	9.4	9.4
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18589B3b
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
DCB	OB-XLB	0.30	0.155	51.7	51.7	0
TCMX	✓	✓	0.191	63.7	63.7	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539B36
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 9/10

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
~~BB~~	0.990	0.990	ND	0.493	0.581	49.8	49.8	58.7	58.7	16.4	16.4

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B5b
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 2
2nd Reviewer: S

_____METHOD: __✓GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080306W

Compound	Spike Added (ug/L)		Sample Conc (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
BB	1.0	NA	-	0.954	NA	95.4	95.4				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185938
SDG #: 55823

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2.6 Compound Name ND

Concentration = _____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALsw.wpd

LDC Report# 18539C3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 6, 2008

LDC Report Date: April 9, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55636

Sample Identification

0810P002
0810P003
0810P004**
0810W002
0810G016
0810P005**
0810W004**
0810W003
0810P006
0810W005
0810P007
0810W006
0810W007
0810G016MS
0810G016MSD

**Indicates sample underwent Level IV review.

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/20/08	0314139	DB-5MS	PCB-1260	21.9	0810P006 0810P007 0810W006 0810W007	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55636

SDG	Sample	Compound	Flag	A or P	Reason
55636	0810P006 0810P007 0810W006 0810W007	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A	Continuing calibration (%D)

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW023
ARF: 55636
APPL ID: AX74835
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	50.5	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	75.2	30-150		%	3/11/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314135
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW055
ARF: 55636
APPL ID: AX74836
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	41.4	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	67.9	30-150		%	3/11/08	3/19/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314076
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW054
ARF: 55636
APPL ID: AX74837
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	31.9	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	71.1	30-150		%	3/11/08	3/19/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314077
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW020
ARF: 55636
APPL ID: AX74839
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	64.7	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	66.7	30-150		%	3/11/08	3/19/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314078
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810G016
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW022
ARF: 55636
APPL ID: AX74840
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	62.3	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	66.0	30-150		%	3/11/08	3/19/08

BC 4/14/08

Quant Method: PCBSC.M
Run #: 0314081
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW025
ARF: 55636
APPL ID: AX74841
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	68.0	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	78.0	30-150		%	3/11/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314136
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW018
ARF: 55636
APPL ID: AX74842
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	51.0	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	71.7	30-150		%	3/11/08	3/19/08

BC 3/11/08

Quant Method: PCBSC.M
Run #: 0314095
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW019
ARF: 55636
APPL ID: AX74843
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	61.5	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	73.1	30-150		%	3/11/08	3/19/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314088
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW010
ARF: 55636
APPL ID: AX74844
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	36.4	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	104	30-150		%	3/11/08	3/20/08

TC 4/4/08

Quant Method: PCBSC.M
Run #: 0314145
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW017
ARF: 55636
APPL ID: AX74845
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	32.2	30-150		%	3/11/08	3/19/08
EPA 8082	Surrogate: TcMX	68.0	30-150		%	3/11/08	3/19/08

TC 4/4/08

Quant Method: PCBSC.M
Run #: 0314090
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW009
ARF: 55636
APPL ID: AX74846
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	54.9	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	76.1	30-150		%	3/11/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314140
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW016
ARF: 55636
APPL ID: AX74847
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected ↓	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	30.0	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	79.3	30-150		%	3/11/08	3/20/08

BK 4/4/09

Quant Method: PCBSC.M
Run #: 0314146
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:05 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW043
ARF: 55636
APPL ID: AX74848
QCG: $8PHP-080311A-120905

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/11/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/11/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	50.8	30-150		%	3/11/08	3/20/08
EPA 8082	Surrogate: TcMX	84.2	30-150		%	3/11/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314141
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 11:11:06 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539C3b
SDG #: 55636
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: a
2nd Reviewer: w

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/6/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	ICV ≤ 15%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All H2Os

1	0810P002	11	0810P007	21	680311WMS	31	
2	0810P003	12	0810W006	22		32	
3	0810P004**	13	0810W007	23		33	
4	0810W002	14	0810G016MS	24		34	
5	0810G016	15	0810G016MSD	25		35	
6	0810P005**	16		26		36	
7	0810W004**	17		27		37	
8	0810W003	18		28		38	
9	0810P006	19		29		39	
10	0810W005	20		30		40	

LDC #: 18539C36
SDG #: 65636

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: LV

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18339C36
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X. ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

LDC #: 18539C3b
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ✓ %D or __ RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	~~Detector~~ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	8/20/08	0314139	DB-5MS	BB	21.9	( )	9.11-13 (ND)	J/UJ/A
						( )		
						( )		(Y, Z, AA, BB)
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

LDC #: 18539C36
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: V

METHOD: GC √ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238825	1725476	1725476	16	16
			BB (DB-XLB)	1098280	1098130	1087120	1087120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539236
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer: [illegible]

METHOD: GC √ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0314070	3/19/08	BB (OB-5M3)	17.255 ug/L	16.623 ug/L	16.623 ug/L	3.7	3.7
			BB (OB-XLB)	10.871 ug/L	11.256 ug/L	11.256 ug/L	3.5	3.5
2	0314087	3/19/08	BB	17.255 ug/L	15.026 ug/L	15.026 ug/L	12.9	12.9
			BB	10.871 ug/L	10.331 ug/L	10.331 ug/L	5.0	5.0
3	0314127	3/20/08	BB	17.255 ug/L	16.158 ug/L	16.158 ug/L	6.4	6.4
			BB	10.871 ug/L	10.458 ug/L	10.458 ug/L	3.8	3.8
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 13539C36
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: __ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 3

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
DCB	DB-XLB	0.291	0.093	31.9	31.9	0
TCMX	↓	↓	0.207	71.1	71.1	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 85396
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: d
2nd Reviewer: [illegible]

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: ~~14~~/15

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
BB	1.0	1.0	ND	0.810	0.826	81.0	81.0	82.6	82.6	2.0	2.0

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C36
SDG #: 54636

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

_____METHOD: ✓GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD =(((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD))*100

LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080311W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
BB	1.0	NA	-	0.927	NA	92.7	92.7				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C36
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: CA
2nd Reviewer: LA

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. ND Compound Name _____

Concentration = _____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539D3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7, 2008

LDC Report Date: April 9, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55644

Sample Identification

0810G018
0810P009
0810G019
0810G020**
0810P010
0810P011
0810P012
0810G021**
0810G022
0810G023
0810G024
0810G025
0810P013
0810P014
0810P015
0810P016**

**Indicates sample underwent Level IV review.

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/19/08	0314113	DB-5MS	PCB-1260	20.4	0810P013 0810P014 0810P015	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 0810P010 and 0810P011 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55644

SDG	Sample	Compound	Flag	A or P	Reason
55644	0810P013 0810P014 0810P015	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A	Continuing calibration (%D)

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G018
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW024
ARF: 55644
APPL ID: AX74906
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	72.4	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	66.6	30-150		%	3/14/08	3/19/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314098
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P009
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW050
ARF: 55644
APPL ID: AX74907
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	73.9	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	66.9	30-150		%	3/14/08	3/19/08

4/11/08

Quant Method: PCBSC.M
Run #: 0314099
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G019
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW002
ARF: 55644
APPL ID: AX74908
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	69.7	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	59.1	30-150		%	3/14/08	3/19/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314102
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G020
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW015
ARF: 55644
APPL ID: AX74909
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	71.7	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	59.7	30-150		%	3/14/08	3/19/08

RC 4/11/08

Quant Method: PCBSC.M
Run #: 0314103
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P010
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74910
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	70.7	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	60.9	30-150		%	3/14/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314147
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P011
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74911
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	72.0	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	67.3	30-150		%	3/14/08	3/20/08

TC 4/4/08

Quant Method: PCBSC.M
Run #: 0314148
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P012
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW008
ARF: 55644
APPL ID: AX74912
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	70.7	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	64.6	30-150		%	3/14/08	3/19/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314106
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G021
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW014
ARF: 55644
APPL ID: AX74913
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	73.8	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	71.4	30-150		%	3/14/08	3/19/08

BC
4/4/08

Quant Method: PCBSC.M
Run #: 0314107
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G022
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW013
ARF: 55644
APPL ID: AX74914
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	67.3	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	67.3	30-150		%	3/14/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314149
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G023
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW044
ARF: 55644
APPL ID: AX74915
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	74.9	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	70.7	30-150		%	3/14/08	3/19/08

BC 4/11/08

Quant Method: PCBSC.M
Run #: 0314109
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:13 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G024
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW003
ARF: 55644
APPL ID: AX74916
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	76.3	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	68.0	30-150		%	3/14/08	3/20/08

TC 4/4/08

Quant Method: PCBSC.M
Run #: 0314150
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G025
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW006
ARF: 55644
APPL ID: AX74917
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	73.8	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	67.6	30-150		%	3/14/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314151
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P013
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW007
ARF: 55644
APPL ID: AX74918
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	75.3	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	74.3	30-150		%	3/14/08	3/19/08

BC 4/4/09

Quant Method: PCBSC.M
Run #: 0314114
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P014
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW004
ARF: 55644
APPL ID: AX74919
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected U J5	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	71.6	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	66.2	30-150		%	3/14/08	3/19/08

3C
4/4/08

Quant Method: PCBSC.M
Run #: 0314115
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P015
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW045
ARF: 55644
APPL ID: AX74920
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	77.6	30-150		%	3/14/08	3/19/08
EPA 8082	Surrogate: TcMX	71.8	30-150		%	3/14/08	3/19/08

BC 4/4/09

Quant Method: PCBSC.M
Run #: 0314116
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P016
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW005
ARF: 55644
APPL ID: AX74921
QCG: $8PHP-080314A-120915

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	0.64	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	77.9	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	74.2	30-150		%	3/14/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314152
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/20/08 1:22:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539D3b
SDG #: 55644
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: Q
2nd Reviewer: V

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	A	ICV=1570
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client specified
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	ND	D=5+6
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MW H2O's

1	0810G018	11	0810G024	21	080314W/MB	31	
2	0810P009	12	0810G025	22		32	
3	0810G019	13	0810P013	23		33	
4	0810G020**	14	0810P014	24		34	
5	0810P010	15	0810P015	25		35	
6	0810P011	16	0810P016**	26		36	
7	0810P012	17		27		37	
8	0810G021**	18		28		38	
9	0810G022	19		29		39	
10	0810G023	20		30		40	

LDC #: 18539D06
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: W

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539036
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 2 of 5
Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/RLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?		✓		
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

LDC #: 18539D36
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: 9
2nd Reviewer: L

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)
Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A".

What type or calibration verification calculation was performed? ___ %D or ___ RPD

(Y) N N/A Were Evaluation mix standards run before initial calibration and before samples?
(Y) N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?
(Y) N N/A Was at least one standard run daily to verify the working curve?
Y (N) N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤15.0%?

~~Level IV/D Only~~
(Y) N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 15.0)	RT (Limits)	Associated Samples	Qualifications
	3/19/08	0314113	DB-5MS	BB	20.4	( )	13-15 (ND)	J5/UJ5/A
						( )		(4.2.AA.BB)
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

A. alpha-BHC	E. Heptachlor	I. Dieldrin	M. 4,4'-DDD	Q. Endrin ketone	~~U. Toxaphene~~	Y. Aroclor-1242	CC. DB 608	GG.
B. beta-BHC	F. Aldrin	J. 4,4'-DDE	N. Endosulfan sulfate	R. Endrin aldehyde	V. Aroclor-1016	~~Z. Aroclor-1248~~	DD. DB 1701	HH.
C. delta-BHC	G. Heptachlor epoxide	K. Endrin	O. 4,4'-DDT	S. alpha-Chlordane	W. ~~Aroclor-1221~~	AA. Aroclor-1254	EE.	II.
D. gamma-BHC	H. Endosulfan I	L. Endosulfan II	P. Methoxychlor	T. gamma-Chlordane	X. ~~Aroclor-1232~~	BB. Aroclor-1260	FF.	JJ.

CONCAL

LDC #: 18539036
SDG #: 5564

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 6

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238725	1725476	1725476	16	16
			BB (DB-XLB)	10981280	10981300	10871120	10871120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539036
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer:

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	031401	3/19/08	BB (DB-5MS)	17.755 26	15.793 26	15.793 26	8.5	8.5
			BB (DB-XLB)	10.871 26	10.616 26	10.616 ✓	2.3	2.3
2	031404	3/20/08	BB	17.755 26	15.650 26	15.650 26	9.3	9.3
			BB	10.871 ✓	10.375 ✓	10.375 ✓	4.6	4.6
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539036
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: T
2nd reviewer: LA

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

Surrogate	Column/~~Detector~~	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
DCB	DB-XLB	0.30	0.215	71.7	71.7	0
TCMX	↓	0.30	0.179	59.7	59.7	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18589026
SDG #: 53644

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

____METHOD: _✓_GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080314W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
BB	1.0	NA	—	0.798	NA	79.8	79.8				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539036
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1a

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 16 Compound Name BB

Concentration = $\frac{(7214185)(2000)(1)}{(10871120)(1030)(2)}$

$= 0.644$ µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539E3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7 through March 11, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55653

Sample Identification

0811D002
0811D003
0811D004
0811D005
0811D006
0811D007**
0811D008
0811P020
0811P021
0811P022
0811P023**
0810P017
0810G026
0810G027

**Indicates sample underwent Level IV review.

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/20/08	0314164	DB-5MS	PCB-1260	19.0	0811D002 0811D003 0811P020	PCB-1242 PCB-1248 PCB-1254 PCB-1260	J5 (all detects) UJ5 (all non-detects)	A
3/20/08	0314183	DB-5MS	PCB-1260	20.9	0811P021 0811P022 0811P023** 0810P017 0810G027	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A
3/22/08	0314193	DB-5MS	PCB-1260	21.4	0811D004 0811D005 0811D006 0810G026	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/24/08	0314204	DB-5MS	PCB-1260	19.4	0811D007** 0811D008	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 0811D005 and 0811D006, samples 0811D007** and 0811D008, and samples 0811P021 and 0811P022 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D005	0811D006	
PCB-1016	2.0	2.0	0

Compound	Concentration (ug/L)		RPD
	0811D007**	0811D008	
PCB-1016	0.99	0.92	7

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55653

SDG	Sample	Compound	Flag	A or P	Reason
55653	0811D002 0811D003 0811D004 0811D005 0811D006 0811D007** 0811D008 0811P020 0811P021 0811P022 0811P023** 0810P017 0810G026 0810G027	PCB-1242 PCB-1248 PCB-1254 PCB-1260	J5 (all detects) UJ5 (all non-detects)	A	Continuing calibration (%D)

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D002
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW036
ARF: 55653
APPL ID: AX74988
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected ↓	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected ↓	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	0.28 J J5	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	79.7	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	70.7	30-150		%	3/14/08	3/20/08

BC 4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314172
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D003
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW035
ARF: 55653
APPL ID: AX74989
QCG: $8PHP-080314B-121017

Method	Analyte	Result		PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected		0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected		0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected		0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected	UJ5	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	↓	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected		0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected		0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	80.4		30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	73.2		30-150		%	3/14/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314173
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:30 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D004
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW039
ARF: 55653
APPL ID: AX74990
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	0.92 J	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	Surrogate: DECA-PCB	73.5	30-150		%	3/14/08	3/22/08
EPA 8082	Surrogate: TcMX	65.9	30-150		%	3/14/08	3/22/08

4/1/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314195
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D005
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74991
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	2.0 J	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	Surrogate: DECA-PCB	84.6	30-150		%	3/14/08	3/22/08
EPA 8082	Surrogate: TcMX	85.3	30-150		%	3/14/08	3/22/08

BC
4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314197
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D006
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74992
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	2.0 J	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	Surrogate: DECA-PCB	81.1	30-150		%	3/14/08	3/22/08
EPA 8082	Surrogate: TcMX	83.2	30-150		%	3/14/08	3/22/08

BC 4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314198
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D007
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74993
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	0.99 J	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1242	Not detected UJ 5	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/24/08
EPA 8082	Surrogate: DECA-PCB	86.7	30-150		%	3/14/08	3/24/08
EPA 8082	Surrogate: TcMX	92.6	30-150		%	3/14/08	3/24/08

4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314206
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D008
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74994
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	0.92 J	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/24/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/24/08
EPA 8082	Surrogate: DECA-PCB	81.1	30-150		%	3/14/08	3/24/08
EPA 8082	Surrogate: TcMX	85.3	30-150		%	3/14/08	3/24/08

4/11/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314205
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P020
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW056
ARF: 55653
APPL ID: AX74997
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected ↓	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	73.8	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	69.7	30-150		%	3/14/08	3/20/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314179
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P021
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74998
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected U75	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	78.7	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	74.9	30-150		%	3/14/08	3/20/08

B
4/4/08

Quant Method: PCBSC.M
Run #: 0314184
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P022
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74999
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	78.7	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	74.5	30-150		%	3/14/08	3/20/08

BC
4/14/08

Quant Method: PCBSC.M
Run #: 0314185
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P023
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW057B
ARF: 55653
APPL ID: AX75000
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected ↓	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	77.0	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	69.7	30-150		%	3/14/08	3/20/08

BC
4/4/08

Quant Method: PCBSC.M
Run #: 0314186
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P017
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW034
ARF: 55653
APPL ID: AX75003
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	74.9	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	67.9	30-150		%	3/14/08	3/20/08

4/14/08

Quant Method: PCBSC.M
Run #: 0314187
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G026
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW038
ARF: 55653
APPL ID: AX75005
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	2.6 J	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/22/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/22/08
EPA 8082	Surrogate: DECA-PCB	63.4	30-150		%	3/14/08	3/22/08
EPA 8082	Surrogate: TcMX	59.6	30-150		%	3/14/08	3/22/08

BC
4/4/08

J = Estimated value.

Quant Method: PCBSC.M
Run #: 0314196
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 4:21:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G027
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW037
ARF: 55653
APPL ID: AX75007
QCG: $8PHP-080314B-121017

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1242	Not detected U35	0.5	0.12	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/14/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/14/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	62.7	30-150		%	3/14/08	3/20/08
EPA 8082	Surrogate: TcMX	58.1	30-150		%	3/14/08	3/20/08

BC
4/4/08

Quant Method: PCBSC.M
Run #: 0314189
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/24/08 2:56:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539E3b
SDG #: 55653
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: A
2nd Reviewer: W

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7 - 11/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	lev=15%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client specified
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	SW	D=4+5.6+7.9+10*
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MH=20s

1	0811D002	11	0811P023**	21	080314W/MB	31	
2	0811D003	12	0811P017 (10)	22		32	
3	0811D004	13	0811G026 (10)	23		33	
4	0811D005	14	0811G027 (10)	24		34	
5	0811D006	15		25		35	
6	0811D007**	16		26		36	
7	0811D008	17		27		37	
8	0811P020	18		28		38	
9	0811P021	19		29		39	
10	0811P022	20		30		40	

LDC #: 18539E3b
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: lw

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18593b
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X. ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

V:\Validation Worksheets\Pesticides\COMPLST-3S.wpd

LDC #: 18539e3b
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: A
2nd Reviewer:

METHOD: GC Pesticides/PCBs (EPA SW 846 Method 8081/8082)
Please see qualifications below for all questions answered "N" Not applicable questions are identified as "N/A".

What type or calibration verification calculation was performed? ___ %D or ___ RPD

Y N N/A Were Evaluation mix standards run before initial calibration and before samples?
Y N N/A Were Endrin & 4,4'-DDT breakdowns acceptable in the Evaluation Mix standard (≤15.0% for individual breakdowns)?
Y N N/A Was at least one standard run daily to verify the working curve?
Y N N/A Did the continuing calibration standards meet the percent difference (%D) / relative percent difference (RPD) criteria of ≤15.0%?

Level IV/D Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Column	Compound	%D (Limit ≤ 15.0)	RT (Limits)	Associated Samples	Qualifications
	3/20/08	0314164	DB5MS	~~BB~~	19.0	( )	1-2.8.~~BK~~	J5/UJ5/A
						( )	(dets+ND)	(Y.2.~~AA~~.BB)
						( )		
						( )		
	3/20/08	0314183	DB-5MS	BB	20.9	( )	9-12.14	J5/UJ5/A
						( )	(ND)	(Y.2.~~AA~~.BB)
						( )		
						( )		
	3/22/08	0314193	DB-5MS	BB	21.4	( )	3,4-5.13	J5/UJ5/A
						( )	(ND)	(Y.2.~~AA~~.BB)
						( )		↓
						( )		
	3/24/08	0314204	DB-5MS	BB	19.4	( )	6-7 (ND)	
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

A. alpha-BHC
B. beta-BHC
C. delta-BHC
D. gamma-BHC
E. Heptachlor
F. Aldrin
G. Heptachlor epoxide
H. Endosulfan I
I. Dieldrin
J. 4,4'-DDE
K. Endrin
L. Endosulfan II
M. 4,4'-DDD
N. Endosulfan sulfate
O. 4,4'-DDT
P. Methoxychlor
Q. Endrin ketone
R. Endrin aldehyde
S. alpha-Chlordane
T. gamma-Chlordane
U. Toxaphene
V. Aroclor-1016
W. Aroclor-1221
X. Aroclor-1232
Y. Aroclor-1242
Z. Aroclor-1248
AA. Aroclor-1254
BB. Aroclor-1260
CC. DB 608
DD. DB 1701
EE.
FF.
GG.
HH.
II.
JJ.

CONCAL

LDC #: 18539E3b
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd reviewer: b

METHOD: ✓ GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y/N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit ____	Qualification Parent only / All Samples
	4	5		
~~8~~ PCB-1016	2.0	2.0	0	

Compound	Concentration (µg/L)		%RPD Limit ____	Qualification Parent only / All Samples
	6	7		
PCB-1016	0.99	0.92	7	

LDC #: 18539236
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238725	17254767	17254767	16	16
			BB (DB-XLB)	10981280	10981300	10871120	10871120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539236
SDG #: 55655

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration ~~average CF~~
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0314164	3/20/08	BB (DB-5MS)	17.255 26	13.983 26	13.983 26	19.0	19.0
			BB (DB-XLB)	10.871 26	9.755 26	9.755 26	10.3	10.3
2	0314183	3/20/08	BB	17.255 26	13.654 26	13.654 26	20.9	20.9
			BB ↓	10.871 26	9.810 26	9.810 26	9.8	9.8
3	0314202	3/22/08	BB	17.255 26	15.342 26	15.342 26	11.1	11.1
			BB ↓	10.871 26	10.507 26	10.507 ✓	3.3	3.3
4	0314204	3/24/08	BB	17.255 26	13.905 26	13.905 26	19.4	19.4
			BB ↓	10.871 ✓	10.184 26	10.184 ✓	6.3	6.3

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 18539236
SDG #: 55653

METHOD: √ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: [illegible]

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 11

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
TCMX	DB-XLB	0.286	0.199	69.7	69.7	0
DCB	√	√	0.220	77.0	77.0	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539E3b
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer:

_____METHOD: _✓_GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080314W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
~~BB~~	1.0	NA	—	0.794	NA	79.4	79.4				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539E3b
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: 9
2nd Reviewer: 1a

METHOD: __✓__ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 6 Compound Name V

Concentration = $\frac{(7837494)(2000)(1)}{(7584675)(1040)(2)}$

$= 0.99$ ug/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539F3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 11, 2008

LDC Report Date: April 9, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55667

Sample Identification

0811D010
0811D011
0811D012
0811D013
0811D014
0811P032**
0811P033
0811P034
0811D015
0811D016
0811D016RE
0811D017
0811D016MS
0811D016MSD

**Indicates sample underwent Level IV review.

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
0811D016RE	All TCL compounds	14	7	J1 (all detects) UJ1 (all non-detects)	A

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/19/08	0314113	DB-5MS	PCB-1260	20.4	0811D011 0811D012 0811D013 0811D014 0811P032**	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits for samples on which a Level IV review was performed. Raw data were not evaluated for the samples on which a Level III review was performed.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which an Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0811D016RE	All TCL compounds	R22	A

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

Samples 0811D011 and 0811D012 were identified as field duplicates. No polychlorinated biphenyls were detected in any of the samples.

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55667

SDG	Sample	Compound	Flag	A or P	Reason
55667	0811D016RE	All TCL compounds	J1 (all detects) UJ1 (all non-detects)	A	Technical holding times
55667	0811D011 0811D012 0811D013 0811D014 0811P032**	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A	Continuing calibration (%D)
55667	0811D016RE	All TCL compounds	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D010
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW032
ARF: 55667
APPL ID: AX75104
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	105	30-150		%	3/18/08	3/20/08
EPA 8082	Surrogate: TcMX	52.8	30-150		%	3/18/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314153
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:05 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D011
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75105
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	133	30-150		%	3/18/08	3/19/08
EPA 8082	Surrogate: TcMX	66.1	30-150		%	3/18/08	3/19/08

PC 4/14/08

Quant Method: PCBSC.M
Run #: 0314121
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:05 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D012
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75106
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	65.9	30-150		%	3/18/08	3/19/08
EPA 8082	Surrogate: TcMX	65.0	30-150		%	3/18/08	3/19/08

4/11/08

Quant Method: PCBSC.M
Run #: 0314122
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:05 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D013
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW041
ARF: 55667
APPL ID: AX75107
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	50.8	30-150		%	3/18/08	3/19/08
EPA 8082	Surrogate: TcMX	55.8	30-150		%	3/18/08	3/19/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314123
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:05 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D014
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW042
ARF: 55667
APPL ID: AX75108
QCG: $8PHP-080318A-121048

Method	Analyte	Result		PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected		0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1221	Not detected		0.5	0.08	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1232	Not detected		0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1242	Not detected	UJ5	0.5	0.12	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1248	Not detected		0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1254	Not detected		0.5	0.20	ug/L	3/18/08	3/19/08
EPA 8082	PCB-1260	Not detected		0.5	0.09	ug/L	3/18/08	3/19/08
EPA 8082	Surrogate: DECA-PCB	125		30-150		%	3/18/08	3/19/08
EPA 8082	Surrogate: TcMX	64.4		30-150		%	3/18/08	3/19/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314124
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:06 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P032
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ161D
ARF: 55667
APPL ID: AX75110
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1242	Not detected UJ5	0.5	0.12	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	03/18/08	03/19/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	03/18/08	03/19/08
EPA 8082	Surrogate: DECA-PCB	80.0	30-150		%	03/18/08	03/19/08
EPA 8082	Surrogate: TcMX	57.3	30-150		%	03/18/08	03/19/08

Quant Method: PCBSC.M
Run #: 0314125
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 04/21/08 10:28:11 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

AMENDED PAGE

4/21/08 JT

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011P033
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138F
ARF: 55667
APPL ID: AX75111
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	69.9	30-150		%	3/18/08	3/20/08
EPA 8082	Surrogate: TcMX	56.8	30-150		%	3/18/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314128
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:06 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011P034
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ144E
ARF: 55667
APPL ID: AX75112
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	83.3	30-150		%	3/18/08	3/20/08
EPA 8082	Surrogate: TcMX	54.7	30-150		%	3/18/08	3/20/08

4/1/08

Quant Method: PCBSC.M
Run #: 0314154
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:06 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011D015
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ131F
ARF: 55667
APPL ID: AX75114
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1254	7.2	0.5	0.20	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	90.3	30-150		%	3/18/08	3/20/08
EPA 8082	Surrogate: TcMX	57.4	30-150		%	3/18/08	3/20/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314130
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/25/08 2:37:06 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D016
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150D
ARF: 55667
APPL ID: AX75115
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	1.1	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/18/08	3/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/18/08	3/20/08
EPA 8082	Surrogate: DECA-PCB	91.9	30-150		%	3/18/08	3/20/08
EPA 8082	Surrogate: TcMX	66.2	30-150		%	3/18/08	3/20/08

TC 4/14/08

Quant Method: PCBSC.M
Run #: 0314157
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/26/08 1:54:01 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER ReExt

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D016
Sample Collection Date: 3/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150D
ARF: 55667
APPL ID: AX75115
QCG: $8PHPX-080325B-121072

Method	Analyte	Result		PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	0.62	R22	0.5	0.12	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1221	Not detected		0.5	0.08	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1232	Not detected		0.5	0.12	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1242	Not detected		0.5	0.12	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1248	Not detected		0.5	0.09	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1254	Not detected		0.5	0.20	ug/L	3/25/08	3/26/08
EPA 8082	PCB-1260	Not detected		0.5	0.09	ug/L	3/25/08	3/26/08
EPA 8082	Surrogate: DECA-PCB	73.2		30-150		%	3/25/08	3/26/08
EPA 8082	Surrogate: TcMX	82.6		30-150		%	3/25/08	3/26/08

4/4/08

Quant Method: PCBSC.M
Run #: 0314214
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/26/08 1:54:20 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D017
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150E
ARF: 55667
APPL ID: AX75116
QCG: $8PHP-080318A-121048

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1242	Not detected	0.5	0.12	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	03/18/08	03/20/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	03/18/08	03/20/08
EPA 8082	Surrogate: DECA-PCB	67.3	30-150		%	03/18/08	03/20/08
EPA 8082	Surrogate: TcMX	65.7	30-150		%	03/18/08	03/20/08

Quant Method: PCBSC.M
Run #: 0314134
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 04/21/08 2:32:27 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

AMENDED PAGE

4/21/08 Q

LDC #: 18539F3b
SDG #: 55667
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: Q
2nd Reviewer: V

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	~~TW~~	Sampling dates: 3/11/08
II.	GC/ECD Instrument Performance Check	A	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	TW	ICV ≤ 15%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	Not reviewed for Level III validation.
XII.	Compound quantitation and reported CRQLs	A	Not reviewed for Level III validation.
XIII.	Overall assessment of data	TW	
XIV.	Field duplicates	ND	D = 2+3
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MH2O

1	0811D010	11	0811D016RE	21	080318W/MB	31	
2	0811D011	12	0811D017	22	080325W/MB	32	
3	0811D012	13	0811D016MS	23		33	
4	0811D013	14	0811D016MSD	24		34	
5	0811D014	15		25		35	
6	0811P032**	16		26		36	
7	0811P033	17		27		37	
8	0811P034	18		28		38	
9	0811D015	19		29		39	
10	0811D016	20		30		40	

LDC #: 18539f3b
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: A
2nd Reviewer: V

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.		✓		
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓	✓	
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539F3b
SDG #: 5566T

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?		✓		
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X. ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

V:\Validation Worksheets\Pesticides\COMPLST-3S.wpd

LDC #: 18539F36
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
(Y) N N/A Were all cooler temperatures within validation criteria?

METHOD: ✓ GC ___ HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
11	W	X	3-11-08	3-25-08	3-26-08	14	~~J~~ VI/VN I/A (dets & ND)

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

HTNew.wpd

LDC #: 18539F3b
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9

METHOD: √ GC __ HPLC

2nd Reviewer: ~

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? √ %D or __ RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?

Level IV Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	3/19/08	031413	DB-5MS	BB	20.4	( )	2-6 (NO)	J5/UN5/A (Y.2.AA,BB)
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

LDC #: 18539F3b
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 2
2nd Reviewer: 2

METHOD: ✓ **GC** ___ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	11	All	11	R/A (22)

Comments: _____

LDC #: 18539F2b
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238825	1725476	1725476	16	16
			BB (DB-XLB)	10981280	10981300	10871120	10871120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F3b
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	031413	3/19/18	BB (OB-5MS)	17.255 E6	13.731 E6	13.731 E6	20.4	20.4
			✓ (OB-XLB)	10.871 ✓	9.286 ✓	9.286 ✓	14.6	14.6
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F36
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer: 6

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 6

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
DCB	DB-XLB	0.306	0.214	80.°	70.°	10
TCMX	✓	✓	0.194	57.3	56.9	4

Sample ID: 6

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
DCB	DB-XLB	0.300	0.240	80.0	80.0	0
TCM	✓	✓	0.172	57.3	57.3	0

Sample ID: ___

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 18539F3b
SDG #: 63667

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: 9
2nd Reviewer: 4

METHOD: __√GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 13/16

Compound	Spike Added (µg/L)		Sample Conc (µg/L)	Spike Sample Concentration (µg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
PCB-1260	2.0	2.0	NO	1.22	1.37	61.0	61.0	68.5	68.5	11.6	11.6

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18639f3b
SDG #: 035667

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 1
2nd Reviewer:

____METHOD: V GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration
SA = Spike added
SC = Sample concentration
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 680318W

Compound	Spike Added (ug/L)		Sample Conc (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
PCB-1260	1.0	NA	-	0.820	NA	82.0	82.0				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F3b
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 6 Compound Name ND

Concentration = _____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539G3b

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 12, 2008

LDC Report Date: April 9, 2008

Matrix: Water

Parameters: Polychlorinated Biphenyls

Validation Level: Level IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55680

Sample Identification

0811D019

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8082 for Polychlorinated Biphenyls.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section V.

Field duplicates are summarized in Section XIV.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/ECD Instrument Performance Check

Instrument performance was acceptable unless noted otherwise under initial calibration and continuing calibration sections.

III. Initial Calibration

Initial calibration of multicomponent compounds was performed for the primary (quantitation) column as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were evaluated and considered technically acceptable.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) of calibration factors in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Affected Compound	Flag	A or P
3/22/08	0314193	DB-5MS	PCB-1260	21.4	All samples in SDG 55680	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

Retention times (RT) of all compounds in the calibration standards were within QC limits.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No polychlorinated biphenyl contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Pesticide Cleanup Checks

a. Florisil Cartridge Check

Florisil cleanup was not required and therefore not performed in this SDG.

b. GPC Calibration

GPC cleanup was not required and therefore not performed in this SDG.

XI. Target Compound Identification

All target compound identifications were within validation criteria.

XII. Compound Quantitation and Reported CRQLs

All compound quantitation and CRQLs were within validation criteria.

XIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIV. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Data Qualification Summary - SDG 55680

SDG	Sample	Compound	Flag	A or P	Reason
55680	0811D019	PCB-1242 PCB-1248 PCB-1254 PCB-1260	UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects) UJ5 (all non-detects)	A	Continuing calibration (%D)

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

EPA 8082 PCB WATER

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D019
Sample Collection Date: 3/12/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138E
ARF: 55680
APPL ID: AX75202
QCG: $8PHP-080319A-121076

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8082	PCB-1016	Not detected	0.5	0.12	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1221	Not detected	0.5	0.08	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1232	Not detected	0.5	0.12	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1242	Not detected UJS	0.5	0.12	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1248	Not detected	0.5	0.09	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1254	Not detected	0.5	0.20	ug/L	3/19/08	3/22/08
EPA 8082	PCB-1260	Not detected	0.5	0.09	ug/L	3/19/08	3/22/08
EPA 8082	Surrogate: DECA-PCB	78.4	30-150		%	3/19/08	3/22/08
EPA 8082	Surrogate: TcMX	73.5	30-150		%	3/19/08	3/22/08

BC 4/4/08

Quant Method: PCBSC.M
Run #: 0314194
Instrument: Ethel
Sequence: 080314
Dilution Factor: 1
Initials: MA

Printed: 3/26/08 3:46:14 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539G3b
SDG #: 55680
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET

Level IV

Date: 4/9/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW 846 Method 8082)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/12/08
II.	GC/ECD Instrument Performance Check	N	
III.	Initial calibration	A	
IV.	Continuing calibration/ICV	SW	ICV ≤ 15%
V.	Blanks	A	
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	client specified
VIII.	Laboratory control samples	A	LCS
IX.	Regional quality assurance and quality control	N	
Xa.	Florisil cartridge check	N	
Xb.	GPC Calibration	N	
XI.	Target compound identification	A	
XII.	Compound quantitation and reported CRQLs	A	
XIII.	Overall assessment of data	A	
XIV.	Field duplicates	N	
XV.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	0811D019 W	11	080319WMB	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 18539G3b
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: VV

Method: / GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	/			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		/		
Did the initial calibration meet the curve fit acceptance criteria?			/	
Were the RT windows properly established?	/			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? (%D or %R	/			
Was a continuing calibration analyzed daily?	/			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		/		
Were all the retention times within the acceptance windows?	/			
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	/			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			/	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			/	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		/		
Was a MS/MSD analyzed every 20 samples of each matrix?		/		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	/			

LDC #: 18539G3b
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: VA

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPASW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. ~~Aroclor-1242~~ PCB-1242	GG.
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248 -1248	HH.
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254 -1254	II.
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. ~~Aroclor-1260~~ -1260	JJ.
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. DB 608	KK.
F. Aldrin	N. Endosulfan sulfate	V. ~~Aroclor-1016~~ PCB-1016	DD. DB 1701	LL.
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221 -1221	EE. Aroclor-1262	MM.
H. Endosulfan I	P. Methoxychlor	X. ~~Aroclor-1232~~ -1232	FF.	NN.

Notes: _____

LDC #: 18539E36
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9

METHOD: ✓ GC __ HPLC

2nd Reviewer: lw

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? __%D or __RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?

Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?

Level IV Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	~~Detector~~ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	3/27/08	0314193	DB-5MS	BB	21.4	( )	All (ND)	J5/UJ5/A
						( )		
						( )		(Y.Z.AA.BB)
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
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LDC #: 18539G36
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (0.0/std)	Recalculated CF (0.0/std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/1/08	BB (DB-5MS)	2238825	2238825	1725476	1725476	16	16
			BB (DB-XLB)	1098280	1098130	1087120	1087120	4.6	4.6
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539G3b
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	031493	3/22/08	BB (DB-5MS)	17.755 26	13.558 26	13.558 26	21.4	21.4
			BB (DB-XLB)	10.871 ✓	9.872 26	9.872 ✓	9.7	9.7
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 18539G3b
SDG #: 55680

METHOD: √ GC ___ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: Q
2nd reviewer: L

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
DCB	DB-XLB	0.196	0.209	78.4	78.4	0
TCMX	√	√	0.207	73.5	73.5	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 85396b
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration, SA = Spike added, SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS = Laboratory Control Sample, LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080319W

Compound	Spike Added (ug/kg)		Sample Conc (ug/kg)	Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
~~EDB~~	1.0	NA	—	0.841	NA	84.1	84.1				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539E-3b
SDG #: 55682

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: V

METHOD: ✓ **GC** ___ **HPLC**

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. NO Compound Name _____

Concentration =_____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Hunters Point Shipyard, E-2 Investigation
Data Validation Reports
LDC# 18539

Dissolved Metals

LDC

LDC Report# 18539A4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 4, 2008

LDC Report Date: April 4, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55609

Sample Identification

810G002**
810G003
810G004**
810G004DL**
810G005

**Indicates sample underwent Level IV review

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Arsenic Copper Thallium	2.32 ug/L 2.71 ug/L 1.32 ug/L 2.73 ug/L	810G002** 810G003 810G004** 810G005

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
810G002**	Antimony Arsenic Copper	2.3 ug/L 6.8 ug/L 3.9 ug/L	2.3U ug/L 6.8U ug/L 3.9U ug/L
810G003	Copper	3.8 ug/L	3.8U ug/L
810G004**	Arsenic	2.7 ug/L	2.7U ug/L
810G005	Antimony	4.2 ug/L	4.2U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0810G008L**	Barium	11.7 (≤10)	810G002** 810G003 810G004** 810G005	J16 (all detects)	A
0810G008L**	Manganese	13.5 (≤10)	All samples in SDG 55609	J16 (all detects)	A

XI. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
810G004**	Manganese	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
810G004**	Manganese	R22	A

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55609

SDG	Sample	Analyte	Flag	A or P	Reason
55609	810G002** 810G003 810G004** 810G005	Barium	J16 (all detects)	A	ICP serial dilution (%D)
55609	810G002** 810G003 810G004** 810G004DL** 810G005	Manganese	J16 (all detects)	A	ICP serial dilution (%D)
55609	810G004**	Manganese	J20 (all detects)	A	Sample result verification
55609	810G004**	Manganese	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55609

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55609	810G002**	Antimony Arsenic Copper	2.3U ug/L 6.8U ug/L 3.9U ug/L	A	7
55609	810G003	Copper	3.8U ug/L	A	7
55609	810G004**	Arsenic	2.7U ug/L	A	7
55609	810G005	Antimony	4.2U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G002
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW046
ARF: 55609
APPL ID: AX74646

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	160	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.3 J U7	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	6.8 ↓	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	356 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.5 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	3.9 J U7	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	87.4 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	25.7	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	13.3	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	5.6 J	50	2.3	ug/L	1	3/7/08	3/11/08

J = Estimated value.

3/6/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G003
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW047
ARF: 55609
APPL ID: AX74647

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	66.2 J	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	181 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.5 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	3.8 J U7	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	232 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	12.1	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	11.9	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

3/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G004
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW048
ARF: 55609
APPL ID: AX74648

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	2.7 J U7	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	202 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	5.3	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	10.4	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	11800 E R22	5	1.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	14200 J16	50	12.0	ug/L	10	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	14.5	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	3.8 J	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	1.3	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	21.6 J	50	2.3	ug/L	1	3/7/08	3/11/08

J = Estimated value.
E = The reported value exceeds linear range.

3/6/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G005
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW051
ARF: 55609
APPL ID: AX74649

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	20.1 J	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.2 J U7	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	99.5 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.9 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	8.9	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	700 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	6.9	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	6.9	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	3.3 J	50	2.3	ug/L	1	3/7/08	3/11/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539A4a

VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 4/9/08

SDG #: 55609

Page: 1 of 1

Laboratory: APPL, Inc.

Reviewer: MY

2nd Reviewer: A

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/4/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	~~SW~~ A	3 MS/Dup from SDG 55609
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not Applied
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	* SW	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	* SW	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

12

1	810G002**	11		21		31	
2	810G003	12		22		32	
3	810G004**	13		23		33	
4	810G004DL**	14		24		34	
5	810G005	15		25		35	
6	PB	16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer: [illegible]

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓	✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Reviewer: WM
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: A

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-3, 5	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
4	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 18539 A4
SDG #: C3604

U(7)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: MY
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied:
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-3, 5

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification: 1	2	3	5							
Al															Al
Sb			2.32	11.6	2.3			4.2							Sb
As			2.71	13.55	6.8		2.7	x							As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.32	6.6	3.9	3.8									Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.73	13.65											Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539A
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: L
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		08106008	AQ	Ba	11.7	1-3, 5	J J+/A (16)
				Mn	13.5	All	↓ ↓

Comments:

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CERCLA-2004-0000-0011 G-213

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: W
2nd Reviewer: A

METHOD: Trace metals (EPA SW-846 6010/7000)

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
1	3	Mn			> Linear range	J+ (20) / A

Comments:

ABVRD.4C5

LDC #: 18539A4
SDG #: 55604

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: MH
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualification
1		3	MH		R/A (22)

Comments: _____

OVR.4SW

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	cd	1048	1000	105	105.0	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.09	4.00	102.2	102.2	Y
CCV	ICP (Continuing calibration)	Tl	811	750	108.1	108.0	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	5.11	5.00	102.2	102.2	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539A4
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ca	462.0	500	92.4	92.4	Y
LCS	Laboratory control sample	Sb	295	250	110	110	
0810G008	Matrix spike	Ni	(SSR-SR) 242.6	250	97.1	97.2	
	Duplicate	Mn	1370	1370	0	0	
↓	ICP serial dilution	Ba	188.4	168.6	11.7	11.7	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539AY
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
(Y) N N/A Are all detection limits below the CRDL?

Detected analyte results for 3, 4 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

#3

$$Ag = \frac{1.265\ \mu g/L \times 50\ mL}{50\ mL} = 1.265\ \mu g/L$$

Sample ID	Analyte	Reported Concentration (µg/L)	Calculated Concentration (µg/L)	Acceptable (Y/N)
3	Ag	2.7	2.7	Y
	Ba	202	202	
	Co	5.3	5.3	
	Cu	10.4	10.4	
	Mg	11800	11800	
	Ni	14.5	14.5	
	Se	3.8	3.8	
	Ag	1.3	1.3	
	Zn	21.6	21.6	✓
4	Mg	14200	14200	Y

LDC Report# 18539B4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 5, 2008

LDC Report Date: April 4, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55623

Sample Identification

0810G007
0810G008**
0810G009
0810G010
0810G011
0810G012**
0810G013
0810G014
0810G014DL
0810G008MS
0810G008DUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Arsenic Copper Thallium	2.32 ug/L 2.71 ug/L 1.32 ug/L 2.73 ug/L	0810G007 0810G008** 0810G009 0810G010 0810G011 0810G012** 0810G013 0810G014

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810G007	Antimony Arsenic	2.3 ug/L 5.6 ug/L	2.3U ug/L 5.6U ug/L
0810G008**	Arsenic Copper	8.0 ug/L 6.6 ug/L	8.0U ug/L 6.6U ug/L
0810G009	Antimony	4.2 ug/L	4.2U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810G010	Antimony	3.6 ug/L	3.6U ug/L
0810G011	Arsenic	4.1 ug/L	4.1U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0810G008L**	Barium	11.7 (≤10)	0810G007 0810G008** 0810G009 0810G010 0810G011 0810G012** 0810G013 0810G014	J16 (all detects)	A
0810G008L**	Manganese	13.5 (≤10)	All samples in SDG 55623	J16 (all detects)	A

XI. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
0810G014	Manganese	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0810G014	Manganese	R22	A

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

Samples 0810G009 and 0810G010 and samples 0810G012** and 0810G013 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810G009	0810G010	
Antimony	4.2	3.6	15
Barium	61.5	61.6	0
Cadmium	0.61	0.58	5
Chromium	3.4	3.5	3
Cobalt	0.72	0.75	4
Copper	25.4	24.9	2
Lead	25.5	23.1	10
Manganese	194	196	1
Mercury	0.064	0.11	53
Nickel	18.5	18.6	1
Selenium	9.7	9.0	7
Zinc	105	30.5	110

Compound	Concentration (ug/L)		RPD
	0810G012**	0810G013	
Barium	228	240	5
Chromium	4.0	4.2	5
Manganese	108	113	5
Nickel	10.3	10.6	3
Selenium	13.0	15.1	15
Silver	1.1	0.7U	200

Compound	Concentration (ug/L)		RPD
	0810G012**	0810G013	
Zinc	43.1	2.3U	200

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55623

SDG	Sample	Analyte	Flag	A or P	Reason
55623	0810G007 0810G008** 0810G009 0810G010 0810G011 0810G012** 0810G013 0810G014	Barium	J16 (all detects)	A	ICP serial dilution (%D)
55623	0810G007 0810G008** 0810G009 0810G010 0810G011 0810G012** 0810G013 0810G014 0810G014DL	Manganese	J16 (all detects)	A	ICP serial dilution (%D)
55623	0810G014	Manganese	J20 (all detects)	A	Sample result verification
55623	0810G014	Manganese	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55623

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55623	0810G007	Antimony Arsenic	2.3U ug/L 5.6U ug/L	A	7
55623	0810G008**	Arsenic Copper	8.0U ug/L 6.6U ug/L	A	7
55623	0810G009	Antimony	4.2U ug/L	A	7
55623	0810G010	Antimony	3.6U ug/L	A	7
55623	0810G011	Arsenic	4.1U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G007
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW052
ARF: 55623
APPL ID: AX74761

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.3 J U7	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	5.6 ↓	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	141 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.6 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.3 J	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	15.0	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	10.7	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	483 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	9.6	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	12.7	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

EC 04/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G008
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW053
ARF: 55623
APPL ID: AX74762

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	8.0 U7	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	169 J1L	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.3 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.1 J	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	6.6 U7	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	7.3	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	1370 J1L	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	7.0	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	12.5	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

9 040408

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G009
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74763

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.2 J 47	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	61.5 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	0.61 J	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.4 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	0.72 J	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	25.4	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	25.5	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	194 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.064 J	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	18.5	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	9.7	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	105	50	2.3	ug/L	1	3/7/08	3/11/08

E 040408

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G010
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74764

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.6 J 47	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	61.6 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	0.58 J	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.5 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	0.75 J	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	24.9	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	23.1	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	196 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.11 J	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	18.6	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	9.0	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	30.5 J	50	2.3	ug/L	1	3/7/08	3/11/08

8/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G011
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW001
ARF: 55623
APPL ID: AX74765

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	4.1 J U7	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	303 J6	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	3.0 J	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	886 J6	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	8.1	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	6.2	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	1.1	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

2/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G012
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74766

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	228 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.0 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	108 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.3	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	13.0	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	1.1	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	43.1 J	50	2.3	ug/L	1	3/7/08	3/11/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G013
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74767

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	240 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.2 J	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	113 J16	5	1.2	ug/L	1	3/7/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.6	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	15.1	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

3/24/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G014
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW012
ARF: 55623
APPL ID: AX74768

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/7/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	991 J16	5	0.8	ug/L	1	3/7/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/7/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/7/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	8.0	5	0.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	10100 E R22	5	1.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	11300 J16	50	12.0	ug/L	10	3/7/08	3/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	31.7	5	3.6	ug/L	1	3/7/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/7/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	2.2	1	0.7	ug/L	1	3/7/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/7/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/7/08	3/11/08

SL 040408

E = The reported value exceeds linear range.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539B4~~8~~ **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/09
SDG #: 55623 Level III/IV Page: 1 of 1
Laboratory: APPL, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/5/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	} not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	SW	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	SW	
XIII.	Field Duplicates	SW	~~(1,2)~~, (6,7) (3,4)
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All

1	0810G007	11	0810G008DUP	21		31	
2	0810G008**	12	PB	22		32	
3	0810G009	13		23		33	
4	0810G010	14		24		34	
5	0810G011	15		25		35	
6	0810G012**	16		26		36	
7	0810G013	17		27		37	
8	0810G014	18		28		38	
9	0810G014DL	19		29		39	
10	0810G008MS	20		30		40	

Notes: _____

LDC #: 18539B
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 7
Reviewer: MH
2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓	✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539B
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Reviewer: MM
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539
SDG #: 556

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-8	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
9		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
10, 11	↓	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 18539B
SDG #: [illegible]

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

U (7)

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-8

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification 1	2	3	4	5						
Al															Al
Sb			2.32	11.6	2.3		4.2	3.6							Sb
As			2.71	13.55	5.6	8.0			4.1						As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.32	6.6		6.6									Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Nl															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.73	13.65											Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18139B
SDG #: 55603

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: LW
2nd Reviewer: LC

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		2	A2	Ba	11.7	1-8	J (all detects) / A (16)
				Mn	13.5	All	

Comments:

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CELVA-2001-0000-0011 G-242

LDC #: 18539 B
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer [illegible]

METHOD: Trace metals (EPA SW-846 6010/7000)

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
1	8	Mn			7 linear range	J+ /A (20)

Comments:

ABVRD.4C5

LDC #: 18539B
SDG #: k5623

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: MH
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualification
1		8	Mn		K/A (22)

Comments: _____

OVR.4SW

LDC#: 18539B4
SDG#: 55623

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 2
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	3	4		
Antimony	4.2	3.6	15	
Barium	61.5	61.6	0	
Cadmium	0.61	0.58	5	
Chromium	3.4	3.5	3	
Cobalt	0.72	0.75	4	
Copper	25.4	24.9	2	
Lead	25.5	23.1	10	
Manganese	194	196	1	
Mercury	0.064	0.11	53	
Nickel	18.5	18.6	1	
Selenium	9.7	9.0	7	
Zinc	105	30.5	110	

Compound	Concentration (ug/L)		RPD	
	6	7		
Barium	228	240	5	
Chromium	4.0	4.2	5	
Manganese	108	113	5	
Nickel	10.3	10.6	3	
Selenium	13.0	15.1	15	

LDC#: 18539B4
SDG#: 55623

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 2 of 2
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	6	7		
Silver	1.1	0.7U	200	
Zinc	43.1	2.3U	200	

V:\FIELD DUPLICATES\FD_inorganic\18539B4.wpd

LDC #: 18839B
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	As	927.5	1000	92.8	92.8	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.09	4.0	102.2	102.2	Y
CCV	ICP (Continuing calibration)	Mn	772.8	750	103	103.0	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	5.09	5.0	101.8	101.9	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539B4
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Se	479.6	500	95.9	95.9	Y
LCS	Laboratory control sample	Pb	294.2	250	110	110	
10	Matrix spike	Mn	(SSR-SR) 242.6	250	97.1	97.2	
11	Duplicate	Mn	137.0	137.0	0	0	
2	ICP serial dilution	Ba	188.4	168.6	11.7	11.7	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539 B4
SDG #: 55023

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
(Y) N N/A Are all detection limits below the CRDL?

Detected analyte results for 2 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$Cu = \frac{6.551\ \mu g/L \times 50\ ml}{50\ ml} = 6.551\ \mu g/L$

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
2	Ag	8.0	8.0	Y
	Ba	169	169	
	Cr	4.3	4.3	
	Co	1.1	1.2	
	Cu	6.6	6.6	
	Pb	7.3	7.3	
	Mn	1370	1370	
	Ni	9.0	9.0	
	Se	12.5	12.5	

LDC Report# 18539C4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 6, 2008

LDC Report Date: April 4, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55636

Sample Identification

0810P002
0810P003
0810P004**
0810W002
0810G016
0810P005**
0810W004**
0810W003
0810P006
0810W005
0810P007
0810W006
0810W007
0810G016MS
0810G016DUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Antimony	2.2 ug/L	All samples in SDG 55644
ICB/CCB	Antimony Arsenic Copper Thallium	2.06 ug/L 2.71 ug/L 1.32 ug/L 2.73 ug/L	All samples in SDG 55644

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810P002	Copper	2.9 ug/L	2.9U ug/L
0810P003	Antimony Arsenic Copper	5.2 ug/L 5.9 ug/L 1.4 ug/L	5.2U ug/L 5.9U ug/L 1.4U ug/L
0810P004**	Arsenic Copper	6.0 ug/L 1.1 ug/L	6.0U ug/L 1.1U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810G016	Antimony	3.0 ug/L	3.0U ug/L
0810P005**	Copper	1.8 ug/L	1.8U ug/L
0810W004**	Antimony	3.0 ug/L	3.0U ug/L
0810W003	Antimony	2.3 ug/L	2.3U ug/L
0810W005	Arsenic Copper	2.7 ug/L 1.6 ug/L	2.7U ug/L 1.6U ug/L
0810P007	Copper	2.3 ug/L	2.3U ug/L
0810W006	Copper	4.5 ug/L	4.5U ug/L
0810W007	Copper	4.6 ug/L	4.6U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0810G016L	Barium	10.8 (≤10)	All samples in SDG 55636	J16 (all detects)	A

XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55636

SDG	Sample	Analyte	Flag	A or P	Reason
55636	0810P002 0810P003 0810P004** 0810W002 0810G016 0810P005** 0810W004** 0810W003 0810P006 0810W005 0810P007 0810W006 0810W007	Barium	J16 (all detects)	A	ICP serial dilution (%D)

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55636

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55636	0810P002	Copper	2.9U ug/L	A	7
55636	0810P003	Antimony Arsenic Copper	5.2U ug/L 5.9U ug/L 1.4U ug/L	A	7
55636	0810P004**	Arsenic Copper	6.0U ug/L 1.1U ug/L	A	7
55636	0810G016	Antimony	3.0U ug/L	A	7
55636	0810P005**	Copper	1.8U ug/L	A	7
55636	0810W004**	Antimony	3.0U ug/L	A	7
55636	0810W003	Antimony	2.3U ug/L	A	7
55636	0810W005	Arsenic Copper	2.7U ug/L 1.6U ug/L	A	7
55636	0810P007	Copper	2.3U ug/L	A	7
55636	0810W006	Copper	4.5U ug/L	A	7

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55636	0810W007	Copper	4.6U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW023
ARF: 55636
APPL ID: AX74835

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	220	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	140 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.4 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.0 J	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	2.9 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	66.6	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	5.7	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	11.6	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	0.78 J	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	5.7 J	50	2.3	ug/L	1	3/10/08	3/11/08

J = Estimated value.

3/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW055
ARF: 55636
APPL ID: AX74836

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	94.6 J	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	5.2 UJ	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	5.9 ↓	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	157 JL	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	1.4 J UJ	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	5.9	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	1140	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	11.1	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	16.7	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	1.2	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

J = Estimated value.

3/10/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW054
ARF: 55636
APPL ID: AX74837

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	33.6 J	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	6.0 U7	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	148 JL	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.2 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	1.1 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	2020	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	9.1	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	13.9	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	0.84 J	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

J = Estimated value.

3/10/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW020
ARF: 55636
APPL ID: AX74839

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	17.2	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	79.5 JL	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	1.1 J	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.5 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.3 J	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	41.4	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	275	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.064 J	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	37.4	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	9.7	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	0.85 J	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	98.6	50	2.3	ug/L	1	3/10/08	3/11/08

J = Estimated value.

4/15/08

Printed: 3/12/08 8:58:54 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810G016
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW022
ARF: 55636
APPL ID: AX74840

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.0 J U7	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	113 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.3 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.7 J	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	27.5	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	8.0	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	519	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	16.9	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	13.8	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	21.3 J	50	2.3	ug/L	1	3/10/08	3/11/08

J = Estimated value.

3/10/08

Printed: 3/12/08 8:58:54 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW025
ARF: 55636
APPL ID: AX74841

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	242 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.0 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	1.8 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	166	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.5	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	6.8	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW018
ARF: 55636
APPL ID: AX74842

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.0 J U7	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	77.2 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.5 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	41.6	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	37.0	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	19.4	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	13.2	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	3.6 J	50	2.3	ug/L	1	3/10/08	3/11/08

3/4/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW019
ARF: 55636
APPL ID: AX74843

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.3 J 47	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	99.6 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	0.85 J	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.8 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	57.5	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	318	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	26.8	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	12.1	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	42.4 J	50	2.3	ug/L	1	3/10/08	3/11/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW010
ARF: 55636
APPL ID: AX74844

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	276 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.4 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	0.66 J	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	354	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	12.9	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	6.8	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

2040408

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW017
ARF: 55636
APPL ID: AX74845

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	2.7 J U7	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	96.6 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	1.6 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	240	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	8.6	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	3.0 J	50	2.3	ug/L	1	3/10/08	3/11/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW009
ARF: 55636
APPL ID: AX74846

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	118 J1L	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.4 J	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	2.3 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	291	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	6.8	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	12.6	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

8/24/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW016
ARF: 55636
APPL ID: AX74847

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	143 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	4.5 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	419	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	11.6	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/10/08	3/11/08

Reviewed 3/4/08

J = Estimated value.

Printed: 3/12/08 8:58:54 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW043
ARF: 55636
APPL ID: AX74848

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/10/08	3/11/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Barium (Ba) (Dissolved)	184 J16	5	0.8	ug/L	1	3/10/08	3/11/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/10/08	3/11/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/10/08	3/11/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Copper (Cu) (Dissolved)	4.6 J U7	5	1.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/10/08	3/11/08
6010B/3010A	Manganese (Mn) (Dissolved)	304	5	1.2	ug/L	1	3/10/08	3/11/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/10/08	3/11/08
6010B/3010A	Nickel (Ni) (Dissolved)	5.3	5	3.6	ug/L	1	3/10/08	3/11/08
6010B/3010A	Selenium (Se) (Dissolved)	12.7	5	3.2	ug/L	1	3/10/08	3/11/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/10/08	3/11/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/10/08	3/11/08
6010B/3010A	Zinc (Zn) (Dissolved)	26.1 J	50	2.3	ug/L	1	3/10/08	3/11/08

3/4/08

J = Estimated value.

Printed: 3/12/08 8:58:54 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539C4a (X) **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/08
SDG #: 55636 Level III/IV Page: 1 of 1
Laboratory: APPL, Inc. Reviewer: MK
2nd Reviewer: K

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/6/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	3 MS/Dup
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	3 Not Utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All

1	0810P002	11	0810P007	21		31	
2	0810P003	12	0810W006	22		32	
3	0810P004**	13	0810W007	23		33	
4	0810W002	14	0810G016MS	24		34	
5	0810G016	15	0810G016DUP	25		35	
6	0810P005**	16	PB	26		36	
7	0810W004**	17		27		37	
8	0810W003	18		28		38	
9	0810P006	19		29		39	
10	0810W005	20		30		40	

Notes:

LDC #: 18539C4
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer: M

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539c4
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539C4
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-13	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
m14,15	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 18539c4
SDG #: 55636

U (7)

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 2
Reviewer: MY
2nd Reviewer: 1

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification 1	2	3	5	6	7	8	10	11	12	Analyte
Al															Al
Sb		2.2	2.06	11.0		5.2		3.0		3.0	2.3	2.7			Sb
As			2.71	13.55		5.9	6.0					2.7			As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.32	6.6	2.9	1.4	1.1		1.8			1.6	2.3	4.5	Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.73	13.65											Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539c4
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

U (7)

Page: 2 of 2
Reviewer: MM
2nd Reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification: 13										
Al															Al
Sb		2.2	2.06	11.0											Sb
As			2.71	13.55											As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Cc															Co
Cu			1.32	6.6	4.6										Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Nl															Nl
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.73	13.65											Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539C4
SDG #: 55632

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		5	AQ	Ba	10.8	All	J+ (+/A (16)

Comments: _____

SDILICPMS.wpd

LDC #: 18839C4
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Be	997.3	1000	99.7	99.7	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.09	4.0	102.3	102.2	Y
CCV	ICP (Continuing calibration)	Zn	983.7	750	104	104	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	5.15	5.0	103	103	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539C4
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ag	964.8	1000	96.5	96.5	Y
LCS	Laboratory control sample	Cu	258.2	250	103	103	↓
14	Matrix spike	Al	(SSR-SR) 1882	2000	94	94.0	↓
15	Duplicate	Ba	112	113	0.9	0.9	↓
5	ICP serial dilution	Mn	568	518.7	9.5	9.5	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539 C4
SDG #: 55036

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 3 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$Mn = \frac{2017\ ug/L \times 50ml}{50ml} = 2017\ ug/L$

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
3	Al	33.6	33.6	Y
	As	6.0	6.0	
	Ba	148	148	
	Cr	2.2	2.2	
	Cu	1.1	1.1	
	Mn	2020	2020	
	Ni	9.1	9.1	
	Se	13.9	14.0	
	Ag	0.84	0.84	✓

RECALC.4S2

LDC Report# 18539D4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7, 2008

LDC Report Date: April 7, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55644

Sample Identification

0810G018
0810P009
0810G019
0810G020**
0810P010
0810P011
0810P012
0810G021**
0810G022
0810G023
0810G024
0810G025
0810P013
0810P014
0810P015
0810P016**
0810G021MS
0810G021DUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Antimony Copper Mercury Zinc	3.30 ug/L 1.52 ug/L 0.090 ug/L 2.82 ug/L	All samples in SDG 55644

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810G018	Antimony Copper	3.2 ug/L 4.1 ug/L	3.2U ug/L 4.1U ug/L
0810G019	Antimony Copper	3.3 ug/L 3.0 ug/L	3.3U ug/L 3.0U ug/L
0810G020**	Antimony Copper Zinc	3.6 ug/L 2.5 ug/L 8.3 ug/L	3.6U ug/L 2.5U ug/L 8.3U ug/L
0810P010	Antimony	2.7 ug/L	2.7U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
0810P011	Antimony	1.8 ug/L	1.8U ug/L
0810P012	Copper	6.0 ug/L	6.0U ug/L
0810G022	Mercury Zinc	0.13 ug/L 2.8 ug/L	0.13U ug/L 2.8U ug/L
0810G023	Mercury	0.075 ug/L	0.075U ug/L
0810G024	Antimony Mercury	4.3 ug/L 0.075 ug/L	4.3U ug/L 0.075U ug/L
0810G025	Antimony Copper	2.8 ug/L 4.9 ug/L	2.8U ug/L 4.9U ug/L
0810P013	Copper Mercury	1.9 ug/L 0.067 ug/L	1.9U ug/L 0.067U ug/L
0810P014	Antimony Mercury	7.2 ug/L 0.13 ug/L	7.2U ug/L 0.13U ug/L
0810P015	Antimony Mercury	5.5 ug/L 0.079 ug/L	5.5U ug/L 0.079U ug/L
0810P016**	Antimony Mercury	7.5 ug/L 0.11 ug/L	7.5U ug/L 0.11U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
0810G021MS (All samples in SDG 55644)	Barium Lead Manganese Thallium	65.6 (75-125) 71.6 (75-125) 73.2 (75-125) 71.2 (75-125)	J8 (all detects) UJ8 (all non-detects)	A

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0810G021L**	Barium Manganese	36.0 (≤10) 32.8 (≤10)	All samples in SDG 55644	J16 (all detects) J16 (all detects)	A

XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

Samples 0810P010 and 0810P011 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810P010	0810P011	
Antimony	2.7	1.8	40
Arsenic	2.6	2.9	11
Barium	90.8	110	19
Chromium	3.0	3.1	3
Cobalt	0.67	0.6U	200
Copper	17.1	9.7	55
Manganese	38.4	24.4	45
Nickel	7.7	7.2	7
Selenium	12.8	17.1	29
Zinc	34.8	32.8	6

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55644

SDG	Sample	Analyte	Flag	A or P	Reason
55644	0810G018 0810P009 0810G019 0810G020** 0810P010 0810P011 0810P012 0810G021** 0810G022 0810G023 0810G024 0810G025 0810P013 0810P014 0810P015 0810P016**	Barium Lead Manganese Thallium	J8 (all detects) UJ8 (all non-detects)	A	Matrix spike analysis (%R)
55644	0810G018 0810P009 0810G019 0810G020** 0810P010 0810P011 0810P012 0810G021** 0810G022 0810G023 0810G024 0810G025 0810P013 0810P014 0810P015 0810P016**	Barium Manganese	J16 (all detects) J16 (all detects)	A	ICP serial dilution (%D)

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55644

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55644	0810G018	Antimony Copper	3.2U ug/L 4.1U ug/L	A	7
55644	0810G019	Antimony Copper	3.3U ug/L 3.0U ug/L	A	7
55644	0810G020**	Antimony Copper Zinc	3.6U ug/L 2.5U ug/L 8.3U ug/L	A	7

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55644	0810P010	Antimony	2.7U ug/L	A	7
55644	0810P011	Antimony	1.8U ug/L	A	7
55644	0810P012	Copper	6.0U ug/L	A	7
55644	0810G022	Mercury Zinc	0.13U ug/L 2.8U ug/L	A	7
55644	0810G023	Mercury	0.075U ug/L	A	7
55644	0810G024	Antimony Mercury	4.3U ug/L 0.075U ug/L	A	7
55644	0810G025	Antimony Copper	2.8U ug/L 4.9U ug/L	A	7
55644	0810P013	Copper Mercury	1.9U ug/L 0.067U ug/L	A	7
55644	0810P014	Antimony Mercury	7.2U ug/L 0.13U ug/L	A	7
55644	0810P015	Antimony Mercury	5.5U ug/L 0.079U ug/L	A	7
55644	0810P016**	Antimony Mercury	7.5U ug/L 0.11U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G018
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW024
ARF: 55644
APPL ID: AX74906

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.2 J U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	111 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.0 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	4.1 J U7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	86.2 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	12.7	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected UJ8	50	2.3	ug/L	1	03/11/08	03/12/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P009
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW050
ARF: 55644
APPL ID: AX74907

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	73.4 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.1 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	305 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.6	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	17.0	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected ~~UJ8~~	50	2.3	ug/L	1	03/11/08	03/12/08

8 040408

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G019
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW002
ARF: 55644
APPL ID: AX74908

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.3 J U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	118 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.7 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	3.0 J U7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected U8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	72.1 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	12.1	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected U8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected U8	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

3/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G020
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW015
ARF: 55644
APPL ID: AX74909

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.6 J U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	114 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	2.5 J U7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected U8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	406 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	8.9	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected U8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	8.3 J U7	50	2.3	ug/L	1	03/11/08	03/12/08

E 2404e

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P010
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74910

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.7 J UJ	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	2.6 J	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	90.8 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.0 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	0.67 J	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	17.1	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	38.4 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	7.7	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	12.8	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	34.8 J	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

2/04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P011
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74911

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	1.8 J UJ	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	2.9 J	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	110 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.1 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	9.7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	24.4 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	7.2	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	17.1	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	32.8 J	50	2.3	ug/L	1	03/11/08	03/12/08

3/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P012
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW008
ARF: 55644
APPL ID: AX74912

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	3.2 J	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	60.6 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	6.0 U7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	124 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	6.9	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	9.5	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/11/08	03/12/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G021
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW014
ARF: 55644
APPL ID: AX74913

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	571 J8,1L	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	444 J8,1L	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	4.7 J	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

3L 04.408

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G022
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW013
ARF: 55644
APPL ID: AX74914

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	769 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	655 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.13 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	2.8 J U7	50	2.3	ug/L	1	03/11/08	03/12/08

SC 04/8/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G023
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW044
ARF: 55644
APPL ID: AX74915

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	6.6	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	273 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.4 J	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	8.6	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	548 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.075 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.3	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	8.0	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	53.4	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

SL 2/26/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G024
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW003
ARF: 55644
APPL ID: AX74916

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.3 J U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	148 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	227 J8,L	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.075 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	13.9	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

3/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G025
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW006
ARF: 55644
APPL ID: AX74917

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.8 J UJ7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	112 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	5.3	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	4.9 J UJ7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	3110 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	32.9	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	10.3	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	105	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

SC 3/24/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P013
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW007
ARF: 55644
APPL ID: AX74918

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	96.7 J8,16	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	1.9 J U7	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	144 J8,16	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.067 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	10.8	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

3/04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P014
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW004
ARF: 55644
APPL ID: AX74919

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	151	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	7.2 U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	10.1	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	154 J8,1L	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.7 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.9 J	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	1580	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	15.2 J8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	988 J8,1L	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.13 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	18.6	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	11.1	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	26.9 J	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

8/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P015
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW045
ARF: 55644
APPL ID: AX74920

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	5.5 U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	9.5	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	503 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	0.50 J	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.4 J	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	6.0	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	224	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	1640 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.079 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	27.9	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	4.3 J	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	71.3	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

SR 04/04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P016
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW005
ARF: 55644
APPL ID: AX74921

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/11/08	03/12/08
6010B/3010A	Antimony (Sb) (Dissolved)	7.5 U7	5	1.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Barium (Ba) (Dissolved)	246 J8,L6	5	0.8	ug/L	1	03/11/08	03/12/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/11/08	03/12/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/11/08	03/12/08
6010B/3010A	Cobalt (Co) (Dissolved)	0.63 J	5	0.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Copper (Cu) (Dissolved)	31.1	5	1.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected UJ8	5	1.9	ug/L	1	03/11/08	03/12/08
6010B/3010A	Manganese (Mn) (Dissolved)	662 J8,L6	5	1.2	ug/L	1	03/11/08	03/12/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.11 J U7	0.2	0.06	ug/L	1	03/12/08	03/13/08
6010B/3010A	Nickel (Ni) (Dissolved)	13.4	5	3.6	ug/L	1	03/11/08	03/12/08
6010B/3010A	Selenium (Se) (Dissolved)	9.5	5	3.2	ug/L	1	03/11/08	03/12/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/11/08	03/12/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/11/08	03/12/08
6010B/3010A	Zinc (Zn) (Dissolved)	51.5	50	2.3	ug/L	1	03/11/08	03/12/08

J = Estimated value.

M 04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539D4a **VALIDATION COMPLETENESS WORKSHEET** Date: 4/4/08
SDG #: 55644 Level III/IV Page: 1 of 1
Laboratory: APPL, Inc. Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	} MS/Dup
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	} Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(5,6)
XIV.	Field Blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0810G018	11	0810G024	21		31	
2	0810P009	12	0810G025	22		32	
3	0810G019	13	0810P013	23		33	
4	0810G020**	14	0810P014	24		34	
5	0810P010	15	0810P015	25		35	
6	0810P011	16	0810P016**	26		36	
7	0810P012	17	0810G021MS	27		37	
8	0810G021**	18	0810G021DUP	28		38	
9	0810G022	19	PB	29		39	
10	0810G023	20		30		40	

Notes: _____

LDC #: 185394
SDG #: 45647

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer: M

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539D4
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall Assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539D4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-16	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
0117.18	AQ	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN,

Comments: Mercury by CVAA if performed

LDC #: 18539b4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

* U(7)

Page: 1 of 2
Reviewer: MM
2nd Reviewer: K

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

					Sample Identification										
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	1	3	4	5	6	7	9	10	11	12	
Al															Al
Sb			3.70	16.5	3.2	3.3	3.6	2.7	1.8				4.3	2.8	Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.52	7.60	4.1	3.0	2.5			6.0				4.9	Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg			0.090	0.45							0.13	0.075	0.075		Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl															Tl
V															V
Zn			2.82	14.1			8.3				2.8				Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539B4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

* U(7)

Page: 2 of 2
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 13	14	15	16							
Al															Al
Sb			7.70	16.5		7.2	5.5	7.5							Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.52	7.60	1.9										Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg			0.090	0.45	0.067	0.13	0.079	0.11							Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl															Tl
V															V
Zn			2.82	14.1											Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539D4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: W
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of (75-125)? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

(Y) (N) N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	17	AQ	Ba	65.6	All	J/UJ/A (8)
			Pb	71.6	↓	↓
			Mn	73.2		
			Fe	71.2		

Comments:

MS.4S2

LDC #: 185394
SDG #: 55674

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: L
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y N N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y N N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		8	AA	Ba	36.0	All	J- (all detects) / A (16)
				Mn	32.8	↓	↓

Comments:

Final Technical Memorandum for Groundwater Investigation at Parcel E-2, February 2009, CERCLA-09-0000-0011, G-313

LDC#: 18539D4
SDG#: 55644

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	5	6		
Antimony	2.7	1.8	40	
Arsenic	2.6	2.9	11	
Barium	90.8	110	19	
Chromium	3.0	3.1	3	
Cobalt	0.67	0.6U	200	
Copper	17.1	9.7	55	
Manganese	38.4	24.4	45	
Nickel	7.7	7.2	7	
Selenium	12.8	17.1	29	
Zinc	34.8	32.8	6	

V:\FIELD DUPLICATES\FD_inorganic\18539D4.wpd

LDC #: 18839D4
SDG #: 55647

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Tl	1.083	1.000	108	108	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.063	4.0	101.6	101.6	Y
CCV	ICP (Continuing calibration)	As	97.6	100	97.8	97.8	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	4.866	5.0	97.3	97.3	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539D4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Ni	917	1000	91.7	91.7	Y
LCS	Laboratory control sample	Co	268.2	250	107	107	
17	Matrix spike	Cd	(SSR-SR) 37.9	50	75.8	75.8	
18	Duplicate	Mn	405	444	9.2	9.2	
8	ICP serial dilution	Ba	1936.5	5711	36.0	36.0	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539D4
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
(Y) N N/A Are all detection limits below the CRDL?

Detected analyte results for 8 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$Se = \frac{4.692\ ug/L \times 50ml}{50ml} = 4.692\ ug/L$

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
8	Ba	571	571	Y
	Mn	444	444	↓
	Se	4.7	4.7	↓

RECALC.4S2

LDC Report# 18539E4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 10, 2008

LDC Report Date: April 7, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55653

Sample Identification

0811D004
0811D005
0811D006
0811D007**
0811D008
0811P020
0811P021
0811P022
0811P023**
0811P025
0811P024**
0811P019
0811P024MS
0811P024DUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Copper Zinc	1.33 ug/L 2.35 ug/L	0811D004 0811D005 0811D006 0811D007** 0811D008 0811P020 0811P021 0811P022 0811P023** 0811P025
PB (prep blank)	Aluminum Copper	33.6 ug/L 1.31 ug/L	0811P024** 0811P019
ICB/CCB	Copper Zinc	1.78 ug/L 8.18 ug/L	0811P024** 0811P019

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0811P022	Copper	1.6 ug/L	1.6U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0811P024L**	Barium	14.8 (≤10)	0811P024** 0811P019	J16 (all detects)	A

XI. Sample Result Verification

All sample result verification met validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

Samples 0811D005 and 0811D006, samples 0811D007** and 0811D008, and samples 0811P021 and 0811P022 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D005	0811D006	
Antimony	2.2	1.8U	200
Barium	499	506	1
Chromium	6.0	6.0	0
Cobalt	2.2	2.1	5
Manganese	216	209	3
Mercury	0.070	0.089	24
Nickel	117	115	2

Compound	Concentration (ug/L)		RPD
	0811D007**	0811D008	
Barium	566	562	1
Chromium	6.1	6.2	2
Manganese	254	255	0
Mercury	0.084	0.064	27
Nickel	44.6	42.6	5
Selenium	3.2U	3.4	200

Compound	Concentration (ug/L)		RPD
	0811P021	0811P022	
Arsenic	8.4	8.7	4
Barium	127	124	2
Copper	1.0U	1.6	200
Manganese	484	497	3
Mercury	0.06U	0.061	2

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55653

SDG	Sample	Analyte	Flag	A or P	Reason
55653	0811P024** 0811P019	Barium	J16 (all detects)	A	ICP serial dilution (%D)

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55653

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55653	0811P022	Copper	1.6U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D004
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW039
ARF: 55653
APPL ID: AX74990

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	494	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	5.0	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	156	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.067 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	19.9	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	3.5 J	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D005
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74991

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.2 J	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	499	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	6.0	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	2.2 J	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	216	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.070 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	117	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/4/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D006
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74992

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	506	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	6.0	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	2.1 J	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	209	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.089 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	115	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/4/0708

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D007
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74993

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	566	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	6.1	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	254	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.084 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	44.6	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

8/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D008
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74994

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	562	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	6.2	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	255	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.064 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	42.6	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	3.4 J	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P020
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW056
ARF: 55653
APPL ID: AX74997

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	7.0	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	203	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	346	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.066 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	7.5	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/04/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P021
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74998

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	8.4	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	127	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	484	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P022
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74999

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	8.7	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	124	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	1.6 J	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	497	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.061 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

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J = Estimated value.

2/4/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P023
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW057B
ARF: 55653
APPL ID: AX75000

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	9.2	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	287	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	335	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	10.9	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	3.2 J	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

3/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P025
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW027B
ARF: 55653
APPL ID: AX75002

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	3/12/08	3/13/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Barium (Ba) (Dissolved)	1490	5	0.8	ug/L	1	3/12/08	3/13/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/12/08	3/13/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	3/12/08	3/13/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	3/12/08	3/13/08
6010B/3010A	Manganese (Mn) (Dissolved)	12.9	5	1.2	ug/L	1	3/12/08	3/13/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.068 J	0.2	0.06	ug/L	1	3/13/08	3/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/12/08	3/13/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/12/08	3/13/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/12/08	3/13/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/12/08	3/13/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	3/12/08	3/13/08

J = Estimated value.

3/04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P024
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW028B
ARF: 55653
APPL ID: AX75249

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	178	100	19.3	ug/L	1	3/14/08	3/17/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.9 J	5	1.8	ug/L	1	3/14/08	3/17/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	3/14/08	3/17/08
6010B/3010A	Barium (Ba) (Dissolved)	166 J16	5	0.8	ug/L	1	3/14/08	3/17/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	3/14/08	3/17/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/14/08	3/17/08
6010B/3010A	Chromium (Cr) (Dissolved)	1.8 J	5	1.4	ug/L	1	3/14/08	3/17/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	3/14/08	3/17/08
6010B/3010A	Copper (Cu) (Dissolved)	18.1	5	1.0	ug/L	1	3/14/08	3/17/08
6010B/3010A	Lead (Pb) (Dissolved)	27.2	5	1.9	ug/L	1	3/14/08	3/17/08
6010B/3010A	Manganese (Mn) (Dissolved)	123	5	1.2	ug/L	1	3/14/08	3/17/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.12 J	0.2	0.06	ug/L	1	3/14/08	3/17/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	3/14/08	3/17/08
6010B/3010A	Selenium (Se) (Dissolved)	3.3 J	5	3.2	ug/L	1	3/14/08	3/17/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/14/08	3/17/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/14/08	3/17/08
6010B/3010A	Zinc (Zn) (Dissolved)	48.3 J	50	2.3	ug/L	1	3/14/08	3/17/08

J = Estimated value.

2/04/08

Printed: 3/18/08 8:44:04 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 8011P019
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW029
ARF: 55653
APPL ID: AX75253

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	22600	100	19.3	ug/L	1	3/14/08	3/17/08
6010B/3010A	Antimony (Sb) (Dissolved)	26.4	5	1.8	ug/L	1	3/14/08	3/17/08
6010B/3010A	Arsenic (As) (Dissolved)	19.9	5	2.5	ug/L	1	3/14/08	3/17/08
6010B/3010A	Barium (Ba) (Dissolved)	510 J16	5	0.8	ug/L	1	3/14/08	3/17/08
6010B/3010A	Beryllium (Be) (Dissolved)	0.20 J	2	0.2	ug/L	1	3/14/08	3/17/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	3/14/08	3/17/08
6010B/3010A	Chromium (Cr) (Dissolved)	115	5	1.4	ug/L	1	3/14/08	3/17/08
6010B/3010A	Cobalt (Co) (Dissolved)	9.5	5	0.6	ug/L	1	3/14/08	3/17/08
6010B/3010A	Copper (Cu) (Dissolved)	528	5	1.0	ug/L	1	3/14/08	3/17/08
6010B/3010A	Lead (Pb) (Dissolved)	1110	5	1.9	ug/L	1	3/14/08	3/17/08
6010B/3010A	Manganese (Mn) (Dissolved)	1230	5	1.2	ug/L	1	3/14/08	3/17/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.95	0.2	0.06	ug/L	1	3/14/08	3/17/08
6010B/3010A	Nickel (Ni) (Dissolved)	93.2	5	3.6	ug/L	1	3/14/08	3/17/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	3/14/08	3/17/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	3/14/08	3/17/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	3/14/08	3/17/08
6010B/3010A	Zinc (Zn) (Dissolved)	1280	50	2.3	ug/L	1	3/14/08	3/17/08

3/20/08

J = Estimated value.

Printed: 3/18/08 8:44:04 AM

PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539E4
SDG #: 55653
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/4/08
Page: 1 of 1
Reviewer: MM
2nd Reviewer: JMA

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/10/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	} MS/Dup
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	} not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(2,3) (4,5) (7,8)
XIV.	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0811D004	11	0811P024**	21		31	
2	0811D005	12	0811P019	22		32	
3	0811D006	13	0811P024MS	23		33	
4	0811D007**	14	0811P024DUP	24		34	
5	0811D008	15	FB	25		35	
6	0811P020	16		26		36	
7	0811P021	17		27		37	
8	0811P022	18		28		38	
9	0811P023**	19		29		39	
10	0811P025	20		30		40	

Notes: _____

LDC #: 185374
SDG #: 5653

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer: GMB

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539E4
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: WM
2nd Reviewer: RM

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution.				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539E4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: GMB

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-12	AS	(Al, Sb, As, Ba, Be, Cd) Ca (Cr, Co, Cu) Fe (Pb) Mg (Mn, Hg, Ni) K (Se, Ag) Na (Tl) V (Zn) Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
13,14	AS	(Al, Sb, As, Ba, Be, Cd) Ca (Cr, Co, Cu) Fe (Pb) Mg (Mn) Hg (Ni) K (Se, Ag) Na (Tl) V (Zn) Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		(Al, Sb, As, Ba, Be, Cd) Ca (Cr, Co, Cu) Fe (Pb) Mg (Mn) Hg (Ni) K (Se, Ag) Na (Tl) V (Zn) Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 18539J4 (1 of 2)
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 2
Reviewer: MM
2nd Reviewer: MM

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 1-10

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification: 8										
Al															Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Cc															Co
Cu			1.33	6.65	1.6										Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl															Tl
V															V
Zn			2.35	11.75											Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539E4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

U(7)

Page: 2 of 7
Reviewer: MY
2nd Reviewer: SMG

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: 11, 12 (75X)

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	Sample Identification										
Al		33.6		168											Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Cc															Co
Cu		1.31	1.78	8.9											Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl															Tl
V															V
Zn			8.18	40.9											Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539E4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		11	AQ	Ba	148	11,12	J+/A (16)

Comments:

SDILICPMS.wpd

LDC#: 18539E4
SDG#: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 2
Reviewer: [signature]
2nd Reviewer: [signature]

METHOD: Metals (EPA Method 6010B/7000)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	2	3		
Antimony	2.2	1.8U	200	
Barium	499	506	1	
Chromium	6.0	6.0	0	
Cobalt	2.2	2.1	5	
Manganese	216	209	3	
Mercury	0.070	0.089	24	
Nickel	117	115	2	

Compound	Concentration (ug/L)		RPD	
	4	5		
Barium	566	562	1	
Chromium	6.1	6.2	2	
Manganese	254	255	0	
Mercury	0.084	0.064	27	
Nickel	44.6	42.6	5	
Selenium	3.2U	3.4	200	

Compound	Concentration (ug/L)		RPD	
	7	8		
Arsenic	8.4	8.7	4	
Barium	127	124	2	

LDC#: 18539E4
SDG#: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	7	8		
Copper	1.0U	1.6	200	
Manganese	484	497	3	
Mercury	0.06U	0.061	2	

V:\FIELD DUPLICATES\FD_inorganic\18539E4.wpd

LDC #: 18839E4
SDG #: 55613

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: AM

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Be	1.019	1.000	102	102	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.308	4.0	107.7	107.7	Y
CCV	ICP (Continuing calibration)	Se	987.3	750	105	105	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	4.648	5.0	93.0	93.0	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539J4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Cr	454.6	500	90.9	90.9	Y
LCS	Laboratory control sample	Ba	280	250	112	112	
13	Matrix spike	Sb	(SSR-SR) ~~48.4~~	~50	96	96.0	
14	Duplicate	Pb	30.2	27.2	10	10	
11	ICP serial dilution	Mn	127.0	123.1	3.2	3.30	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539B4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MY
2nd reviewer: MB

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
(Y) N N/A Are all detection limits below the CRDL?

Detected analyte results for 11 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$Al = \frac{177.8\ ug/L \times 50\ ml}{50\ ml} = 177.8\ ug/L$

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
11	Al	178	178	Y
	Sb	2.9	2.9	
	Ba	166	166	
	Cr	1.8	1.8	
	Cu	18.1	18.1	
	Pb	27.2	27.2	
	Mn	123	123	
	Hg	0.12	0.12	
	Se	3.3	3.3	
	Zn	48.3	48.3	✓

RECALC.4S2

LDC Report# 18539F4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 11, 2008

LDC Report Date: April 7, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55667

Sample Identification

0811D010
0811D011
0811D012
0811D013
0811D014
0811P032**
0811P033
0811P034
0811D015
0811D016
0811D017
0811P027
0811P028
0811P029**
0811P030
0811P031
0811D016MS
0811D016DUP

**Indicates sample underwent Level IV review

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Cadmium Mercury	0.682 ug/L 0.081 ug/L	All samples in SDG 55667
ICB/CCB	Antimony Copper Mercury Thallium	3.63 ug/L 1.70 ug/L 0.073 ug/L 2.12 ug/L	All samples in SDG 55667

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0811D010	Antimony Copper	4.6 ug/L 2.3 ug/L	4.6U ug/L 2.3U ug/L
0811D011	Antimony Copper Mercury	4.7 ug/L 2.6 ug/L 0.063 ug/L	4.7U ug/L 2.6U ug/L 0.063U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
0811D012	Antimony Copper Mercury	4.9 ug/L 2.5 ug/L 0.069 ug/L	4.9U ug/L 2.5U ug/L 0.069U ug/L
0811D013	Antimony Mercury	4.0 ug/L 0.11 ug/L	4.0U ug/L 0.11U ug/L
0811D014	Antimony Mercury	3.2 ug/L 0.093 ug/L	3.2U ug/L 0.093U ug/L
0811P032**	Antimony Mercury	5.0 ug/L 0.066 ug/L	5.0U ug/L 0.066U ug/L
0811P033	Antimony Mercury	3.0 ug/L 0.061 ug/L	3.0U ug/L 0.061U ug/L
0811D016	Antimony Copper Mercury	8.8 ug/L 6.7 ug/L 0.071 ug/L	8.8U ug/L 6.7U ug/L 0.071U ug/L
0811P029**	Copper Thallium	1.2 ug/L 2.1 ug/L	1.2U ug/L 2.1U ug/L
0811P030	Copper Thallium	1.2 ug/L 5.7 ug/L	1.2U ug/L 5.7U ug/L
0811P031	Copper	2.8 ug/L	2.8U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
0811D016MS (All samples in SDG 55667)	Thallium	68.4 (75-125)	J8 (all detects) UJ8 (all non-detects)	A

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0811D016L	Barium	16.2 (≤10)	All samples in SDG 55667	J16 (all detects)	A

XI. Sample Result Verification

All sample result verification met validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

Samples 0811D011 and 0811D012 were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D011	0811D012	
Antimony	4.7	4.9	4
Barium	337	325	4
Chromium	5.2	5.0	4
Cobalt	10.0	9.7	3
Copper	2.6	2.5	4
Manganese	1940	1860	4
Mercury	0.063	0.069	9
Nickel	47.1	44.6	5
Selenium	3.2	4.7	38

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55667

SDG	Sample	Analyte	Flag	A or P	Reason
55667	0811D010 0811D011 0811D012 0811D013 0811D014 0811P032** 0811P033 0811P034 0811D015 0811D016 0811D017 0811P027 0811P028 0811P029** 0811P030 0811P031	Thallium	J8 (all detects) UJ8 (all non-detects)	A	Matrix spike analysis (%R)
55667	0811D010 0811D011 0811D012 0811D013 0811D014 0811P032** 0811P033 0811P034 0811D015 0811D016 0811D017 0811P027 0811P028 0811P029** 0811P030 0811P031	Barium	J16 (all detects)	A	ICP serial dilution (%D)

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55667

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55667	0811D010	Antimony Copper	4.6U ug/L 2.3U ug/L	A	7
55667	0811D011	Antimony Copper Mercury	4.7U ug/L 2.6U ug/L 0.063U ug/L	A	7
55667	0811D012	Antimony Copper Mercury	4.9U ug/L 2.5U ug/L 0.069U ug/L	A	7

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55667	0811D013	Antimony Mercury	4.0U ug/L 0.11U ug/L	A	7
55667	0811D014	Antimony Mercury	3.2U ug/L 0.093U ug/L	A	7
55667	0811P032**	Antimony Mercury	5.0U ug/L 0.066U ug/L	A	7
55667	0811P033	Antimony Mercury	3.0U ug/L 0.061U ug/L	A	7
55667	0811D016	Antimony Copper Mercury	8.8U ug/L 6.7U ug/L 0.071U ug/L	A	7
55667	0811P029**	Copper Thallium	1.2U ug/L 2.1U ug/L	A	7
55667	0811P030	Copper Thallium	1.2U ug/L 5.7U ug/L	A	7
55667	0811P031	Copper	2.8U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D010
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW032
ARF: 55667
APPL ID: AX75104

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.6 J UJ	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	471 J	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	6.4	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.8 J	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	2.3 J UJ	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	1320	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	24.3	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	5.0	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

8/4/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D011
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75105

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.7 J UJ	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	337 JL	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	5.2	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	10.0	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	2.6 J UJ	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	1940	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.063 J UJ	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	47.1	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	3.2 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

E 040708

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D012
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75106

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.9 J UJ	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	325 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	5.0	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	9.7	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	2.5 J UJ	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	1860	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.069 J UJ	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	44.6	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	4.7 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

4/20/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D013
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW041
ARF: 55667
APPL ID: AX75107

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	4.0 J UJ	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	555 J	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.3 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.0 J	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	125	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.11 J UJ	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	15.3	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	3.5 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	1.1	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

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J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D014
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW042
ARF: 55667
APPL ID: AX75108

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.2 J U7	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	552 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.2 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	483	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.093 J U7	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	13.4	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	3.4 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

SC 04/2008

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P032
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ161D
ARF: 55667
APPL ID: AX75110

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	5.0 UT	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	424 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.7 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	216	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.066 J UT	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	9.6	5	0.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	0.33 J	1	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

AMENDED PAGE
4/21/08 CL

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P033
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138F
ARF: 55667
APPL ID: AX75111

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	3.0 J U7	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	623 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	14.2	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	473	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.061 J U7	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

8/04/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P034
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ144E
ARF: 55667
APPL ID: AX75112

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	208 JL6	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.2 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	392	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	4.6 J	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D015
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ131F
ARF: 55667
APPL ID: AX75114

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	38.3	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	96.3 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	11.7	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	3.1 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	18.9	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	1630	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	12.6	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	2000	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	1.0	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	196	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	5530	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D016
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150D
ARF: 55667
APPL ID: AX75115

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	8.8 UJ	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	659 J	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.0 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	6.7 UJ	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	118	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	0.071 J UJ	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	3.6 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	0.71 J	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D017
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150E
ARF: 55667
APPL ID: AX75116

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	335 J6	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	4.1 J	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	211	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	4.7 J	5	0.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected U8	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

4/21/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P027
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW059
ARF: 55667
APPL ID: AX75117

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	195 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	129	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	6.1	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	1.0	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P028
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW030B
ARF: 55667
APPL ID: AX75118

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	479 JL	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	Not detected	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	432	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	4.3 J	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

9/4/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P029
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW026B
ARF: 55667
APPL ID: AX75120

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	50.3 J1L	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	2.0 J	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	1.2 J UJ7	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	3750	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	7.0	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	6.1	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	0.83 J	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	2.1 J UJ7,8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

4/15/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P030
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW060
ARF: 55667
APPL ID: AX75121

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	237 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	1.2 J J7	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	378	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	Not detected	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	2.5	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	5.7 J7,8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P031
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW061
ARF: 55667
APPL ID: AX75122

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	Not detected	100	19.3	ug/L	1	03/13/08	03/14/08
6010B/3010A	Antimony (Sb) (Dissolved)	Not detected	5	1.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Barium (Ba) (Dissolved)	166 J16	5	0.8	ug/L	1	03/13/08	03/14/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/13/08	03/14/08
6010B/3010A	Chromium (Cr) (Dissolved)	Not detected	5	1.4	ug/L	1	03/13/08	03/14/08
6010B/3010A	Cobalt (Co) (Dissolved)	1.4 J	5	0.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Copper (Cu) (Dissolved)	2.8 J UJ7	5	1.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/13/08	03/14/08
6010B/3010A	Manganese (Mn) (Dissolved)	567	5	1.2	ug/L	1	03/13/08	03/14/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/13/08	03/14/08
6010B/3010A	Nickel (Ni) (Dissolved)	8.2	5	3.6	ug/L	1	03/13/08	03/14/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/13/08	03/14/08
6010B/3010A	Silver (Ag) (Dissolved)	Not detected	1	0.7	ug/L	1	03/13/08	03/14/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected UJ8	5	2.0	ug/L	1	03/13/08	03/14/08
6010B/3010A	Zinc (Zn) (Dissolved)	Not detected	50	2.3	ug/L	1	03/13/08	03/14/08

J = Estimated value.

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PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539F4a
SDG #: 55667
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/11/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	SW	3 MS/Dup
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	
VIII.	Internal Standard (ICP-MS)	N	3 not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	(2,3)
XIV.	Field Blanks	N SW	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0811D010	11	0811D017	21		31	
2	0811D011	12	0811P027	22		32	
3	0811D012	13	0811P028	23		33	
4	0811D013	14	0811P029**	24		34	
5	0811D014	15	0811P030	25		35	
6	0811P032**	16	0811P031	26		36	
7	0811P033	17	0811D016MS	27		37	
8	0811P034	18	0811D016DUP	28		38	
9	0811D015	19	PB	29		39	
10	0811D016	20		30		40	

Notes:

LDC #: 18539F4
SDG #: 45667

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer: gmh

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 18539F4
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer: JMB

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA SW 846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539F4
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: JMG

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-16	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
17, 18	Aq	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP Trace		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN, ___

Comments: Mercury by CVAA if performed

LDC #: 18539T4 (UC7)
SDG #: 5566

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 2
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification 1	2	3	4	5	6	7	10	14	15	
Al															Al
Sb			3.63	18.15	4.6	4.7	4.9	4.0	3.2	5.0	3.0	8.8			Sb
As															As
Ba															Ba
Be															Be
Cd		0.682		3.41											Cd
Ca															Ca
Cr															Cr
Cc															Co
Cu			1.70	8.50	2.3	2.6	2.5					6.7	1.2	1.2	Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg		0.081	0.093	0.405		0.063	0.069	0.1	0.093	0.066	0.061	0.071			Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.12	10.6									2.1	5.7	Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539F-4
SDG #: 5566

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

(UC7)

Page: 2 of 2
Reviewer: MM
2nd Reviewer: SMG

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 16										
Al															Al
Sb			3.63	18.15											Sb
As															As
Ba															Ba
Be															Be
Cd		0.682		3.41											Cd
Ca															Ca
Cr															Cr
Co															Co
Cu			1.70	8.50	2.8										Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg		0.081	0.093	0.405											Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl			2.12	10.6											Tl
V															V
Zn															Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539F4
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Matrix Spike Analysis

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: MG

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y (N) N/A Were matrix spike percent recoveries (%R) within the control limits of ~~75-125~~ lab limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for matrix spike recovery?

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	17	Aq	Tl	68.4 (75-125)	All	J/UJ/A (8)
			~~Hg~~	~~80.7 (85-115)~~	~~J~~	~~A~~

Comments:

MS.4S2

LDC #: 18539F4
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		10	Aq	Ba	16.2	All	J+/A (16)

Comments:

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CERCLA-2001-0000-0011 G-382

LDC#: 18539F4
SDG#: 55667

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer: GMB

METHOD: Metals (EPA Method 6010B/7000)

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	2	3		
Antimony	4.7	4.9	4	
Barium	337	325	4	
Chromium	5.2	5.0	4	
Cobalt	10.0	9.7	3	
Copper	2.6	2.5	4	
Manganese	1940	1860	4	
Mercury	0.063	0.069	9	
Nickel	47.1	44.6	5	
Selenium	3.2	4.7	38	

V:\FIELD DUPLICATES\FD_inorganic\18539F4.wpd

LDC #: 18839F4
SDG #: 55669

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MY
2nd Reviewer: MY

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	cd	1046	1000	105	105	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.308	4.0	107.7	107.7	Y
CCV	ICP (Continuing calibration)	Zn	7992	750	106	106.0	Y
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	4.629	5.0	92.6	92.6	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 18539F4
SDG #: 55660

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MY
2nd Reviewer: AM

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Mn	490.7	500	94.1	94.1	Y
LCS	Laboratory control sample	Co	276.2	250	110	110	
17	Matrix spike	Be	(SSR-SR) 46.15	50	92.3	92.2	
18	Duplicate	Ba	648	659	1.7	1.7	
10	ICP serial dilution	Mn	122.7	117.7	4.2	4.20	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18397-4
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 6 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

From raw data
Hg = 0.066 ug/L

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
6	Sb	5.0	5.0	Y
	Ba	424	424	
	Cr	3.7	3.7	
	Mn	216	216	
	Hg	0.066	0.066	
	Ni	9.6	9.6	✓

RECALC.4S2

LDC Report# 18539G4

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 12, 2008

LDC Report Date: April 7, 2008

Matrix: Water

Parameters: Dissolved Metals

Validation Level: Level IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55680

Sample Identification

0811D019

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010B and 7000 for Dissolved Metals. The metals analyzed were Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Aluminum Copper	33.6 ug/L 1.31 ug/L	All samples in SDG 55680
ICB/CCB	Copper Zinc	1.78 ug/L 8.18 ug/L	All samples in SDG 55680

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
0811D019	Aluminum Copper Zinc	32.3 ug/L 2.2 ug/L 3.4 ug/L	32.3U ug/L 2.2U ug/L 3.4U ug/L

No field blanks were identified in this SDG.

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits.

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards

ICP-MS was not utilized in this SDG.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
0811P024L	Barium	14.8 (≤10)	All samples in SDG 55680	J16 (all detects)	A

XI. Sample Result Verification

All sample result verification met validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Data Qualification Summary - SDG 55680

SDG	Sample	Analyte	Flag	A or P	Reason
55680	0811D019	Barium	J16 (all detects)	A	ICP serial dilution (%D)

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Laboratory Blank Data Qualification Summary - SDG 55680

SDG	Sample	Analyte	Modified Final Concentration	A or P	Code
55680	0811D019	Aluminum Copper Zinc	32.3U ug/L 2.2U ug/L 3.4U ug/L	A	7

Hunters Point Shipyard, E-2 Investigation
Dissolved Metals - Field Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Metals Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D019
Sample Collection Date: 03/12/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138E
ARF: 55680
APPL ID: AX75202

Method	Analyte	Result	PQL	MDL	Units	DF	Prep Date	Analysis Date
6010B/3010A	Aluminum (Al) (Dissolved)	32.3 J U7	100	19.3	ug/L	1	03/14/08	03/17/08
6010B/3010A	Antimony (Sb) (Dissolved)	2.7 J	5	1.8	ug/L	1	03/14/08	03/17/08
6010B/3010A	Arsenic (As) (Dissolved)	Not detected	5	2.5	ug/L	1	03/14/08	03/17/08
6010B/3010A	Barium (Ba) (Dissolved)	150 J16	5	0.8	ug/L	1	03/14/08	03/17/08
6010B/3010A	Beryllium (Be) (Dissolved)	Not detected	2	0.2	ug/L	1	03/14/08	03/17/08
6010B/3010A	Cadmium (Cd) (Dissolved)	Not detected	5	0.5	ug/L	1	03/14/08	03/17/08
6010B/3010A	Chromium (Cr) (Dissolved)	2.2 J	5	1.4	ug/L	1	03/14/08	03/17/08
6010B/3010A	Cobalt (Co) (Dissolved)	Not detected	5	0.6	ug/L	1	03/14/08	03/17/08
6010B/3010A	Copper (Cu) (Dissolved)	2.2 J U7	5	1.0	ug/L	1	03/14/08	03/17/08
6010B/3010A	Lead (Pb) (Dissolved)	Not detected	5	1.9	ug/L	1	03/14/08	03/17/08
6010B/3010A	Manganese (Mn) (Dissolved)	625	5	1.2	ug/L	1	03/14/08	03/17/08
7470A/7470A	Mercury (Hg) (Dissolved)	Not detected	0.2	0.06	ug/L	1	03/14/08	03/17/08
6010B/3010A	Nickel (Ni) (Dissolved)	8.1	5	3.6	ug/L	1	03/14/08	03/17/08
6010B/3010A	Selenium (Se) (Dissolved)	Not detected	5	3.2	ug/L	1	03/14/08	03/17/08
6010B/3010A	Silver (Ag) (Dissolved)	0.74 J	1	0.7	ug/L	1	03/14/08	03/17/08
6010B/3010A	Thallium (Tl) (Dissolved)	Not detected	5	2.0	ug/L	1	03/14/08	03/17/08
6010B/3010A	Zinc (Zn) (Dissolved)	3.4 J U7	50	2.3	ug/L	1	03/14/08	03/17/08

J = Estimated value.

3/14/08

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PL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539G4
SDG #: 55680
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level IV

Date: 4/14/08
Page: 1 of 1
Reviewer: W
2nd Reviewer: N

METHOD: Dissolved Metals (EPA SW 846 Method 6010B/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/12/08
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Matrix Spike Analysis	A	MS/DUP from SDG 55765
VI.	Duplicate Sample Analysis	A	
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	N	Not utilized
IX.	Furnace Atomic Absorption QC	N	
X.	ICP Serial Dilution	SW	
XI.	Sample Result Verification	A	
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	N	
XIV.	Field Blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: All

1	0811D019	11		21		31	
2	PB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 18539E4
SDG #: 45680

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MH
2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients > 0.995? (Level IV only)	✓			
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
IV. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VI. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995?			✓	
Do all applicable analysies have duplicate injections? (Level IV only)			✓	
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only)			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	

LDC #: 185394
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
VII. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) < 10%?		✓		
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration?			✓	
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539G4
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: MM
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	As	(Al, Sb, As, Ba, Be, Cd) Ca, (Cr, Co, Cu) Fe, (Pb) Mg, (Mn, Hg, Ni) K, (Se, Ag) Na, (Tl) V, (Zn) Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
ICP Trace		(Al, Sb, As, Ba, Be, Cd) Ca, (Cr, Co, Cu) Fe, (Pb) Mg, (Mn) Hg, (Ni) K, (Se, Ag) Na, (Tl) V, (Zn) Mo, B, Si, CN^-, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN^-, ___

Comments: (Mercury by CVAA if performed)

LDC #: 185392A
SDG #: K5653

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

4(7)

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: _____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All

					Sample Identification										
Analyte	Maximum PB* (mg/Kg)	Maximum PB* (ug/L)	Maximum ICB/CCB* (ug/L)	Blank Action Limit	1										
Al		33.6		168	32.3										Al
Sb															Sb
As															As
Ba															Ba
Be															Be
Cd															Cd
Ca															Ca
Cr															Cr
Co															Co
Cu		1.31	1.78	8.9	2.2										Cu
Fe															Fe
Pb															Pb
Mg															Mg
Mn															Mn
Hg															Hg
Ni															Ni
K															K
Se															Se
Ag															Ag
Na															Na
Tl															Tl
V															V
Zn			8.18	40.9	3.4										Zn
B															B
Mo															Mo
Sr															Sr

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18539B4
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
ICP Serial Dilution

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?
Y (N) N/A Were ICP serial dilution percent differences (%D) ≤10%?
Y (N) N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	Date	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
1		08|1pors	AA	Ba	14.8	All	J+/A (16)

Comments: _____

SDILICPMS.wpd

LDC #: 18839G4
SDG #: 556.80

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
ICV	ICP (Initial calibration)	Ag	959.9	1000	96.0	96.0	Y
	GFAA (Initial calibration)						
ICV	CVAA (Initial calibration)	Hg	4.286	4.0	107.2	107.2	Y
CCV	ICP (Continuing calibration)	Sb	964.9	750	102	102	↓
	GFAA (Continuing calibration)						
CCV	CVAA (Continuing calibration)	Hg	5.144	5.0	102.9	102.9	Y
	ICP/MS (Initial calibration)						
	ICP/MS (Continuing calibation)						

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CALCLC.4SW

LDC #: 185396Y
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: A

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB	ICP interference check	Tl	448.8	500	89.8	89.8	Y
LCS	Laboratory control sample	Hg	4.279	4.00	107	108	
0811P004	Matrix spike	Sb	(SSR-SR) 240.4	250	96	96.0	
	Duplicate	Pb	30.2	29.2	10	10	
	ICP serial dilution	Mn	129.0	123.1	3.2	3.2	

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18539G4
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for 1 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor
%S = Decimal percent solids

Recalculation:

$Ni = \frac{8.069\ ug/L \times 50\ ml}{50\ ml} = 8.069\ ug/L$

Sample ID	Analyte	Reported Concentration (ug/L)	Calculated Concentration (ug/L)	Acceptable (Y/N)
1	Al	32.3	32.3	Y
	Sb	2.7	2.7	
	Ba	150	150	
	Cr	2.2	2.2	
	Cu	2.2	2.2	
	Mn	6.5	6.5	
	Ni	8.1	8.1	
	Ag	0.74	0.74	
	Zn	3.4	3.4	

RECALC.4S2

Hunters Point Shipyard, E-2 Investigation
Data Validation Reports
LDC# 18539

Ammonia as Nitrogen

LDC

LDC Report# 18539A6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 4, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55609

Sample Identification

810G002**
810G003
810G004**
810G005
810G005MS
810G005MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 6 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW046

Sample ID: 0810G002

APPL ID: AX74646

Sample Collection Date: 03/04/08

ARF: 55609

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.0	0.35	0.122	mg/L	03/05/08	03/18/08

3/24/08

Printed: 03/18/08 1:49:05 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW047

Sample ID: 0810G003

APPL ID: AX74647

Sample Collection Date: 03/04/08

ARF: 55609

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	2.8	0.35	0.122	mg/L	03/05/08	03/18/08

3/24/08

Printed: 03/18/08 1:49:05 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW048

Sample ID: 0810G004

APPL ID: AX74648

Sample Collection Date: 03/04/08

ARF: 55609

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	1.9	0.35	0.122	mg/L	03/05/08	03/18/08

3/20/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW051

Sample ID: 0810G005

APPL ID: AX74649

Sample Collection Date: 03/04/08

ARF: 55609

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.36	0.35	0.122	mg/L	03/06/08	03/07/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539A6
SDG #: 55609
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/4/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	3MS/MSD
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	810G002**	11		21		31	
2	810G003	12		22		32	
3	810G004**	13		23		33	
4	810G005	14		24		34	
5	810G005MS	15		25		35	
6	810G005MSD	16		26		36	
7	MB	17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 18539A6
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JMM
2nd Reviewer: M

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539A6
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539A6
SDG #: 55609

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: W
2nd Reviewer: A

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH_3-N was recalculated.Calibration date: 3/18/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	13721	*0.99980*	0.9998	Y
		s2	0.5	197826			
		s3	2	747713			
		s4	4	1431108			
		s5	8	2856139			
		s6	10	3422104			
		s7	20	6798236			
CCV Calibration verification	NH_3-N	8.00	7.85		1.88	-1.88	Y
Calibration verification							
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A6
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.84	5.00	96.8	96.8	Y
5	Matrix spike sample	↓	(SSR-SR) 4.76	5.00	95.2	95.2	↓
5/6	Duplicate sample	↓	5.15	5.12	0.58	0.58	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18539A6
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 1 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

Area NH_3-N = $(2.953 \times 10^{-6} \times \text{Area} - 0.1667) \times DF$

NH_3-N = $(2.953 \times 10^{-6} \times 1402718 - 0.1667) \times 1.45 = 4.97$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	NH_3-N	5.0	5.0	Y

Note:

LDC Report# 18539B6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 5, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55623

Sample Identification

0810G007
0810G008**
0810G009
0810G010
0810G011
0810G011DL
0810G012**
0810G013
0810G014
0810G008MS
0810G008MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
0810G011	Ammonia as N	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0810G011	Ammonia as N	R22	A

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810G009 and 0810G010 and samples 0810G012** and 0810G013 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD
	0810G009	0810G010	
Ammonia as N	0.59	0.55	7

Analyte	Concentration (mg/L)		RPD
	0810G012**	0810G013	
Ammonia as N	1.7	0.14	170

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55623

SDG	Sample	Analyte	Flag	A or P	Reason
55623	0810G011	Ammonia as N	J20 (all detects)	A	Sample result verification
55623	0810G011	Ammonia as N	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW052

Sample ID: 0810G007

APPL ID: AX74761

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.8	0.35	0.122	mg/L	03/06/08	03/07/08

3/04/08

Printed: 03/19/08 1:10:49 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW053

Sample ID: 0810G008

APPL ID: AX74762

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	6.8	0.35	0.122	mg/L	03/06/08	03/07/08

3/4/08

Printed: 03/19/08 1:10:49 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW021

Sample ID: 0810G009

APPL ID: AX74763

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.59	0.35	0.122	mg/L	03/06/08	03/07/08

3/19/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW021

Sample ID: 0810G010

APPL ID: AX74764

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.55	0.35	0.122	mg/L	03/06/08	03/07/08

3/20/08

Printed: 03/19/08 1:10:49 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810G011

Sample Collection Date: 03/05/08

Loc ID: TW001

APPL ID: AX74765

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	28.0 E R22	0.35	0.122	mg/L	03/06/08	03/07/08
EPA 350.1	Ammonia as N	31.7	1.75	0.610	mg/L	03/06/08	03/07/08

E = The reported value exceeds linear range.

3/19/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810G012

Sample Collection Date: 03/05/08

Loc ID: TW049

APPL ID: AX74766

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	1.7	0.35	0.122	mg/L	03/06/08	03/07/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW049

Sample ID: 0810G013

APPL ID: AX74767

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.14 J	0.35	0.122	mg/L	03/06/08	03/07/08

J = Estimated value.

8 04 08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW012

Sample ID: 0810G014

APPL ID: AX74768

Sample Collection Date: 03/05/08

ARF: 55623

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	6.4	0.35	0.122	mg/L	03/13/08	03/13/08

3/19/08

Printed: 03/19/08 1:10:49 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539B6
SDG #: 55623
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MM
2nd Reviewer: M

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/5/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	3MS/MSD
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	SW	Not reviewed for Level III validation.
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	(3,4) (7,8)
X	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0810G007	11	0810G008MSD	21		31	
2	0810G008**	12	MB	22		32	
3	0810G009	13		23		33	
4	0810G010	14		24		34	
5	0810G011	15		25		35	
6	0810G011DL	16		26		36	
7	0810G012**	17		27		37	
8	0810G013	18		28		38	
9	0810G014	19		29		39	
10	0810G008MS	20		30		40	

Notes:

LDC #: 18539B6
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JMM
2nd Reviewer: AC

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539B6
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer: ✓

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall Assessment of Data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field Duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field Blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18839B6
SDG #: 15623

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 350.1

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	5	NH_3-N			> calibration range	J (all/A (20)

Comments:

ABVCRDL.6

LDC #: 15739B6
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: W
2nd Reviewer: A

METHOD: Inorganics, Method 300.0

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		5	NH_3-N	5	R/A (22)

Comments:

OVR.6

LDC#:18539B6
SDG#: 55623

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method 350.1

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD	
	3	4		
Ammonia as N	0.59	0.55	7	

Analyte	Concentration (mg/L)		RPD	
	7	8		
Ammonia as N	1.7	0.14	170	

V:\FIELD DUPLICATES\FD_inorganic\18539B6.wpd

LDC #: 18539B6
SDG #: 55627

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH3-N was recalculated.Calibration date: 3/7/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	40766	*0.99987*	0.9999	Y
		s2	0.5	264100			
		s3	2	945468			
		s4	4	1892215			
		s5	8	3598845			
		s6	10	4409392			
		s7	20	8805330			
CCV Calibration verification	NH3-N	8.00	8.397		-2.4 4.96	7.8 4.96	Y
Calibration verification							
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B6
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer:

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.85	5.00	97.0	97.0	Y
10	Matrix spike sample	↓	(SSR-SR) 4.82	5.00	96.4	96.0	↓
10/11	Duplicate sample	↓	11.6	11.6	0	0	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18539B6
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 2 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $NH_3\text{-}N = (2.288 \times 10^{-6} \text{Area} - 0.164287) \times DF$

Recalculation: $NH_3\text{-}N = (64413 \times 2.288 \times 10^{-6} - 0.164287) \times 1.25 = 6.775$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	2	$NH_3\text{-}N$	6.8	6.8	Y

Note: _____

LDC Report# 18539C6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 6, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55636

Sample Identification

0810P002
0810P003
0810P004**
0810W002
0810G016
0810P005**
0810W004**
0810W003
0810P006
0810W005
0810P007
0810W006
0810W007
0810G016MS
0810G016MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
3/12/08	CCV (14:36)	Ammonia as N	112.6 (90-110)	MB	J5 (all detects)	P

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Loc ID: TW023

Sample ID: 0810P002

APPL ID: AX74835

Sample Collection Date: 03/06/08

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.3	0.35	0.122	mg/L	03/07/08	03/12/08

4/21/08 g

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3
Sample ID: 0810P003
Sample Collection Date: 03/06/08

Loc ID: TW055
APPL ID: AX74836
ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.1	0.35	0.122	mg/L	03/07/08	03/12/08

4/21/08 R

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810P004

Sample Collection Date: 03/06/08

Loc ID: TW054

APPL ID: AX74837

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	1.1	0.35	0.122	mg/L	03/07/08	03/12/08

4/21/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810W002

Sample Collection Date: 03/06/08

Loc ID: TW020

APPL ID: AX74839

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.41	0.35	0.122	mg/L	03/07/08	03/12/08

6/11/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810G016

Sample Collection Date: 03/06/08

Loc ID: TW022

APPL ID: AX74840

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.69	0.35	0.122	mg/L	03/07/08	03/12/08

4/21/08 Q

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810P005

Sample Collection Date: 03/06/08

Loc ID: TW025

APPL ID: AX74841

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.6	0.35	0.122	mg/L	03/10/08	03/12/08

4/21/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810W004

Sample Collection Date: 03/06/08

Loc ID: TW018

APPL ID: AX74842

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.17 J	0.35	0.122	mg/L	03/10/08	03/12/08

J = Estimated value.

4/21/08 9

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3
Sample ID: 0810W003
Sample Collection Date: 03/06/08

Loc ID: TW019
APPL ID: AX74843
ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.22 J	0.35	0.122	mg/L	03/10/08	03/12/08

J = Estimated value.

4/21/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810P006

Sample Collection Date: 03/06/08

Loc ID: TW010

APPL ID: AX74844

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	3.1	0.35	0.122	mg/L	03/10/08	03/12/08

6/24/08 P AMENDED PAGE

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810W005

Sample Collection Date: 03/06/08

Loc ID: TW017

APPL ID: AX74845

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.57	0.35	0.122	mg/L	03/10/08	03/12/08

4/21/08 D AMENDED PAGE

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3
Sample ID: 0810P007
Sample Collection Date: 03/06/08

Loc ID: TW009
APPL ID: AX74846
ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	8.0	0.35	0.122	mg/L	03/10/08	03/12/08

4/21/09

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3

Sample ID: 0810W006

Sample Collection Date: 03/06/08

Loc ID: TW016

APPL ID: AX74847

ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.7	0.35	0.122	mg/L	03/10/08	03/12/08

4/21/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762/3
Sample ID: 0810W007
Sample Collection Date: 03/06/08

Loc ID: TW043
APPL ID: AX74848
ARF: 55636

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	4.0	0.35	0.122	mg/L	03/10/08	03/12/08

4/21/08 9

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539C6
SDG #: 55636
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MH
2nd Reviewer: M

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/6/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	SW	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	3 MS/MSD
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0810P002	11	0810P007	21		31	
2	0810P003	12	0810W006	22		32	
3	0810P004**	13	0810W007	23		33	
4	0810W002	14	0810G016MS	24		34	
5	0810G016	15	0810G016MSD	25		35	
6	0810P005**	16	MB	26		36	
7	0810W004**	17		27		37	
8	0810W003	18		28		38	
9	0810P006	19		29		39	
10	0810W005	20		30		40	

Notes:

LDC #: 18539C6
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MM
2nd Reviewer: [illegible]

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?		✓		
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539C6
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539C6
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: VM
2nd Reviewer: JK

METHOD: Inorganics, EPA Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
(Y) N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% ?
(Y) N N/A Are all correlation coefficients ≥0.995 ?

LEVEL IV/D ONLY:

(Y) N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recaluculation Worksheet for recalulations.
Y N (N/A) Was a balance check conducted prior to the TDS analysis.?
Y N (N/A) Was the titrant normality checked?

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualifications
1	3/12/08	ccv (1436)	NH3-N	112.6	MB	J+/P (+)

Comments:

CAL.6

LDC #: 18539c6
SDG #: 55634

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: MY
2nd Reviewer: R

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH3-N was recalculated.Calibration date: 3/12/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	0	*0.9995*	0.9995	Y
		s2	0.5	167955			
		s3	2	628622			
		s4	4	1227198			
		s5	8	2428799			
		s6	10	2940200			
		s7	20	5662959			
ccv Calibration verification	NH3-N	8.00	8.79		1.00 9.88	1.00 9.89	Y
ccv Calibration verification	↓	8.00	8.30		3.75	3.72	↓
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539c6
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: KC

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.73	5.00	94.6	94.6	Y
14	Matrix spike sample	"	(SSR-SR) 4.89	5.00	97.8	97.8	"
14/15	Duplicate sample	"	5.37	5.58	3.8	3.8	"

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18396C6
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: [illegible]

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 3 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$NH_3\text{-}N = (3.5278 \times 10^{-6} \times Area - 0.22256) \times DF$

$NH_3\text{-}N = (315185 \times 3.5278 \times 10^{-6} - 0.22256) \times 1.25 = 1.112\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	3	$NH_3\text{-}N$	1.1	1.1	Y

Note: _____

LDC Report# 18539D6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55644

Sample Identification

0810G018
0810P009
0810G019
0810G020**
0810P010
0810P011
0810P012
0810G021**
0810G022
0810G023
0810G024
0810G025
0810P013
0810P014
0810P015
0810P016**

**Indicates sample underwent Level IV review

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810P010 and 0810P011 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD
	0810P010	0810P011	
Ammonia as N	9.3	10.5	12

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW024

Sample ID: 0810G018

APPL ID: AX74906

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	4.9	0.35	0.122	mg/L	03/10/08	03/12/08

3/20/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
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Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810P009

Sample Collection Date: 03/07/08

Loc ID: TW050

APPL ID: AX74907

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	3.5	0.35	0.122	mg/L	03/10/08	03/12/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW002

Sample ID: 0810G019

APPL ID: AX74908

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.0	0.35	0.122	mg/L	03/10/08	03/12/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810G020

Sample Collection Date: 03/07/08

Loc ID: TW015

APPL ID: AX74909

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.91	0.35	0.122	mg/L	03/10/08	03/12/08

E 24040

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW011

Sample ID: 0810P010

APPL ID: AX74910

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	9.3	0.35	0.122	mg/L	03/10/08	03/12/08

RC 4/04/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

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Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810P011

Sample Collection Date: 03/07/08

Loc ID: TW011

APPL ID: AX74911

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	10.5	0.35	0.122	mg/L	03/10/08	03/12/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW008

Sample ID: 0810P012

APPL ID: AX74912

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.86	0.35	0.122	mg/L	03/10/08	03/12/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW014

Sample ID: 0810G021

APPL ID: AX74913

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	9.7	0.35	0.122	mg/L	03/11/08	03/13/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810G022

Sample Collection Date: 03/07/08

Loc ID: TW013

APPL ID: AX74914

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	7.6	0.35	0.122	mg/L	03/11/08	03/13/08

8/4/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0810G023

Sample Collection Date: 03/07/08

Loc ID: TW044

APPL ID: AX74915

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	4.0	0.35	0.122	mg/L	03/11/08	03/13/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW003

Sample ID: 0810G024

APPL ID: AX74916

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	14.3	0.35	0.122	mg/L	03/11/08	03/13/08

E 04408

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW006

Sample ID: 0810G025

APPL ID: AX74917

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	3.0	0.35	0.122	mg/L	03/11/08	03/13/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW007

Sample ID: 0810P013

APPL ID: AX74918

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	3.1	0.35	0.122	mg/L	03/11/08	03/13/08

3/14/08

Printed: 03/21/08 9:12:08 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW004

Sample ID: 0810P014

APPL ID: AX74919

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.77	0.35	0.122	mg/L	03/11/08	03/13/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW045

Sample ID: 0810P015

APPL ID: AX74920

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	4.6	0.35	0.122	mg/L	03/11/08	03/13/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW005

Sample ID: 0810P016

APPL ID: AX74921

Sample Collection Date: 03/07/08

ARF: 55644

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.64	0.35	0.122	mg/L	03/11/08	03/13/08

3/21/08

Printed: 03/21/08 9:12:08 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539D6
SDG #: 55644
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MM
2nd Reviewer: [signature]

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(5, 6)
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0810G018	11	0810G024	21		31	
2	0810P009	12	0810G025	22		32	
3	0810G019	13	0810P013	23		33	
4	0810G020**	14	0810P014	24		34	
5	0810P010	15	0810P015	25		35	
6	0810P011	16	0810P016**	26		36	
7	0810P012	17	MB	27		37	
8	0810G021**	18		28		38	
9	0810G022	19		29		39	
10	0810G023	20		30		40	

Notes:

LDC #: 18539 Pb
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MM
2nd Reviewer: MC

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	N	✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	N		✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	N		✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539D6
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC#: 18539D6
SDG#: 55644

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method 350.1

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD	
	5	6		
Ammonia as N	9.3	10.5	12	

V:\FIELD DUPLICATES\FD_inorganic\18539D6.wpd

LDC #: 18839D6
SDG #: 35647

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: VV
2nd Reviewer: VV

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH_3-N was recalculated.Calibration date: 3/13/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	0	*0.99992*	0.9999	Y
		s2	0.5	144712			
		s3	2	463149			
		s4	4	886316			
		s5	8	1709483			
		s6	10	2146529			
		s7	20	4201828			
ccv Calibration verification	NH_3-N	8.00	8.565		7.06 1.06	7.0 7.07	Y
ccv Calibration verification	NH_3-N	8.00	7.96		7.0 -0.50	7.0 -0.50	Y
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539D6
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.64	5.00	92.8	92.8	Y
MS	Matrix spike sample		(SSR-SR)				
↓	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18396
SDG #: 556f4

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: M

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 8 reported with a positive detect were recalculated and verified using the following equation:

Concentration = $NH_3\text{-}N = (4.7828 \times 10^{-6} \times Area - 0.1693) \times DF$

Recalculation: $NH_3\text{-}N = (4.7828 \times 10^{-6} \times 16509\,41 - 0.1693) \times 1.25 = 9.658$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	8	$NH_3\text{-}N$	9.7	9.7	Y

Note: _____

LDC Report# 18539E6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 10, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55653

Sample Identification

0811D004
0811D005
0811D006
0811D007**
0811D008
0811P020
0811P021
0811P022
0811P023**

**Indicates sample underwent Level IV review

Introduction

This data review covers 9 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verifications were acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D005 and 0811D006, samples 0811D007** and 0811D008, and samples 0811P021 and 0811P022 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD
	0811D005	0811D006	
Ammonia as N	20.1	16.0	23

Analyte	Concentration (mg/L)		RPD
	0811D007**	0811D008	
Ammonia as N	20.9	21.0	0

Analyte	Concentration (mg/L)		RPD
	0811P021	0811P022	
Ammonia as N	0.50	0.56	11

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW039

Sample ID: 0811D004

APPL ID: AX74990

Sample Collection Date: 03/10/08

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	16.7	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW040

Sample ID: 0811D005

APPL ID: AX74991

Sample Collection Date: 03/10/08

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	20.1	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW040

Sample ID: 0811D006

APPL ID: AX74992

Sample Collection Date: 03/10/08

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	16.0	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW031

Sample ID: 0811D007

APPL ID: AX74993

Sample Collection Date: 03/10/08

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	20.9	0.35	0.122	mg/L	03/12/08	03/13/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811D008

Sample Collection Date: 03/10/08

Loc ID: TW031

APPL ID: AX74994

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	21.0	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW056

Sample ID: 0811P020

APPL ID: AX74997

Sample Collection Date: 03/10/08

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	2.6	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P021

Sample Collection Date: 03/10/08

Loc ID: TW058

APPL ID: AX74998

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.50	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P022

Sample Collection Date: 03/10/08

Loc ID: TW058

APPL ID: AX74999

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	0.56	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P023

Sample Collection Date: 03/10/08

Loc ID: TW057B

APPL ID: AX75000

ARF: 55653

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	4.1	0.35	0.122	mg/L	03/12/08	03/13/08

3/24/08

Printed: 03/24/08 9:21:58 AM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539E6
SDG #: 55653
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/10/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	3 client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	(2,3) (4,5) (7,8)
X	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0811D004	11		21		31	
2	0811D005	12		22		32	
3	0811D006	13		23		33	
4	0811D007**	14		24		34	
5	0811D008	15		25		35	
6	0811P020	16		26		36	
7	0811P021	17		27		37	
8	0811P022	18		28		38	
9	0811P023**	19		29		39	
10	MB	20		30		40	

Notes:

LDC #: 18393E6
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MM
2nd Reviewer: MV

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.			✓	
V. Laboratory Control Samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539E6
SDG #: 55643

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC#: 18539E6
SDG#: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: W
2nd Reviewer: W

Inorganics, Method 350.1

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD	
	2	3		
Ammonia as N	20.1	16.0	23	

Analyte	Concentration (mg/L)		RPD	
	4	5		
Ammonia as N	20.9	21.0	0	

Analyte	Concentration (mg/L)		RPD	
	7	8		
Ammonia as N	0.50	0.56	11	

V:\FIELD DUPLICATES\FD_inorganic\18539E6.wpd

LDC #: 18539Z1
SDG #: 55453

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: W
2nd Reviewer: M

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH3-N was recalculated.Calibration date: 3/13/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	22166	*0.9998*	0.9998	Y
		s2	0.5	131043			
		s3	2	479247			
		s4	4	929296			
		s5	8	1781457			
		s6	10	2209670			
		s7	20	4266167			
CCV Calibration verification	NH3N	8.0	8.178		9.9 2.22	7.0 2.22	Y
Calibration verification							
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539E6
SDG #: 17653

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: WW
2nd Reviewer:

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$$\%R = \frac{Found}{True} \times 100$$

Where,
Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$RPD = \frac{|S-D|}{(S+D)/2} \times 100$$

Where,
S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.56	5.00	91.2	91.2	Y
MS	Matrix spike sample		(SSR-SR)				
↓	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18396
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: [illegible]

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 4 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$NH_3\text{-}N = (4.974 \times 10^{-6} \times Area - 0.24598) \times DF$

$NH_3\text{-}N = (3611606 \times 4.974 \times 10^{-6} - 0.24598) \times 1.25 = 20.944\ mg/L$

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	4	NH_3 N	20.9	20.9	Y

Note:

LDC Report# 18539F6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 11, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55667

Sample Identification

0811D010
0811D011
0811D012
0811D013
0811D014
0811P032**
0811P033
0811P034
0811D015
0811D016
0811D016DL
0811D017
0811D016MS
0811D016MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

V. Duplicates

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verification met validation criteria with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
0811D016	Ammonia as N	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0811D016	Ammonia as N	R22	A

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D011 and 0811D012 were identified as field duplicates. No contaminant concentrations were detected in any of the samples with the following exceptions:

Analyte	Concentration (mg/L)		RPD
	0811D011	0811D012	
Ammonia as N	11.8	12.2	3

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55667

SDG	Sample	Analyte	Flag	A or P	Reason
55667	0811D016	Ammonia as N	J20 (all detects)	A	Sample result verification
55667	0811D016	Ammonia as N	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW032

Sample ID: 0811D010

APPL ID: AX75104

Sample Collection Date: 03/11/08

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	14.6	0.35	0.122	mg/L	03/12/08	03/13/08

3/25/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811D011

Sample Collection Date: 03/11/08

Loc ID: TW033

APPL ID: AX75105

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	11.8	0.35	0.122	mg/L	03/12/08	03/13/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811D012

Sample Collection Date: 03/11/08

Loc ID: TW033

APPL ID: AX75106

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	12.2	0.35	0.122	mg/L	03/12/08	03/13/08

3/25/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: TW041

Sample ID: 0811D013

APPL ID: AX75107

Sample Collection Date: 03/11/08

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	18.8	0.35	0.122	mg/L	03/12/08	03/13/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811D014

Sample Collection Date: 03/11/08

Loc ID: TW042

APPL ID: AX75108

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	17.1	0.35	0.122	mg/L	03/12/08	03/13/08

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P032

Sample Collection Date: 03/11/08

Loc ID: PZ161D

APPL ID: AX75110

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	16.2	0.35	0.122	mg/L	03/12/08	03/13/08

4/21/08 Q

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
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APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P033

Sample Collection Date: 03/11/08

Loc ID: PZ138F

APPL ID: AX75111

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	5.7	0.35	0.122	mg/L	03/13/08	03/13/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
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Attn: Patricia Walters

Project: E-2/89762

Sample ID: 0811P034

Sample Collection Date: 03/11/08

Loc ID: PZ144E

APPL ID: AX75112

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	3.5	0.35	0.122	mg/L	03/13/08	03/13/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: PZ131F

Sample ID: 0811D015

APPL ID: AX75114

Sample Collection Date: 03/11/08

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	Not detected	0.35	0.122	mg/L	03/13/08	03/13/08

3/24/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: PZ150D

Sample ID: 0811D016

APPL ID: AX75115

Sample Collection Date: 03/11/08

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	31.7	1.75	0.610	mg/L	03/13/08	03/17/08
EPA 350.1	Ammonia as N	27.1 E R22	0.35	0.122	mg/L	03/13/08	03/13/08

E = The reported value exceeds linear range.

3/14/08

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: PZ150E

Sample ID: 0811D017

APPL ID: AX75116

Sample Collection Date: 03/11/08

ARF: 55667

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	10.5	0.35	0.122	mg/L	03/13/08	03/13/08

AMENDED PAGE

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539F6
SDG #: 55667
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/3/08
Page: 1 of 1
Reviewer: MH
2nd Reviewer: [illegible]

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/11 to 8
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	A	1 MS/MSD >4X
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	SW	Not reviewed for Level III validation.
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	(2,3)
X	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0811D010	11	0811D016DL	21		31	
2	0811D011	12	0811D017	22		32	
3	0811D012	13	0811D016MS	23		33	
4	0811D013	14	0811D016MSD	24		34	
5	0811D014	15	MB	25		35	
6	0811P032**	16		26		36	
7	0811P033	17		27		37	
8	0811P034	18		28		38	
9	0811D015	19		29		39	
10	0811D016	20		30		40	

Notes: _____

LDC #: 18539T6
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MM
2nd Reviewer: KC

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix Spike Duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 18539T6
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18839F6
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Page: 1 of 1
Reviewer: MH
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 350.1

#	Sample ID	Analyte	Lab Reporting Limit (units)	RDL (units)	Finding	Qualifications
1	10	NH3-N			> calibration range	J+/A(20)

Comments: _____

ABVCRDL.6

LDC #: 85396
SDG #: 55664

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: W
2nd Reviewer: M

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y)/N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
1		10	NH_3-N		R/A (22)

Comments:

OVR.6

LDC#: 18539F6
SDG#: 55667

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer:
2nd Reviewer:

Inorganics, Method 350.1

(Y) N NA Were field duplicate pairs identified in this SDG?
(Y) N NA Were target analytes detected in the field duplicate pairs?

Analyte	Concentration (mg/L)		RPD	
	2	3		
Ammonia as N	11.8	12.2	3	

V:\FIELD DUPLICATES\FD_inorganic\18539F6.wpd

LDC #: 18539T1
SDG #: 55667

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: MW
2nd Reviewer: [illegible]

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH3-N was recalculated. Calibration date: 3/13/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	22166	*0.9998*	0.9998	Y
		s2	0.5	131043			
		s3	2	479247			
		s4	4	929296			
		s5	8	1781457			
		s6	10	2209670			
		s7	20	4266167			
CCV Calibration verification	NH3-N	8.0	8.40		7.87 5.00	7.87 5.00	Y
Calibration verification							
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F6
SDG #: 55367

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.56	5.00	91.2	91.2	Y
13	Matrix spike sample	↓	(SSR-SR) 5.75	5.0	115	114	↓
13/14	Duplicate sample	↓	34.8	39.4	9.2	9.2	↓

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18539T6
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer:

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 6 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$NH_3\text{-}N = (4.7074 \times 10^{-6} \times \text{Area} - 0.24598) \times DF$

$NH_3\text{-}N = (4.7074 \times 10^{-6} \times 2796934 - 0.24598) \times 1.25 = 16.15$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	6	$NH_3\text{-}N$	16.2	16.2	Y

Note:

LDC Report# 18539G6

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 12, 2008

LDC Report Date: April 3, 2008

Matrix: Water

Parameters: Ammonia as Nitrogen

Validation Level: Level IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55680

Sample Identification

0811D019

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 350.1 for Ammonia as Nitrogen.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

All criteria for the initial calibration of each method were met.

b. Calibration Verification

Calibration verification frequency and analysis criteria were met for each method when applicable.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks.

No field blanks were identified in this SDG.

IV. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) analyses specified for the samples in this SDG, and therefore matrix spike analyses were not performed for this SDG.

V. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

VI. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VII. Sample Result Verification

All sample result verifications were acceptable.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Laboratory Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Ammonia as Nitrogen - Field Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Wet Lab Analysis

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters

Project: E-2/89762

Loc ID: PZ138E

Sample ID: 0811D019

APPL ID: AX75202

Sample Collection Date: 3/12/2008

ARF: 55680

Method	Analyte	Result	PQL	MDL	Units	Prep Date	Analysis Date
EPA 350.1	Ammonia as N	2.0	0.35	0.122	mg/L	3/13/2008	3/17/2008

Printed: 3/26/2008 12:47:29 PM

APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539G6
SDG #: 55680
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level IV

Date: 4/3/08
Page: 1 of 1
Reviewer: VM
2nd Reviewer: M

METHOD: (Analyte) Ammonia-N (EPA Method 350.1)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/12/08
IIa.	Initial calibration	A	
IIb.	Calibration verification	A	
III.	Blanks	A	
IV	Matrix Spike/Matrix Spike Duplicates	N	client specified
V	Duplicates	N	
VI.	Laboratory control samples	A	LCS/LCSD
VII.	Sample result verification	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	0811D019	11		21		31	
2	MB	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes:

LDC #: 185396
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MM
2nd Reviewer: M

Method: Inorganics (EPA Method 350.1)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix Spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			✓	
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were < 5X the CRDL.			✓	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 185396
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MM
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.		✓		
Target analytes were detected in the field blanks.			✓	

LDC #: 18539g6
SDG #: 55680

Validatin Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: MY
2nd Reviewer: M

Method: Inorganics, Method 350.1

The correlation coefficient (r) for the calibration of NH3-N was recalculated.Calibration date: 3/17/08

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	NH3-N	s1	0	23411	*0.9999*	0.9999	Y
		s2	0.5	207758			
		s3	2	757711			
		s4	4	1503550			
		s5	8	2990012			
		s6	10	3683513			
		s7	20	7181078			
CCV Calibration verification	NH3-N	8.0	8,127		7.D 1.59	7.D 1.59	Y
Calibration verification							
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539G6
SDG #: 17680

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MM
2nd Reviewer: [illegible]

METHOD: Inorganics, Method 350.1

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	NH3-N	4.41	5.0	88.2	88.2	Y
MS	Matrix spike sample		(SSR-SR)				
↓	Duplicate sample						

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.6

LDC #: 18539G6
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: MH
2nd reviewer: Y

METHOD: Inorganics, Method 350.1

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Have results been reported and calculated correctly?
(Y) N N/A Are results within the calibrated range of the instruments?
(Y) N N/A Are all detection limits below the CRQL?

Compound (analyte) results for 1 reported with a positive detect were recalculated and verified using the following equation:

Concentration = Recalculation:

$NH_3\text{-}N = (2.787 \times 10^{-6} \times Area - 0.152) \times DF$

$NH_3\text{-}N = (2.878 \times 10^{-6} \times 619038 - 0.152) \times 1.25 = 1.96$ mg/L

#	Sample ID	Analyte	Reported Concentration (mg/L)	Calculated Concentration (mg/L)	Acceptable (Y/N)
1	1	NH_3-N	2.0	2.0	Y

Note: _____

Hunters Point Shipyard, E-2 Investigation
Data Validation Reports
LDC# 18539

TPH as Gasoline

LDC

LDC Report# 18539A7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 4, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55609

Sample Identification

810G001
810G002**
810G003
810G004**
810G005

**Indicates sample underwent Level IV review

Introduction

This data review covers 5 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample 810G001 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G001
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55609
APPL ID: AX74645
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	106	75-125		%	3/8/08	3/8/08

4/11/08

Quant Method: HBTXGOK.M
Run #: 0307H38
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:12:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G002
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW046
ARF: 55609
APPL ID: AX74646
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	230 ++	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	99.5	75-125		%	3/8/08	3/8/08

TC 4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0307H39
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:12:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G003
Sample Collection Date: 3/4/08

Loc ID: TW047
ARF: 55609
APPL ID: AX74647
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	117	75-125		%	3/8/08	3/8/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H40
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:12:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G004
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW048
ARF: 55609
APPL ID: AX74648
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	110	75-125		%	3/8/08	3/8/08

Pc 4/11/08

Quant Method: HBTXGOK.M
Run #: 0307H41
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:12:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G005
Sample Collection Date: 3/4/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW051
ARF: 55609
APPL ID: AX74649
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	110	75-125		%	3/8/08	3/8/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H43
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:12:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539A7
SDG #: 55609
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: x
2nd Reviewer: ✓

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/4/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV≤15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB = 1

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	810G001 W	11	080308IW MP	21		31	
2	810G002**	12		22		32	
3	810G003	13		23		33	
4	810G004**	14		24		34	
5	810G005	15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 18539A7
SDG #: 455609

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: VV

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539AT
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation and CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18537A7
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: M
2nd Reviewer: LA

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/21/08	GRO	27728	27728	22166	22166	12	12
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A7
SDG #: 35609

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 4
2nd Reviewer: 4

METHOD: GC N HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0307H28	2/8/08	ERO	2.2166	2.1448	2.1448	3.2	3.2
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A7
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: W

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 2

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	NS	20.0	19.907	99.5	99.5	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539A7
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 1
2nd Reviewer:

____METHOD: 1 GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080308W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	--	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	296	NA	98.7	98.7				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185394
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: LC

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2 Compound Name ERC

Concentration = $\frac{(2549716)(1)}{(22166)(5)}$

= 230.1 MB/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALsw.wpd

LDC Report# 18539B7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 5, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55623

Sample Identification

0810G006
0810G007
0810G008**
0810G009
0810G010
0810G011
0810G012**
0810G013
0810G014
0810G008MS
0810G008MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 11 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample 0810G006 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810G009 and 0810G010 and samples 0810G012** and 0810G013 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810G012**	0810G013	
TPH as gasoline	18	16	12

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G006
Sample Collection Date: 3/5/08

Loc ID: TRIP BLANK
ARF: 55623
APPL ID: AX74760
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	104	75-125		%	3/8/08	3/8/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H44
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:10 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G007
Sample Collection Date: 3/5/08

Loc ID: TW052
ARF: 55623
APPL ID: AX74761
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	108	75-125		%	3/8/08	3/8/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H45
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G008
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW053
ARF: 55623
APPL ID: AX74762
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	109	75-125		%	3/8/08	3/8/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H46
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G009
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74763
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	111	75-125		%	3/8/08	3/8/08

tc 4/4/08

Quant Method: HBTXGOK.M
Run #: 0307H47
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G010
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW021
ARF: 55623
APPL ID: AX74764
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	107	75-125		%	3/8/08	3/8/08

Quant Method: HBTXGOK.M
Run #: 0307H48
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G011
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW001
ARF: 55623
APPL ID: AX74765
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	113	75-125		%	3/8/08	3/8/08

Quant Method: HBTXGOK.M
Run #: 0307H49
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G012
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74766
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	18 ++J	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	110	75-125		%	3/8/08	3/8/08

tc 4/11/08

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0307H50
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G013
Sample Collection Date: 3/5/08

Loc ID: TW049
ARF: 55623
APPL ID: AX74767
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	16 ++J	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	114	75-125		%	3/8/08	3/8/08

4/14/08

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0307H51
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G014
Sample Collection Date: 3/5/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW012
ARF: 55623
APPL ID: AX74768
QCG: $GAHP-080308A-120590

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/8/08	3/8/08
8015	Surrogate: BFB-FID	112	75-125		%	3/8/08	3/8/08

BC 4/11/08

Quant Method: HBTXGOK.M
Run #: 0307H52
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/11/08 4:13:11 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539B7
SDG #: 55623
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: V
2nd Reviewer:

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/5/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	%R ≤ 15/0
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	MS
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 4+5* 7+8
X.	Field blanks	ND	TB = 1

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

* ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All H2Os

1	0810G006	11	0810G008MS D	21	080308WMB	31	
2	0810G007	12		22		32	
3	0810G008**	13		23		33	
4	0810G009	14		24		34	
5	0810G010	15		25		35	
6	0810G011	16		26		36	
7	0810G012**	17		27		37	
8	0810G013	18		28		38	
9	0810G014	19		29		39	
10	0810G008MS	20		30		40	

Notes: _____

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: VE

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18535B7
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 3 of 2
Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation and CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: Q
2nd reviewer: [illegible]

METHOD: V GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?

Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit_____	Qualification Parent only / All Samples
	7	8		
GRO	18	16	12	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: L

METHOD: GC √ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	10A C	2/21/08	GRO	27728	27728	22166	22166	10	10
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B7
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	030728	3/8/08	ERO	22166	21448	21448	3.2	3.2
2	030742	3/8/08	ERO	22166	22050	22050	0.53	0.52
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 3

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	dB-624	20	21.830	109	109	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 6

METHOD: √ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: # 10/11

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	300	ND	275	279	91.7	91.7	93.0	93.0	1.4	1.4
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 08339B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

____METHOD: ✓GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080308W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	296	NA	98.7	98.7				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B7
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: L
2nd Reviewer: LW

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 7 Compound Name GRO

Concentration = $\frac{(1950944)(1)}{(22166)(5)}$

= 17.6 mg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539C7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 6, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55636

Sample Identification

0810P001
0810P002
0810P003
0810P004**
0810W001
0810W002
0810G016
0810P005**
0810W004**
0810W003
0810P006
0810W005
0810P007
0810W006
0810W007
0810G015
0810G016MS
0810G016MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Samples 0810W001 and 0810G015 were identified as trip blanks. No total petroleum hydrocarbons as gasoline contaminants were found in these blanks.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P001
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANKS
ARF: 55636
APPL ID: AX74834
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	113	75-125		%	3/12/08	3/12/08

BC
4/4/08

Quant Method:	HBTXGOK.M
Run #:	0311H10
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW023
ARF: 55636
APPL ID: AX74835
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	110	75-125		%	3/12/08	3/12/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H11
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW055
ARF: 55636
APPL ID: AX74836
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	110	75-125		%	3/12/08	3/12/08

4/4/08

Quant Method:	HBTXGOK.M
Run #:	0311H12
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW054
ARF: 55636
APPL ID: AX74837
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	74 ++	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	110	75-125		%	3/12/08	3/12/08

TC 4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0311H13
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W001
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANKS
ARF: 55636
APPL ID: AX74838
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	111	75-125		%	3/12/08	3/12/08

4/4/08

Quant Method:	HBTXGOK.M
Run #:	0311H14
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W002
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW020
ARF: 55636
APPL ID: AX74839
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	115	75-125		%	3/12/08	3/12/08

4/14/08

Quant Method: HBTXGOK.M
Run #: 0311H15
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810G016
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW022
ARF: 55636
APPL ID: AX74840
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	115	75-125		%	3/12/08	3/12/08

RC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H16
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW025
ARF: 55636
APPL ID: AX74841
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	37 ++	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	115	75-125		%	3/12/08	3/12/08

4/4/08

++(G5) The analyst has noted that the chromatogram of this sample is mainly a dominant peak(s) which is not indicative of petroleum hydrocarbons.

Quant Method:	HBTXGOK.M
Run #:	0311H17
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W004
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW018
ARF: 55636
APPL ID: AX74842
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	110	75-125		%	3/12/08	3/12/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H18
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W003
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW019
ARF: 55636
APPL ID: AX74843
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	109	75-125		%	3/12/08	3/12/08

tc 4/4/08

Quant Method:	HBTXGOK.M
Run #:	0311H19
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW010
ARF: 55636
APPL ID: AX74844
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	116	75-125		%	3/12/08	3/12/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H21
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W005
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW017
ARF: 55636
APPL ID: AX74845
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	116	75-125		%	3/12/08	3/12/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H22
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW009
ARF: 55636
APPL ID: AX74846
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	54 ++	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	111	75-125		%	3/12/08	3/12/08

4/4/08

++(G5) The analyst has noted that the chromatogram of this sample is mainly a dominant peak(s) which is not indicative of petroleum hydrocarbons.

Quant Method:	HBTXGOK.M
Run #:	0311H23
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W006
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW016
ARF: 55636
APPL ID: AX74847
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	109	75-125		%	3/12/08	3/12/08

4/11/08

Quant Method:	HBTXGOK.M
Run #:	0311H24
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:48:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W007
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW043
ARF: 55636
APPL ID: AX74848
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	116	75-125		%	3/12/08	3/12/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H25
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810G015
Sample Collection Date: 3/6/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANKS
ARF: 55636
APPL ID: AX74849
QCG: $GAHP-080312A-120719

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/12/08	3/12/08
8015	Surrogate: BFB-FID	115	75-125		%	3/12/08	3/12/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H26
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:48:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539C7
SDG #: 55636
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/6/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV = 1570
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB = 5.1b

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All H2Os

1	0810P001	11	0810P006	21	080312WMB	31	
2	0810P002	12	0810W005	22		32	
3	0810P003	13	0810P007	23		33	
4	0810P004**	14	0810W006	24		34	
5	0810W001	15	0810W007	25		35	
6	0810W002	16	0810G015	26		36	
7	0810G016	17	0810G016MS	27		37	
8	0810P005**	18	0810G016MSD	28		38	
9	0810W004**	19		29		39	
10	0810W003	20		30		40	

Notes: _____

LDC #: 185390 7
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: W

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: [illegible]

METHOD: GC √ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	10AC	2/21/08	GRO	27728	27728	22166	22166	10	10
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: K
2nd Reviewer: W

METHOD: GC 1 HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	031407	3/12/08	~~GRO~~	22166	20765	20765	6.3	6.3
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: Q
2nd reviewer: W

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 8

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	RtxBAC-624	20	22.948	115	115	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539C7
SDG #: 655636

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: VK

METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 17/18

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	300	ND	320	315	107	107	105	105	1.6	1.6
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

_____METHOD: __GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration
SA = Spike added
SC = Sample concentration
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample duplicate

RPD =(((SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080312W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	--	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	288	NA	96.0	96.0				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C7
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer: V

METHOD: √ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 4 Compound Name GRO

Concentration = $\frac{(8229637)(1)}{(22166)(5)}$

$= 74.25\ \mu g/L$

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539D7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55644

Sample Identification

0810G018	0810G027
0810P009	
0810G019	
0810G020**	
0810P010	
0810P011	
0810P012	
0810G021**	
0810G022	
0810G023	
0810G024	
0810G025	
0810P013	
0810P014	
0810P015	
0810P016**	
0810G017	
0810P017	
0810P008	
0810G026	

**Indicates sample underwent Level IV review

Introduction

This data review covers 21 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample 810G001 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810P010 and 0810P011 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810P010	0810P011	
TPH as gasoline	48	72	40

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G018
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW024
ARF: 55644
APPL ID: AX74906
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	114	75-125		%	3/13/08	3/13/08

4/4/08
BC

Quant Method: HBTXGOK.M
Run #: 0311H35
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P009
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW050
ARF: 55644
APPL ID: AX74907
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	112	75-125		%	3/13/08	3/13/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H36
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G019
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW002
ARF: 55644
APPL ID: AX74908
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	108	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H37
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G020
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW015
ARF: 55644
APPL ID: AX74909
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	118	75-125		%	3/13/08	3/13/08

Rec 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H38
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P010
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74910
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	48 ++	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	115	75-125		%	3/13/08	3/13/08

++(G5) The analyst has noted that the chromatogram of this sample is mainly a dominant peak(s) which is not indicative of petroleum hydrocarbons.

Quant Method:	HBTXGOK.M
Run #:	0311H39
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P011
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74911
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	72 ++	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	110	75-125		%	3/13/08	3/13/08

BC 4/4/08

++(G5) The analyst has noted that the chromatogram of this sample is mainly a dominant peak(s) which is not indicative of petroleum hydrocarbons.

Quant Method: HBTXGOK.M
Run #: 0311H40
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P012
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW008
ARF: 55644
APPL ID: AX74912
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	16 ++J	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	112	75-125		%	3/13/08	3/13/08

BC 4/4/08

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0311H41
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G021
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW014
ARF: 55644
APPL ID: AX74913
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	115	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H42
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G022
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW013
ARF: 55644
APPL ID: AX74914
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	125	75-125		%	3/13/08	3/13/08

tc 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H43
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G023
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW044
ARF: 55644
APPL ID: AX74915
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	18 ++J	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	115	75-125		%	3/13/08	3/13/08

TC 4/6/09

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0311H44
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G024
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW003
ARF: 55644
APPL ID: AX74916
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	120 ++	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	123	75-125		%	3/13/08	3/13/08

4C 4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0311H46
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G025
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW006
ARF: 55644
APPL ID: AX74917
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	17 ++J	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	122	75-125		%	3/13/08	3/13/08

BC 4/4/08

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0311H47
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P013
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW007
ARF: 55644
APPL ID: AX74918
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	118	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H48
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P014
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW004
ARF: 55644
APPL ID: AX74919
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	111	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method:	HBTXGOK.M
Run #:	0311H49
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P015
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW045
ARF: 55644
APPL ID: AX74920
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	11 ++J	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	114	75-125		%	3/13/08	3/13/08

4/4/08

J = Estimated value.
++(G5) The analyst has noted that the chromatogram of this sample is mainly a dominant peak(s) which is not indicative of petroleum hydrocarbons.

Quant Method:	HBTXGOK.M
Run #:	0311H50
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P016
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW005
ARF: 55644
APPL ID: AX74921
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	108	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0311H51
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G017
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55644
APPL ID: AX74922
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	116	75-125		%	3/13/08	3/13/08

TC 4/11/08

Quant Method: HBTXGOK.M
Run #: 0311H52
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P017
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW034
ARF: 55644
APPL ID: AX74923
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	122	75-125		%	3/13/08	3/13/08

BC 4/4/09

Quant Method:	HBTXGOK.M
Run #:	0311H53
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P008
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55644
APPL ID: AX74924
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	115	75-125		%	3/13/08	3/13/08

4/14/08

Quant Method: HBTXGOK.M
Run #: 0311H54
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G026
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW038
ARF: 55644
APPL ID: AX74925
QCG: $GAHP-080312B-120720

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	18 ++J	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	122	75-125		%	3/13/08	3/13/08

BC 4/4/08

J = Estimated value.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0311H55
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G027
Sample Collection Date: 3/7/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW037
ARF: 55644
APPL ID: AX74926
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	116	75-125		%	3/13/08	3/13/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0313H04
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/14/08 1:49:51 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539D7
SDG #: 55644
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: 9
2nd Reviewer: lv

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV≤15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client spiked
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=5+6
X.	Field blanks	ND	TB=1T·19

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MW-20S

1	0810G018	11	0810G024	21	0810G027	31	080313WMB
2	0810P009	12	0810G025	22		32	080313WMB2
3	0810G019	13	0810P013	23		33	
4	0810G020**	14	0810P014	24		34	
5	0810P010	15	0810P015	25		35	
6	0810P011	16	0810P016**	26		36	
7	0810P012	17	0810G017	27		37	
8	0810G021**	18	0810P017	28		38	
9	0810G022	19	0810P008	29		39	
10	0810G023	20	0810G026	30		40	

Notes: _____

LDC #: 185390T
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or ____%R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539DT
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Reviewer: 4
2nd Reviewer: LW

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?	✓	✓		
Were target compounds detected in the field blanks?		✓		

LDC #: 185390T
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: √ GC ___ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit_____	Qualification Parent only / All Samples
	5	6		
Gasoline	48	72	40	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

Final Technical Memorandum for Groundwater Investigation at Parcel E-2
February 2009 CEKA-3001-0000-0011 G-666

LDC #: 1853907
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC √ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1			GRO	27728	27728	22166	22166	10	10
	10A-C	2/21/08							
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 188907
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: GC √ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0311432	3/12/08	GRO	22166	23478	23478	5.9	5.9
2	0311445	3/13/08	GRO	22166	20644	20644	6.9	6.9
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185390T
SDG #: 5564

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer:

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 4

Surrogate	~~Column/Detector~~	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	d5624	20	23.543	118	118	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18339D7
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

_____METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080312W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	--	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	338	NA	113	113				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 1853907
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: W

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 4.8.16 Compound Name ND

Concentration = _____

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539E7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 10, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55653

Sample Identification

0811D001
0811D002
0811D003
0811D004
0811D005
0811D006
0811D007**
0811D008
0811P018
0811P020
0811P021
0811P022
0811P023**

**Indicates sample underwent Level IV review

Introduction

This data review covers 13 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Samples 0811D001 and 0811P018 were identified as trip blanks. No total petroleum hydrocarbons as gasoline contaminants were found in these blanks.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0811D004	Bromofluorobenzene	128 (75-125)	TPH as gasoline	J13 (all detects)	P
0811D005	Bromofluorobenzene	128 (75-125)	TPH as gasoline	J13 (all detects)	P
0811D006	Bromofluorobenzene	133 (75-125)	TPH as gasoline	J13 (all detects)	P

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0811D007**	Bromofluorobenzene	133 (75-125)	TPH as gasoline	J13 (all detects)	P
0811D008	Bromofluorobenzene	134 (75-125)	TPH as gasoline	J13 (all detects)	P
0811P023**	Bromofluorobenzene	138 (75-125)	TPH as gasoline	NA	-

Although the above listed %R flagged "NA" demonstrates a high bias, the affected compounds in the associated samples were non-detected and did not warrant the qualification of the data.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D005 and 0811D006, samples 0811D007** and 0811D008, samples 0811P021 and 0811P022 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D005	0811D006	
TPH as gasoline	200	220	10

Compound	Concentration (ug/L)		RPD
	0811D007**	0811D008	
TPH as gasoline	190	180	5

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55653

SDG	Sample	Compound	Flag	A or P	Reason
55653	0811D004 0811D005 0811D006 0811D007** 0811D008	TPH as gasoline	J13 (all detects)	P	Surrogate recovery (%R)

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D001
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55653
APPL ID: AX74987
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	03/13/08	03/13/08
8015	Surrogate: 8FB-FID	121	75-125		%	03/13/08	03/13/08

Quant Method:	HBTXGOK.M
Run #:	0313H05
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 04/25/08 11:38:34 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

4/25/08 a

AMENDED PAGE

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D002
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW036
ARF: 55653
APPL ID: AX74988
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	03/13/08	03/13/08
8015	Surrogate: BFB-FID	116	75-125		%	03/13/08	03/13/08

4/24/08 Q

AMENDED PAGE

Quant Method:	HBTXGOK.M
Run #:	0313H06
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 04/25/08 11:38:34 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D003
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW035
ARF: 55653
APPL ID: AX74989
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	120	75-125		%	3/13/08	3/13/08

4/1/08

Quant Method: HBTXGOK.M
Run #: 0313H07
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D004
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW039
ARF: 55653
APPL ID: AX74990
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	190 ++J13	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	128 #	75-125		%	3/13/08	3/13/08

4/4/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0313H08
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D005
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74991
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	200 ++J3	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	128 #	75-125		%	3/13/08	3/13/08

4/4/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0313H09
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D006
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74992
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	220 ++J13	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	133 #	75-125		%	3/13/08	3/13/08

EC
4/4/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0313H10
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D007
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74993
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	190 ++ J3	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	133 #	75-125		%	3/13/08	3/13/08

tc 4/4/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0313H11
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D008
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74994
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	180 ++J3	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	134 #	75-125		%	3/13/08	3/13/08

4/4/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0313H12
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P018
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55653
APPL ID: AX74995
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/13/08	3/13/08
8015	Surrogate: BFB-FID	115	75-125		%	3/13/08	3/13/08

BC
4/11/08

Quant Method:	HBTXGOK.M
Run #:	0313H13
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P020
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW056
ARF: 55653
APPL ID: AX74997
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/14/08	3/14/08
8015	Surrogate: BFB-FID	114	75-125		%	3/14/08	3/14/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0313H16
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P021
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74998
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/14/08	3/14/08
8015	Surrogate: BFB-FID	121	75-125		%	3/14/08	3/14/08

LC
4/4/08

Quant Method:	HBTXGOK.M
Run #:	0313H17
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P022
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74999
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/14/08	3/14/08
8015	Surrogate: BFB-FID	118	75-125		%	3/14/08	3/14/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0313H18
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P023
Sample Collection Date: 3/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW057B
ARF: 55653
APPL ID: AX75000
QCG: $GAHP-080313A-120742

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/14/08	3/14/08
8015	Surrogate: BFB-FID	138 #	75-125		%	3/14/08	3/14/08

BC 4/4/08

= Recovery (or RPD) is outside QC limits.

Quant Method: HBTXGOK.M
Run #: 0313H19
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/24/08 10:55:55 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539E7
SDG #: 55653
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: ~~3/7~~ 3/10/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	RRF≤1570
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	N	client spiked
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=5+6. 7+8. 11+12*
X.	Field blanks	ND	TB=1, 9

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

*ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MI H2O's

1	0811D001	11	0811P021	21	680313W MB	31	
2	0811D002	12	0811P022	22		32	
3	0811D003	13	0811P023**	23		33	
4	0811D004	14		24		34	
5	0811D005	15		25		35	
6	0811D006	16		26		36	
7	0811D007**	17		27		37	
8	0811D008	18		28		38	
9	0811P018	19		29		39	
10	0811P020	20		30		40	

Notes: _____

LDC #: 18639Z7
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: W

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ____%D or %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539E1
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 2 of 3
Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18539E7
SDG #: 55653

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 6

METHOD: ✓ GC __ HPLC

Are surrogates required by the method? Yes ✓ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	4 (dets)	NS	BFB	128 (75-125)	✓ 13 dets / P
	5			128 ( )	
	6			133 ( )	
	7			133 ( )	
	8			134 ( )	
	13 (ND)	NS	BFB	138 (75-125)	✓ 13 dets / P

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 18539G7
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: CA
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit_____	Qualification Parent only / All Samples
	5	6		
Gasoline	200	220	10	

Compound	Concentration (µg/L)		%RPD Limit _____	Qualification Parent only / All Samples
	7	8		
Gasoline	190	180	5	

LDC #: 18539E7
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: K
2nd Reviewer: L

METHOD: GC √ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	10AC	2/21/08	GRO	27728	27728	22166	22166	12	12
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539E7
SDG #: 55853

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 6 of 7
Reviewer: 9
2nd Reviewer: MC

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0313H01	3/13/08	GRO	22166	22476	22476	1.4	1.4
2	0313H14	3/13/08	GRO	22166	20924	20924	5.6	5.6
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185396

SDG #: 35653

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9

2nd reviewer: lw

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 23

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	db-624	20	23.532	118	118	0.9
BFB	db-624	20	27.522	138	138	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539E7
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9
2nd Reviewer:

_____METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080313W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	283	NA	94.3	94.3				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185397
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 7 Compound Name 4RO

Concentration = $\frac{(20740405)\ (1)}{(22166)\ (5)}$

$= 187.1$ µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

LDC Report# 18539F7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 11, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55667

Sample Identification

0811D010
0811D011
0811D012
0811D013
0811D014
0811D009
0811P032**
0811P033
0811P034
0811P026
0811D015
0811D016
0811D017
0811D016MS
0811D016MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 15 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Samples 0811D009 and 0811P026 were identified as trip blanks. No total petroleum hydrocarbons as gasoline contaminants were found in these blanks.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0811P032**	Bromofluorobenzene	131 (75-125)	TPH as gasoline	J13 (all detects)	P
0811P033	Bromofluorobenzene	127 (75-125)	TPH as gasoline	J13 (all detects)	P

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D011 and 0811D012 were identified as field duplicates. No total petroleum hydrocarbons as gasoline were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D011	0811D012	
TPH as gasoline	48	39	21

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55667

SDG	Sample	Compound	Flag	A or P	Reason
55667	0811P032** 0811P033	TPH as gasoline	J13 (all detects)	P	Surrogate recovery (%R)

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D010
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW032
ARF: 55667
APPL ID: AX75104
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	67 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	119	75-125		%	03/16/08	03/16/08

4/11/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0315H34
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D011
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75105
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	48 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	121	75-125		%	03/16/08	03/16/08

TC 4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0315H35
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D012
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75106
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	39 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	119	75-125		%	03/16/08	03/16/08

4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H36
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D013
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW041
ARF: 55667
APPL ID: AX75107
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	47 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	121	75-125		%	03/16/08	03/16/08

BC 4/11/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H37
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D014
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW042
ARF: 55667
APPL ID: AX75108
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	21	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	121	75-125		%	03/16/08	03/16/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0315H38
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D009
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55667
APPL ID: AX75109
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	114	75-125		%	03/16/08	03/16/08

4/14/08

Quant Method: HBTXGOK.M
Run #: 0315H39
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P032
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ161D
ARF: 55667
APPL ID: AX75110
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	140 ++J13	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	131 #	75-125		%	03/16/08	03/16/08

= Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

4/21/08 Q

AMENDED PAGE

Quant Method: HBTXGOK.M
Run #: 0315H40
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 04/21/08 10:28:11 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P033
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138F
ARF: 55667
APPL ID: AX75111
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	15 ++J JB	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	127 #	75-125		%	03/16/08	03/16/08

4/4/08

J = Estimated value.
# = Recovery (or RPD) is outside QC limits.
++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H41
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P034
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ144E
ARF: 55667
APPL ID: AX75112
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	37 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	122	75-125		%	03/16/08	03/16/08

4/14/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H42
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P026
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55667
APPL ID: AX75113
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	116	75-125		%	03/16/08	03/16/08

4/4/08

Quant Method: HBTXGOK.M
Run #: 0315H43
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D015
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ131F
ARF: 55667
APPL ID: AX75114
QCG: $GAHP-080316A-121015

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	114	75-125		%	03/16/08	03/16/08

4/4/09

Quant Method: HBTXGOK.M
Run #: 0315H47
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D016
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150D
ARF: 55667
APPL ID: AX75115
QCG: $GAHP-080316A-121015

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	93 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	125	75-125		%	03/16/08	03/16/08

4/4/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H48
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 03/25/08 7:00:41 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D017
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150E
ARF: 55667
APPL ID: AX75116
QCG: $GAHP-080316A-121015

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	94 ++	20	8.6	ug/L	03/16/08	03/16/08
8015	Surrogate: BFB-FID	123	75-125		%	03/16/08	03/16/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method:	HBTXGOK.M
Run #:	0315H49
Instrument:	Harpo
Sequence:	080221
Dilution Factor:	1
Initials:	LF

Printed: 04/21/08 2:32:27 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

4/21/08 L

AMENDED PAGE

LDC #: 18539F7
SDG #: 55667
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV=1570
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=2+3
X.	Field blanks	ND	TB=6, 10

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MW H2O's

1	0811D010	11	0811D015	21	080315W/MB	31	
2	0811D011	12	0811D016	22	080316W/MB	32	
3	0811D012	13	0811D017	23		33	
4	0811D013	14	0811D016MS	24		34	
5	0811D014	15	0811D016MSD	25		35	
6	0811D009	16		26		36	
7	0811P032**	17		27		37	
8	0811P033	18		28		38	
9	0811P034	19		29		39	
10	0811P026	20		30		40	

Notes: _____

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539FT
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: CF
2nd Reviewer: LW

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18539F7
SDG #: 55467

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 6

METHOD: ✓ GC ___ HPLC

Are surrogates required by the method? Yes ✓ or No ___.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	7 dets	NS	BFB	131 (75-125)	13 dets / P
	↓	↓	↓	( )	
	8	↓	↓	127 ( )	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 18339F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd reviewer:

METHOD: ✓ GC ___ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (MCL)		%RPD Limit_____	Qualification Parent only / All Samples
	2	3		
Gasoline	48	39	21	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

Final Technical Memorandum for Groundwater Investigation at Parcel E-2
February 2009 CEKA-3001-0000-0011 G-725

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: R

METHOD: GC √ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	10AC	2/21/08	GRO	27728	27728	22166	22166	10	10
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: W

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0315433	3/16/08	~~4RD~~	22166	21547	21547	2.8	2.8
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: a
2nd reviewer: [illegible]

METHOD: √ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 7

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	db-624	20	26.099	131	131	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 14/15

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	300	93	434	404	114	114	104	104	7.2	7.2
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

MSDCLCNew.wpd

LDC #: 18539F7
SDG #: 65667

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

_____METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080315W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	283	NA	94.3	94.3				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
~~PCB-1260~~	30										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LCSCLCNew.wpd

LDC #: 18539F7
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 7 Compound Name 4RD

Concentration = $\frac{(1546378)(1)}{(22166)(5)}$

= 139.4 ug/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539G7

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 12, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55680

Sample Identification

0811D019**
0811D018

**Indicates sample underwent Level IV review

Introduction

This data review covers 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Gasoline.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1	Holding Times
2	Sample Preservation (Cooler Temp)
3	Sample Custody
4	Missing Deliverables
5	Calibration
6	Field Blanks
7	Laboratory Blanks
8	Matrix Spike (%)
9	Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10	Laboratory Control Sample
11	ICP Interference Check
12	RPD Between Two Columns
13	Surrogates
14	Field Duplicates
15	Furnace QC
16	ICP Serial Dilution
17	Chemical Recoveries
18	Trip Blanks
19	Internal Standards
20	Linear Range Exceeded
21	Potential False Positives
22	Do not use, other result more technically sound
23	Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as gasoline contaminants were found in the method blanks.

Sample 0811D018 was identified as a trip blank. No total petroleum hydrocarbons as gasoline contaminants were found in this blank.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D018
Sample Collection Date: 3/12/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TRIP BLANK
ARF: 55680
APPL ID: AX75203
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	Not detected	20	8.6	ug/L	3/16/08	3/16/08
8015	Surrogate: BFB-FID	116	75-125		%	3/16/08	3/16/08

BC 4/4/08

Quant Method: HBTXGOK.M
Run #: 0315H29
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/26/08 10:48:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

Gas-Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D019
Sample Collection Date: 3/12/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138E
ARF: 55680
APPL ID: AX75202
QCG: $GAHP-080315A-121012

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
8015	Gasoline	45 ++	20	8.6	ug/L	3/16/08	3/16/08
8015	Surrogate: BFB-FID	120	75-125		%	3/16/08	3/16/08

BC 4/1/08

++(G1) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which does not match our gasoline standard.

Quant Method: HBTXGOK.M
Run #: 0315H28
Instrument: Harpo
Sequence: 080221
Dilution Factor: 1
Initials: LF

Printed: 3/26/08 10:48:44 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539G7
SDG #: 55680
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/12/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	RPD ≤ 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	ND	TB = 2

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	0811D019** W	11	080315MMB	21		31	
2	0811D018 W	12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 183997
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: W

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18839GT
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 2 of 3
Reviewer: A
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		

LDC #: 18539G3b7
SDG #: 35680

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: W

METHOD: GC √ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)	Recalculated CF (20 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/21/08	GRO	27728	27728	22166	22166	12	12
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18537E7
SDG #: 55880

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: VR

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	0315H20	3/15/08	GRO	22166	22306	22306	0.63	0.63
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 18539G7
SDG #: 55680

METHOD: √ GC ___ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: 9
2nd reviewer:

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
BFB	db-624	20	24.055	120	~~102~~ 120	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539F7
SDG #: 55682

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer:

_____METHOD: _✓_GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
LCS = Laboratory Control Sample LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 0803ISW

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	300	NA	-	283	NA	94.3	94.3				
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CEKA-3001-0000-0011 G-746

LDC #: 185397
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: _____
2nd Reviewer: _____

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name GRO

Concentration = $\frac{(1495872)(1)}{(22166)(5)}$

= 44.7 µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Hunters Point Shipyard, E-2 Investigation
Data Validation Reports
LDC# 18539

TPH as Extractables

LDC

LDC Report# 18539A8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 4, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55609

Sample Identification

810G002**
810G003
810G004**
810G005

**Indicates sample underwent Level IV review

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55609

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G002
Sample Collection Date: 03/04/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW046
ARF: 55609
APPL ID: AX74646
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	560 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	860	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	79.2	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	88.7	60-140		%	03/07/08	03/08/08

4/11/09

++(T1I) The analyst has noted that the chromatogram of this sample includes a wide range of hydrocarbons which are not necessarily indicative of diesel.

Quant Method: TPHD0205.M
Run #: 307032
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/10/08 4:17:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G003
Sample Collection Date: 03/04/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW047
ARF: 55609
APPL ID: AX74647
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	240 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	530	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	80.8	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	92.2	60-140		%	03/07/08	03/08/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307033
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/10/08 4:17:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G004
Sample Collection Date: 03/04/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW048
ARF: 55609
APPL ID: AX74648
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	56 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	79.6	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	86.4	60-140		%	03/07/08	03/08/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	307034
Instrument:	Apollo
Sequence:	080307
Dilution Factor:	1
Initials:	EJ

Printed: 03/10/08 4:17:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G005
Sample Collection Date: 03/04/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW051
ARF: 55609
APPL ID: AX74649
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	110 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	310 J	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	80.4	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	87.2	60-140		%	03/07/08	03/08/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	307035
Instrument:	Apollo
Sequence:	080307
Dilution Factor:	1
Initials:	EJ

Printed: 03/10/08 4:17:02 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539A8
SDG #: 55609
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/4/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV ≤ 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

1	810G002** W	11	080307WMB	21		31	
2	810G003	12		22		32	
3	810G004**	13		23		33	
4	810G005	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 18539A8
SDG #: 08-55609

VALIDATION FINDINGS CHECKLIST

Reviewer: Q
2nd Reviewer: VV

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix Spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539A8
SDG #: 55609

VALIDATION FINDINGS CHECKLIST

Page: 2 of 3
Reviewer: 9
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQL				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

LDC #: 18539A8
SDG #: 65609

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: W

METHOD: GC ✓ HPLC_____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (10 std)	Recalculated CF (11 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL2	2/4/08	DRO	371444	37444	45233I	45233I	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A8
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	30705	3/8/08	DRO	452331	390175	390175	14	14
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A8
SDG #: 55609

METHOD: ✓ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: Q
2nd reviewer: LA

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 3

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
octacosane	NS	49.020	38.997	79.6	79.6	0
TPH	✓	33.630	29.063	86.4	86.4	✓

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 185398
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

_____METHOD: ✓GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
SA = Spike added
LCS = Laboratory Control Sample
SC = Sample concentration
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080307W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	-	646	NA	64.6	64.6				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539A8
SDG #: 55609

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name 4RD

Concentration = $\frac{(10711404)(5)(1)}{(452331)(1.050)(2)}$

$= 563.81 \mu g/L$

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539B8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 5, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55623

Sample Identification

0810G007
0810G008**
0810G009
0810G010
0810G011
0810G012**
0810G013
0810G014
0810G008MS
0810G008MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 10 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810G009 and 0810G010 and samples 0810G012** and 0810G013 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810G009	0810G010	
TPH as diesel	82	74	10

Compound	Concentration (ug/L)		RPD
	0810G012**	0810G013	
TPH as diesel	1200	1300	8
TPH as motor oil	2600	2800	7

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55623

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G007
Sample Collection Date: 03/05/08

Loc ID: TW052
ARF: 55623
APPL ID: AX74761
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	120 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	250 J	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	74.0	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	80.8	60-140		%	03/07/08	03/08/08

4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	307039
Instrument:	Apollo
Sequence:	080307
Dilution Factor:	1
Initials:	EJ

Printed: 03/10/08 4:23:18 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G008
Sample Collection Date: 03/05/08

Loc ID: TW053
ARF: 55623
APPL ID: AX74762
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	170 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	290 J	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	78.1	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	89.5	60-140		%	03/07/08	03/08/08

BC 4/14/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	307046
Instrument:	Apollo
Sequence:	080307
Dilution Factor:	1
Initials:	EJ

Printed: 03/10/08 4:23:18 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G009
Sample Collection Date: 03/05/08

Loc ID: TW021
ARF: 55623
APPL ID: AX74763
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	82 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	76.6	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	85.5	60-140		%	03/07/08	03/08/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	307047
Instrument:	Apollo
Sequence:	080307
Dilution Factor:	1
Initials:	EJ

Printed: 03/19/08 9:00:34 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G010
Sample Collection Date: 03/05/08

Loc ID: TW021
ARF: 55623
APPL ID: AX74764
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	74 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	71.2	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	78.5	60-140		%	03/07/08	03/08/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307048
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/19/08 9:00:34 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G011
Sample Collection Date: 03/05/08

Loc ID: TW001
ARF: 55623
APPL ID: AX74765
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	280 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	290 J	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	81.2	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	91.4	60-140		%	03/07/08	03/08/08

4/11/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307049
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/10/08 4:23:18 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G012
Sample Collection Date: 03/05/08

Loc ID: TW049
ARF: 55623
APPL ID: AX74766
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1200 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	2600	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	81.4	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	102	60-140		%	03/07/08	03/08/08

tc 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307050
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/10/08 4:23:19 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G013
Sample Collection Date: 03/05/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW049
ARF: 55623
APPL ID: AX74767
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1300 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	2800	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	86.1	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	99.3	60-140		%	03/07/08	03/08/08

BC
4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307051
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/10/08 4:23:19 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G014
Sample Collection Date: 03/05/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW012
ARF: 55623
APPL ID: AX74768
QCG: $DIHP-080307A-120586

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	220 ++	50	40.4	ug/L	03/07/08	03/08/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/07/08	03/08/08
EPA 8015B-	Surrogate: Octacosane	82.2	60-140		%	03/07/08	03/08/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	93.6	60-140		%	03/07/08	03/08/08

4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 307052
Instrument: Apollo
Sequence: 080307
Dilution Factor: 1
Initials: EJ

Printed: 03/19/08 9:00:34 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539B8
SDG #: 55623
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/5/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV ≤ 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=3+4 . 6+7
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MW-207

1	0810G007	11	080307W/MB	21		31	
2	0810G008**	12		22		32	
3	0810G009	13		23		33	
4	0810G010	14		24		34	
5	0810G011	15		25		35	
6	0810G012**	16		26		36	
7	0810G013	17		27		37	
8	0810G014	18		28		38	
9	0810G008MS	19		29		39	
10	0810G008MSD	20		30		40	

Notes: _____

LDC #: 18539B8
SDG #: 55623

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: W

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539B8
SDG #: 55423

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

LDC #: 18533B8
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 1
2nd reviewer: 1

METHOD: ✓ GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/L)		%RPD Limit____	Qualification Parent only / All Samples
	3	4		
DRO	82	74	10	

Compound	Concentration (µg/L)		%RPD Limit _____	Qualification Parent only / All Samples
	6	7		
DRO	1200	1300	8	
Motor oil	2600	2800	7	

Final Technical Memorandum for Groundwater Investigation at Parcel E-2
February 2009 CEKA-3001-0000-0011 G1784

LDC #: 18539B8
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: W

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (10 std)	Recalculated CF (11 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	1042	2/4/08	DRO	371444	37444	452331	452331	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185393B
SDG #: 55823

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: 9
2nd Reviewer: 1

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	307075	3/8/08	DRO	452331	390175	390175	14	14
2	307042	3/8/08	DRO	452331	403750	403750	11	11
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B8
SDG #: 53623
METHOD: ✓ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: R
2nd reviewer: LA

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 6

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	OB-5	47.619	38.760	81.4	81.4	0
TPH	✓	32.670	33.248	102	102	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18537B8
SDG #: 25623

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; MS = Matrix spike; SC = Sample concentration; MSD = Matrix spike duplicate

MS/MSD samples: 4/10

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	--	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	2000	2000	170	1620	1650	72.5	72.5	74.0	74.0	1.8	1.8
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539B8
SDG #: 53623

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓GC HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 080307W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	-	646	NA	64.6	64.6				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CERCLA-3097-0100-0011 | G-789

LDC #: 1853B8
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: LW

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 2 Compound Name DRO

Concentration = $\frac{(32068309)(5000)(1)}{(45233)(1050)(2)}$

$= 168.8$ mg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539C8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 6, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55636

Sample Identification

0810P002
0810P003
0810P004**
0810W002
0810G016
0810P005**
0810W004**
0810W003
0810P006
0810W005
0810P007
0810W006
0810W006RE
0810W007
0810G016MS
0810G016MSD

**Indicates sample underwent Level IV review

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met with the following exceptions:

Sample	Compound	Total Days From Sample Collection Until Extraction	Required Holding Time (in Days) From Sample Collection Until Extraction	Flag	A or P
0810W006RE	TPH as extractables	14	7	J1 (all detects)	A

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Compound	%D	Affected Compound	Associated Samples	Flag	A or P
3/13/08	TPH as diesel	20	TPH as diesel	0810P005** 0810W004** 0810W003 0810P006 0810W005 0810P007 0810W007	J5 (all detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0810W006	Octacosane ortho-Terphenyl	10.6 (60-140) 14.3 (60-140)	TPH as extractables	UJ13 (all non-detects)	A

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0810W006	TPH as extractables	R22	A

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55636

SDG	Sample	Compound	Flag	A or P	Reason
55636	0810W006RE	TPH as extractables	J1 (all detects)	A	Technical holding times
55636	0810P005** 0810W004** 0810W003 0810P006 0810W005 0810P007 0810W007	TPH as diesel	J5 (all detects)	A	Continuing calibration (%D)
55636	0810W006	TPH as extractables	UJ13 (all non-detects)	A	Surrogate recovery (%R)
55636	0810W006	TPH as extractables	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55636

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P002
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW023
ARF: 55636
APPL ID: AX74835
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1700 ++	250	202.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	3500	2500	530.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	DO	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	DO	60-140		%	03/11/08	03/13/08

4/4/08

DO = Diluted Out.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311046
Instrument: Apollo
Sequence: 080311
Dilution Factor: 5
Initials: EJ

Printed: 03/21/08 8:24:28 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P003
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW055
ARF: 55636
APPL ID: AX74836
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	240 ++	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	470 J	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	70.4	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	93.7	60-140		%	03/11/08	03/13/08

BC 4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.m
Run #: 311056
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:28 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P004
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW054
ARF: 55636
APPL ID: AX74837
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	350 ++	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	760	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	65.7	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	83.6	60-140		%	03/11/08	03/13/08

BC 4/4/08

++(T3I) The analyst has noted that the chromatogram of this sample includes higher boiling hydrocarbons such as asphaltene, waste oil or motor oil or weathered diesel.

Quant Method: TPHD0205.M
Run #: 311057
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:28 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W002
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW020
ARF: 55636
APPL ID: AX74839
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	120 ++	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	300 J	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	68.4	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	83.6	60-140		%	03/11/08	03/13/08

JC 4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311058
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810G016
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW022
ARF: 55636
APPL ID: AX74840
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	220 ++	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	460 J	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	74.9	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	97.4	60-140		%	03/11/08	03/14/08

ZC 4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	311106
Instrument:	Apollo
Sequence:	080311
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P005
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW025
ARF: 55636
APPL ID: AX74841
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	770 ++ J5	250	202.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	2100 J	2500	530.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	DO	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	DO	60-140		%	03/11/08	03/13/08

BC 4/4/08

J = Estimated value.
DO = Diluted Out.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311069
Instrument: Apollo
Sequence: 080311
Dilution Factor: 5
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W004
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW018
ARF: 55636
APPL ID: AX74842
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	200 ++JS	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	540	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	67.0	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	83.6	60-140		%	03/11/08	03/13/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311070
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W003
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW019
ARF: 55636
APPL ID: AX74843
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	240 ++J5	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	690	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	71.9	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	88.3	60-140		%	03/11/08	03/13/08

JC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311071
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P006
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW010
ARF: 55636
APPL ID: AX74844
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1100 ++J5	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	2600	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	67.2	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	90.2	60-140		%	03/11/08	03/13/08

TK 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311072
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W005
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW017
ARF: 55636
APPL ID: AX74845
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	160 ++ JS	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	440 J	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	74.5	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	101	60-140		%	03/11/08	03/13/08

TC 4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	311073
Instrument:	Apollo
Sequence:	080311
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810P007
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW009
ARF: 55636
APPL ID: AX74846
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	440 ++J5	100	80.8	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	1000	1000	212.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	67.0	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	94.1	60-140		%	03/11/08	03/13/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311074
Instrument: Apollo
Sequence: 080311
Dilution Factor: 2
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W006
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW016
ARF: 55636
APPL ID: AX74847
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	Not detected R22	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	10.6 #	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	14.3 #	60-140		%	03/11/08	03/14/08

MM 4/14/08

= Recovery (or RPD) is outside QC limits.

Quant Method:	TPHD0205.M
Run #:	311111
Instrument:	Apollo
Sequence:	080311
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water Re-Ex

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W006
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW016
ARF: 55636
APPL ID: AX74847
QCG: $DIHX-080320A-120936

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1400 ++J1	50	40.4	ug/L	03/20/08	03/20/08
EPA 8015B-	Motor Oil	2900 J	500	106.0	ug/L	03/20/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	95.0	60-140		%	03/20/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	134	60-140		%	03/20/08	03/20/08

Mu 4/14/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	320024
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762/3
Sample ID: 0810W007
Sample Collection Date: 03/06/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW043
ARF: 55636
APPL ID: AX74848
QCG: $DIHP-080311A-120814

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	350 ++J5	50	40.4	ug/L	03/11/08	03/13/08
EPA 8015B-	Motor Oil	770	500	106.0	ug/L	03/11/08	03/13/08
EPA 8015B-	Surrogate: Octacosane	73.2	60-140		%	03/11/08	03/13/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	102	60-140		%	03/11/08	03/13/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311076
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 8:24:29 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539C8
SDG #: 55636
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/8/08
Page: 1 of 1
Reviewer: 9
2nd Reviewer: W

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	SW	Sampling dates: 3/6/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	SW	ICV ≤ 15/0
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation
All + 20's

1	0810P002	11	0810P007	21	080311WMB	31	
2	0810P003	12	0810W006	22	080320WMB	32	
3	0810P004**	13	0810W006RE	23		33	
4	0810W002	14	0810W007	24		34	
5	0810G016	15	0810G016MS	25		35	
6	0810P005**	16	0810G016MSD	26		36	
7	0810W004**	17		27		37	
8	0810W003	18		28		38	
9	0810P006	19		29		39	
10	0810W005	20		30		40	

Notes: _____

LDC #: 18539C8
SDG #: 55636

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: V

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?	✓			
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539C8
SDG #: 55639

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓	✓	
Were target compounds detected in the field blanks?			✓	

LDC #: 18537C8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Technical Holding Times

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

All circled dates have exceeded the technical holding times.
Y N N/A Were all cooler temperatures within validation criteria?

METHOD: ✓ GC __ HPLC

Sample ID	Matrix	Preserved	Sampling Date	Extraction date	Analysis date	Total # of Days	Qualifier
13	W	Y	3-6-08	3-20-08	3-20-08	14	J1/UH1/A
(dets)							

TECHNICAL HOLDING TIME CRITERIA

VOLATILES:
- Water unpreserved: Aromatic within 7 days, non-aromatic within 14 days of sample collection.
- Water preserved: Both within 14 days of sample collection.
- Soils: Both within 14 days of sample collection.

EXTRACTABLES:
- Water: Extracted within 7 days, analyzed within 40 days.
- Soil: Extracted within 14 days, analyzed within 40 days.

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CEKA-3001-0000-0011 G-815

LDC #: 18539C8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9

METHOD: ✓ GC __ HPLC

2nd Reviewer: W

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ✓ %D or __RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	3/13/08	311063	NS	DRO	20	( )	6-11.14 (dets	J5/UJ5/A
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

LDC #: 183928
SDG #: 55623

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Are surrogates required by the method? Yes ✓ or No ___.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

(Y) N N/A Were surrogates spiked into all samples and blanks?

Y (N) N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	1 (5x)	NS	All	70 (–)	No Qual.
		↓	↓	↓ (↓)	↓
	6 (5x)	↓	↓	↓ (↓)	↓
				( )	
				( )	
				( )	
	12 ~~(DUP)~~	NS	G	10.6 (60-140)	J (LL) / A (13)
	(ND)		H	14.3 (↓)	↓
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 18539C8
SDG #: 655636

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ **GC** ___ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	13	All	All 12	R/A (22)

Comments: _____

LDC #: 18539C8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: W

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (10th std)	Recalculated CF (11th std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/4/08	DRO	371444	374444	452331	452331	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539C8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: V

METHOD: GC V HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	311050	3/13/08	DRO	452331	494603	494603	9.3	9.3
2	311053	3/13/08	DRO	452331	541584	541584	20	20
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185398

SDG #: 55623

METHOD: √ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: [illegible]

2nd reviewer: [illegible]

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 7

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	DB-5	50.00	33.490	67.0	67.0	0
TPH	√	34.303	28.683	83.6	83.6	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539C8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 4
2nd Reviewer: W

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 15/16

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	2000	2000	220	1960	1820	87.0	87.0	80.0	80.0	7.4	7.4
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539j8
SDG #: 55636

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

_____METHOD: _✓_GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080311W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	--	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	-	831	NA	63.1	63.1				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185398
SDG #: 55623

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 3 Compound Name DRO

Concentration = $\frac{(6400\,9863)(5000)(1)}{(45\,3331)(1020)(82)}$

= 346.8 mg/kg ✓

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539D8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55644

Sample Identification

0810G018
0810P009
0810G019
0810G020**
0810P010
0810P011
0810P012
0810G021**
0810G022
0810G023
0810G024
0810G025
0810P013
0810P014
0810P015
0810P016**

**Indicates sample underwent Level IV review

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0810P010 and 0810P011 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0810P010	0810P011	
TPH as diesel	860	630	31
TPH as motor oil	2000	1700	16

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55644

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G018
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW024
ARF: 55644
APPL ID: AX74906
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	890 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	1800	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	97.4	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	125	60-140		%	03/11/08	03/20/08

BC 4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320004
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P009
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW050
ARF: 55644
APPL ID: AX74907
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	370 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	790	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	86.1	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	112	60-140		%	03/11/08	03/20/08

BC 4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	320005
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G019
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW002
ARF: 55644
APPL ID: AX74908
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	740 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	1400	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	91.6	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	124	60-140		%	03/11/08	03/20/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320006
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G020
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW015
ARF: 55644
APPL ID: AX74909
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	550 ++	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	1400	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	69.5	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	110	60-140		%	03/11/08	03/14/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311113
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P010
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74910
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	860 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	2000	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	89.8	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	125	60-140		%	03/11/08	03/20/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	320007
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	1
Initials:	EJ

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APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P011
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW011
ARF: 55644
APPL ID: AX74911
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	630 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	1700	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	79.5	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	111	60-140		%	03/11/08	03/20/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320008
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P012
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW008
ARF: 55644
APPL ID: AX74912
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	260 ++	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	350 J	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	79.3	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	116	60-140		%	03/11/08	03/14/08

4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 311092
Instrument: Apollo
Sequence: 080311
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G021
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW014
ARF: 55644
APPL ID: AX74913
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	980 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	2500	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	84.5	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	107	60-140		%	03/11/08	03/20/08

BC 4/6/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320009
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 2:02:01 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G022
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW013
ARF: 55644
APPL ID: AX74914
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1800 ++	50	40.4	ug/L	03/11/08	03/21/08
EPA 8015B-	Motor Oil	3200	500	106.0	ug/L	03/11/08	03/21/08
EPA 8015B-	Surrogate: Octacosane	94.2	60-140		%	03/11/08	03/21/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	130	60-140		%	03/11/08	03/21/08

tc 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320056
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 3:15:50 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G023
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW044
ARF: 55644
APPL ID: AX74915
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	980 ++	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	1300	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	74.7	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	115	60-140		%	03/11/08	03/14/08

4/14/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	311095
Instrument:	Apollo
Sequence:	080311
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G024
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW003
ARF: 55644
APPL ID: AX74916
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1100 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	2000	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	94.9	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	123	60-140		%	03/11/08	03/20/08

EC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320012
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G025
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW006
ARF: 55644
APPL ID: AX74917
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1400 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	3000	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	97.4	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	131	60-140		%	03/11/08	03/20/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	320025
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P013
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW007
ARF: 55644
APPL ID: AX74918
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	340 ++	50	40.4	ug/L	03/11/08	03/14/08
EPA 8015B-	Motor Oil	930	500	106.0	ug/L	03/11/08	03/14/08
EPA 8015B-	Surrogate: Octacosane	70.2	60-140		%	03/11/08	03/14/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	100	60-140		%	03/11/08	03/14/08

BC 4/9/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	311114
Instrument:	Apollo
Sequence:	080311
Dilution Factor:	1
Initials:	EJ

Printed: 03/21/08 2:08:46 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P014
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW004
ARF: 55644
APPL ID: AX74919
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	830 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	2000	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	101	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	118	60-140		%	03/11/08	03/20/08

BC 4/14/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320026
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:31 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P015
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW045
ARF: 55644
APPL ID: AX74920
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1600 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	4100	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	95.3	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	117	60-140		%	03/11/08	03/20/08

BC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320027
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:32 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P016
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW005
ARF: 55644
APPL ID: AX74921
QCG: $DIHP-080311B-120807

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	360 ++	50	40.4	ug/L	03/11/08	03/20/08
EPA 8015B-	Motor Oil	900	500	106.0	ug/L	03/11/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	87.1	60-140		%	03/11/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	114	60-140		%	03/11/08	03/20/08

JC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320028
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/21/08 1:49:32 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539D8
SDG #: 55644
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: 9
2nd Reviewer: ✓

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	lcv = 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D = 5+6
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MW-20s

1	0810G018	11	0810G024	21	080311W/MB	31	
2	0810P009	12	0810G025	22		32	
3	0810G019	13	0810P013	23		33	
4	0810G020**	14	0810P014	24		34	
5	0810P010	15	0810P015	25		35	
6	0810P011	16	0810P016**	26		36	
7	0810P012	17		27		37	
8	0810G021**	18		28		38	
9	0810G022	19		29		39	
10	0810G023	20		30		40	

Notes: _____

LDC #: 18538D8
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Reviewer: A
2nd Reviewer: JK

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) < 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) < 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18639D8
SDG #: 55644

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

LDC #: 185390B
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Reviewer: 9
2nd reviewer: V

METHOD: ✓ GC __ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (mg/L)		%RPD Limit_____	Qualification Parent only / All Samples
	5	6		
DRO	860	630	31	
Motor oil	2000	1700	16	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 1853908
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: L

METHOD: GC ✓ HPLC_____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (10 std)	Recalculated CF (11 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL2	2/4/08	DRO	371444	371444	45233I	45233I	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 853908
SDG #: 53644

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [signature]

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	311079	3/13/08	DRO	452331	479842	479842	6.1	6.1
2	311109	3/14/08	DRO	452331	496082	496082	9.7	9.7
3	32002	3/20/08	DRO	452331	469475	469475	3.8	3.8
4	320013	3/20/08	DRO	452331	437802	437802	3.2	3.2

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539D8
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: LA

METHOD: ✓ GC __ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 8

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	DB-5	48.544	41.015	84.5	84.5	0
TPH	↓	~~38.318~~ 38.318	32.328	107	107	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539B8
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: Q
2nd Reviewer:

____METHOD: ✓ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration, SA = Spike added, SC = Sample concentration

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100 LCS = Laboratory Control Sample, LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 680311W

Compound	Spike Added (ug/L)		Sample Conc. (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	—	778	NA	77.8	77.8				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 1853908
SDG #: 55644

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: V

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID: 4 Compound Name DRO

Concentration = $\frac{(1035584464)(5000)(1)}{(452331)(1040)(2)}$

$= 550.3$ µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539E8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 7 through 11, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55653

Sample Identification

0811D002
0811D003
0811D004
0811D005
0811D006
0811D007**
0811D008
0811P020
0811P021
0811P022
0811P023**
0810P017
0810G026
0810G027

**Indicates sample underwent Level IV review

Introduction

This data review covers 14 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D005 and 0811D006, samples 0811D007** and 0811D008, and samples 0811P021 and 0811P022 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D005	0811D006	
TPH as diesel	2300	2200	4
TPH as motor oil	1800	1600	12

Compound	Concentration (ug/L)		RPD
	0811D007**	0811D008	
TPH as diesel	1800	1800	0
TPH as motor oil	1600	1400	1

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55653

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D002
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW036
ARF: 55653
APPL ID: AX74988
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	870 ++	50	40.4	ug/L	03/13/08	03/18/08
EPA 8015B-	Motor Oil	950	500	106.0	ug/L	03/13/08	03/18/08
EPA 8015B-	Surrogate: Octacosane	99.6	60-140		%	03/13/08	03/18/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	122	60-140		%	03/13/08	03/18/08

BL 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317058
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:21 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D003
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW035
ARF: 55653
APPL ID: AX74989
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	310 ++	50	40.4	ug/L	03/13/08	03/18/08
EPA 8015B-	Motor Oil	270 J	500	106.0	ug/L	03/13/08	03/18/08
EPA 8015B-	Surrogate: Octacosane	94.3	60-140		%	03/13/08	03/18/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	128	60-140		%	03/13/08	03/18/08

BC 4/4/08

J = Estimated value.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317059
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:21 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D004
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW039
ARF: 55653
APPL ID: AX74990
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	2300 ++	50	40.4	ug/L	03/13/08	03/19/08
EPA 8015B-	Motor Oil	1700	500	106.0	ug/L	03/13/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	108	60-140		%	03/13/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	121	60-140		%	03/13/08	03/19/08

TC
4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317074
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D005
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74991
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	2300 ++	50	40.4	ug/L	03/13/08	03/18/08
EPA 8015B-	Motor Oil	1800	500	106.0	ug/L	03/13/08	03/18/08
EPA 8015B-	Surrogate: Octacosane	98.7	60-140		%	03/13/08	03/18/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	129	60-140		%	03/13/08	03/18/08

BC 4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317061
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D006
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW040
ARF: 55653
APPL ID: AX74992
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	2200 ++	50	40.4	ug/L	03/13/08	03/18/08
EPA 8015B-	Motor Oil	1600	500	106.0	ug/L	03/13/08	03/18/08
EPA 8015B-	Surrogate: Octacosane	98.1	60-140		%	03/13/08	03/18/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	125	60-140		%	03/13/08	03/18/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317062
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D007
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74993
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1800 ++	50	40.4	ug/L	03/13/08	03/19/08
EPA 8015B-	Motor Oil	1600	500	106.0	ug/L	03/13/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	108	60-140		%	03/13/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	107	60-140		%	03/13/08	03/19/08

4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317063
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D008
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW031
ARF: 55653
APPL ID: AX74994
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1800 ++	50	40.4	ug/L	03/13/08	03/19/08
EPA 8015B-	Motor Oil	1400	500	106.0	ug/L	03/13/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	100	60-140		%	03/13/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	118	60-140		%	03/13/08	03/19/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317064
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P020
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW056
ARF: 55653
APPL ID: AX74997
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	340 ++	50	40.4	ug/L	03/13/08	03/19/08
EPA 8015B-	Motor Oil	780	500	106.0	ug/L	03/13/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	79.7	60-140		%	03/13/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	103	60-140		%	03/13/08	03/19/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	317065
Instrument:	Apollo
Sequence:	080317
Dilution Factor:	1
Initials:	EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P021
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74998
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	Not detected	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	74.6	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	89.3	60-140		%	03/13/08	03/17/08

EC 4/4/08

Quant Method: TPHD0205.M
Run #: 316021
Instrument: Apollo
Sequence: 080316
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 2:48:49 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P022
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW058
ARF: 55653
APPL ID: AX74999
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	Not detected	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	71.6	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	94.9	60-140		%	03/13/08	03/17/08

4/4/08

Quant Method: TPHD0205.M
Run #: 316022
Instrument: Apollo
Sequence: 080316
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P023
Sample Collection Date: 03/10/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW057B
ARF: 55653
APPL ID: AX75000
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	270 ++	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	600	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	65.3	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	82.6	60-140		%	03/13/08	03/17/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	316023
Instrument:	Apollo
Sequence:	080316
Dilution Factor:	1
Initials:	EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810P017
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW034
ARF: 55653
APPL ID: AX75003
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	Not detected	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	Not detected	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	88.9	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	99.2	60-140		%	03/13/08	03/17/08

4/4/08

Quant Method: TPHD0205.M
Run #: 316024
Instrument: Apollo
Sequence: 080316
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G026
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW038
ARF: 55653
APPL ID: AX75005
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	5200 ++	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	2500	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	108	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	139	60-140		%	03/13/08	03/17/08

RC 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 316025
Instrument: Apollo
Sequence: 080316
Dilution Factor: 1
Initials: EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0810G027
Sample Collection Date: 03/07/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW037
ARF: 55653
APPL ID: AX75007
QCG: $DIHP-080313A-120883

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	290 ++	50	40.4	ug/L	03/13/08	03/17/08
EPA 8015B-	Motor Oil	640	500	106.0	ug/L	03/13/08	03/17/08
EPA 8015B-	Surrogate: Octacosane	105	60-140		%	03/13/08	03/17/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	83.7	60-140		%	03/13/08	03/17/08

BC 4/14/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	316026
Instrument:	Apollo
Sequence:	080316
Dilution Factor:	1
Initials:	EJ

Printed: 03/24/08 10:13:22 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539E8
SDG #: 55653
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: CV
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/7-11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	RF ≤ 15%
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	A	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	A	
IX.	Field duplicates	SW	D=4+5, 6+7, 9+10*
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
* ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

All H2O's

1	0811D002	11	0811P023**	21	080313WMB	31	
2	0811D003	12	0811P017	22		32	
3	0811D004	13	0811G026	23		33	
4	0811D005	14	0811G027	24		34	
5	0811D006	15		25		35	
6	0811D007**	16		26		36	
7	0811D008	17		27		37	
8	0811P020	18		28		38	
9	0811P021	19		29		39	
10	0811P022	20		30		40	

Notes: _____

LDC #: 185378
SDG #: 55853

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: Q
2nd Reviewer: V

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓	✓	
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 185392B
SDG #: 55653

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer:
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓	✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓	✓	
Were target compounds detected in the field blanks?			✓	

LDC #: 18539E8
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were field duplicate pairs identified in this SDG?
Y N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (µg/kg)		%RPD	Qualification
	4	5	Limit ____	Parent only / All Samples
DRO	2300	2200	4	
Motor oil	1800	1600	12	

Compound	Concentration (µg/L)		%RPD	Qualification
	6	7	Limit ____	Parent only / All Samples
DRO	1800	1800	0	
Motor oil	1600	1400	1	

LDC #: 18539E8
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: R
2nd Reviewer: V

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (1st std)	Recalculated CF (1st std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/4/08	DRO	371444	371444	452331	452331	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539E8
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: AV
2nd Reviewer: LA

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	316019	3/17/08	ORO	452331	520868	520868	15	15
2	31705	3/18/08	ORO	452331	436803	436803	3.4	3.4
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

LDC #: 185378
SDG #: 55853

METHOD: √ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 11

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	DB-5	47.619	31.075	~~67~~ 65.3	65.3	0
TPH	↓	29.741	24.563	82.6	82.6	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

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February 2009 CEKA-3001-0000-0011 G-882

LDC #: 18539B8
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of 1
Reviewer: 1
2nd Reviewer: V

_____METHOD: _✓_ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration
SA = Spike added
SC = Sample concentration
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 080313W

Compound	Spike Added (ug/L)		Sample Conc (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	—	903	NA	90.3	90.3				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18537B8
SDG #: 55653

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 1

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 6 Compound Name DRO

Concentration = $\frac{(34317896 5)(5000)(1)}{(452331)(1050)(2)}$

= 1806.4 µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539F8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 11, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55667

Sample Identification

0811D010
0811D011
0811D012
0811D013
0811D014
0811P032**
0811P033
0811P034
0811D015
0811D016
0811D017
0811D016MS
0811D016MSD
0811D010DL
0811D013DL
0811D014DL
0811P033DL
0811D015DL

**Indicates sample underwent Level IV review

Introduction

This data review covers 18 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Samples indicated by a double asterisk on the front cover underwent a Level IV review. A Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0811D010	Octacosane ortho-Terphenyl	185 (60-140) 267 (60-140)	TPH as extractables	J13 (all detects)	A
0811D012	ortho-Terphenyl	162 (60-140)	TPH as extractables	J13 (all detects)	P
0811D013	ortho-Terphenyl	173 (60-140)	TPH as extractables	J13 (all detects)	P

Sample	Surrogate	%R (Limits)	Compound	Flag	A or P
0811D014	ortho-Terphenyl	159 (60-140)	TPH as extractables	J13 (all detects)	P
0811P033	Octacosane ortho-Terphenyl	385 (60-140) 148 (60-140)	TPH as extractables	J13 (all detects)	P
0811D015	Octacosane ortho-Terphenyl	319 (60-140) 302 (60-140)	TPH as extractables	J13 (all detects)	P

b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
0811D010	Diesel range organics Motor oil range organics	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects) J20 (all detects)	A
0811D013 0811D014 0811P033 0811D015	Motor oil range organics	Sample result exceeded calibration range.	Reported result should be within calibration range.	J20 (all detects)	A

Raw data were not evaluated for the samples reviewed by Level III criteria.

VII. System Performance

The system performance was acceptable for samples on which a Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

VIII. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

Sample	Compound	Flag	A or P
0811D010	Diesel range organics Motor oil range organics	R22 R22	A
0811D013 0811D014 0811P033 0811D015	Motor oil range organics	R22	A

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

Samples 0811D011 and 0811D012 were identified as field duplicates. No total petroleum hydrocarbons as extractables were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	0811D011	0811D012	
TPH as diesel	3300	3400	3
TPH as motor oil	4800	5000	4

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55667

SDG	Sample	Compound	Flag	A or P	Reason
55667	0811D010	TPH as extractables	J13 (all detects)	A	Surrogate recovery (%R)
55667	0811D012 0811D013 0811D014 0811P033 0811D015	TPH as extractables	J13 (all detects)	P	Surrogate recovery (%R)
55667	0811D010	Diesel range organics Motor oil range organics	J20 (all detects) J20 (all detects)	A	Compound quantitation and CRQLs
55667	0811D013 0811D014 0811P033 0811D015	Motor oil range organics	J20 (all detects)	A	Compound quantitation and CRQLs
55667	0811D010	Diesel range organics Motor oil range organics	R22 R22	A	Overall assessment of data
55667	0811D013 0811D014 0811P033 0811D015	Motor oil range organics	R22	A	Overall assessment of data

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55667

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D010
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW032
ARF: 55667
APPL ID: AX75104
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	6700 E	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	9300 E	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	185 #	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	267 #	60-140		%	03/18/08	03/19/08

R22 ↓

4/14/08

E = The reported value exceeds linear range.
# = Recovery (or RPD) is outside QC limits.

Quant Method: TPHD0205.M
Run #: 317083
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D010
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW032
ARF: 55667
APPL ID: AX75104
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	7100 ++	100	80.8	ug/L	03/18/08	03/21/08
EPA 8015B-	Motor Oil	8500	1000	212.0	ug/L	03/18/08	03/21/08

4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205
Run #: 320066
Instrument: Apollo
Sequence: 080320
Dilution Factor: 2
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D011
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75105
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	3300 ++	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	4800	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	92.8	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	137	60-140		%	03/18/08	03/19/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317084
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D012
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW033
ARF: 55667
APPL ID: AX75106
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	3400 ++J3	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	5000 ↓	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	103	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	162 #	60-140		%	03/18/08	03/19/08

4/4/08

= Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	317085
Instrument:	Apollo
Sequence:	080317
Dilution Factor:	1
Initials:	EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D013
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW041
ARF: 55667
APPL ID: AX75107
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	4400 ++ J3	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	6600 E R22	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	109	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	173 #	60-140		%	03/18/08	03/19/08

4/4/08

E = The reported value exceeds linear range.
# = Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317086
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D013
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW041
ARF: 55667
APPL ID: AX75107
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Motor Oil	6700	1000	212.0	ug/L	03/18/08	03/21/08

4/4/08

Quant Method: TPHD0205
Run #: 320067
Instrument: Apollo
Sequence: 080320
Dilution Factor: 2
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D014
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW042
ARF: 55667
APPL ID: AX75108
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	4400 ++ J3	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	6600 E R22	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	94.6	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	159 #	60-140		%	03/18/08	03/19/08

EC 4/14/08

E = The reported value exceeds linear range.
# = Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317087
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D014
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: TW042
ARF: 55667
APPL ID: AX75108
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Motor Oil	5900	1000	212.0	ug/L	03/18/08	03/21/08

4/4/08

Quant Method:	TPHD0205
Run #:	320068
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	2
Initials:	EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P032
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ161D
ARF: 55667
APPL ID: AX75110
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1900 ++	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	1400	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	107	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	129	60-140		%	03/18/08	03/19/08

++(T3I) The analyst has noted that the chromatogram of this sample includes higher boiling hydrocarbons such as asphaltene, waste oil or motor oil or weathered diesel.

AMENDED PAGE

4/21/08 Q

Quant Method: TPHD0205.M
Run #: 317088
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 04/21/08 10:28:11 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P032
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ161D
ARF: 55667
APPL ID: AX75110
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1900 ++	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	1400	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	107	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	129	60-140		%	03/18/08	03/19/08

++(T3I) The analyst has noted that the chromatogram of this sample includes higher boiling hydrocarbons such as asphaltene, waste oil or motor oil or weathered diesel.

AMENDED PAGE

4/21/08 Q

Quant Method: TPHD0205.M
Run #: 317088
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 04/21/08 10:28:11 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P033
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138F
ARF: 55667
APPL ID: AX75111
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	3900 ++ J13	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	8000 E R22	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	385 #	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	148 #	60-140		%	03/18/08	03/19/08

BC 4/4/08

E = The reported value exceeds linear range.
# = Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	317089
Instrument:	Apollo
Sequence:	080317
Dilution Factor:	1
Initials:	EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P033
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138F
ARF: 55667
APPL ID: AX75111
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Motor Oil	8100	1000	212.0	ug/L	03/18/08	03/21/08

4/4/08

Quant Method:	TPHD0205
Run #:	320069
Instrument:	Apollo
Sequence:	080320
Dilution Factor:	2
Initials:	EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811P034
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ144E
ARF: 55667
APPL ID: AX75112
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	1100 ++	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	1500	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	105	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	134	60-140		%	03/18/08	03/19/08

4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method:	TPHD0205.M
Run #:	317090
Instrument:	Apollo
Sequence:	080317
Dilution Factor:	1
Initials:	EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D015
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ131F
ARF: 55667
APPL ID: AX75114
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	3700 ++J13	50	40.4	ug/L	03/18/08	03/19/08
EPA 8015B-	Motor Oil	9300 E R22	500	106.0	ug/L	03/18/08	03/19/08
EPA 8015B-	Surrogate: Octacosane	319 #	60-140		%	03/18/08	03/19/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	302 #	60-140		%	03/18/08	03/19/08

BK 4/4/08

E = The reported value exceeds linear range.
# = Recovery (or RPD) is outside QC limits.
++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317091
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D015
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ131F
ARF: 55667
APPL ID: AX75114
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Motor Oil	9200	2500	530.0	ug/L	03/18/08	03/21/08

4/11/08

Quant Method: TPHD0205
Run #: 320070
Instrument: Apollo
Sequence: 080320
Dilution Factor: 5
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D016
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150D
ARF: 55667
APPL ID: AX75115
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	2300 ++	50	40.4	ug/L	03/18/08	03/20/08
EPA 8015B-	Motor Oil	2000	500	106.0	ug/L	03/18/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	118	60-140		%	03/18/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	129	60-140		%	03/18/08	03/20/08

BC 4/11/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317100
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 03/25/08 6:38:38 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D017
Sample Collection Date: 03/11/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ150E
ARF: 55667
APPL ID: AX75116
QCG: $DIHP-080318A-121036

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	3200 ++	50	40.4	ug/L	03/18/08	03/20/08
EPA 8015B-	Motor Oil	4900	500	106.0	ug/L	03/18/08	03/20/08
EPA 8015B-	Surrogate: Octacosane	103	60-140		%	03/18/08	03/20/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	132	60-140		%	03/18/08	03/20/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 317101
Instrument: Apollo
Sequence: 080317
Dilution Factor: 1
Initials: EJ

Printed: 04/21/08 2:32:27 PM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

4/21/08 Q

AMENDED PAGE

LDC #: 18539F8
SDG #: 55667
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 4/9/08
Page: 1 of 1
Reviewer: O
2nd Reviewer: W

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/11/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	A	ICV ≤ 15% D
III.	Blanks	A	
IVa.	Surrogate recovery	SW	
IVb.	Matrix spike/Matrix spike duplicates	A	
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	Not reviewed for Level III validation.
VI.	Compound Quantitation and CRQLs	SW	Not reviewed for Level III validation.
VII.	System Performance	A	Not reviewed for Level III validation.
VIII.	Overall assessment of data	SW	
IX.	Field duplicates	SW	D = 2+3
X.	Field blanks	N	

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

MH 4/8/09

1	0811D010	11	0811D017	21	080318W/MB	31	
2	0811D011	12	0811D016MS	22		32	
3	0811D012	13	0811D016MSD	23		33	
4	0811D013	14	0811D010 DL	24		34	
5	0811D014	15	0811D013 DL	25		35	
6	0811P032**	16	0811D014 DL	26		36	
7	0811P033	17	0811P033 DL	27		37	
8	0811P034	18	0811D015 DL	28		38	
9	0811D015	19		29		39	
10	0811D016	20		30		40	

Notes: _____

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Page: 1 of 3
Reviewer: Q
2nd Reviewer: V

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?		✓		
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?		✓		
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS CHECKLIST

Reviewer: 9
2nd Reviewer: W

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds idetected in the field duplicates?	✓			
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

LDC #: 18539F8
SDG #: 53667

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: 9
2nd Reviewer: 0

METHOD: ✓ GC __ HPLC

Are surrogates required by the method? Yes ✓ or No ___.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	1 (dets)	NS	G	185 (60-140)	J (3 dets) / A
			H	267	
	3		H	162	J (3 dets) / P
	4		H	173	
	5		H	159	
	7		G	385	
			H	148	
	9		G	319	
			H	302	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene		
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin		
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin		
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate		
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

Final Technical Memorandum for Groundwater Investigation at Parcel E-2 February 2009 CEKA-3001-0000-0011 G-912

LDC #: 18339F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: Q
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Level IV/D Only

(Y) N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

(Y) N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

#	Compound Name	Finding	Associated Samples	Qualifications
	1	DRO. Motor oil > calib	1	J detects/A (20)
		range		
	4, 5, 7, 9	Motor oil > calib range	4, 5, 7, 9	

Comments: See sample calculation verification worksheet for recalculations

LDC #: 18539F8
SDG #: 5566 7

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: √ **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Compound Name	Finding	Associated Samples	Qualifications
	1	All	1	P/A (22)
	4, 5, 7, 9	Motor oil	4, 5, 7, 9	√

Comments: _____

OVRNew.wpd

LDC #: 18539F8
SDG #: 5567

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: 9
2nd reviewer: [illegible]

METHOD: ✓ GC __ HPLC

(Y) N N/A Were field duplicate pairs identified in this SDG?
(Y) N N/A Were target compounds detected in the field duplicate pairs?

Compound	Concentration (ug/L)		%RPD Limit_____	Qualification Parent only / All Samples
	2	3		
Diesel	3300	3400	3	
Motor oil	4800	5000	4	

Compound	Concentration ( )		%RPD Limit _____	Qualification Parent only / All Samples

LDC #: 18539F8
SDG #: 5567

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (18 std)	Recalculated CF (17 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	1042	2/4/08	DRO	371444	37444	45233I	45233I	9.3	9.3
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer:
2nd Reviewer:

METHOD: GC ✓ HPLC ____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	31705	3/19/08	ORO	452331	453533	453533	0.27	0.27
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: 1

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 6

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	NS	50.0	53.705	107	107	0
TPH	✓	31.228	40.404	129	129	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: 4
2nd Reviewer: 4

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA Where SSC = Spiked sample concentration SC = Sample concentration
SA = Spike added
RPD =({{SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100 MS = Matrix spike MSD = Matrix spike duplicate

MS/MSD samples: 12/13

Compound	Spike Added (µg/L)		Sample Conc (µg/L)	Spike Sample Concentration (µg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	2000	2000	2300	3780	3890	74.0	74.0	79.5	79.5	2.9	2.9
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

_____METHOD: __✓__ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA

Where SSC = Spiked sample concentration
SA = Spike added
SC = Sample concentration
LCS = Laboratory Control Sample
LCSD = Laboratory Control Sample duplicate

RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

LCS/LCSD samples: 680318W

Compound	Spike Added (ug/L)		Sample Conc (ug/L)	Spike Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	---	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	1000	NA	—	884	NA	88.4	88.4				
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18539F8
SDG #: 55667

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 6 Compound Name DRO

Concentration = $\frac{(34265268)(5000)(1)}{(452331)(1000)(2)}$

= 1893.8 µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

LDC Report# 18539G8

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: Hunters Point Shipyard, E-2 Investigation

Collection Date: March 12, 2008

LDC Report Date: April 11, 2008

Matrix: Water

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 55680

Sample Identification

0811D019

Introduction

This data review covers one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows the Final Work Plan for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard, San Francisco, CA (February 2008) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 ICP Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

The percent relative standard deviations (%RSD) of calibration factors for compounds were less than or equal to 20.0% .

b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits with the following exceptions:

Date	Compound	%D	Affected Compound	Associated Samples	Flag	A or P
3/21/08	TPH as motor oil	16	TPH as motor oil	All samples in SDG 55680	J5 (all detects)	A

The percent differences (%D) of the second source calibration standard were less than or equal to 15.0% for all compounds.

III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractables contaminants were found in the method blanks.

No field blanks were identified in this SDG.

IV. Accuracy and Precision Data

a. Surrogate Recovery

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

b. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

c. Laboratory Control Samples

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

V. Target Compound Identification

All target compound identifications were within validation criteria.

VI. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria.

VII. System Performance

The system performance was acceptable.

VIII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

IX. Field Duplicates

No field duplicates were identified in this SDG.

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 55680

SDG	Sample	Compound	Flag	A or P	Reason
55680	0811D019	TPH as motor oil	J5 (all detects)	A	Continuing calibration (%D)

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

Hunters Point Shipyard, E-2 Investigation
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 55680

No Sample Data Qualified in this SDG

EPA 8015B TPH Diesel Water

Kleinfelder
1970 Broadway, Suite 710
Oakland, CA 94612

Attn: Patricia Walters
Project: E-2/89762
Sample ID: 0811D019
Sample Collection Date: 03/12/08

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Loc ID: PZ138E
ARF: 55680
APPL ID: AX75202
QCG: $DIHP-080319A-121050

Method	Analyte	Result	PQL	MDL	Units	Extraction Date	Analysis Date
EPA 8015B-	Diesel Fuel	960 ++	50	40.4	ug/L	03/19/08	03/21/08
EPA 8015B-	Motor Oil	1300 J5	500	106.0	ug/L	03/19/08	03/21/08
EPA 8015B-	Surrogate: Octacosane	88.1	60-140		%	03/19/08	03/21/08
EPA 8015B-	Surrogate: Ortho-Terphenyl	112	60-140		%	03/19/08	03/21/08

RE 4/4/08

++(T3M) The analyst has noted that the chromatogram of this sample is mainly higher boiling hydrocarbons such as asphaltene, waste oil, motor oil, weathered diesel, and hydraulic fluid.

Quant Method: TPHD0205.M
Run #: 320039
Instrument: Apollo
Sequence: 080320
Dilution Factor: 1
Initials: EJ

Printed: 03/26/08 8:29:08 AM
APPL-F1-SC-MCRes/MCPQL-REG MDLs

LDC #: 18539G8
SDG #: 55680
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Level IV

Date: 4/8/09
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 3/12/08
IIa.	Initial calibration	A	
IIb.	Calibration verification/ICV	SW	ICV=570
III.	Blanks	A	
IVa.	Surrogate recovery	A	
IVb.	Matrix spike/Matrix spike duplicates	N	client specified
IVc.	Laboratory control samples	A	LCS
V.	Target compound identification	A	
VI.	Compound Quantitation and CRQLs	A	
VII.	System Performance	A	
VIII.	Overall assessment of data	A	
IX.	Field duplicates	N	
X.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

1	0811D019 W	11	080319WMB	21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Notes: _____

LDC #: 185396
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: 9
2nd Reviewer: V

Method: ✓ GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used?		✓		
Did the initial calibration meet the curve fit acceptance criteria?			✓	
Were the RT windows properly established?	✓			
IV. Continuing calibration				
What type of continuing calibration calculation was performed? ✓ %D or ___ %R	✓			
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		✓		
Was a MS/MSD analyzed every 20 samples of each matrix?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			

LDC #: 18539E8
SDG #: 55680

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 9
2nd Reviewer: lw

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XI. Compound quantitation/CRQLs				
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIV. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds idetected in the field duplicates?			✓	
XV. Field blanks				
Were field blanks identified in this SDG?		✓		
Were target compounds detected in the field blanks?			✓	

LDC #: 18539F8
SDG #: 55680

METHOD: √ GC __ HPLC

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: 9
2nd Reviewer: V

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? √ %D or __ RPD

Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / RPD validation criteria of ≤15.0%?

Level IV Only

Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

#	Date	Standard ID	Detector/ Column	Compound	%D / RPD (Limit ≤ 15.0)	RT (limit)	Associated Samples	Qualifications
	3/21/18	320034	NS	Motoroil	16	( )	All (dets)	J5/MNS/A
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		
						( )		

LDC #: 18539F8
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: A
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

#	Standard ID	Calibration Date	Compound	Reported CF (18 std)	Recalculated CF (18 std)	Reported Average CF (initial)	Recalculated Average CF (initial)	Reported %RSD	Recalculated %RSD
1	1842	2/4/08	DRO	371444	37444	45=331	45=331	9.3	93
2									
3									
4									

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 1853J48
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: W

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(Ical)/ CCV Conc.	Reported CF/Conc. CCV	Recalculated CF/Conc. CCV	Reported %D	Recalculated %D
1	320034	3/21/08	DRO	452331	429703	429703	5.0	5.0
2								
3								
4								

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 185348
SDG #: 55680

METHOD: V GC ___ HPLC

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: 9
2nd reviewer: [illegible]

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Octacosane	DB-5	50.0	44.037	88.1	88.1	0
TPH	V	31.228	34.902	112	112	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 185396B
SDG #: 55680

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: 9
2nd Reviewer: _____

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. 1 Compound Name DRO

Concentration = $\frac{(173069737)(5000)(1)}{(452331)(1000)(2)}$

= 956.5 µg/L

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

SAMPCALew.wpd

Appendix H.
Technical System Audit report

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TECHNICAL SYSTEM AUDIT - SUMMARY REPORT
HUNTERS POINT SHIPYARD
GROUNDWATER INVESTIGATION AT PARCEL E-2
SAN FRANCISCO, CALIFORNIA

Navy Contract:
N62473-07-C-3001

Prepared by:

CE2-Kleinfelder Joint Venture
7901 Stoneridge Drive, Suite 505
Pleasanton, CA 94588

March 25, 2008

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Prepared for:

Mr. Mark Walden
Remedial Project Manager
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108

TECHNICAL SYSTEM AUDIT - SUMMARY REPORT
GROUNDWATER INVESTIGATION AT PARCEL E-2
HUNTERS POINT SHIPYARD
SAN FRANCISCO, CALIFORNIA

Contract No.: N62473-07-C-3001

Prepared by:

Thomas A. Sayre
Field Manager

Reviewed By:

Mohammad Abri
Corporate Quality Assurance Manager

CE2-Kleinfelder Joint Venture
7901 Stoneridge Drive
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March 25, 2008

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3.0 AUDIT ACTIVITIES 3-1

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APPENDICES

Appendix A. Soil Boring/Temporary Well Installation and Grab Groundwater Sampling Audit Forms and Auditor's Field Notes.

Appendix B. Daily Equipment Calibration Logs.

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EXECUTIVE SUMMARY

Two Technical System Audits (TSA) were performed during the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard. The purpose of the TSAs was to verify that the field team is following the proper procedures during the temporary well installation and grab groundwater sampling. The TSA activities for the soil boring and temporary well installation were performed on February 27, 2008 by Tom Sayre of Kleinfelder. The TSA activities for the grab groundwater sampling were performed on March 12, 2008 by Stacie Wissler of Kleinfelder. A total of two field team-specific audits were conducted, one for each activity. The TSA activities were performed in accordance with the Final Sampling and Analysis Plan (SAP) for the Groundwater Investigation at Parcel E-2 at Hunters Point Shipyard in San Francisco, California, prepared by CE2-Kleinfelder for the US Navy, Naval Facilities Engineering Command Southwest, dated February 4, 2008. The results of the TSA activities were discussed with the individual field teams and the Field Manager: Tom Sayre of Kleinfelder. All observed activities under the two TSAs were found to be in compliance with the SAP. Therefore no corrective actions were necessary.

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1.0 PURPOSE OF TECHNICAL SYSTEM AUDITS

Per SAP Worksheet #31 of the SAP (dated February 4, 2008), CE2-Kleinfelder conducted a TSA during the temporary well installation and a TSA during the grab groundwater sampling. The purpose of the TSA was to verify that each team is following the temporary well installation procedure and the data and groundwater samples collection procedures identified in Worksheet #17 of the SAP. Results of the TSA were forwarded to the Field Manager and Project Manager. If deficiencies had been noted, then corrective actions would have been identified and immediately implemented for each deficiency.

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2.0 AUDIT PROCEDURES

The CE2-Kleinfelder auditor visited the team to be audited with an audit form and observed a temporary well installation and a complete well sampling event. If any activities were noted as not being in compliance with the SAP, corrective action would be initiated and recorded. The audit form completed by the auditor is divided into the following four categories:

- Health and Safety: a review of proper personal protective equipment (PPE) and air monitoring procedures.
- Documentation: proper recording of data during temporary well installation and grab groundwater sampling.
- Soil Boring/Temporary Well Installation: a review of proper temporary well installation procedures and equipment decontamination.
- Grab Groundwater Sampling: a review of proper bottle collection, equipment usage, and equipment decontamination.

In addition, the designated auditor observed the calibration of field instruments at the beginning of the day, or discussed the calibration activities with the person responsible for meter calibrations. To ensure that each instrument is calibrated following the same procedures, the Field Manager or Sample Control Manager calibrated the instruments for the field teams. Appendix B contains the calibration logs for the audit days. Upon completion of the TSA, the auditor briefed CE2-Kleinfelder's Field Manager on the results of the TSA. No deficiencies were observed during the two TSAs. Therefore, no corrective actions were necessary.

2.1 AUDIT TEAM

The following are the audit team members and their respective roles:

Kleinfelder Project Manager:	Tom Sayre, Kleinfelder
Field Manager:	Tom Sayre, Kleinfelder
Field Team Auditors:	Stacie Wissler and Tom Sayre, Kleinfelder
Sample Control Managers:	Patricia Walters and Cynthia Ruelas, Kleinfelder

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3.0 AUDIT ACTIVITIES

During the groundwater investigation at Parcel E-2, grab groundwater samples were collected from 61 temporary wells, installed as part of the investigation, and from 7 existing piezometers. Temporary well installation began on February 2 and concluded on March 11, 2008. Grab groundwater sampling began on March 4 and is expected to conclude by June 1, 2008. A total of two activity-specific audits were performed, one auditing the temporary well installation, performed on February 27, and the second auditing the grab groundwater sampling, performed on March 12, 2008.

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4.0 AUDIT RESULTS

The results of the temporary well installation TSA are described below. Copies of the field audit form and the auditor's field notes are provided as Appendix A.

Health and Safety	
Deficiency	**Corrective Action**
1. No health and safety issues were noted.	1. No action was necessary regarding health and safety.
Documentation	
Deficiency	**Corrective Action**
1. No documentation deficiencies were noted.	1. No action was necessary regarding documentation.
Soil Boring/Temporary Well Installation	
Deficiency	**Corrective Action**
1. No deficiencies were noted.	1. No action was necessary regarding well installation.
Grab Groundwater Sampling	
Deficiency	**Corrective Action**
1. Not Applicable.	1. Not Applicable.
General Comments	
Deficiency	**Corrective Action**
1. No general issues were noted.	1. No action was necessary regarding general issues.
Calibration	
Deficiency	**Corrective Action**
1. Not Applicable	1. Not Applicable

The results of the grab groundwater sampling TSA are described below. Copies of the field audit form and the auditor's field notes are provided as Appendix A. Copies of the equipment calibration log for the audit days are provided as Appendix B.

Health and Safety	
Deficiency	**Corrective Action**
1. No health and safety issues were noted.	1. No action was necessary regarding health and safety.
Documentation	
Deficiency	**Corrective Action**
1. No documentation deficiencies were noted.	1. No action was necessary regarding documentation.
Soil Boring/Temporary Well Installation	
Deficiency	**Corrective Action**
1. Not Applicable.	1. Not Applicable.
Grab Groundwater Sampling	
Deficiency	**Corrective Action**
1. No grab sampling issues were noted.	1. No action was necessary regarding sampling.

General Comments	
Deficiency	**Corrective Action**
1. No general issues were noted.	1. No action was necessary regarding general issues.
Calibration	
Deficiency	**Corrective Action**
1. No deficiencies were noted in the calibration of field equipment.	1. No action was necessary regarding calibration.

5.0 SUMMARY

During the groundwater investigation at Parcel E-2, two TSAs were conducted. The first TSA was conducted on February 27 and the second TSA was conducted on March 12, 2008. No deficiencies were noted during the audit events.

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APPENDIX A

Soil Boring/Temporary Well Installation and Grab Groundwater Sampling Audit Forms and Auditor's Field Notes

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CE² KLEINFELDER

Technical Systems Audit Form: Soil boring/temporary well installation and grab groundwater sampling

Crew members: Gabe Fuson, Chris Fluty, Josh Rykun, Ted Ramos

Date: 2/27/08
Time: 0830 - 0905

Drilling/sampling location: Parcel E-2 TW052
Work activity: Installation of Temporary Well

	In compliance? Yes	In compliance? No	If "No" Corrective action taken (Attach additional documentation if necessary)
HEALTH & SAFETY			
APP/SSHP readiliy available	✓		
Hard hats	✓		
Steel-toed boots	✓		
Safety vest	✓		
Gloves	✓		
Eye protection	✓		
Air monitoring conducted in breathing zone			NA - Unnecessary due to Steady wind
DOCUMENTATION			
SAP onsite	✓		
Boring and well log			NA - Well installation only, no logs Required
Field notebook	✓		
Sample labels			NA
Chain of custody			NA
SOIL BORING/TEMPORARY WELL INSTALLATION			
Drill rods clean	✓		
Boring location	✓		
Boring/well installation form			NA - No form required for well installation
Total boring depth	✓		
Soil classified to USCS			NA - Well installation only
Well materials	✓		
Well construction	✓		
Soil core stored appropriately			NA - Well installation only
GRAB GROUNDWATER SAMPLING			
Water level probe cleaned			NA
Total well depth measured			NA
Depth to water measured			NA
Adequate water in well to begin sampling			NA
Sample tubing installed to correct depth			NA
Sampling flow rate < 500 mL/minute			NA
Samples collected in correct order by analysis			NA
TPH-purgeable samples (in VOAs) free of bubbles			NA
Samples collected in correct containers			NA
QC samples collected			NA
Sample storage (cooler, ice, etc.)			NA
If well runs dry, documented and sampled later			NA
Well head closed			NA
Water level probel cleaned			NA
IDW stored and labeled appropriately			NA

ADDITIONAL NOTES/COMMENTS:
NA = Not Applicable

QA/QC Reviewer: _____

Signature: Thomas A Sawyer

WS31-3

CE² KLEINFELDER

Technical Systems Audit Form: Soil boring/temporary well installation and grab groundwater sampling

Crew members: DAN ELDRIDGE, BILL BERGERON

Date: 3/12/08

Time: 1130

Drilling/sampling location: PARCEL E2 PZ138E

Work activity: GW SAMPLING

	In compliance? Yes	In compliance? No	If "No" Corrective action taken (Attach additional documentation if necessary)
HEALTH & SAFETY			
APP/SSHP readiliy available	✓		
Hard hats	✓		
Steel-toed boots	✓		
Safety vest	✓		
Gloves	✓		
Eye protection	✓		
Air monitoring conducted in breathing zone	✓		
DOCUMENTATION			
SAP onsite	✓		
Boring and well log	✓		
Field notebook	✓		
Sample labels	✓		
Chain of custody			DO NOT HAVE
SOIL BORING/TEMPORARY WELL INSTALLATION			
Drill rods clean			
Boring location			Not Applicable
Boring/well installation form			
Total boring depth			
Soil classified to USCS			
Well materials			
Well construction			
Soil core stored appropriately			
GRAB GROUNDWATER SAMPLING			
Water level probe cleaned	✓		
Total well depth measured	✓		
Depth to water measured	✓		5.79' bgs
Adequate water in well to begin sampling	✓		
Sample tubing installed to correct depth	✓		
Sampling flow rate < 500 mL/minute	—		
Samples collected in correct order by analysis	✓		
TPH-purgeable samples (in VOAs) free of bubbles	✓		
Samples collected in correct containers	✓		
QC samples collected	✓		TRIP BLANKS, TEMP BLANK
Sample storage (cooler, ice, etc.)	✓		
If well runs dry, documented and sampled later	—		
Well head closed	✓		
Water level probel cleaned	✓		
IDW stored and labeled appropriately	✓		

ADDITIONAL NOTES/COMMENTS:

WHEN TEAM HAD BUBBLE IN VOA VIAL, GOT A NEW VIAL RATHER THAN DILUTING OUT HCL

QA/QC Reviewer: Stacie Wissler

Signature:

APPENDIX B

Daily Equipment Calibration Logs

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E-2 EQUIPMENT CALIBRATION LOG

Date	Time	Equipment			Successful Calibration (Y/N)			Initials
		YSI		Equip. Set No.	pH 4	pH 7	Conductivity 1 mS/cm	
3/3/2008	1300	1			Y	Y	Y	PW
↓	1310	3			Y	Y	Y	PW
↓	1400	5			Y	Y	Y	PW
3/4/2008	0710	1			Y	Y	Y	PW
↓	0714	3			Y	Y	Y	PW
↓	0718	4			Y	Y	Y	PW
3/5/2008	0725	1			Y	Y	Y	NC
↓	0730	3			Y	Y	Y	↓
↓	0735	4			Y	Y	Y	↓
3/6/2008	0720	1			Y	Y	Y	NC
↓	0730	3			Y	Y	Y	↓
↓	0735	4			Y	Y	Y	↓
3/7/2008	0700	1	+	PW 3-11-08	Y	Y	Y	NC
↓	0710	3	~~3~~	PW 3-11-08	Y	Y	Y	NC
3/10/2008	0705	1			Y	Y	Y	NC
↓	0710	3			Y	Y	Y	↓
↓	0715	4			Y	Y	Y	↓
3/11/08	0710	1			Y	Y	Y	NC

Notes:
Equip. Set No. = Equipment Set Number
mS/cm = milliSiemens per centimeter

E-2 **EQUIPMENT CALIBRATION LOG**

Date	Time	Equipment			Successful Calibration (Y/N)			Initials
		YSI		Equip. Set No.	pH 4	pH 7	Conductivity 1 mS/cm	
3/11/08	0715	3			Y	Y	Y	NC
↓	0725	4			Y	Y	Y	↓

Notes:
Equip. Set No. = Equipment Set Number
mS/cm = milliSiemens per centimeter

Appendix I.
Quality Control Summary Report

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Appendix I.
Quality Control Summary Report

Abbreviations and Acronyms

APPL	Agriculture and Priority Pollutants Laboratories, Inc.
DQO	data quality objectives
EDD	electronic data deliverable
HPS	Hunters Point Shipyard
LCS	laboratory control sample
LDC	Laboratory Data Consultants
LUFT	leaking underground fuel tank
MS	matrix spike
MSD	matrix spike duplicate
NEDD	Navy Electronic Data Deliverable
NFESC	Naval Facilities Engineering Service Center
NIRIS	Naval Installation Restoration Information Solution
PARCCS	precision, accuracy, representativeness, completeness, comparability, and sensitivity
PCBs	polychlorinated biphenyls
QC	quality control
QCSR	Quality Control Summary Report
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SDG	sample delivery group
SOP	standard operating procedure
TPH	total petroleum hydrocarbons
USEPA	United Stated Environmental Protection Agency

1.0 Introduction

This Quality Control Summary Report (QCSR) summarizes the quality control (QC) activities associated with the groundwater investigation at Parcel E-2, located at the Hunters Point Shipyard (HPS) in San Francisco, California. Groundwater sampling procedures, analytical methods, analytical results, project objectives and data quality objectives (DQOs) are described in the Final Sampling and Analysis Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard (SAP) (CE2-Kleinfelder Joint Venture [CE2-Kleinfelder JV], 2008).

This QCSR consists of eight sections. Section 2.0 provides an overview of the groundwater sampling procedures. Section 3.0 provides an overview of the decontamination procedures. Section 4.0 provides a summary of the QC samples collected along with their analytical results. Section 5.0 identifies the analytical methods. Section 6.0 summarizes the findings of the data quality assessment process, which includes a review, verification, validation and usabilty assessment of the data, in accordance with the data quality indicators defined in the SAP. Section 7.0 provides an overview of the data storage process. Section 8.0 provides references.

2.0 Groundwater Sampling Procedure

Field personnel measured depth to water in the wells and piezometers in Parcel E-2, using electronic water level indicators, prior to sampling. Grab groundwater samples were collected from temporary wells and piezometers in Parcel E-2 by pumping groundwater using peristaltic pumps and well-dedicated Teflon™-lined polyethylene tubing. Grab samples do not require purging prior to sample collection. Groundwater was pumped at a rate of 500 milliliters (mL/min) or less. Groundwater samples were collected in the following order: total petroleum hydrocarbons (TPH)-purgeables, TPH-extractables, polychlorinated biphenyls (PCBs), dissolved metals, ammonia. Dissolved metals samples were filtered and acidified with nitric acid by the laboratory prior to analysis.

Water quality parameters were measured at sample locations designated for ammonia analysis. Water quality parameters (i.e., temperature, specific conductance, and pH) were measured after sample collection using YSI™ multi-probe water quality meters.

3.0 Decontamination Procedure

Sampling equipment that came in contact with groundwater was decontaminated immediately after sampling was completed at each well. Additionally, the electronic water level indicators were decontaminated after the sampling of each well, using a mixture of tap water and non-phosphate detergent, a rinse with tap water, and a final rinse with distilled water. The YSI™ water quality meters were decontaminated using tap water and distilled water. Dedicated Teflon™-lined polyethylene tubing was used for pumping each well; therefore, decontamination of the tubing was not necessary.

4.0 Quality Control Samples

Field and laboratory QC samples were collected in the field and laboratory to evaluate and monitor the quality of both the field and laboratory procedures. Field and laboratory QC samples were collected at a frequency in accordance with the SAP. Table I-1 summarizes the field and laboratory QC samples collected during the groundwater investigation at Parcel E-2.

Field samples, including field QC samples, were preserved (if required), stored, and transported in coolers with sufficient "wet" ice to maintain sample temperature at less than 6 degrees Celsius. Upon receipt, the laboratory measured the cooler temperatures using temperature blanks, which were submitted with each cooler. The laboratory did not detect temperatures in any sample cooler that exceeded the limit of 6 degrees Celsius.

During the data quality assessment, organic and inorganic contaminants reported in field samples with less than 5 times the concentrations detected in blanks (or 10 times for common laboratory contaminants) were qualified as not detected and assigned a "U" qualifier. A low percentage of sample results (approximately 4.1 percent) were qualified due to laboratory blank contamination, which indicates that laboratory decontamination procedures were effective.

During a data quality assessment of the field and laboratory QC samples, no significant discrepancies were noted. Trip blank samples were included in each of the coolers containing samples for TPH-purgeables analysis, and accompanied the samples during sample collection, storage, and transport. TPH-purgeables were not detected in any of the trip blank samples, and thus no data was qualified due to trip blank contamination.

Field duplicate pairs were collected at 7 of the 68 locations. Relative percent differences (RPDs) were calculated using the field duplicate pair results, then evaluated against a RPD criterion of 30 percent. Of the 196 field duplicate pair analyte results, 15 (approximately 7.7 percent) exceeded the 30 percent RPD criterion. Analytical data were not qualified based on field duplicate pair results.

Table I-1. QC Samples Collected during the Groundwater Investigation at Parcel E-2

Field QC Samples		
Sample Type	**Purpose**	**Frequency**
Trip blank	Measures background levels of TPH-purgeables from sample handling, storing, and transport.	One per cooler containing TPH-purgeables samples
Field duplicate	Measures variability in results from sampling procedures.	One per 20 field samples collected
Laboratory QC Samples		
Sample Type	**Purpose**	**Frequency**
Instrument blank	Sets baseline or instrument zero.	Start of calibration process and per method
Method blank	Measures laboratory contamination during sample preparation and analysis.	One per preparation or analytical batch
Matrix spikes	Measures matrix effect and accuracy of analytical process.	One per preparation or analytical batch
Laboratory duplicate	Indicates precision of laboratory procedures	One per 10 samples
Laboratory Control Sample	Measures accuracy of analytical process and calibration.	One per preparation or analytical batch

5.0 Laboratory Analyses

A total of 68 groundwater samples, with 19 accompanying field QC samples, were collected for chemical analysis during the groundwater investigation at Parcel E-2. The groundwater samples were collected from March 5, 2008 to March 13, 2008. Field and laboratory QC samples were collected at a frequency in accordance with the SAP. Table I-2 summarizes the analytical parameters and methods performed for the groundwater investigation at Parcel E2.

Table I-2. Analytical Groups and Methods

Analytical Group	Analytical Method
Ammonia Nitrogen	USEPA Method 350.1
Dissolved Metals	USEPA Method 6010B
	USEPA Method 7470A
PCBs	USEPA Method 8082
TPH-extractables	USEPA Method 8015B
TPH-purgeables	USEPA Method 8015B

Notes:

USEPA: United States Environmental Protection Agency, *Test Methods for Evaluating Solid Wastes Physical/Chemical Methods* (SW-846, 4th Edition, Update III)
PCBs: polychlorinated biphenyls
TPH: total petroleum hydrocarbons

Samples collected during the Parcel E-2 groundwater investigation were submitted and analyzed by a California State- and Naval Facilities Engineering Service Center (NFESC)-certified laboratory, Agriculture and Priority Pollutants Laboratories, Inc. (APPL), located in Fresno, California.

6.0 Data Quality Assessment

The data quality assessment process consists of a systematic review, verification, validation, and usability assessment of the data. The purpose of the data quality assessment is to evaluate and monitor the performance of the field sampling and analytical procedures and assess the quality of the data. Data review and verification were performed by the Project Chemist on 100 percent of the data. Laboratory Data Consultants, Inc. (LDC), located in Carlsbad, California, was selected to perform the independent, third-party data validation. The data were reviewed, verified and validated in accordance with procedures, presented in the following documents:

- *Final Sampling and Analysis Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard (Kleinfelder-CE2 JV, February 2008)*
- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA 1999b)*
- *USEPA Contract Laboratory National Functional Guidelines for Inorganic Data Review (USEPA 2004).*

- *USEPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition. Updates I, II, IIA, IIB, III, IIIA, and IV (USEPA 1998).*

6.1 Summary of the Data Quality Assessment

One hundred percent of the data were subject to a data quality assessment (i.e. review, verification, validation, and usability assessment), with approximately 80 percent undergoing a Level III data validation and 20 percent undergoing a Level IV validation in accordance with the SAP.

A total of 1,953 analytical results were evaluated by LDC during the data validation process.

Based on the data validation process, some analytical results were qualified as estimated (i.e., "J" qualified) or estimated at an elevated project quantitation (i.e. "UJ" qualified). Results were qualified as estimated for one or more of the following reasons:

- Laboratory blank contamination
- Serial dilution criteria exceeded
- Surrogates, laboratory control sample (LCS), matrix spike (MS), or matrix spike duplicate (MSD) samples reported percent recoveries outside the acceptable criteria
- Technical holding times exceeded
- Calibration with percent differences outside the acceptable criteria.

Table I-3 summarizes the data qualified as estimated ("J" or "UJ" qualified") or rejected ("R" qualified), as well as the percent of qualified analytical data, generated during the groundwater investigation at Parcel E-2. During the data quality assessment process, it was deemed that the results are of good quality and are acceptable for use during the decision-making process.

Table I-3. Summary of Qualified Analytical Data by Analytical Method

Analytical Group	Analytical Method	Total Estimated, Usable ("J" or "UJ") Data	Total Unusable ("R") Data
Ammonia Nitrogen	USEPA Method 350.1	0	0
Dissolved Metals	USEPA Method 6010B	0	0
	USEPA Method 7470A	136	0
PCBs	USEPA Method 8082	0	0
TPH-extractables	USEPA Method 8015B	16	0
TPH-purgeables	USEPA Method 8015B	7	0
Total qualified analytical results		159	0
Percent of total qualified analytical results		8.1%	0 %

Note:

The percent of data qualified by category was calculated using the total number of analytical results (including QC samples) generated by the groundwater investigation at Parcel E-2 (i.e., total of 1,953 analytical results).

The data quality indicators, otherwise known as precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS), were evaluated in accordance with the PARCCS parameters defined in the SAP to assess data usability. The PARCCS parameters were met for the groundwater investigation at Parcel E-2, and were assessed as follows:

- **Precision** was assessed by evaluating the RPDs of the MS/MSD samples and duplicates for each applicable analytical method. The low percentage (approximately 7.7 percent) of precision exceedances indicates that the analytical methods were consistently precise.
- **Accuracy** was assessed by evaluating percent recoveries of MS samples, LCS, and surrogate recoveries for each applicable analytical method. A low percentage of sample results (approximately 4.9 percent) were qualified due to MS, LCS, or surrogate recoveries, indicating that the methods were consistently accurate.
- **Representativeness** was assessed by the use of established field and laboratory procedures, and their consistent application. Representativeness was maintained by using standard operating procedures (SOPs), including chain-of-custody protocol and documentation, groundwater sampling, sample labeling, sample packaging and transport, as well as the condition of the samples upon receipt at the laboratory.
- **Comparability** was assessed by evaluating the use of well-documented analytical methods and SOPs, standard reference materials, QC samples, and reporting each data type in consistent units. The use of the USEPA analytical methods, specified and well-documented analyses, California State- and NFESC-certified laboratories, and a standardized data quality assessment process give the data a high degree of analytical comparability.
- **Completeness** was assessed by evaluating the validity of data obtained as a result of the data quality assessment process (i.e. amount of valid data obtained as compared to the amount that was expected to be obtained under normal conditions). Estimated data ("J" or "UJ" qualified) are considered valid and usable; however, rejected data ("R" qualified) and missing analyses are considered unusable and incomplete. One hundred percent of the analytical results are considered usable, which exceeds the SAP completeness goal of 90 percent.
- **Sensitivity** was assessed by evaluating the use of project quantitation limits. In general, project quantitation limits were low enough to satisfy the action levels being applied and used to evaluate the project data.

As a result of the DQA process, it has been concluded that the data quality indicators (i.e., PARCCS) either met or exceeded the parameters, as defined in the SAP.

7.0 Data Storage

Data collected during the groundwater investigation at Parcel E-2 were recorded on field and laboratory forms, including but not limited to field notes or logbooks, chain-of-custody forms, field calibration logs, audit forms, laboratory raw data, hard copy analytical reports, electronic data deliverables (EDDs), and data validation reports. Field notes or logbooks, chain-of-custody forms, and field calibration logs were peer-reviewed and securely stored in the CE2-Kleinfelder JV field trailer, located on HPS.

Laboratory analytical results were provided by APPL to the Kleinfelder-Oakland office in hard copy and EDD format, as sample delivery groups (SDGs), to undergo data quality assessment procedures. The hard copy SDGs were retained in a secured location until final submittal to the NAVFAC Southwest Administrative Record along with the Technical Memorandum for Groundwater Investigation at Parcel E-2. The SDGs included the laboratory data deliverables defined in the SAP.

The EDDs were provided by APPL via electronic mail and contain the laboratory analytical results by SDG. The EDDs underwent a data checker to evaluate accuracy and completeness of information, and were then uploaded into the Kleinfelder-HPS database. Upon completion of the data quality assessment process, the validated data were finalized. Once finalized, the data were electronically submitted to the Department of the Navy's data repository, Naval Installation Restoration Information Solution (NIRIS), in the Navy Electronic Data Deliverable (NEDD) format.

Copies of the field forms, electronic laboratory analytical reports, and EDDs have been retained in the Kleinfelder-Oakland office in the project files.

8.0 References

CE2-Kleinfelder Joint Venture. 2008. Final Sampling and Analysis Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California. February.

CE2-Kleinfelder Joint Venture. 2008. Addendum 1 to the Final Sampling and Analysis Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California. March.

CE2-Kleinfelder Joint Venture. 2008. Draft Final Technical Memorandum for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California. August.

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USEPA. 1999a. U.S. EPA Contract Laboratory Program Statement of Work for Organic Analysis, Multi-media, Multi-concentration. Document Number OLM04.2. May.

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USEPA. 2001. EPA Requirements for Quality Assurance Project Plans. EPA QA-R5. Office of Environmental Information. Washington, DC. EPA/240/B-01/003. March.

USEPA. 2004a. Statement of Work for Multi-media, Multi-concentration Inorganic Analysis (ILM05.3). March.

USEPA. 2004b. National Functional Guidelines for Inorganic Data Review. Office of Emergency and Remedial Response. Washington, D.C. EPA-540-R-04-004. October.

Appendix J.
Groundwater Sampling for Radionuclides at Parcel E-2

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Appendix J
Groundwater Sampling for Radionuclides at Parcel E-2

Hunters Point Shipyard
San Francisco, California

February 2009

Document Control No. CEKA-3001-0000-0011

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DO/CTO #: Not applicable. Stand-alone contract

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Appendix A. Project personnel sign-off sheets.

Appendix B. Analytical reports and chain-of-custody records.

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Abbreviations and Acronyms

BRAC	Base Realignment and Closure
Cs-137	cesium-137
Co-60	cobalt-60
COC	chain-of-custody
DOT	Department of Transportation
HPS	Hunters Point Shipyard
IDW	investigation-derived waste
JV	Joint Venture
mL	milliliter
Navy	United States Department of the Navy
NWT	New World Technology, Inc.
PALs	Project Action Limits
pCi/L	picoCuries per liter
Ra-226	radium-226
SAP	Sampling and Analysis Plan
Sr-90	strontium-90

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Executive Summary

CE2-Kleinfelder Joint Venture (CE2-Kleinfelder JV) has prepared this appendix to present radionuclide analytical results from groundwater sampling conducted between June 27 and July 1, 2008 at Parcel E-2. Radionuclides analyzed for were cesium-137 (Cs-137), cobalt-60 (Co-60), radium-226 (Ra-226), and strontium-90 (Sr-90). This supplements prior chemical analytical data provided in the Final Technical Memorandum for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, (HPS) San Francisco, California (Figure 1). This work was performed for the U.S. Department of the Navy (Navy), Base Realignment and Closure (BRAC) Project Management Office West, in accordance with Contract No. N62473-07-C-3001 except for analytical laboratory work which was performed under a separate contract between Tetra Tech ECI and the Navy. .

Sampling was conducted in accordance with a Work Plan addendum (CE2-Kleinfelder JV, 2008a) and a Sampling and Analysis Plan (SAP) addendum (CE2-Kleinfelder JV, 2008b).

Analysis was performed in accordance with the SAP addendum except that Ra-226 and Sr-90 were analyzed by an offsite analytical laboratory, TestAmerica.

The following scope of work was performed, in conjunction with and additional to the larger investigation:

- Grab groundwater samples were collected from the 61 temporary wells and 7 previously installed A-Aquifer piezometers between June 27 and July 1, 2008.
- Samples from the 61 temporary wells and 7 piezometers were analyzed for Cs-137, Ra-226, and Sr-90. Analysis for Co-60 was performed on samples from 11 of the temporary wells.

Summary of Analytical Results

Analytic results are reported in picoCuries/liter (pCi/L) and compared to HPS Project Action Limits (PALs) as follows:

Analyte	PAL (pCi/L)
Cs-137	111.9
Co-60	100
Ra-226	5
Sr-90	8

Analytic results from only two locations, TW004 and TW011, showed activities greater than PALs (11.0 and 6.08 pCi/L Ra-226, respectively).

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1.0 Introduction

CE2-Kleinfelder Joint Venture (CE2-Kleinfelder JV) has prepared this appendix to present radionuclide analytical results from groundwater sampling conducted between June 27 and July 1, 2008 at Parcel E-2. This supplements prior chemical analytical data provided in the Final Technical Memorandum for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, (HPS) San Francisco, California (Figure 1). This work was performed for the U.S. Department of the Navy (Navy), Base Realignment and Closure (BRAC) Project Management Office West, in accordance with Contract No. N62473-07-C-3001 except for analytical laboratory work which was performed under a separate contract between Tetra Tech ECI and the Navy.

This appendix presents the sampling and analytical work related to radionuclide investigation in groundwater conducted as implementation of the following documents:

- *Addendum 1 to the Work Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California* (CE2-Kleinfelder JV, 2008a).
- *Final Addendum 1 to the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Groundwater Investigation at Parcel E-2* (CE2-Kleinfelder JV, 2008b).

Key personnel reviewed the Final Addendum 1 to the Final SAP prior to conducting the sampling event as indicated in the Personnel Sign-off Sheets included in Appendix A.

1.1 Project Objectives

The project objective for this work was to provide data to evaluate whether the A-Aquifer groundwater in Parcel E-2 has been impacted by radionuclides. This in turn will be used as supplemental data for the RI/FS report for evaluation of remedial alternatives for Parcel E-2.

1.2 Scope of Work

This radionuclide investigation consisted of the following field activities:

1. Groundwater samples were collected from the 61 temporary wells and 7 previously installed A-Aquifer piezometers, using a peristaltic pump. Temporary well and piezometer locations are shown on Plate 1.
2. Groundwater samples were analyzed for the following radionuclides (in all wells and piezometers except as noted below):
    - Cesium-137 (Cs-137).
    - Cobalt-60 (Co-6) - 11 temporary wells.
    - Radium-226 (Ra-226).
    - Strontium-90 (Sr-90).

Samples were collected by CE2-Kleinfelder JV personnel and submitted to the onsite analytical laboratory, New World Technology, Inc. (NWT) under contract with Tetra Tech ECI.

NWT subsequently submitted a complete set of samples to an offsite analytical laboratory, TestAmerica, for Ra-226 and Sr-90 analysis. NWT also submitted a subset of samples (from seven locations) to offsite analytical laboratory, Eberline Services, for confirmation analysis of Cs-137, Ra-226, and Sr-90 with one location to also be analyzed for Co-60.

2.0 Groundwater Sampling Methodology

Depth to water was measured in and groundwater samples were collected from the temporary wells and existing piezometers shown on Plate 1.

Prior to sampling, depth to water was measured with an electric water level indicator, relative to top of casing.

Samples were collected using a peristaltic pump located at ground surface with well-specific, disposable, Teflon-lined, plastic tubing lowered to within one foot of the bottom of each temporary well or piezometer. If the well/piezometer ran dry during the initial sampling attempt, samples were collected on subsequent days as water recharged into the well/piezometer.

Groundwater samples were collected by pumping the wells/piezometers at a rate of $\leq$ 500 mL/minute to minimize turbidity.

Samples were collected directly into pre-cleaned, laboratory-supplied sample containers (two 500-ml polyethylene containers per sampling location per radionuclide to be analyzed). Extra containers were filled if the location was to have a field duplicate or confirmatory sample.

The sample containers were placed in an ice-filled cooler for transport to the onsite analytical laboratory: NWT, following chain-of-custody protocol. The chain-of-custody records indicating transfer of samples from CE2-Kleinfelder JV to NWT are presented in Appendix B.

Samples were submitted to NWT unfiltered and unpreserved with chain of custody (COC) instruction for NWT to filter and acidify following sample receipt.

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3.0 Management of Investigation-Derived Waste

Investigation-derived waste (IDW) generated by the radionuclides sampling portion of this project included equipment decontamination water (rinsate), disposable sampling tubing and used personal protective equipment (PPE).

Equipment decontamination rinsate was collected in Department of Transportation (DOT)-approved 55-gallon drums and transported to the CE2-Kleinfelder JV field office where it was transferred into the 4,000-gallon storage tank used for storing purge water from the Basewide Groundwater Monitoring Program. That water was managed according to the IDW Management Plan for that Program.

Regular trash, disposal sampling tubing and PPE were placed in waste bins for offsite disposal as non-hazardous waste.

Less than one-quarter of a 55-gallon drum of soil had been generated from prior temporary well coring work at Parcel E-2. It was field-screened and cleared by NWT field radiation technicians. The soil was composite-sampled with other HPS drilling soil, also cleared for radiation, and profiled for offsite disposal. On February 9, 2009, the drum was transported offsite by North State Environmental (South San Francisco, California – U.S. EPA Hazardous Waste Transporter ID No. CAR000159459) for land disposal at Chemical Waste Management, Inc.'s Class I landfill in Kettleman City, California under manifest number 002507920FLE. This manifest was signed at the time of transport by Navy representative, Doug DeLong, Safety and Security Manager, BRAC PMO West. Once received and processed by the disposal facility, the fully executed manifest will be returned to Mr. DeLong for filing.

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4.0 Groundwater Analytical Results

Analytical results for groundwater sampling are reported based on the following analytical methods:

Normal field samples and field duplicates:

- Cs-137 and Co-60 – analysis performed by New World Technology using a proprietary analytical method utilizing gamma spectroscopy per standard operating procedures on file with the Navy.
- Ra-226 and Sr-90 _ analysis performed by TestAmerica by EPA 903.0 Modified and EPA 905, respectively.

Confirmation samples analysis performed by Eberline Services:

- Cs-137 by EPA 901.0 Modified.
- Co-60 by EPA 901.1.
- Ra-226 by EPA 903.1.
- Sr-90 by EPA 905.0.

Tables 1 and 2 show the analytical results for each location.

Table 1 presents analytical results for Cs-137 and Co-60 analyses. Table 2 presents analytical results for Ra-226 and Sr-60. Plate 1 shows the radionuclide analytical results at each sampled location. Co-60 results are shown on Plate 1 at the 11 temporary well locations specified in the SAP Addendum.

These analyses did not detect any of these analytes above their respective PALs except for Ra-226 at two locations as follows:

TW004 – Ra-226 was reported at 11.0 pCi/L

TW011 – Ra-226 was reported at 6.08 pCi/L

Laboratory analytical reports and chain-of-custody documents are included as Appendix B.

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5.0 Data Quality

This section summarizes the quality control measures implemented for this scope of work and deviations from the SAP addendum (CE2-Kleinfelder JV. 2008b).

Field duplicate and confirmation samples were collected at frequencies in accordance with the SAP addendum; 1 field duplicate per 10 field samples for each analyte rounded up to the nearest 10 field samples. Confirmation samples were submitted to Eberline Services at a rate of approximately 10 per cent of normal field samples. Results for both field duplicates and confirmation samples are shown on Tables 1 and 2 adjacent to their corresponding location-specific normal sample results. Groundwater sampling and analysis was conducted in accordance with procedures presented in the SAP addendum with the following deviations:

1. NWT did not perform Sr-90 analysis.

2. Samples were submitted to TestAmerica by NWT for Ra-226 and Sr-90 analysis.

3. TestAmerica used analytic method EPA 903.0 Modified for Ra-226 analysis. The SAP indicated use of NWT's standard operating procedure for the normal samples and, EPA Method 903.1 for confirmatory samples analyzed by Eberline Services, the offsite laboratory.

4. Confirmation sample analytical reports by Eberline Services did not undergo Level IV third-party validation (planned for Laboratory Data Consultants).

Two field duplicate and two confirmation sample locations were changed form locations indicated in the SAP addendum due to low groundwater recharge rates at the initially planned locations. This does not constitute a deviation as the frequency of these sample types met project requirements.

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6.0 References

CE2-Kleinfelder JV. 2008a. *"Addendum 1 to the Work Plan for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California*. June 23.

CE2-Kleinfelder JV. 2008b. *"Final Addendum 1 to the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Groundwater Investigation at Parcel E-2, Hunters Point Shipyard, San Francisco, California*. June 23.

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Tables

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Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
Temporary Wells																			
TW001	panhandle	0827E021	6/30/2008	1035	N	23.985	F	43.901	43.921	22.2	-	-	-	-	2.4328	#B	22.807	22.808	12.3
TW002	panhandle	0826P009	6/27/2008	1338	N	8.5754	B	38.648	38.651	20.5	-	-	-	-	16.555	#F	10.947	10.986	15.0
TW003	panhandle	0826P006	6/27/2008	1153	N	12.085	F	18.363	18.375	9.86	-	-	-	-	11.715	F	18.727	18.738	10.0
TW004	panhandle	0826P011 (a)	6/27/2008	1424	N	9.1811	#B	28.982	28.986	14.1	-	-	-	-	-9.7505	#B	-111.04	-111.05	17.2
			6/30/2008	1500	*N*	34.566	F	36.794	*36.816*	27.8	-	-	-	-	25.707	#F	27.957	*27.973*	18.9
			7/1/2008	945	*N*	19.650	B	33.356	*33.364*	26.1	-	-	-	-	26.257	#F	24.537	*24.556*	18.4
TW005	panhandle	0826P007 (a)	6/27/2008	1317	N	-15.187	#B	-19.302	*-19.311*	10.9	-	-	-	-	15.401	#F	10.156	*10.172*	5.84
			6/30/2008	1510	N						-	-	-	-					
TW006	panhandle	0826P004	6/27/2008	1136	N	24.107		10.148	*10.255*	7.77	-	-	-	-	-1.9283	#B	13.799	*13.800*	8.76
TW006	panhandle	0826P005	6/27/2008	1142	C						0.192	U	0.48	10.0 / 0.840					
TW007	panhandle	0826P010	6/27/2008	1345	N	40.097		9.5582	*9.6736*	6.99	-	-	-	-	3.9199	B	5.4403	*5.4422*	5.97
TW008	panhandle	0827P025	6/30/2008	1453	N	9.5335	B	48.214	48.217	25.9	-	-	-	-	-45.829	#B	-131.60	-131.63	38.6
TW009	panhandle	0826P030	6/27/2008	1502	N	-0.97613	#B	285660	285660	17.8	-	-	-	-	44.573	F	43.380	43.451	18.9
TW010	panhandle	0827P022	6/30/2008	1047	N	36.068		32.066	*32.094*	23.2	-	-	-	-	60.772	#F	30.441	*30.524*	11.0
TW011	panhandle	0826P012	6/27/2008	1450	N	40.677		27.222	*27.264*	19.1	-	-	-	-	25.236	#	11.014	*11.054*	7.33
TW012	panhandle	0827E024 (a)	6/30/2008	1110	N	78.520		37.776	*37.889*	24.8	-	-	-	-	4.0544	#B	14.841	*14.842*	11.4

Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
TW013	panhandle	0827D018	6/30/2008	930	N	6.180	#B	19.979	19.982	10.2	-	-	-	-	29.997	#F	44.387	44.418	16.3
TW013	panhandle	0827D019	6/30/2008	935	C						0.037	U	0.41	10.0 / 0.761					
TW014	panhandle	0827D017	6/30/2008	920	N	11.318	B	43.707	43.711	23.2	-	-	-	-	-109.32	#B	-1156.0	-1156.0	33.5
TW015	panhandle	0826D016	6/27/2008	1500	N	41.368		29.772	*29.812*	20.8	-	-	-	-	4.2735	#B	11.104	*11.105*	10.7
TW016	panhandle	0826D015	6/27/2008	1440	N	39.511		33.611	*33.698*	24.6	-	-	-	-	26.633	F	24.627	*24.681*	18.1
TW017	panhandle	0826D014	6/27/2008	1420	N	11.253	B	35.853	35.859	18.8	-	-	-	-	13.806	#B	10.547	10.575	38.9
TW018	panhandle	0826D012	6/27/2008	1358	N	29.995		23.553	*23.624*	16.0	-	-	-	-	-0.34037	#B	9.4510	*9.4510*	28.2
	panhandle	0826D013	6/27/2008	1403	FD	19.928	F	34.863	34.881	17.2	-	-	-	-	-92.997	#B	432.87	432.90	37.6
TW019	panhandle	0826D011	6/27/2008	1345	N	22.314	F	40.823	40.842	20.7	-	-	-	-	6.6136	#F	11.854	11.860	5.11
TW020	panhandle	0826D007	6/27/2008	1148	N	12.950		16.832	16.848	8.94	-	-	-	-	22.273		19.285	19.325	8.70
TW020	panhandle	0826D008	6/27/2008	1153	C						0.613	U	0.57	10.0 / 0.941					
TW021	panhandle	0826D009	6/27/2008	1315	N	66.939		29.519	*29.624*	19.2	-	-	-	-	14.937	#B	31.965	*31.969*	16.9
TW022	panhandle	0826D010	6/27/2008	1330	N	8.9152	F	16.494	16.501	8.85	-	-	-	-	1.1012	B	2.1662	2.1671	10.5
TW023	panhandle	0827E022	6/30/2008	1050	N	1.2916	#B	9.5125	*9.5128*	8.8	-	-	-	-	4.6857	#B	219.32	*219.32*	68.0
TW024	panhandle	0826E014	6/27/2008	1455	N	29.474	B	59.833	59.855	31.2	-	-	-	-	23.449	#F	35.910	35.933	20.7
TW025	panhandle	0826E015	6/27/2008	1505	N	84.095	#	93.800	93.916	29.2	-	-	-	-	15.561	#B	18.148	18.168	17.7
TW026B	metal slag	0827P015	6/30/2008	906	N	20.361	F	39.135	39.151	19.5	-	-	-	-	6.4450	#B	12.439	12.444	15.3
TW027B	metal slag	0827P014	6/30/2008	850	N	30.129	F	31.256	*31.276*	23.0	-	-	-	-	11.387	#B	31.341	*31.344*	18.6

Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
TW028B	metal slag	0827P018	6/30/2008	936	N	12.014	B	38.382	38.388	20.0	-	-	-	-	4.7167	#B	30.470	30.471	10.2
TW029	metal slag	0827P016	6/30/2008	917	N	14.832	#B	37.084	37.094	16.7	-	-	-	-	0.15327	#B	7.0637	7.0637	6.19
TW029	metal slag	0827P017	6/30/2008	922	FD	13.055	B	49.349	49.354	26.3	-	-	-	-	-106.95	#B	-847.02	-847.04	36.0
TW030B	metal slag	0826P002	6/27/2008	1108	N	30.476	F	52.405	52.432	26.5	-	-	-	-	-7.6818	#B	-54.046	-54.048	15.4
TW030B	metal slag	0826P003	6/27/2008	1115	C						0.699	U	0.52	10.0 / 0.846					
TW031	landfill area	0826E008	6/27/2008	1135	N	12.611	B	56.914	56.918	30.5	-	-	-	-	60.839	#	43.999	44.129	22.9
TW031	landfill area	0826E009	6/27/2008	1140	FD	42.204	#	57.605	57.653	21.9	-	-	-	-	-1.3518	#B	-6.8997	-6.9001	15.7
TW032	landfill area	0826E007	6/27/2008	1125	N	16.872	B	42.872	42.882	22.3	-	-	-	-	185.94	#B	0.39743	0.39757	38.0
TW033	landfill area	0826E006	6/27/2008	1115	N	-1.0038	#B	251870	251870	21.5	-	-	-	-	52.660		37.502	37.617	22.1
TW034	PCB Hot Spot	0826D002 (a)	6/27/2008	951	N	19.760	B	47.140	47.153	24.4	-	-	-	-	10.766	#B	21.993	22.001	12.5
TW035	PCB Hot Spot	0826E001 (a)	6/27/2008	931	N	6.9257	B	35.563	35.565	19.0	-	-	-	-	-104.49	#B	-644.19	-644.22	35.0
			6/30/2008	942	N						-	-	-	-					
TW036	PCB Hot Spot	0826E002	6/27/2008	955	N	40.488		36.718	*36.749*	27.2	-	-	-	-	-0.45815	#B	-9.3880	*-9.3881*	9.97
TW037	PCB Hot Spot	0826P001 (a)	6/27/2008	929	N	55.786		32.785	*32.850*	21.8	-	-	-	-	51.040	#F	28.322	*28.386*	10.8
			6/30/2008	1130	N						-	-	-	-					

Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
TW038	PCB Hot Spot	0826D001 (a)	6/27/2008	924	N	31.596		39.743	39.781	18.9	-	-	-	-	6.4163	#B	12.843	12.848	10.5
			6/30/2008	836	N						-	-	-	-					
TW039	landfill area	0826E011	6/27/2008	1335	N	43.476		53.482	53.537	26.4	-	-	-	-	51.589	#F	57.180	57.252	20.3
TW040	landfill area	0826E010	6/27/2008	1320	N	41.725		30.302	*30.341*	20.9	-	-	-	-	25.419	#F	30.271	*30.286*	16.6
TW041	landfill area	0826E012	6/27/2008	1400	N	29.621	F	47.363	47.391	23.8	-	-	-	-	51.401	#F	67.228	67.289	23.4
TW042	panhandle	0826E013	6/27/2008	1430	N	62.508		28.468	*28.563*	18.4	-	-	-	-	11.953	#F	8.4854	*8.4970*	6.76
TW043	panhandle	0827E027	6/30/2008	1425	N	32.116	B	42.787	*42.804*	33.1	-	-	-	-	7.3907	#F	7.3612	*7.3663*	5.99
TW044	panhandle	0827E025	6/30/2008	1130	N	44.877		39.042	*39.077*	28.8	-	-	-	-	-1.7968	#B	-11.353	*-11.354*	8.57
TW045	panhandle	0826P008 (a)	6/27/2008	1325	N	73.220		29.820	*29.944*	18.6	-	-	-	-	6.6128	#B	12.049	*12.052*	8.70
			6/30/2008	1521	N						-	-	-	-					
TW046	panhandle	0827D020	6/30/2008	1000	N	14.060	B	58.598	58.603	31.4	-	-	-	-	33.168	#F	44.129	44.167	24.8
TW047	panhandle	0827D021	6/30/2008	1025	N	21.259	B	42.751	42.767	21.7	-	-	-	-	23.002	#F	23.011	23.046	6.00
TW048	panhandle	0827D022	6/30/2008	1040	N	7.4253	B	42.727	42.729	29.9	-	-	-	-	7.7341	#B	22.935	22.939	20.1
TW049	panhandle	0827E020	6/30/2008	1020	N	13.841	B	52.762	52.768	28.1	-	-	-	-	-15.624	#B	-227.32	-227.32	15.3
TW050	panhandle	0827E023	6/30/2008	1100	N	1.7069	B	37.088	37.088	20.3	-	-	-	-	60.819	#F	50.292	50.405	18.0
TW051	panhandle	0826D003	6/27/2008	1014	N	72.047	#	64.700	64.824	21.7	-	-	-	-	-18.497	#B	-15.061	-15.096	41.7
TW051	panhandle	0826D004	6/27/2008	1019	C						0.276	U	0.42	10.0 / 0.750					
TW052	panhandle	0826D006	6/27/2008	1124	N	20.522	F	38.152	38.170	19.1	-	-	-	-	46.147	#F	59.200	59.256	19.2

Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
TW053	panhandle	0826D005	6/27/2008	1038	N	43.899		30.527	*30.570*	21.9	-	-	-	-	9.8766	#F	9.2152	*9.2225*	7.37
TW054	panhandle	0827P024	6/30/2008	1435	N	83.760	#	36.385	*36.518*	17.0	-	-	-	-	7.7725	#F	8.2430	*8.2481*	5.90
TW055	panhandle	0827P003	6/30/2008	1425	N	22.737	B	46.430	46.447	23.8	-	-	-	-	-93.085	#B	-319.74	-319.78	37.2
TW056	panhandle	0827P028	7/1/2008	925	N	31.354	#F	48.363	48.395	18.7	-	-	-	-	25.820	#F	27.042	27.081	9.13
TW056	panhandle	0827P029	7/1/2008	930	FD	-1.1755	#B	219.44	219.440	23.7	-	-	-	-	14.820	#B	23.037	23.051	15.9
TW057B	panhandle	0827P026	7/1/2008	913	N	23.227	B	59.185	59.199	31.1	-	-	-	-	14.369	#F	22.566	22.580	8.55
TW057B	panhandle	0827P027	7/1/2008	918	FD	59.237		29.517	*29.599*	19.6	-	-	-	-	0.97905	#B	2.1957	*2.1960*	6.21
TW058	panhandle	0827P021	6/30/2008	1027	N	69.810		32.969	*33.071*	22.1	-	-	-	-	30.280	#F	31.554	*31.574*	15.0
TW059	panhandle	0827P013	6/30/2008	835	N	39.243		36.783	36.848	16.4	-	-	-	-	-93.472	#B	-540.45	-540.48	41.6
TW060	panhandle	0827D025	6/30/2008	1400	N	51.112		29.476	*29.537*	20.2	-	-	-	-	10.831	#F	10.457	*10.465*	5.85
TW061	panhandle	0827D024	6/30/2008	1345	N	11.104	B	35.766	35.772	18.7	-	-	-	-	-44.868	#B	-147.48	-147.50	37.5
Piezometer Wells																			
PZ131F	landfill area	0827E026 (a)	6/30/2008	1320	N	68.266	#	64.027	64.139	20.9	-	-	-	-	-17.001	#B	-171.72	-171.72	14.9
PZ138E	landfill area	0826E005	6/27/2008	1050	N	51.702		34.935	34.987	24.5	-	-	-	-	4.4505	#B	16.441	16.441	12.1
PZ138F	landfill area	0826E003	6/27/2008	1025	N	11.210	F	16.930	16.941	9.1	-	-	-	-	-96.984	B	-426.75	-426.78	14.6
PZ138F	landfill area	0826E004	6/27/2008	1030	C						0.2	U	0.31	10.0 / 0.552					

Table 1. Sample summary and analytical results for Cesium-137 and Cobalt-60 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Cesium-137: PAL = 111.9 pCi/L New World Technology Method					Cesium-137: PAL = 111.9 pCi/L EPA Method 901.0 Mod (Eberline)				Cobalt-60: PAL = 100 pCi/L New World Technology Method				
						New World Technology Method	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Result (pCi/L)	Data Qualifier	Uncertainty Counting (pCi/L)	3 Sigma Total (*italics* = 2 Sigma Total) (pCi/L)	MDA (pCi/L)
PZ144E	landfill area	0827E016	6/30/2008	920	N	52.521		29.784	29.848	20.4	-	-	-	-	27.233	F	16.102	16.134	22.1
PZ144E	landfill area	0827E017	6/30/2008	925	C						0.171	U	0.30	10.0 / 0.523					
PZ150D	landfill area	0827D023	6/30/2008	1110	N	26.680	F	47.934	47.957	24.4	-	-	-	-	47.463	#F	66.498	66.550	23.3
PZ150E	landfill area	0827E030	7/1/2008	1417	N	59.347		31.469	31.546	21.5	-	-	-	-	28.356	#F	29.296	29.315	15.8
PZ150E	landfill area	0827E031	7/1/2008	1421	FD	18.931	B	40.678	40.691	20.7	-	-	-	-	56.871	#F	59.363	59.447	17.9
PZ161D	landfill area	0827E028	7/1/2008	1030	N	39.899		34.201	34.287	24.8	-	-	-	-	-8.7522	#B	976.69	976.69	73.4
PZ161D	landfill area	0827E029	7/1/2008	1035	FD	31.489	F	31.892	31.913	23.4	-	-	-	-	8.0314	#B	15.321	15.324	10.6

Notes:

(a) Well exhibited low recharge; sample containers filled on two or more days with same sample ID. Results shown adjacent to sampling date listed on analytical report. New World Technology performed and reported separate analyses for the three sampling dates for TW004.

Laboratory Qualifiers:

# = New World Technology data qualifier; "All peaks for activity calculation had bad shape."
B = New World Technology data qualifier; "Activity <MDA and failed test."
F = New World Technology data qualifier; "Failed fraction or key line test."
U = Result is less than the sample detection limit

Abbreviations:

C = Confirmation sample
FD = Field Duplicate
MDA = Minimum detectable activity
N = Normal sample
PAL = Project action limit
pCi/L = picoCuries/liter
PZ = Piezometer
RDL = Reportable detection limit
TW = Temporary well

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
Temporary Wells																							
TW001	panhandle	0827E021	6/30/2008	1035	N	Yes	1.06		0.23	1.00 / 0.14	-	-	-	-	Yes	0.1	U	0.15	3.00 / 0.26	-	-	-	-
TW002	panhandle	0826P009	6/27/2008	1338	N	Yes	0.14	U	0.12	1.00 / 0.18	-	-	-	-	Yes	0.03	U	0.26	3.00 / 0.46	-	-	-	-
TW003	panhandle	0826P006	6/27/2008	1153	N	No	0.18	J	0.10	1.00 / 0.13	-	-	-	-	Yes	0.28	U	0.54	3.00 / 0.91	-	-	-	-
TW004	panhandle	0826P011 (a)	6/27/2008	1424	N	No	**11.0**		1.1	1.0 / 0.2	-	-	-	-	Yes	-1.2	U	1.3	3.0 / 2.4	-	-	-	-
			6/30/2008	1500	*N*						-	-	-	-						-	-	-	-
			7/1/2008	945	*N*						-	-	-	-						-	-	-	-
TW005	panhandle	0826P007 (a)	6/27/2008	1317	N						-	-	-	-						-	-	-	-
			6/30/2008	1510	N	Yes	0.40	J	0.13	1.00 / 0.11	-	-	-	-	Yes	0.15	U	0.16	3.00 / 0.26	-	-	-	-
TW006	panhandle	0826P004	6/27/2008	1136	N	Yes	0.42	J	0.14	1.00 / 0.12	-	-	-	-	Yes	-0.8	U	1.2	3.0 / 2.2	-	-	-	-
TW006	panhandle	0826P005	6/27/2008	1142	C						0.288	U	0.30	1.00 / 0.480						0	U	0.22	2.00 / 0.426
TW007	panhandle	0826P010	6/27/2008	1345	N	Yes	0.16	U	0.12	1.00 / 0.18	-	-	-	-	Yes	0.24	U	0.21	3.00 / 0.34	-	-	-	-
TW008	panhandle	0827P025	6/30/2008	1453	N	Yes	0.58	J	0.20	1.00 / 0.20	-	-	-	-	Yes	0.25	U	0.18	3.00 / 0.28	-	-	-	-
TW009	panhandle	0826P030	6/27/2008	1502	N	Yes	0.16	U	0.11	1.00 / 0.16	-	-	-	-	Yes	-0.69	U	0.81	3.00 / 1.5	-	-	-	-
TW010	panhandle	0827P022	6/30/2008	1047	N	Yes	0.24	J	0.11	1.00 / 0.12	-	-	-	-	Yes	-1.09	U	0.86	3.00 / 1.7	-	-	-	-
TW011	panhandle	0826P012	6/27/2008	1450	N	Yes	0.43	J	0.14	1.00 / 0.12	-	-	-	-	Yes	0.009	U	0.92	3.0 / 1.6	-	-	-	-
TW012	panhandle	0827E024 (a)	6/30/2008	1110	N	No	**6.08**		0.81	1.00 / 0.28	-	-	-	-	Yes	0.55	U	0.76	3.0 / 1.3	-	-	-	-

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
TW013	panhandle	0827D018	6/30/2008	930	N	Yes	0.80	J	0.20	1.00 / 0.13	-	-	-	-	Yes	0.1	U	0.14	3.00 / 0.23	-	-	-	-
TW013	panhandle	0827D019	6/30/2008	935	C						0.375	U	0.36	1.00 / 0.566						-0.055	U	0.37	2.00 / 0.735
TW014	panhandle	0827D017	6/30/2008	920	N	Yes	0.52	J	0.16	1.00 / 0.13	-	-	-	-	Yes	0.17	U	0.16	3.00 / 0.25	-	-	-	-
TW015	panhandle	0826D016	6/27/2008	1500	N	Yes	0.52	J	0.16	1.00 / 0.13	-	-	-	-	Yes	-0.3	U	1.4	3.0 / 2.4	-	-	-	-
TW016	panhandle	0826D015	6/27/2008	1440	N	Yes	0.51	J	0.16	1.00 / 0.12	-	-	-	-	Yes	1.0	U	1.1	3.0 / 1.8	-	-	-	-
TW017	panhandle	0826D014	6/27/2008	1420	N	Yes	0.54	J	0.18	1.00 / 0.18	-	-	-	-	Yes	0.07	U	0.18	3.00 / 0.30	-	-	-	-
TW018	panhandle	0826D012	6/27/2008	1358	N	No	0.25	J	0.14	1.00 / 0.17	-	-	-	-	Yes	-0.28	U	0.9	3.00 / 1.6	-	-	-	-
	panhandle	0826D013	6/27/2008	1403	FD	No	0.36	J	0.14	1.00 / 1.3	-	-	-	-	Yes	0.29	U	0.43	3.00 / 0.72	-	-	-	-
TW019	panhandle	0826D011	6/27/2008	1345	N	Yes	0.30	J	0.13	1.00 / 0.14	-	-	-	-	Yes	-0.3	U	1	3.0 / 1.8	-	-	-	-
TW020	panhandle	0826D007	6/27/2008	1148	N	Yes	0.26	J	0.16	1.00 / 0.21	-	-	-	-	Yes	0.92	U	0.98	3.00 / 1.6	-	-	-	-
TW020	panhandle	0826D008	6/27/2008	1153	C						0.275	U	0.33	1.00 / 0.538						0.437	U	0.27	2.00 / 0.447
TW021	panhandle	0826D009	6/27/2008	1315	N	Yes	0.31	J	0.14	1.00 / 0.15	-	-	-	-	Yes	0.08	U	0.20	3.00 / 0.34	-	-	-	-
TW022	panhandle	0826D010	6/27/2008	1330	N	Yes	0.37	J	0.18	1.00 / 0.22	-	-	-	-	Yes	-0.5	U	1.2	3.0 / 2.2	-	-	-	-
TW023	panhandle	0827E022	6/30/2008	1050	N	No	0.28	J	0.16	1.00 / 0.20	-	-	-	-	Yes	0.84	U	0.98	3.00 / 1.6	-	-	-	-
TW024	panhandle	0826E014	6/27/2008	1455	N	Yes	0.21	J	0.11	1.00 / 0.13	-	-	-	-	Yes	0.5	U	1.3	3.0 / 2.1	-	-	-	-
TW025	panhandle	0826E015	6/27/2008	1505	N	No	0.25	J	0.11	1.00 / 0.11	-	-	-	-	Yes	0.03	U	0.91	3.00 / 1.6	-	-	-	-
TW026B	metal slag	0827P015	6/30/2008	906	N	No	0.58	J	0.17	1.00 / 0.13	-	-	-	-	Yes	0.02	U	0.83	3.00 / 1.4	-	-	-	-
TW027B	metal slag	0827P014	6/30/2008	850	N	Yes	0.53	J	0.16	1.00 / 0.12	-	-	-	-	Yes	0.48	U	0.84	3.00 / 1.4	-	-	-	-
TW028B	metal slag	0827P018	6/30/2008	936	N	Yes	0.20	J	0.12	1.00 / 0.16	-	-	-	-	Yes	0.09	U	0.21	3.00 / 0.36	-	-	-	-

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
TW029	metal slag	0827P016	6/30/2008	917	N	No	0.56	J	0.17	1.00 / 0.14	-	-	-	-	Yes	-0.07	U	0.29	3.00 / 0.52	-	-	-	-
TW029	metal slag	0827P017	6/30/2008	922	FD	Yes	0.37	J	0.15	1.00 / 0.16	-	-	-	-	Yes	1.47	J	0.89	3.00 / 1.3	-	-	-	-
TW030B	metal slag	0826P002	6/27/2008	1108	N	Yes	0.15	J	0.11	1.00 / 0.15	-	-	-	-	Yes	0.17	U	0.16	3.00 / 0.25	-	-	-	-
TW030B	metal slag	0826P003	6/27/2008	1115	C						0.165	U	0.33	1.00 / 0.576						-0.018	U	0.37	2.00 / 0.638
TW031	landfill area	0826E008	6/27/2008	1135	N	Yes	0.62	J	0.19	1.00 / 0.15	-	-	-	-	Yes	-0.07	U	0.92	3.00 / 1.6	-	-	-	-
TW031	landfill area	0826E009	6/27/2008	1140	FD	No	0.43	J	0.14	1.00 / 0.13	-	-	-	-	Yes	-0.02	U	0.84	3.00 / 1.5	-	-	-	-
TW032	landfill area	0826E007	6/27/2008	1125	N	No	0.87	J	0.2	1.00 / 0.12	-	-	-	-	Yes	0.34	U	0.73	3.00 / 1.2	-	-	-	-
TW033	landfill area	0826E006	6/27/2008	1115	N	No	0.44	J	0.15	1.00 / 0.12	-	-	-	-	Yes	0.13	U	0.47	3.00 / 0.80	-	-	-	-
TW034	PCB Hot Spot	0826D002 (a)	6/27/2008	951	N	No	0.85	J	0.22	1.00 / 0.16	-	-	-	-	Yes	-0.26	U	0.98	3.00 / 1.7	-	-	-	-
TW035	PCB Hot Spot	0826E001 (a)	6/27/2008	931	N						-	-	-	-						-	-	-	-
			6/30/2008	942	N	No	2.42		0.35	1.00 / 0.15	-	-	-	-	Yes	-0.22	U	0.82	3.00 / 1.4	-	-	-	-
TW036	PCB Hot Spot	0826E002	6/27/2008	955	N	Yes	0.33	J	0.15	1.00 / 0.16	-	-	-	-	Yes	-0.15	U	0.21	3.00 / 0.39	-	-	-	-
TW037	PCB Hot Spot	0826P001 (a)	6/27/2008	929	N						-	-	-	-						-	-	-	-
			6/30/2008	1130	N	No	0.41	J	0.17	1.00 / 0.19	-	-	-	-	Yes	-0.36	U	0.67	3.00 / 1.2	-	-	-	-

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
TW038	PCB Hot Spot	0826D001 (a)	6/27/2008	924	N						-	-	-	-						-	-	-	-
			6/30/2008	836	N	No	0.50	J	0.19	1.00 / 0.19	-	-	-	-	Yes	0.28	U	0.67	3.00 / 1.1	-	-	-	-
TW039	landfill area	0826E011	6/27/2008	1335	N	Yes	0.72	J	0.20	1.00 / 0.16	-	-	-	-	Yes	0.28	U	0.19	3.00 / 0.29	-	-	-	-
TW040	landfill area	0826E010	6/27/2008	1320	N	Yes	0.93	J	0.24	1.00 / 0.15	-	-	-	-	Yes	1.0	U	1.1	3.0 / 1.9	-	-	-	-
TW041	landfill area	0826E012	6/27/2008	1400	N	No	0.44	J	0.16	1.00 / 0.15	-	-	-	-	Yes	0.63	U	0.51	3.00 / 0.82	-	-	-	-
TW042	panhandle	0826E013	6/27/2008	1430	N	No	0.80	J	0.19	1.00 / 0.12	-	-	-	-	Yes	0.89	U	0.67	3.00 / 1.0	-	-	-	-
TW043	panhandle	0827E027	6/30/2008	1425	N	Yes	0.29	J	0.13	1.00 / 0.14	-	-	-	-	Yes	0.14	U	0.14	3.00 / 0.22	-	-	-	-
TW044	panhandle	0827E025	6/30/2008	1130	N	No	0.13	U	0.11	1.00 / 0.17	-	-	-	-	Yes	-1.5	U	1.2	3.0 / 2.2	-	-	-	-
TW045	panhandle	0826P008 (a)	6/27/2008	1325	N	No	1.72		0.28	1.00 / 0.13	-	-	-	-	Yes	0.04	U	0.45	3.00 / 0.77	-	-	-	-
			6/30/2008	1521	N						-	-	-	-						-	-	-	-
TW046	panhandle	0827D020	6/30/2008	1000	N	Yes	0.45	J	0.16	1.00 / 0.14	-	-	-	-	Yes	-0.3	U	1.0	3.0 / 1.9	-	-	-	-
TW047	panhandle	0827D021	6/30/2008	1025	N	Yes	0.25	J	0.12	1.00 / 0.14	-	-	-	-	Yes	0.22	J	0.14	3.00 / 0.21	-	-	-	-
TW048	panhandle	0827D022	6/30/2008	1040	N	Yes	0.072	U	0.085	1.00 / 0.13	-	-	-	-	Yes	0.21	U	0.23	3.00 / 0.37	-	-	-	-
TW049	panhandle	0827E020	6/30/2008	1020	N	Yes	0.31	J	0.15	1.00 / 0.18	-	-	-	-	Yes	0.28	U	0.19	3.00 / 0.29	-	-	-	-
TW050	panhandle	0827E023	6/30/2008	1100	N	Yes	0.24	J	0.12	1.00 / 0.15	-	-	-	-	Yes	0.24	U	0.23	3.00 / 0.36	-	-	-	-
TW051	panhandle	0826D003	6/27/2008	1014	N	Yes	0.33	J	0.17	1.00 / 0.21	-	-	-	-	Yes	0.06	U	0.94	3.00 / 1.6	-	-	-	-
TW051	panhandle	0826D004	6/27/2008	1019	C						0.416	U	0.35	1.00 / 0.525						0.278	U	0.35	2.00 / 0.627
TW052	panhandle	0826D006	6/27/2008	1124	N	Yes	0.23	J	0.13	1.00 / 0.16	-	-	-	-	Yes	-0.58	U	0.84	3.00 / 1.6	-	-	-	-
TW053	panhandle	0826D005	6/27/2008	1038	N	No	0.42	J	0.15	1.00 / 0.14	-	-	-	-	Yes	0.19	U	0.67	3.00 / 1.1	-	-	-	-

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
TW054	panhandle	0827P024	6/30/2008	1435	N	No	0.93	J	0.25	1.00 / 0.21	-	-	-	-	Yes	-0.18	U	0.62	3.00 / 1.1	-	-	-	-
TW055	panhandle	0827P003	6/30/2008	1425	N	No	0.79	J	0.23	1.00 / 0.20	-	-	-	-	Yes	0.51	U	0.74	3.00 / 1.2	-	-	-	-
TW056	panhandle	0827P028	7/1/2008	925	N	No	0.28	J	0.14	1.00 / 0.16	-	-	-	-	Yes	0.6	U	1.1	3.0 / 1.8	-	-	-	-
TW056	panhandle	0827P029	7/1/2008	930	FD	No	0.45	J	0.16	1.00 / 0.15	-	-	-	-	Yes	0.53	U	0.93	3.00 / 1.6	-	-	-	-
TW057B	panhandle	0827P026	7/1/2008	913	N	No	0.33	J	0.14	1.00 / 0.13	-	-	-	-	Yes	0.57	U	0.71	3.00 / 1.2	-	-	-	-
TW057B	panhandle	0827P027	7/1/2008	918	FD	No	0.17	J	0.12	1.00 / 0.17	-	-	-	-	Yes	-0.43	U	0.91	3.00 / 1.7	-	-	-	-
TW058	panhandle	0827P021	6/30/2008	1027	N	Yes	0.41	J	0.16	1.00 / 0.16	-	-	-	-	Yes	0.40	J	0.23	3.00 / 0.35	-	-	-	-
TW059	panhandle	0827P013	6/30/2008	835	N	Yes	0.46	J	0.16	1.00 / 0.14	-	-	-	-	Yes	-0.3	U	1.0	3.0 / 1.8	-	-	-	-
TW060	panhandle	0827D025	6/30/2008	1400	N	No	0.171	J	0.098	1.00 / 0.12	-	-	-	-	Yes	0.59	J	0.35	3.00 / 0.52	-	-	-	-
TW061	panhandle	0827D024	6/30/2008	1345	N	No	0.23	J	0.14	1.00 / 0.19	-	-	-	-	Yes	1.82	J	0.75	3.00 / 1.0	-	-	-	-
Piezometer Wells																							
PZ131F	landfill area	0827E026 (a)	6/30/2008	1320	N	No	0.069	U	0.073	1.00 / 0.11	-	-	-	-	Yes	-0.16	U	0.87	3.00 / 1.6	-	-	-	-
PZ138E	landfill area	0826E005	6/27/2008	1050	N	No	0.26	J	0.12	1.00 / 0.12	-	-	-	-	Yes	0.17	U	0.69	3.00 / 1.2	-	-	-	-
PZ138F	landfill area	0826E003	6/27/2008	1025	N	Yes	0.15	U	0.12	1.00 / 0.17	-	-	-	-	Yes	0.2	U	1.1	3.0 / 1.8	-	-	-	-
PZ138F	landfill area	0826E004	6/27/2008	1030	C						0.324	U	0.31	1.00 / 0.498						0.362	U	0.34	2.00 / 0.582

Table 2. Sample summary and analytical results for radium-226 and strontium-90 in Parcel E-2 groundwater.

Temporary Well or Piezometer ID	Installation location area	Sample ID	Sample Date	Sample Time	Sample Type	Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (TestAmerica)					Radium-226: PAL = 5 pCi/L EPA Method 903.0 Mod (Eberline)				Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (TestAmerica)					Strontium-90: PAL = 8 pCI/L EPA Method 905 Mod (Eberline)			
						Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)	Filtered Yes/No (b)	Result (pCi/L)	Data Qualifier	± 2σ Error (pCi/L)	RL / MDC (pCi/L)	Result (pCi/L)	Data Qualifier	2σ Error (pCi/L)	RDL / MDA (pCi/L)
PZ144E	landfill area	0827E016	6/30/2008	920	N	Yes	0.63	J	0.19	1.00 / 0.17	-	-	-	-	Yes	0.4	U	1.0	3.0 / 1.7	-	-	-	-
PZ144E	landfill area	0827E017	6/30/2008	925	C						0.616		0.39	1.00 / 0.530						0.181	U	0.28	2.00 / 0.522
PZ150D	landfill area	0827D023	6/30/2008	1110	N	Yes	1.30		0.28	1.00 / 0.18	-	-	-	-	Yes	0.34	J	0.18	3.00 / 0.26	-	-	-	-
PZ150E	landfill area	0827E030	7/1/2008	1417	N	No	0.59	J	0.16	1.00 / 0.11	-	-	-	-	Yes	0.40	U	0.49	3.00 / 0.80	-	-	-	-
PZ150E	landfill area	0827E031	7/1/2008	1421	FD	No	0.54	J	0.16	1.00 / 0.14	-	-	-	-	Yes	0.08	U	0.35	3.00 / 0.60	-	-	-	-
PZ161D	landfill area	0827E028	7/1/2008	1030	N	No	0.64	J	0.17	1.00 / 0.13	-	-	-	-	Yes	-0.08	U	0.61	3.00 / 1.1	-	-	-	-
PZ161D	landfill area	0827E029	7/1/2008	1035	FD	No	0.73	J	0.18	1.00 / 0.12	-	-	-	-	Yes	0.10	U	0.48	3.00 / 0.83	-	-	-	-

Notes:

(a) Well exhibited low recharge; sample containers filled on two or more days with same sample ID.
Results shown adjacent to sampling date listed on analytical report.

(b) Filtering based on TestAmerica analytical report narrative. "Yes" indicates filtering was conducted by TestAmerica. "No" indicates no mention of sample being filtered by TestAmerica.

Laboratory Qualifiers:

J = Result is greater than sample detection limit but less than stated reporting limit

U = Result is less than the sample detection limit

Abbreviations:

C = Confirmation sample
COC = Chain of custody
FD = Field Duplicate
MDA = Minimum detectable activity
MDC = Minimum detectable concentration (per TestAmerica)
N = Normal sample
PAL = Project action limit

Plate

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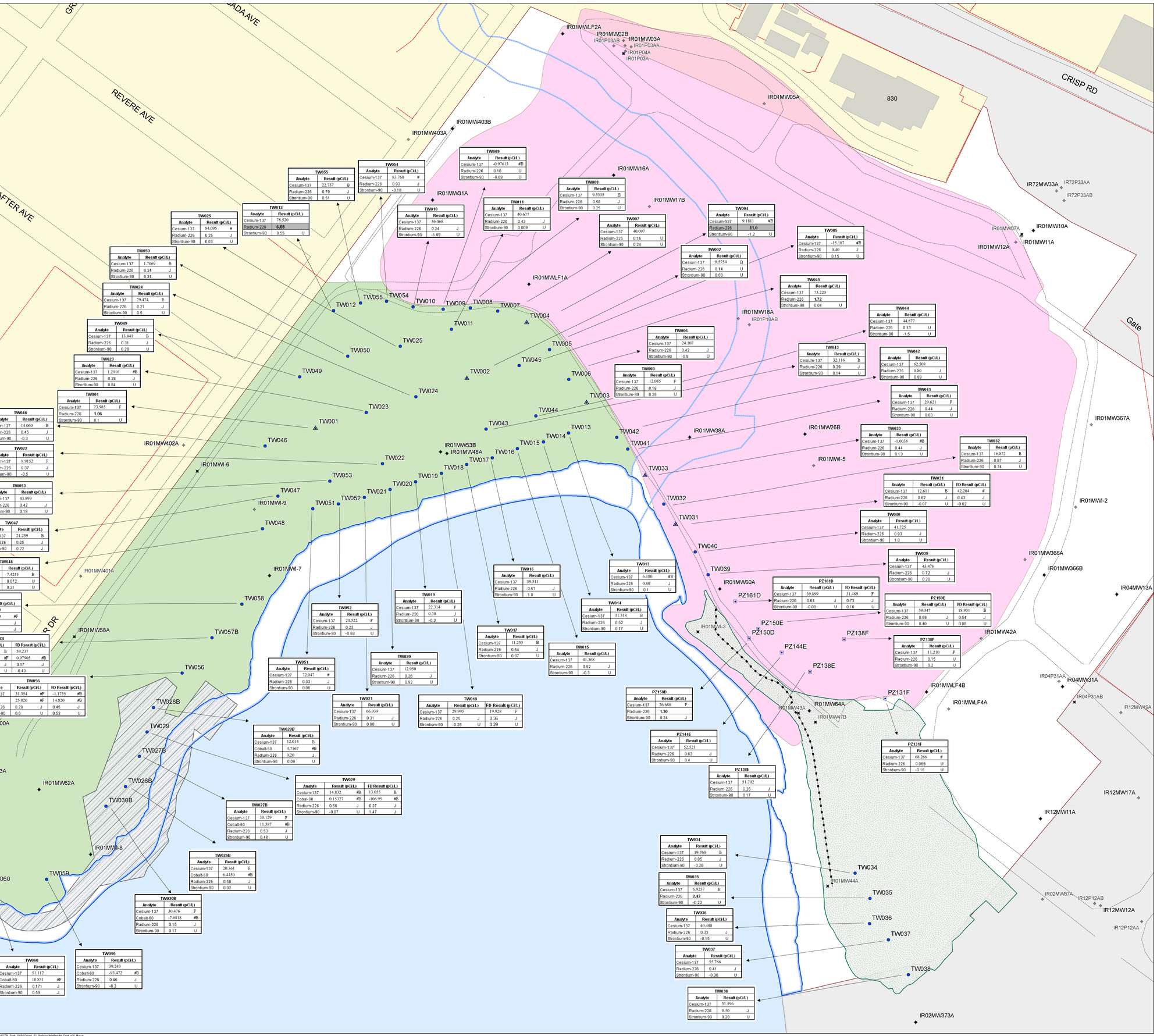

TW009	
Analyte	Result (pCi/L)
Cesium-137	-0.97613 #B
Radium-226	0.16 U
Strontium-90	-0.69 U

TW055	
Analyte	Result (pCi/L)
Cesium-137	22.737 B
Radium-226	0.79 J
Strontium-90	0.51 U

TW054	
Analyte	Result (pCi/L)
Cesium-137	83.760 #
Radium-226	0.93 J
Strontium-90	-0.18 U

TW000	
Analyte	Result (pCi/L)
Cesium-137	9.5335 B
Radium-226	0.58 J
Strontium-90	0.25 U

TW012	
Analyte	Result (pCi/L)
Cesium-137	78.520
Radium-226	6.08
Strontium-90	0.55 U

TW010	
Analyte	Result (pCi/L)
Cesium-137	36.068
Radium-226	0.24 J
Strontium-90	-1.09 U

TW011	
Analyte	Result (pCi/L)
Cesium-137	40.677
Radium-226	0.43 J
Strontium-90	0.009 U

TW007	
Analyte	Result (pCi/L)
Cesium-137	40.097
Radium-226	0.16 U
Strontium-90	0.24 U

TW004	
Analyte	Result (pCi/L)
Cesium-137	9.1811 #B
Radium-226	11.0
Strontium-90	-1.2 U

TW025	
Analyte	Result (pCi/L)
Cesium-137	84.095 #
Radium-226	0.25 J
Strontium-90	0.03 U

TW002	
Analyte	Result (pCi/L)
Cesium-137	8.5754 B
Radium-226	0.14 U
Strontium-90	0.03 U

TW005	
Analyte	Result (pCi/L)
Cesium-137	-15.187 #B
Radium-226	0.40 J
Strontium-90	0.15 U

TW050	
Analyte	Result (pCi/L)
Cesium-137	1.7069 B
Radium-226	0.24 J
Strontium-90	0.24 U

TW045	
Analyte	Result (pCi/L)
Cesium-137	73.220
Radium-226	1.72
Strontium-90	0.04 U

TW024	
Analyte	Result (pCi/L)
Cesium-137	29.474 B
Radium-226	0.21 J
Strontium-90	0.5 U

TW044	
Analyte	Result (pCi/L)
Cesium-137	44.877
Radium-226	0.13 U
Strontium-90	-1.5 U

TW049	
Analyte	Result (pCi/L)
Cesium-137	13.841 B
Radium-226	0.31 J
Strontium-90	0.28 U

TW006	
Analyte	Result (pCi/L)
Cesium-137	24.107
Radium-226	0.42 J
Strontium-90	-0.8 U

TW043	
Analyte	Result (pCi/L)
Cesium-137	32.116 B
Radium-226	0.29 J
Strontium-90	0.14 U

TW042	
Analyte	Result (pCi/L)
Cesium-137	62.508
Radium-226	0.80 J
Strontium-90	0.89 U

TW023	
Analyte	Result (pCi/L)
Cesium-137	1.2916 #B
Radium-226	0.28 J
Strontium-90	0.84 U

TW003	
Analyte	Result (pCi/L)
Cesium-137	12.085 F
Radium-226	0.18 J
Strontium-90	0.28 U

TW041	
Analyte	Result (pCi/L)
Cesium-137	29.621 F
Radium-226	0.44 J
Strontium-90	0.63 U

TW001	
Analyte	Result (pCi/L)
Cesium-137	23.985 F
Radium-226	1.06
Strontium-90	0.1 U

TW033	
Analyte	Result (pCi/L)
Cesium-137	-1.0038 #B
Radium-226	0.44 J
Strontium-90	0.13 U

TW046	
Analyte	Result (pCi/L)
Cesium-137	14.060 B
Radium-226	0.45 J
Strontium-90	-0.3 U

TW032	
Analyte	Result (pCi/L)
Cesium-137	16.872 B
Radium-226	0.87 J
Strontium-90	0.34 U

TW022	
Analyte	Result (pCi/L)
Cesium-137	8.9152 F
Radium-226	0.37 J
Strontium-90	-0.5 U

TW031		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	12.611 B	42.204 #
Radium-226	0.62 J	0.43 J
Strontium-90	-0.07 U	-0.02 U

TW053	
Analyte	Result (pCi/L)
Cesium-137	43.899
Radium-226	0.42 J
Strontium-90	0.19 U

TW040	
Analyte	Result (pCi/L)
Cesium-137	41.725
Radium-226	0.93 J
Strontium-90	1.0 U

TW047	
Analyte	Result (pCi/L)
Cesium-137	21.259 B
Radium-226	0.25 J
Strontium-90	0.22 J

TW039	
Analyte	Result (pCi/L)
Cesium-137	43.476
Radium-226	0.72 J
Strontium-90	0.28 U

TW048	
Analyte	Result (pCi/L)
Cesium-137	7.4253 B
Radium-226	0.072 U
Strontium-90	0.21 U

PZ161D		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	39.899	31.489 F
Radium-226	0.64 J	0.73 J
Strontium-90	-0.08 U	0.10 U

PZ150E		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	59.347	18.931 B
Radium-226	0.59 J	0.54 J
Strontium-90	0.40 U	0.08 U

TW058	
Analyte	Result (pCi/L)
Cesium-137	69.810
Cobalt-60	30.280 #F
Radium-226	0.41 J
Strontium-90	0.40 J

TW052	
Analyte	Result (pCi/L)
Cesium-137	20.522 F
Radium-226	0.23 J
Strontium-90	-0.58 U

TW019	
Analyte	Result (pCi/L)
Cesium-137	22.314 F
Radium-226	0.30 J
Strontium-90	-0.3 U

TW016	
Analyte	Result (pCi/L)
Cesium-137	39.511
Radium-226	0.51 J
Strontium-90	1.0 U

TW013	
Analyte	Result (pCi/L)
Cesium-137	6.180 #B
Radium-226	0.80 J
Strontium-90	0.1 U

TW014	
Analyte	Result (pCi/L)
Cesium-137	11.318 B
Radium-226	0.52 J
Strontium-90	0.17 U

TW057B		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	23.277 B	59.237
Cobalt-60	14.369 #F	0.97905 #B
Radium-226	0.33 J	0.17 J
Strontium-90	0.57 U	-0.43 U

TW017	
Analyte	Result (pCi/L)
Cesium-137	11.253 B
Radium-226	0.54 J
Strontium-90	6.07 U

TW015	
Analyte	Result (pCi/L)
Cesium-137	41.368
Radium-226	0.52 J
Strontium-90	-0.3 U

TW051	
Analyte	Result (pCi/L)
Cesium-137	72.047 #
Radium-226	0.33 J
Strontium-90	0.06 U

TW020	
Analyte	Result (pCi/L)
Cesium-137	12.950
Radium-226	0.26 J
Strontium-90	0.92 U

PZ150D	
Analyte	Result (pCi/L)
Cesium-137	26.680 F
Radium-226	1.30
Strontium-90	0.34 J

TW056		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	31.354 #F	-1.1755 #B
Cobalt-60	25.820 #F	14.820 #B
Radium-226	0.28 J	0.45 J
Strontium-90	0.6 U	0.53 U

TW021	
Analyte	Result (pCi/L)
Cesium-137	66.939
Radium-226	0.31 J
Strontium-90	0.08 U

TW018		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	29.995	19.928 F
Radium-226	0.25 J	0.36 J
Strontium-90	-0.28 U	0.29 U

PZ144E	
Analyte	Result (pCi/L)
Cesium-137	52.521
Radium-226	0.63 J
Strontium-90	0.4 U

PZ131F	
Analyte	Result (pCi/L)
Cesium-137	68.266 #
Radium-226	0.069 U
Strontium-90	-0.16 U

TW028B	
Analyte	Result (pCi/L)
Cesium-137	12.014 B
Cobalt-60	4.7167 #B
Radium-226	0.20 J
Strontium-90	0.09 U

PZ138E	
Analyte	Result (pCi/L)
Cesium-137	51.702
Radium-226	0.26 J
Strontium-90	0.17 U

TW029		
Analyte	Result (pCi/L)	FD Result (pCi/L)
Cesium-137	14.832 #B	13.055 B
Cobalt-60	0.15327 #B	-106.95 #B
Radium-226	0.58 J	0.37 J
Strontium-90	-0.07 U	1.47 J

TW027B	
Analyte	Result (pCi/L)
Cesium-137	30.129 F
Cobalt-60	11.387 #B
Radium-226	0.53 J
Strontium-90	0.48 U

TW034	
Analyte	Result (pCi/L)
Cesium-137	19.760 B
Radium-226	0.85 J
Strontium-90	-0.26 U

TW026B	
Analyte	Result (pCi/L)
Cesium-137	20.361 F
Cobalt-60	6.4450 #B
Radium-226	0.58 J
Strontium-90	0.02 U

TW035	
Analyte	Result (pCi/L)
Cesium-137	6.9257 B
Radium-226	2.42
Strontium-90	-0.22 U

TW030B	
Analyte	Result (pCi/L)
Cesium-137	30.476 F
Cobalt-60	-7.6818 #B
Radium-226	0.15 J
Strontium-90	0.17 U

TW036	
Analyte	Result (pCi/L)
Cesium-137	40.488
Radium-226	0.33 J
Strontium-90	-0.15 U

TW061	
Analyte	Result (pCi/L)
Cesium-137	11.104 B
Cobalt-60	-44.868 #B
Radium-226	0.23 J
Strontium-90	1.82 J

TW037	
Analyte	Result (pCi/L)
Cesium-137	55.786
Radium-226	0.41 J
Strontium-90	-0.36 U

TW060	
Analyte	Result (pCi/L)
Cesium-137	51.112
Cobalt-60	10.831 #F
Radium-226	0.171 J
Strontium-90	0.59 J

TW059	
Analyte	Result (pCi/L)
Cesium-137	39.243
Cobalt-60	-93.472 #B
Radium-226	0.46 J
Strontium-90	-0.3 U

TW038	
Analyte	Result (pCi/L)
Cesium-137	31.596
Radium-226	0.59 J
Strontium-90	0.28 U

Plate 1
Temporary well and piezometer locations and groundwater analytical results for cesium-137, cobalt-60, radium-226, and strontium-90 (June/July 2008)

Appendix J
Groundwater Sampling for Radionuclides at Parcel E-2

Hunters Point Shipyard, San Francisco, CA

February 2009

CE² KLEINFELDER
4457 Willow Road, Suite 210, Pleasanton, CA 94588-3677

G. Fong, CE2 Corporation
February 2009

NAD 1927, State Plane 1927 California III FIPS 0403
Lambert Conformal Conic (Ford US)

E:\PROJECTS\HPS\GIS\EventsReports\E2\E2ReportsE2\E2TechMemo\E2TM_Final_20081\Apps_F\1_RadionuclideResults_Final_v09_BLw.ai

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Appendix A.
Project personnel sign-off sheets

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SAP Worksheet #4 -- Project Personnel Sign-Off Sheet

Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Hamide Kayaci	Navy / RPM	619-532-0930	9/9/09 —	complete SAP	6/26/08
Patrick Owens	RASO / Environmental Protection Manager	757-887-7644			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

[1] = Sampling personnel to be determined (TBD) by Field Manager at time of final work scheduling.

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Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
Hamide Kayaci	Navy / RPM	619-532-0930			
Patrick Owens	RASO / Environmental Protection Manager	757-887-7644	Laurie Lowman for	Entire SAP	6/25/08
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Hamide Kayaci	Navy / RPM	619-532-0930			
Patrick Owens	RASO / Environmental Protection Manager	757-887-7644			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301		complete SAP w/Addendum 1	6/24/08
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301		Complete SAP w/Addendum 1	6/23/08
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000	Gary Goodemote	complete	6/25/08
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263		complete	6/25/08
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

[1] = Sampling personnel to be determined (TBD) by Field Manager at time of final work scheduling.

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Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000	Patricia Walters	Entire SAP	6/26/08
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175	Diane Anderson	3,4,5,6,7,14,15,16,20-29 30,34	6/25/08
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731		A1	5/9/08
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
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Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739	Paul Wall	5/28/08 (ADD A1)	6/24/08
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633	Rodney Melgard	SAP Addendum 1	6/27/08
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

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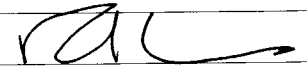
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437		WS #34,35&36	6/25/08
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000			
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

[1] = Sampling personnel to be determined (TBD) by Field Manager at time of final work scheduling.

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Name	Organization/Title/Role	Telephone Number (optional)	Signature/email receipt	SAP Section Reviewed	Date SAP Read
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Patrick Owens	RASO / Environmental Protection Manager	757-887-7644			
Edward Kilduff	CE2-Kleinfelder JV / Program Manager	925-463-7301			
Thomas Berry	CE2-Kleinfelder JV / Project Manager	925-463-7301			
Gary Goodemote	CE2-Kleinfelder JV / Project QAO	510-628-9000			
Stacie Wissler	CE2-Kleinfelder JV /Project Chemist	858-320-2263			
Patricia Walters	CE2-Kleinfelder JV / Data Manager	510-628-9000			
Diane Anderson	APPL	559-275-2175			
Bill Dougherty	TtECI	415-216-2731			
Paul Wall	New World Technology, Inc.	415-216-2739			
Rod Melgard	Eberline Services / Laboratory Director	510-235-2633			
Richard Amano	LDC	760-634-0437			
Tom Sayre	CE2-Kleinfelder JV / Field Manager, On-Site H&S Officer	510-628-9000		Complete SAP	06/26/2008
TBD[1]	CE2-Kleinfelder JV / Sampling personnel	Not applicable			

[1] = Sampling personnel to be determined (TBD) by Field Manager at time of final work scheduling.

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Appendix B.
Analytical reports and chain-of-custody records
(CD only)

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APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27039

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Klein Petter	Phone: 510-628-9000	Company Name: T-Hatch ECI/NWT	Phone: 415-216-2739
Address: 1970 Broadway Suite 710 Oakland, CA 94612	Fax: 510-628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2189762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - EPA 901.0 mod	Ra-226 - EPA 903.1	Sr-90 - EPA 905.0	Co-60 - EPA 901.1 mod	Analysis Requested/Method Number
J826D004	TW051	6/27/08	1019	L	6	X	X	X		
0826F003	TW030B	↓	1115	↓	10	X	X	X	X	
0826P005	TW006		1142		6	X	X	X		
0826E004	PZ138F	↓	1030	↓	6	X	X	X		

PW 6/27/08

PW 6/27/08

Confirmation Samples

PW 6/27/08

Date Shipped:
Carrier:
Waybill No.:
Comments:
NWT: please filter & acidify sample volume before transmitting samples to Eberline
run MS for Sr-90 only

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1618					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27047

PLEASE PRINT

Report to:
Company Name: Kleinfelder/CE²
Phone: (510) 628-9000
Address: 1970 Broadway Ste# 710 Oakland, Ca 94612
Fax: (510) 628-9009
Attn: Patricia Walters

PLEASE PRINT

Invoice to:
Company Name: Tetra Tech EC/NWT
Phone: (415) 316-2739
Address:
Fax:
Attn:

Project Name/Number	Sampler (Print)
E-2 89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - EPA 901.0 mod.	Ra-226 - EPA 903.1	Sr-90 - EPA 905.0	Ca-45 - Gamma spec.	Analysis Requested/Method Number	Date Shipped: / Carrier: / Waybill No.: / Comments:
08262008	TW020	6/27/08	1153	L	6	X	X	X	X	PW 6/27/08	Please filter and acidify sample volume before transferring to Eberline for NWT Sops PW 6/30/08

PW 6/27/08 — PW 6/27/08 — PW 6/27/08

[ ] confirmation Sample - P.W. 6/30/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
	☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1636					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27033

PLEASE PRINT

Report to:
Company Name Kleinfelder-Ce²
Address 1970 Broadway Ste# 710
Oakland, CA 94612
Attn: Patricia Walters
Phone: (510) 628-9000
Fax: (510) 628-9009

PLEASE PRINT

Invoice to:
Company Name Tetra Tech EC / NWT
Address
Attn:
Phone: (415) 216-2739
Fax:

Project Name/Number	Sampler (Print)
E-2 89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - Gamma Spec*	Ra-226 - Gamma Spec*	Sr-90 - gas Proportional*	Co-60 - Gamma Spec*	Analysis Requested/Method Number
0826D003	TW051	6/27/08	1014	L	6	X	X	X		
0826D005	TW053	"	1038	"	6	X	X	X		
0826D006	TW052	"	1124	"	6	X	X	X		
0826P002	TW030B	↓	1108	↓	8	X	X	X	X	

Date Shipped:
Carrier:
Waybill No.:
Comments:
*per NWT SOPs
*Please filter and acidify sample volume
run MS for Sr-90 only

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1421					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27042

PLEASE PRINT

Report to:
Company Name: Kleinfelder / CL² Phone: (510) 628-9000
Address: 1970 Broadway Ste #710, Oakland, CA 94612 Fax: (510) 628-9009
Attn: Patricia Walters

PLEASE PRINT

Invoice to:
Company Name: TetraTech EC/NWT Phone: (415) 216-2739
Address: Fax:
Attn:

Project Name/Number: E2 991762/3
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: Cs-137-Gamma Spec*; Ra-226-Gamma Spec*; Sr-90-Gas Proportional*; Co-60-Gamma Spec*

Date Shipped:
Carrier:
Waybill No.:
Comments:
*Please filter and acidify sample volume per NWT SOP

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137	Ra-226	Sr-90	Co-60
~~0826D608~~	~~TW020~~	~~6/27/08~~	~~1153~~	~~L~~	~~6~~	~~X~~	~~X~~	~~X~~	
0826D009	TW021	6/27/08	1315	L	6	X	X	X	
0826D010	TW022	6/27/08	1330	L	6	X	X	X	
0826DC11	TW019	6/27/08	1345	L	6	X	X	X	

DW 6/27/08
GCF 6/23/08
DW 6/27/08
DW 6/27/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1638					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27044

PLEASE PRINT

Report to:
Company Name Kleinfelder / CE² Phone: (510) 628-9000
Address 1970 Broadway St# 710
Oakland, CA 94612 Fax: (510) 628-9009
Attn: Patricia Walters

PLEASE PRINT

Invoice to:
Company Name TetraTech EC1/NWT Phone: (415) 216-2739
Address
Fax:
Attn:

Project Name/Number	Sampler (Print)
E-2 89762	Patricia Walters
Purchase Order Number —	Sampler (Signature) Patricia Walters

Analysis Requested/Method Number

Date Shipped:
Carrier:
Waybill No.:
Comments:

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec *	Ra-226 - gamma spec *	Sr-90 - gas proportional *	Co-60 - gamma spec *
0826E011	TW039	6/27/08	1335	L	6	X	X	X	
0826E012	TW041		1400	L	6	X	X	X	
0826P012	TW011		1450	L	6	X	X	X	
0826~~P013~~ P030 PW 7/9/08	TW009		1502	L	6	X	X	X	
	PW 6/27/08								

PW 6/27/08

Sample ID= 0826P030 PW 7/9/08

PW 6/27/08

* Please filter and acidify sample volume

* per NWT SOPs

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	16:18					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27041

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder - CE2	Phone: (510) 628 9000	Company Name: Tetra Tech EC / NWT	Phone: (415) 216-2739
Address: 1970 Broadway, Suite 710 Oakland Ca 94612	Fax: (510) 628 9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2/59767	Patricia Walters
Purchase Order Number	Sampler (Signature)
—	Patricia Walters

Analysis Requested/Method Number: Cs-137 - Gamma Spec *; Sr-90 - Gas Flow Proportional * ; Co-60 - Gamma Spec *

Date Shipped:
Carrier:
Waybill No.:
Comments: Measure filter and ad.fy Sample volume * 8260, NWT SOP, -field duplicate

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
0826D012	TW018	6/27/08	1558	L	6
0826D013	TW018	6/27/08	1403	L	6
0826D014	TW017		1470		6
0826D015	TW016		1440		6
0826D016	TW015		1500		6

PW 6/27/08

PW 6/28/08

PW 6/28/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1639	[signature]				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27043

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder - CEZ	Phone: (510) 628-9000	Company Name: Tetra Tech FEC/NWT	Phone: (415) 716-2739
Address: 1970 Broadway, Suite 710, Oakland, Ca 94612	Fax: (510) 628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2/69762	Patricia Walters
Purchase Order Number: —	Sampler (Signature): Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - Gamma spec *	Ra-226 - gamma spec	Sr-90 - gas proportional *	Co-60 - gamma spec *	Analysis Requested/Method Number	Date Shipped: / Carrier: / Waybill No.: / Comments:
0826E007	TW032	6/27/08	1125	L	6	X	X	X		TW 6/27/08	Please Filter and acidify Sample Volume * per NWT SOPs
0826E008	TW031	↓	1135	↓	6	X	X	X			
0826E009	TW031		1140		6	X	X	X			- field duplicate
0826E010	TW040		1320		6	X	X	X			
	TW 6/27/08										

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	16:20					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27035

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder/CE2	Phone: (510) 628 9000	Company Name: Tetratech ECT/NWT	Phone: (415) 216 2759
Address: 1970 Broadway, Suite 710, Oakland, Ca 94612	Fax: (510) 628 9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)	Date Shipped:
E-2/ 89762	Patricia Walters	Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
—	Patricia Walters	Comments: Please filter and acidify sample volume per NWT SOPs

Analysis Requested/Method Number

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec*	Ra-226 - gamma spec*	Sr-90 - gas proportional*	Co-60 - gamma spec*
0826E002	TW036	6/27/08	0955	L	6	X	X	X	
0826E003	~~TW~~ PZ138F (PW 6/27/08)	↓	1025	↓	6	X	X	X	
0826E005	PZ138E	↓	1050	↓	6	X	X	X	
0826E006	TW033	↓	1115	↓	6	X	X	X	

(Unused portions lined out: PW 6/27/08; PW 6/27/08; PW 6/29/08)

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1616	[signature]				
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27045

Report to: PLEASE PRINT	Invoice to: PLEASE PRINT
Company Name: Kleinfelder	Company Name: Tetra Tech EC/NWT
Phone: (510) - 628-9000	Phone: (415) - 210 - 2759
Address: 1710 Broadway, Suite 710 Oakland, CA 94612	Address:
Fax: (510) - 628 9009	Fax:
Attn:	Attn:

Project Name/Number: E-2/89762	Sampler (Print): Patricia Walters
Purchase Order Number: —	Sampler (Signature): Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec*	Ra-226 - gamma spec*	Sr-90 - gamma spec*	Co-60 - gamma spec*	Analysis Requested/Method Number
0826E013	TW042	6/19/08	1430	L	6	X	X	X		
0826E014	TW024	↓	1455	↓	6	X	X	X		
0826E015	TW025	↓	1505	↓	6	X	X	X		
0826DX07	TW020	↓	1148	↓	6	X	X	X		

PW 6/27/08

PW 6/27/08

PW 6/27/08

Date Shipped:	
Carrier:	
Waybill No.:	
Comments:	* per NWT SOPs
	Please filter and archive sample volume

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1615					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27034

Report to: PLEASE PRINT
Company Name Kleinfelder / CE² Phone: (510) 628-9000
Address 1970 Broadway Ste# 710
Oakland, CA 94612 Fax: (510) 628-9009
Attn: Patricia Walters

Invoice to: PLEASE PRINT
Company Name Tetra Tech ECI / NWT Phone: (415) 216-2739
Address
Fax:
Attn:

Project Name/Number: E 2 / 89716.2
Purchase Order Number:
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Date Shipped:
Carrier:
Waybill No.:
Comments:
* Please filter and acidify sample volume
* per NWT SOPs

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - Gamma Spec *	Ra-226 - Gamma Spec *	Sr-90 - Gas Proportional	Co-60 - Gamma Spec *
0826P004	TW006	6/27/08	1136	L	6	X	X	X	
0826P006	TW003		1153		6	X	X	X	
0826P009	TW002		1338		6	X	X	X	
0826P010	TW007	↓	1345	↓	6	X	X	X	

RLW 6/27/08

RLW 6/27/08

RLW 6/27/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1627					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 27046

PLEASE PRINT

Report to:
Company Name Kleinfelder - CEZ
Address 1970 Broadway, Suite 1K
Oakland CA 94612
Attn: Patricia Walters

Phone: (510) - 628 - 9000
Fax: (510) - 628 - 9009

PLEASE PRINT

Invoice to:
Company Name Tetratech EC1/NVT
Address
Attn:

Phone (415) - 216-2739
Fax:

Project Name/Number: E-2 / 27046
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Date Shipped:
Carrier:
Waybill No.:
Comments: please filter and acidify sample volume * per NVT SOPs

Analysis Requested/Method Number: Cs-137 - gamma spec; Ra-226 - gamma spec; Sr-90 - RadChem; Co-60 - gamma spec

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
08226P007	TW005	6/27/08	1317	L	2
0826P008	TW045	6/27/08	1525	L	2
~~0826P009~~ 08260001	TW038	6/27/08	0924	L	2
08260002	TW034	6/27/08	0951	L	2
0826E001	TW035	6/27/08	0931	L	3
0826P001	TW037	6/27/08	0929	L	2
0826P011	TW004	6/27/08	1424	L	3
	PW 6/27/08				

PW 6/27/08

partial sample volumes - additional volume will be provided

PW 6/27/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/27/08	1695					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26127

Report to: PLEASE PRINT
Company Name Kleinfelder - Ce 2 Phone: 510-628-9000
Address 1970 Broadway, Suite 710 Fax: 510-628-9009
Attn:

Invoice to: PLEASE PRINT
Company Name Tetratech ECI / NWT Phone: 415-26-2739
Address Fax:
Attn:

Project Name/Number: E-2189762
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: Cs-137 - gamma spec*; Ra-226 - gamma spec*; Sr-90 - gamma spec*; Co-60 - gamma spec*

Date Shipped:
Carrier:
Waybill No.:
Comments: * for NWT SOPs
Please filter & acidify sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	
0827P017	TW029B	6.30.08	0922	L	8	- field duplicate
0827D017	TW014		0920		6	
0827P018	TW028B		0936		8	
~~0827P019~~	~~TW056~~		0951		8	sample discarded - PW 7/1/08
~~0827P020~~	~~TW057B~~		1016		8	sample discarded - PW 7/1/08

PW 6/30/08
PW 7/1/08
PW 7/1/08
PW 6/30/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1648					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26126

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder-Ce2	Phone: 510-628-9000	Company Name: Tetratech EC I/NWT	Phone: 415-216-2739
Address: 1970 Broadway, Suite 710 Oakland, CA 94612	Fax: 510-628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2/89762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec*	Ra-226 - gamma spec*	Sr-90 - gas proportional*	Co-60 - gamma spec*
0827P013	TW059	6.30.08	0835	L	10	X	X	X	X
0827P014	TW027B	↓	0850	↓	8	X	X	X	X
0827P015	TW026B	↓	0906	↓	9	X	X	X	X
0827P016	TW029B	↓	0917	↓	9	X	X	X	X

Analysis Requested/Method Number

PW 6/29/08

Co-60 analysis added - PW. 7/9/08

PW 6/30/08

PW 6/30/08

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NWTSOPs
please filter and acidify Sample volume
1 run MS for Sr-90
Sediment Sudden sample volume - additional volume provided

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
	☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1645					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26129

Report to: PLEASE PRINT
Company Name Kleinfelder - Co2 Phone: 510-628-9000
Address 1970 Broadway, Suite 710 Fax: 510-628-9009
Oakland, CA 94612
Attn: Patricia Walters

Invoice to: PLEASE PRINT
Company Name Tetratech EC T/NUS Phone: 415-216-2739
Address _____ Fax: _____
_____
Attn: _____

Project Name/Number: E-2189762
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NUS SOPs
please filter & acidify sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec *	Ra-226 - gamma spec *	Sr-90 - 90 - gamma spec *	Co-60 - 90 - gamma spec *	Analysis Requested/Method Number
0827E016	PZ14E	6.30.08	0920	L	6	X	X	X		PW 6/30/08
~~PZ15OE~~ ← 0827E018			0935		6	X	X	X		PW 7/1/08 — Sample discarded - PW 7/1/08
~~PZ16D~~ ← 0827E019			0955		6	X	X	X		PW 7/1/08 — Sample discarded - PW 7/1/08
0827E020	TW049		1020		6	X	X	X		
0827E021	TW001		1035		6	X	X	X		
0827E022	TW023	↓	1050	↓	6	X	X	X		PW 6/30/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1652					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

CHAIN OF CUSTODY RECORD

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175
Fax: (559) 275-4422

C.O.C. № 26130

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name: Kleinfelder-SF2	Phone: 510-628-9800	Company Name: TetraTech EC I/NUT	Phone: 415-216-2739
Address: 1970 Broadway, Suite 710 Oakland, CA 94612	Fax: 510-628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2/87762	Patricia Walters
Purchase Order Number	Sampler (Signature)
—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec *	Ra-226 - gamma spec *	U - 90 - gamma spec *	Co-60 - gamma spec *	Analysis Requested/Method Number
0827P021	TW058	6/30/08	1021	L	8	X	X	X	X	
0827P022	TW010		1047		6	X	X	X		
0827D024	TW061		1345		8	X	X	X	X	
0827D025	TW060		1400		8	X	X	X	X	
~~0827D023~~	~~P2150D~~	↓	1110	↓	6	X	X	X		~~no 7/1/08 sample discarded~~ ~~PW 7/1/08~~
0827D023	P2150D	6/30/08	1110	L	6	X	X	X		
	PW 6/30/08									PW 6/30/08
										PW 6/30/08

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NUT SOPs
please filter & acidify sample volume

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
	☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1643					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26180

Report to: *PLEASE PRINT*
Company Name Kleinfelder-CO2 Phone: 510-628-9000
Address 1970 Broadway, Suite 710 Oakland, CA 94612 Fax: 510-628-9009
Attn: Patricia Walters

Invoice to: *PLEASE PRINT*
Company Name Tetratech ECI/NUST Phone: 415-216-2739
Address
Fax:
Attn:

Project Name/Number: E-2189762
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: Cs-137 gamma spec *; Ra-226 gamma spec *; Sr-90 gamma spec *; Co-60 gamma spec *; TWO 4/20/10's; TWO 4/30/08

Date Shipped:
Carrier:
Waybill No.:
Comments: *per NUST SOPs please filter & acidify sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers
0827E023	TW050	6/30/08	1100	L	6
0827E025	TW044		1130		6
0827D018	TW013		0930		6
0827D020	TW046		1000		6
0827D021	TW047		1025		6
0827D022	TW048	↓	1040	↓	6
0827E027	TW049 per GW SAP/QAPP 43	6/30/08	1425	L	6

TWO 6/30/08

TWO 4/30/08

Duration = TW043

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1690					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

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Fresno, CA 93722

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Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 1 of 2

C.O.C. № 26128

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder-CO2	Phone: 510-628-9000	Company Name: Tetra Tech ECI/NWT	Phone: 415-216-2739
Address: 1970 Broadway, Suite 710, Oakland, CA 94612	Fax: 510-628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)	Date Shipped:
81762/E-2	Patricia Walters	Carrier:
Purchase Order Number	Sampler (Signature)	Waybill No.:
—	Patricia Walters	Comments: * per NWT SOPs; please filter & acidify sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma Spec*	Ra-226 - gamma Spec*	Sr-90 - gas Plasma Lab*	Co-60 - gamma Spec*
0826E001	TW03S	6-30-08	0942	L	3	X	X	X	
0826D001	TW038	↓	0836	↓	2	X	X	X	
0826D002	TW034	↓	0900	↓	3	X	X	X	
0826P001	TW037	↓	1130	↓	2	X	X	X	

Analysis Requested/Method Number

PW 6/30/08

partial sample volume

PW 6/30/08

PW 6/30/08

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
	☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1635					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

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Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26176

Report to: PLEASE PRINT		Invoice to: PLEASE PRINT	
Company Name: Kleinfelder - CE2	Phone: 510-628-9000	Company Name: Tetratech ECI / NWT	Phone: 415-~~510~~ 216-2739
Address: 1970 Broadway Suite 710 Oakland, CA 94612	Fax: 510-628-9009	Address:	Fax:
Attn: Patricia Walters		Attn:	

Project Name/Number	Sampler (Print)
E-2189762	Patricia Walters
Purchase Order Number	**Sampler (Signature)**
—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - EPA 901.0 mod	Ra-226 - EPA 903.1	Sr-90 - EPA 905.0	Co-60 - EPA 901.1 mod
0827E017	PZ144E	6/30/08	0925	L	6	X	X	X	
0827D019	TN013	↓	0935	↓	6	X	X	X	

Analysis Requested/Method Number

Date Shipped:
Carrier:
Waybill No.:
Comments: ★CONFIRMATION SAMPLES★

NWT: please filter & acidify sample volume before sending to Eberline

PW 6/30/08

PW 6/30-OR

PW 6/30-EB

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1659					
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26179

Report to: (PLEASE PRINT)		Invoice to: (PLEASE PRINT)	
Company Name	Kleinfelder - Co2	Company Name	Tetratech ECI/NUST
Address	1970 Broadway, Suite 710, Oakland, CA 94612	Address	
Phone	510-628-9000	Phone	415-216-2739
Fax	510-628-9009	Fax	
Attn	Patricia Walters	Attn	

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2189762	Patricia Walters	—	Patricia Walters

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec *	Ra-226 - gamma spec *	Sr-90 - Anal. Laboratory *	Co-60 - gamma spec *	Analysis Requested/Method Number
0827P023	TW055	6/30/08	1425	L	6	X	X	X		
0827P024	TW054	↓	1435	↓	6	X	X	X		
0827P025	TW008	↓	1453	↓	6	X	X	X		

FW 6/30/08

FRD 6/30/08

Analysis Requested/Method Number: FW 6/30/08; FRD 6/30/08

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NUST SOPs
please filter & acidify
Sample volume

Shuttle Temperature:	Turnaround Requested: MUST CHECK ONE	Sample Disposal:
	☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour	☐ Return to client ☑ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1642					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175
Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

Pg 2 of 2

C.O.C. № 26181

Report to: (PLEASE PRINT)
Company Name: Kleinfelder-Co2
Address: 1970 Broadway Suite 710, Oakland, CA 94612
Attn: Patricia Walters
Phone: 510-628-9000
Fax: 510-628-9009

Invoice to: (PLEASE PRINT)
Company Name: TetraTech EC/NWT
Address:
Attn:
Phone: 415-216-2729
Fax:

Project Name/Number: E-2/89762
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: *Cs-137 + gamma spec; *Ra-226 gamma spec; *Sr-90 gas proportional; Co-60 gamma spec

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 gamma spec	Ra-226 gamma spec	Sr-90 gas proportional	Co-60 gamma spec
0827E024	TW012	6/30/08	1110	L	2	X	X	X	
0827E026	PZ131F	↓	1320	↓	4	X	X	X	
~~0827P009~~ PW 6/30/08	TW005	6/30/08	1510	L	4	X	X	X	
0826P008	TW045	↓	1521	↓	2	X	X	X	
0826P011	TW004	↓	1500	↓	2	X	X	X	

PW 6/30/08 — TW 6/30/08 — partial sample volume

Date Shipped:
Carrier:
Waybill No.:
Comments: *001 NWT STD — please filter & acidify sample volume
Sample ID = ~~0826P006~~ 0826P007 PW 6/30/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE ☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal: ☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	6/30/08	1658	[signature]				
Relinquished by:	**Date**	**Time**	**Received by:**	**Relinquished by:**	**Date**	**Time**	**Received at lab by:**

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26185

Report to: PLEASE PRINT
Company Name Kleinfelder - Ce2
Address 1970 Broadway, Suite 710
Oakland, CA 94612
Attn: Patricia Walters
Phone: 510-628-9000
Fax: 510-628-9009

Invoice to: PLEASE PRINT
Company Name Tetratech EC / NWT
Address
Attn:
Phone: 415-216-2739
Fax:

Project Name/Number	Sampler (Print)	Purchase Order Number	Sampler (Signature)
E-2/89762	Patricia Walters	—	Patricia Walters

* * * Analysis Requested/Method Number

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NWT SOP; please filter & acidify Sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec	Ra-226 - gamma spec	Sr-90 - gas proportional	
0826P008	TW045	7/1/08	1015	L	2	X	X	X	
0826P011	TW004		745		2	X	X	X	
0826P001	TW037		1345		2	X	X	X	
0826E001	TW035		0920		2	X	X	X	
0827E024*	TW012		0950		2	X	X	X	* limited sample volume *
0827E026	PZ131F		1015		2	X	X	X	
0826D001	TW038	↓	1400	↓	2	X	X	X	

Tue 7/1/08 — Tue 7/1/08 — Tue 7/1/08 — expected sample volume

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☑ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	7/1/08	1541					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175

Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26183

Report to: PLEASE PRINT
Company Name Kleinfelder - CeZ Phone: 510-628-9000
Address 1970 Broadway, Suite 710
Oakland, CA 94612 Fax: 510-628-9009
Attn: Patricia Walters

Invoice to: PLEASE PRINT
Company Name Tetratech ECI/NWT Phone: 415-216-2739
Address
Fax:
Attn:

Project Name/Number: Geo Tracker E-2/189762
Purchase Order Number: —
Sampler (Print): Patricia Walters
Sampler (Signature): Patricia Walters

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NWT SOPs - please filter & acidify sample volume

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	*Analysis Requested/Method Number: Cs-137 - gamma spec *	Ra-226 - gamma spec *	Sr-90 - rad chem *	Co-60 - gamma spec *	
0827P026	TW057B	7/11/08	0913	L	8	X	X	X	X	
0827P027	TW057B	"	0918	"	8	X	X	X	X	-field duplicate
0827P028	TW056	"	0925	"	8	X	X	X	X	
0827P029	TW056	↓	0930	↓	8	X	X	X	X	-field duplicate

PW 7/11/08
PW 7/11/08
PW 7/11/08

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	7/11/08	1552					
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

APPL, Inc.
4203 W. Swift
Fresno, CA 93722

Phone: (559) 275 2175
Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

C.O.C. № 26132

Report to: *PLEASE PRINT*
Company Name: Kleinfelder - Ce2 Phone: 510-628-9000
Address: 1970 Broadway Suite 710, Oakland, CA 94612 Fax: 510-628-9009
Attn: Patricia Walters

Invoice to: *PLEASE PRINT*
Company Name: Tetratech ECI/NWT Phone: 415-216-2739
Address:
Fax:
Attn:

Project Name/Number: E-2/89762
Sampler (Print): Patricia Walters
Purchase Order Number: —
Sampler (Signature): Patricia Walters

Analysis Requested/Method Number: Cs-137 - gamma spec*; Ra-226 - gamma spec*; Sr-90 - gas proportional*

Sample Identification	Location	Date Collected	Time Collected	Matrix	Number of Containers	Cs-137 - gamma spec*	Ra-226 - gamma spec*	Sr-90 - gas proportional*	Comments
0827E028	PZ161D	7/1/08	1030	L	8	X	X	X	run MS for Sr-90
0827E029	PZ161D	↓	1035	↓	6	X	X	X	- field duplicate
0827E031	PZ150E	↓	1421	↓	6	X	X	X	- field duplicate
0827E030	PZ150E	↓	1417	↓	6	X	X	X	

Date Shipped:
Carrier:
Waybill No.:
Comments: * per NWT SOR - please filter & acidify sample volume

PW 7/1/08 (unused rows lined out)

Shuttle Temperature:

Turnaround Requested: MUST CHECK ONE
☒ Standard (2-3 week) ☐ One week ☐ 24-48 hour

Sample Disposal:
☐ Return to client ☒ Disposal by Lab (30-day retention)

Relinquished by sampler:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Patricia Walters	7/1/08	1544	Eric Schroder				

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260224

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

October 28, 2008

Case Narrative
LOT NUMBER: F8I260224

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Radium-226 by GFPC (EPA 903.0 MOD)
The samples were filtered due to high solid content in the sample matrices.
Affected Samples:
F8I260224 (1): 0826E011
F8I260224 (2): 0826D009
F8I260224 (3): 0826P009
F8I260224 (4): 0826D014
F8I260224 (5): 0826E002
F8I260224 (6): 0826P002
F8I260224 (7): 0826P010
F8I260224 (8): 0827E020
F8I260224 (9): 0827P025
F8I260224 (10): 0827D023

(narrative continued on next page)

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

The samples produced excessive amounts of precipitate which may cause possible matrix interference when precipitating strontium sulfate.

Strontium sulfate pellets for samples were larger than those of the Blank and LCS. Carrier recoveries may be high for Strontium 90.
Affected Samples:
F8I260224 (1): 0826E011
F8I260224 (2): 0826D009
F8I260224 (3): 0826P009
F8I260224 (4): 0826D014
F8I260224 (5): 0826E002
F8I260224 (6): 0826P002
F8I260224 (7): 0826P010
F8I260224 (8): 0827E020
F8I260224 (9): 0827P025
F8I260224 (10): 0827D023

The strontium carrier recovery is outside the upper control limit (110%). There was physical evidence of matrix interference apparent during the initial preparation of the sample. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interferences.
Affected Samples:
F8I260224 (1): 0826E011
F8I260224 (6): 0826P002
F8I260224 (9): 0827P025
F8I260224 (10): 0827D023

The strontium sulfate carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260224 (1): 0826E011
F8I260224 (6): 0826P002
F8I260224 (9): 0827P025
F8I260224 (10): 0827D023

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260224

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260224

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXNVD	001	0826E011	06/27/08	13:35
KXNVF	002	0826D009	06/27/08	13:15
KXNVG	003	0826P009	06/27/08	13:38
KXNVJ	004	0826D014	06/27/08	14:20
KXNVK	005	0826E002	06/27/08	09:55
KXNVL	006	0826P002	06/27/08	11:08
KXNVM	007	0826P010	06/27/08	13:45
KXNVP	008	0827E020	06/30/08	10:20
KXNVQ	009	0827P025	06/30/08	14:53
KXNVT	010	0827D023	06/30/08	11:10

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E011

Radiochemistry

Lab Sample ID: F8I260224-001
Work Order: KXNVD
Matrix: WATER

Date Collected: 06/27/08 1335
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 99**
Radium (226)	**0.72**	**J**	**0.20**	1.00	**0.16**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.28	U	0.19	3.00	0.29	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D009

Radiochemistry

Lab Sample ID: F8I260224-002
Work Order: KXNVF
Matrix: WATER

Date Collected: 06/27/08 1315
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 96**
Radium (226)	**0.31**	**J**	**0.14**	1.00	**0.15**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 76**
Strontium 90	0.08	U	0.20	3.00	0.34	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P009

Radiochemistry

Lab Sample ID: F8I260224-003
Work Order: KXNVG
Matrix: WATER

Date Collected: 06/27/08 1338
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 95**
Radium (226)	0.14	U	0.12	1.00	0.18	09/29/08	10/27/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 57**
Strontium 90	0.03	U	0.26	3.00	0.46	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D014

Radiochemistry

Lab Sample ID: F8I260224-004
Work Order: KXNVJ
Matrix: WATER

Date Collected: 06/27/08 1420
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 103**
Radium (226)	**0.54**	**J**	**0.18**	1.00	**0.18**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 90**
Strontium 90	0.07	U	0.18	3.00	0.30	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E002

Radiochemistry

Lab Sample ID: F8I260224-005
Work Order: KXNVK
Matrix: WATER

Date Collected: 06/27/08 0955
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 103**
Radium (226)	**0.33**	**J**	**0.15**	1.00	**0.16**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 59**
Strontium 90	-0.15	U	0.21	3.00	0.39	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P002

Radiochemistry

Lab Sample ID: F8I260224-006
Work Order: KXNVL
Matrix: WATER

Date Collected: 06/27/08 1108
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 100**
Radium (226)	**0.15**	**J**	**0.11**	1.00	**0.15**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.17	U	0.16	3.00	0.25	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P010

Radiochemistry

Lab Sample ID: F8I260224-007
Work Order: KXNVM
Matrix: WATER

Date Collected: 06/27/08 1345
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 100**
Radium (226)	0.16	U	0.12	1.00	0.18	09/29/08	10/27/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 71**
Strontium 90	0.24	U	0.21	3.00	0.34	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E020

Radiochemistry

Lab Sample ID: F8I260224-008
Work Order: KXNVP
Matrix: WATER

Date Collected: 06/30/08 1020
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 102**
Radium (226)	**0.31**	**J**	**0.15**	1.00	**0.18**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 81**
Strontium 90	0.28	U	0.19	3.00	0.29	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P025

Radiochemistry

Lab Sample ID: F8I260224-009
Work Order: KXNVQ
Matrix: WATER

Date Collected: 06/30/08 1453
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 96**
Radium (226)	**0.58**	**J**	**0.20**	1.00	**0.20**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.25	U	0.18	3.00	0.28	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D023

Radiochemistry

Lab Sample ID: F8I260224-010
Work Order: KXNVT
Matrix: WATER

Date Collected: 06/30/08 1110
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 99**
Radium (226)	**1.30**		**0.28**	1.00	**0.18**	**09/29/08**	**10/27/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 93**
Strontium 90	**0.34**	**J**	**0.18**	3.00	**0.26**	**10/01/08**	**10/25/08**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260224
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275553**		**Yld % 70**	**F8J010000-553B**
Strontium 90	0.24	U	0.30	3.00	0.48	10/01/08	10/25/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273105**		**Yld % 88**	**F8I290000-105B**
Radium (226)	0.042	U	0.084	1.00	0.15	09/29/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260224
Matrix: WATER

Parameter		Spike Amount	Result	Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**905 MOD**				**F8J010000-553C**	
Strontium 90		7.03	9.12	0.99	65	130	(73 - 135)		
	Spk 2	7.03	9.11	0.99	66	130	(73 - 135)	0.05	%RPD
		Batch #:	8275553		**Analysis Date:**		10/25/08		
Radium 226 by EPA 903.0 MOD			**pCi/L**	**903.0 MOD**				**F8I290000-105C**	
Radium (226)		11.3	12.1	1.2	91	107	(72 - 130)		
	Spk 2	11.3	12.0	1.2	94	106	(72 - 130)	0.9	%RPD
		Batch #:	8273105		**Analysis Date:**		10/28/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33805

ENTERED 10-17

10-28

PROJECT NAME: FTPS	PURCHASE ORDER NO.: 1036773
PROJECT LOCATION: TCC	PROJECT NO.: 2591-070D
SAMPLER NAME: Various	AIRBILL NUMBER: 2654-3257-3
PROJECT CONTACT: Sabina Siddiqui	PROJECT CONTACT PHONE NUMBER: 949-468-1592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	LOCATION	DEPTH START	DEPTH END	QC
0826E011	06/27/08	13:35	5	X		W		TW039			
0826D009	06/27/08	13:15	5	X		W		TW021			
0826P009	06/27/08	13:38	5	X		W		TW002			
0826D014	06/27/08	14:20	5	X		W		TW017			
0826E002	06/27/08	9:55	5		X	W		TW036			
0826P002	06/27/08	11:08	7	X		W		TW030B			
0826P010	06/27/08	13:45	4	X		W		TW007			
0827E020	06/30/08	10:20	5	X		W		TW049			
0827P025	06/30/08	14:53	5	X		W		TW008			
0827D023	06/30/08	11:10	5		X	W		PZ150D			

ANALYSES REQUIRED: Perchlorate EPA 314.0; Chloride EPA 300.0

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY): FBI260224

COMMENTS:

Project Information Section Do not submit to Laboratory

RELINQUISHED BY (Signature): Robert Stutz	DATE: 09/25/08	RECEIVED BY (Signature):	
COMPANY: NWT	TIME: 0900	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	

LABORATORY INSTRUCTIONS/COMMENTS: PER SAP FOR PERCHLORATE GROUNDWATER MONITORING PROGRAM FOR KIRTLAND

COMPOSITE DESCRIPTION:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260234

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

October 28, 2008

Case Narrative
LOT NUMBER: F8I260234

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Radium-226 by GFPC (EPA 903.0 MOD)
The samples were filtered due to high solid content in the sample matrices.
Affected Samples:
F8I260234 (1): 0827D017
F8I260234 (2): 0826P007
F8I260234 (3): 0827E021
F8I260234 (4): 0827E027
F8I260234 (5): 0827D021
F8I260234 (6): 0827D018
F8I260234 (7): 0827E023
F8I260234 (8): 0827D022
F8I260234 (9): 0827P018
F8I260234 (10): 0827P021

(narrative continued on next page)

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

The samples produced excessive amounts of precipitate which may cause possible matrix interference when precipitating strontium sulfate.

Strontium sulfate pellets for samples were larger than those of the Blank and LCS. Carrier recoveries may be high for Strontium 90.
Affected Samples:
F8I260234 (1): 0827D017
F8I260234 (2): 0826P007
F8I260234 (3): 0827E021
F8I260234 (4): 0827E027
F8I260234 (5): 0827D021
F8I260234 (6): 0827D018
F8I260234 (7): 0827E023
F8I260234 (8): 0827D022
F8I260234 (9): 0827P018
F8I260234 (10): 0827P021

The strontium carrier recovery is outside the upper control limit (110%). There was physical evidence of matrix interference apparent during the initial preparation of the sample. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.
Affected Samples:
F8I260234 (1): 0827D017
F8I260234 (2): 0826P007
F8I260234 (3): 0827E021
F8I260234 (4): 0827E027
F8I260234 (6): 0827D018
F8I260234 (7): 0827E023
F8I260234 (8): 0827D022
F8I260234 (10): 0827P021

The strontium sulfate carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260234 (1): 0827D017
F8I260234 (2): 0826P007
F8I260234 (3): 0827E021
F8I260234 (4): 0827E027
F8I260234 (6): 0827D018
F8I260234 (7): 0827E023
F8I260234 (8): 0827D022
F8I260234 (10): 0827P021

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260234

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260234

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXNXD	001	0827D017	06/30/08	09:20
KXNXE	002	0826P007	06/30/08	15:10
KXNXF	003	0827E021	06/30/08	10:35
KXNXH	004	0827E027	06/30/08	14:25
KXNXJ	005	0827D021	06/30/08	10:25
KXNXK	006	0827D018	06/30/08	09:30
KXNXL	007	0827E023	06/30/08	11:00
KXNXM	008	0827D022	06/30/08	10:40
KXNXN	009	0827P018	06/30/08	09:36
KXNXQ	010	0827P021	06/30/08	10:27

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D017

Radiochemistry

Lab Sample ID: F8I260234-001
Work Order: KXNXD
Matrix: WATER

Date Collected: 06/30/08 0920
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 101**
Radium (226)	**0.52**	**J**	**0.16**	1.00	**0.13**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 93**
Strontium 90	0.17	U	0.16	3.00	0.25	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P007

Radiochemistry

Lab Sample ID: F8I260234-002
Work Order: KXNXE
Matrix: WATER

Date Collected: 06/30/08 1510
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 101**
Radium (226)	**0.40**	**J**	**0.13**	1.00	**0.11**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.15	U	0.16	3.00	0.26	10/01/08	10/25/08

NOTE(S)

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MDC is determined by instrument performance only.
Bold results are greater than the MDC

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U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E021

Radiochemistry

Lab Sample ID: F8I260234-003
Work Order: KXNXF
Matrix: WATER

Date Collected: 06/30/08 1035
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 102**
Radium (226)	**1.06**		**0.23**	1.00	**0.14**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 93**
Strontium 90	0.1	U	0.15	3.00	0.26	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E027

Radiochemistry

Lab Sample ID: F8I260234-004
Work Order: KXNXH
Matrix: WATER

Date Collected: 06/30/08 1425
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 98**
Radium (226)	**0.29**	**J**	**0.13**	1.00	**0.14**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.14	U	0.14	3.00	0.22	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D021

Radiochemistry

Lab Sample ID: F8I260234-005
Work Order: KXNXJ
Matrix: WATER

Date Collected: 06/30/08 1025
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 96**
Radium (226)	**0.25**	**J**	**0.12**	1.00	**0.14**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 99**
Strontium 90	**0.22**	**J**	**0.14**	3.00	**0.21**	**10/01/08**	**10/25/08**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D018

Radiochemistry

Lab Sample ID: F8I260234-006
Work Order: KXNXK
Matrix: WATER

Date Collected: 06/30/08 0930
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 103**
Radium (226)	**0.80**	**J**	**0.20**	1.00	**0.13**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	0.1	U	0.14	3.00	0.23	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E023

Radiochemistry

Lab Sample ID: F8I260234-007
Work Order: KXNXL
Matrix: WATER

Date Collected: 06/30/08 1100
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 96**
Radium (226)	**0.24**	**J**	**0.12**	1.00	**0.15**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 92**
Strontium 90	0.24	U	0.23	3.00	0.36	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D022

Radiochemistry

Lab Sample ID: F8I260234-008
Work Order: KXNXM
Matrix: WATER

Date Collected: 06/30/08 1040
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 98**
Radium (226)	0.072	U	0.085	1.00	0.13	09/29/08	10/28/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 91**
Strontium 90	0.21	U	0.23	3.00	0.37	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P018

Radiochemistry

Lab Sample ID: F8I260234-009
Work Order: KXNXN
Matrix: WATER

Date Collected: 06/30/08 0936
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 89**
Radium (226)	**0.20**	**J**	**0.12**	1.00	**0.16**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 96**
Strontium 90	0.09	U	0.21	3.00	0.36	10/01/08	10/25/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P021

Radiochemistry

Lab Sample ID: F8I260234-010
Work Order: KXNXQ
Matrix: WATER

Date Collected: 06/30/08 1027
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273105**	**Yld % 100**
Radium (226)	**0.41**	**J**	**0.16**	1.00	**0.16**	**09/29/08**	**10/28/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275553**	**Yld % 94**
Strontium 90	**0.40**	**J**	**0.23**	3.00	**0.35**	**10/01/08**	**10/25/08**

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260234
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275553**		**Yld % 70**	**F8J010000-553B**
Strontium 90	0.24	U	0.30	3.00	0.48	10/01/08	10/25/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273105**		**Yld % 88**	**F8I290000-105B**
Radium (226)	0.042	U	0.084	1.00	0.15	09/29/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260234
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-553C**	
Strontium 90		7.03	9.12		0.99	65	130	(73 - 135)		
	Spk 2	7.03	9.11		0.99	66	130	(73 - 135)	0.05	%RPD
		Batch #:	8275553			**Analysis Date:**		10/25/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-105C**	
Radium (226)		11.3	12.1		1.2	91	107	(72 - 130)		
	Spk 2	11.3	12.0		1.2	94	106	(72 - 130)	0.9	%RPD
		Batch #:	8273105			**Analysis Date:**		10/28/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33806

ENTERED 10-17

10-28

PROJECT NAME: HTS	PURCHASE ORDER NO.: 1636773
PROJECT LOCATION: TOC	PROJECT NO.: 591-6106
SAMPLER NAME: VUNOUS	AIRBILL NUMBER: 854-3857-3
PROJECT CONTACT: Seema Sethi	PROJECT CONTACT PHONE NUMBER: 949-753-7592

ANALYSES REQUIRED

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Do 8260 FIELDS	SVOC FIELDS	LOCATION	DEPTH START	DEPTH END	QC
0827D017	6/30/08	0920	5	X		W		X	X	TW014			
0826P007	6/30/08	1510	4	X		W		X	X	TW005			
0827E021	6/30/08	1035	5	X		W		X	X	TW001			
0827E027	6/30/08	1425	5	X		W		X	X	TW043			
0827D021	6/30/08	1025	5		X	W		X	X	TW047			
0827D018	6/30/08	0930	5	X		W		X	X	TW013			
0827E023	6/30/08	1100	5	X		W		X	X	TW050			
0827D022	6/30/08	1040	5	X		W		X	X	TW048			
0827P018	6/30/08	0936	7	X		W		X	X	TW028B			
0827P021	6/30/08	1027	7		X	W		X	X	TW058			

LABORATORY NAME: Eurofins

LABORATORY ID (FOR LABORATORY): FB1260234

COMMENTS:

Project Information Section Do not submit to Laboratory

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY: NUT	TIME: 0100	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

LABORATORY INSTRUCTIONS/COMMENTS: Per SAP for Basewide Groundwater Monitoring Program for Kleinfelder

COMPOSITE DESCRIPTION:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260376

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

November 3, 2008

Case Narrative
LOT NUMBER: F8I260376

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

Due to excessive amount of precipitate the sample aliquots were reduced to 250mL.

F8J260376-001, 003, 004, 005, and 008 have strontium sulfate recoveries higher than 110% due to the sample matrices.
Affected Samples:
F8I260376 (1): 0826D003
F8I260376 (2): 0826D010
F8I260376 (3): 0826D007
F8I260376 (4): 0826D012
F8I260376 (5): 0826D002
F8I260376 (6): 0826E014
F8I260376 (7): 0826P011
F8I260376 (8): 0826E003
F8I260376 (9): 0826D016
F8I260376 (10): 0826P004

The strontium carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260376 (1): 0826D003
F8I260376 (3): 0826D007
F8I260376 (4): 0826D012
F8I260376 (5): 0826D002
F8I260376 (8): 0826E003

Radium-226 by GFPC (EPA 903.0 MOD)
The samples were filtered due to high solid content in the sample matrices.
Affected Samples:
F8I260376 (1): 0826D003
F8I260376 (2): 0826D010
F8I260376 (3): 0826D007
F8I260376 (6): 0826E014
F8I260376 (8): 0826E003
F8I260376 (9): 0826D016
F8I260376 (10): 0826P004

The barium carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260376 (7): 0826P011

There were no other nonconformances or observations noted with any analysis on this lot.

METHODS SUMMARY

F8I260376

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260376

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXP5J	001	0826D003	06/27/08	10:14
KXQE8	002	0826D010	06/27/08	13:30
KXQE9	003	0826D007	06/27/08	11:48
KXQFA	004	0826D012	06/27/08	13:58
KXQFP	005	0826D002	06/27/08	09:51
KXQFQ	006	0826E014	06/27/08	14:55
KXQFR	007	0826P011	06/27/08	14:24
KXQFT	008	0826E003	06/27/08	10:25
KXQFV	009	0826D016	06/27/08	15:00
KXQFW	010	0826P004	06/27/08	11:36

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D003

Radiochemistry

Lab Sample ID: F8I260376-001
Work Order: KXP5J
Matrix: WATER

Date Collected: 06/27/08 1014
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 93**
Radium (226)	0.33	J	0.17	1.00	0.21	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 88**
Strontium 90	0.06	U	0.94	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D010

Radiochemistry

Lab Sample ID: F8I260376-002
Work Order: KXQE8
Matrix: WATER

Date Collected: 06/27/08 1330
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 95**
Radium (226)	0.37	J	0.18	1.00	0.22	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 68**
Strontium 90	-0.5	U	1.2	3.0	2.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D007

Radiochemistry

Lab Sample ID: F8I260376-003
Work Order: KXQE9
Matrix: WATER

Date Collected: 06/27/08 1148
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 94**
Radium (226)	0.26	J	0.16	1.00	0.21	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 88**
Strontium 90	0.92	U	0.98	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D012

Radiochemistry

Lab Sample ID: F8I260376-004
Work Order: KXQFA
Matrix: WATER

Date Collected: 06/27/08 1358
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 99**
Radium (226)	0.25	J	0.14	1.00	0.17	09/29/08	10/31/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 87**
Strontium 90	-0.28	U	0.90	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D002

Radiochemistry

Lab Sample ID: F8I260376-005
Work Order: KXQFP
Matrix: WATER

Date Collected: 06/27/08 0951
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 101**
Radium (226)	0.85	J	0.22	1.00	0.16	09/29/08	10/31/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 86**
Strontium 90	-0.26	U	0.98	3.00	1.7	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E014

Radiochemistry

Lab Sample ID: F8I260376-006
Work Order: KXQFQ
Matrix: WATER

Date Collected: 06/27/08 1455
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 92**
Radium (226)	0.21	J	0.11	1.00	0.13	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 69**
Strontium 90	0.5	U	1.3	3.0	2.1	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P011

Radiochemistry

Lab Sample ID: F8I260376-007
Work Order: KXQFR
Matrix: WATER

Date Collected: 06/27/08 1424
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 100**
Radium (226)	11.0		1.1	1.0	0.2	09/29/08	10/31/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 64**
Strontium 90	-1.2	U	1.3	3.0	2.4	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E003

Radiochemistry

Lab Sample ID: F8I260376-008
Work Order: KXQFT
Matrix: WATER

Date Collected: 06/27/08 1025
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 75**
Radium (226)	0.15	U	0.12	1.00	0.17	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 85**
Strontium 90	0.2	U	1.1	3.0	1.8	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D016

Radiochemistry

Lab Sample ID: F8I260376-009
Work Order: KXQFV
Matrix: WATER

Date Collected: 06/27/08 1500
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 96**
Radium (226)	0.52	J	0.16	1.00	0.13	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 64**
Strontium 90	-0.3	U	1.4	3.0	2.4	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P004

Radiochemistry

Lab Sample ID: F8I260376-010
Work Order: KXQFW
Matrix: WATER

Date Collected: 06/27/08 1136
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 102**
Radium (226)	0.42	J	0.14	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 66**
Strontium 90	-0.8	U	1.2	3.0	2.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260376
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275555**		**Yld % 66**	**F8J010000-555B**
Strontium 90	0.06	U	0.27	3.00	0.47	10/01/08	10/29/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273113**		**Yld % 94**	**F8I290000-113B**
Radium (226)	-0.005	U	0.056	1.00	0.12	09/29/08	11/01/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273111**		**Yld % 89**	**F8I290000-111B**
Radium (226)	0.004	U	0.061	1.00	0.13	09/29/08	10/23/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260376
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**Lab Sample ID F8J010000-555C**	
Strontium 90		7.02	7.63		0.93	65	109	(73 - 135)		
	Spk 2	7.02	8.8		1.0	64	126	(73 - 135)	15	%RPD
		Batch #:	8275555			**Analysis Date:**		10/29/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**Lab Sample ID F8I290000-113C**	
Radium (226)		11.3	11.3		1.1	90	100	(72 - 130)		
	Spk 2	11.3	12.0		1.1	94	106	(72 - 130)	6	%RPD
		Batch #:	8273113			**Analysis Date:**		11/01/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**Lab Sample ID F8I290000-111C**	
Radium (226)		11.3	10.2		1.0	92	90	(72 - 130)		
	Spk 2	11.3	9.58		0.99	91	85	(72 - 130)	6	%RPD
		Batch #:	8273111			**Analysis Date:**		10/23/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33802

D 10-28 ENTERED 10-17-08

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1C6713
PROJECT LOCATION: TC 70	PROJECT NO.: 6977-C7CD
SAMPLER NAME: [illegible]	AIRBILL NUMBER: [illegible]
PROJECT CONTACT: [illegible]	PROJECT CONTACT PHONE NUMBER: [illegible]

ANALYSES REQUIRED

LABORATORY NAME: Test America

LABORATORY ID (FOR LABORATORY): F8I260376

Project Information Section Do not submit to Laboratory

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0826 D003	6/27/08	1014	5	X		W			TW051			
0826 D010	6/27/08	1330	5	X		W			TW022			
0826 D007	6/27/08	1148	5	X		W			TW020			
0826 D012	6/27/08	1358	3	X		W			TW018			
0826 D002	6/27/08	0951	2		X	W			TW034			
0826 E014	6/27/08	1455	5	X		W			TW024			
0826 P011	6/27/08	1424	2	X		W			TWD04			
0826 E003	6/27/08	1025	5	X		W			PZ188F			
0826 D016	6/27/08	1500	4	X		W			TW015			
0826 P004	6/27/08	1136	5		X	W			TW006			

RELINQUISHED BY (Signature): [illegible]	DATE: 6/27/08	RECEIVED BY (Signature):	
COMPANY: NUT	TIME: 1700	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	

LABORATORY INSTRUCTIONS/COMMENTS: [illegible]

COMPOSITE DESCRIPTION:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260377

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

October 28, 2008

Case Narrative
LOT NUMBER: F8I260377

This report contains the analytical results for the four samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Radium-226 by GFPC (EPA 903.0 MOD)
The samples were filtered due to high solid content in the sample matrices.
Affected Samples:
F8I260377 (1): 0827E016
F8I260377 (2): 0827P013
F8I260377 (3): 0826E010
F8I260377 (4): 0826E008

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

Due to excessive amount of precipitate the sample aliquot was reduced to 250mL.
Affected Samples:
F8I260377 (1): 0827E016
F8I260377 (2): 0827P013
F8I260377 (3): 0826E010
F8I260377 (4): 0826E008

The strontium carrier recovery is outside the upper control limit (110%). There was physical evidence of matrix interference apparent during the initial preparation of the samples. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.
Affected Samples:
F8I260377 (1): 0827E016
F8I260377 (2): 0827P013
F8I260377 (3): 0826E010

The strontium carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.

Affected Samples:

F8I260377 (1): 0827E016
F8I260377 (2): 0827P013
F8I260377 (3): 0826E010

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260377

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260377

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXP5L	001	0827E016	06/30/08	09:20
KXQF1	002	0827P013	06/30/08	08:35
KXQF2	003	0826E010	06/27/08	13:20
KXQF3	004	0826E008	06/27/08	11:35

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E016

Radiochemistry

Lab Sample ID: F8I260377-001
Work Order: KXP5L
Matrix: WATER

Date Collected: 06/30/08 0920
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 91**
Radium (226)	**0.63**	**J**	**0.19**	1.00	**0.17**	**09/29/08**	**10/23/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 91**
Strontium 90	0.4	U	1.0	3.0	1.7	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P013

Radiochemistry

Lab Sample ID: F8I260377-002
Work Order: KXQF1
Matrix: WATER

Date Collected: 06/30/08 0835
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 93**
Radium (226)	**0.46**	**J**	**0.16**	1.00	**0.14**	**09/29/08**	**10/23/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 89**
Strontium 90	-0.3	U	1.0	3.0	1.8	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E010

Radiochemistry

Lab Sample ID: F8I260377-003
Work Order: KXQF2
Matrix: WATER

Date Collected: 06/27/08 1320
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 82**
Radium (226)	**0.93**	**J**	**0.24**	1.00	**0.15**	**09/29/08**	**10/23/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 89**
Strontium 90	1.0	U	1.1	3.0	1.9	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E008

Radiochemistry

Lab Sample ID: F8I260377-004
Work Order: KXQF3
Matrix: WATER

Date Collected: 06/27/08 1135
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 96**
Radium (226)	**0.62**	**J**	**0.19**	1.00	**0.15**	**09/29/08**	**10/23/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 98**
Strontium 90	-0.07	U	0.92	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260377
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275559**		**Yld % 71**	**F8J010000-559B**
Strontium 90	0.93	U	0.99	3.00	1.6	10/01/08	10/28/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273111**		**Yld % 89**	**F8I290000-111B**
Radium (226)	0.004	U	0.061	1.00	0.13	09/29/08	10/23/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260377
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-559C**	
Strontium 90		28.1	36.5		4.0	70	130	(73 - 135)		
	Spk 2	28.1	32.3		3.6	71	115	(73 - 135)	12	%RPD
		Batch #:	8275559			**Analysis Date:**		10/28/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-111C**	
Radium (226)		11.3	10.2		1.0	92	90	(72 - 130)		
	Spk 2	11.3	9.58		0.99	91	85	(72 - 130)	6	%RPD
		Batch #:	8273111			**Analysis Date:**		10/23/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33808

10-28

ENTERED 10-17

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036713	ANALYSES REQUIRED	LABORATORY NAME: Test America
PROJECT LOCATION: TO10	PROJECT NO.: 2597-070D		LABORATORY ID (FOR LABORATORY): F81260377
SAMPLER NAME: Various	AIRBILL NUMBER: 3654-3257-3		
PROJECT CONTACT: Selina Sicko	PROJECT CONTACT PHONE NUMBER: 949-705-7592		

Project Information Section Do not submit to Laboratory

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0827E016	06/30/08	9:20	5	X		W			PZ144G			
0827P013	06/30/08	8:35	9	X		W			TW059			
0826E010	06/27/08	13:20	5	X		W			TW040			
0826E008	06/27/08	11:35	5	X		W			TW031			

RELINQUISHED BY (Signature): [illegible]	DATE: 6/25/08	RECEIVED BY (Signature):	LABORATORY INSTRUCTIONS/COMMENTS: Per SAP & Basewide Groundwater Monitoring Treatment Monitoring
COMPANY: TtWT	TIME: 0900	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	COMPOSITE DESCRIPTION:
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
COMPANY:	TIME:	COMPANY:	TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260378

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

October 29, 2008

Case Narrative
LOT NUMBER: F8I260378

This report contains the analytical results for the eight samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances
Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Radium-226 by GFPC (EPA 903.0 MOD)
The samples were filtered due to high solid content in the sample matrices.
Affected Samples:
F8I260378 (1): 0827P014
F8I260378 (2): 0827P017
F8I260378 (3): 0827D020
F8I260378 (4): 0827P022
F8I260378 (5): 0826D011
F8I260378 (6): 0826D015
F8I260378 (7): 0826P012
F8I260378 (8): 0826D006

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.
Due to excessive amount of precipitate the sample aliquot was reduced to 250mL.
Affected Samples:
F8I260378 (1): 0827P014
F8I260378 (2): 0827P017
F8I260378 (3): 0827D020
F8I260378 (4): 0827P022
F8I260378 (5): 0826D011
F8I260378 (6): 0826D015
F8I260378 (7): 0826P012
F8I260378 (8): 0826D006

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260378

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

SAMPLE SUMMARY

F8I260378

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXQF8	001	0827P014	06/30/08	08:50
KXQF9	002	0827P017	06/30/08	09:22
KXQGA	003	0827D020	06/30/08	10:00
KXQGD	004	0827P022	06/30/08	10:47
KXQGE	005	0826D011	06/27/08	13:45
KXQGG	006	0826D015	06/27/08	14:40
KXQGH	007	0826P012	06/27/08	14:50
KXQGK	008	0826D006	06/27/08	11:24

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P014

Radiochemistry

Lab Sample ID: F8I260378-001
Work Order: KXQF8
Matrix: WATER

Date Collected: 06/30/08 0850
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 104**
Radium (226)	0.53	J	0.16	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 70**
Strontium 90	0.48	U	0.84	3.00	1.4	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P017

Radiochemistry

Lab Sample ID: F8I260378-002
Work Order: KXQF9
Matrix: WATER

Date Collected: 06/30/08 0922
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				pCi/L		Batch # 8273111	Yld % 94
Radium (226)	0.37	J	0.15	1.00	0.16	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				pCi/L		Batch # 8275559	Yld % 72
Strontium 90	1.47	J	0.89	3.00	1.3	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D020

Radiochemistry

Lab Sample ID: F8I260378-003
Work Order: KXQGA
Matrix: WATER

Date Collected: 06/30/08 1000
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 100**
Radium (226)	0.45	J	0.16	1.00	0.14	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 72**
Strontium 90	-0.3	U	1.0	3.0	1.9	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P022

Radiochemistry

Lab Sample ID: F8I260378-004
Work Order: KXQGD
Matrix: WATER

Date Collected: 06/30/08 1047
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 96**
Radium (226)	0.24	J	0.11	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 73**
Strontium 90	-1.09	U	0.86	3.00	1.7	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D011

Radiochemistry

Lab Sample ID: F8I260378-005
Work Order: KXQGE
Matrix: WATER

Date Collected: 06/27/08 1345
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 90**
Radium (226)	0.30	J	0.13	1.00	0.14	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 70**
Strontium 90	-0.3	U	1.0	3.0	1.8	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D015

Radiochemistry

Lab Sample ID: F8I260378-006
Work Order: KXQGG
Matrix: WATER

Date Collected: 06/27/08 1440
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 94**
Radium (226)	0.51	J	0.16	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 69**
Strontium 90	1.0	U	1.1	3.0	1.8	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

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Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P012

Radiochemistry

Lab Sample ID: F8I260378-007
Work Order: KXQGH
Matrix: WATER

Date Collected: 06/27/08 1450
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 95**
Radium (226)	0.43	J	0.14	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 68**
Strontium 90	0.009	U	0.92	3.00	1.6	10/01/08	10/28/08

NOTE(S)

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U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D006

Radiochemistry

Lab Sample ID: F8I260378-008
Work Order: KXQGK
Matrix: WATER

Date Collected: 06/27/08 1124
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 93**
Radium (226)	0.23	J	0.13	1.00	0.16	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 71**
Strontium 90	-0.58	U	0.84	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
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U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P012

Radiochemistry

Lab Sample ID: F8I260378-007
Work Order: KXQGH
Matrix: WATER

Date Collected: 06/27/08 1450
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 95**
Radium (226)	0.43	J	0.14	1.00	0.12	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 68**
Strontium 90	0.009	U	0.92	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D006

Radiochemistry

Lab Sample ID: F8I260378-008
Work Order: KXQGK
Matrix: WATER

Date Collected: 06/27/08 1124
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273111**	**Yld % 93**
Radium (226)	0.23	J	0.13	1.00	0.16	09/29/08	10/23/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 71**
Strontium 90	-0.58	U	0.84	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260378
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275559**		**Yld % 71**	**F8J010000-559B**
Strontium 90	0.93	U	0.99	3.00	1.6	10/01/08	10/28/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273111**		**Yld % 89**	**F8I290000-111B**
Radium (226)	0.004	U	0.061	1.00	0.13	09/29/08	10/23/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample Report

Radiochemistry

Client Lot ID:
Matrix:

Parameter	Spike Amount	Result	Total Uncert. σ+/-)	Lab Sample ID % Yld	% Rec	QC Control Limits

Batch #: Analysis Date:

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260378
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-559C**	
Strontium 90		28.1	36.5		4.0	70	130	(73 - 135)		
	Spk 2	28.1	32.3		3.6	71	115	(73 - 135)	12	%RPD
		Batch #:	8275559			**Analysis Date:**		10/28/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-111C**	
Radium (226)		11.3	10.2		1.0	92	90	(72 - 130)		
	Spk 2	11.3	9.58		0.99	91	85	(72 - 130)	6	%RPD
		Batch #:	8273111			**Analysis Date:**		10/23/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33803

0 10-28 ENTERED 10-17

PROJECT NAME	PURCHASE ORDER NO.
HPS	1036473
PROJECT LOCATION	PROJECT NO.
7676	[illegible]
SAMPLER NAME	AIRBILL NUMBER
[illegible] S	8654-3359-3
PROJECT CONTACT	PROJECT CONTACT PHONE NUMBER
Sabina Sudoko	[illegible]

LABORATORY NAME: [illegible]

LABORATORY ID (FOR LABORATORY): F8I260378

Project Information Section Do not submit to Laboratory

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Sr90 905.0	Ra226 903.1	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
*0826P011	06/30/08	15:00	1	X		W	HSH	X	X	Logged under F8I260376	TW004			
0827P014	06/30/08	8:50	7	X		W	HSH	X	X		TW027B			
0827P017	06/30/08	9:22	7	X		W	HSH	X	X		TW029			
*0826D002	06/30/08	9:00	3	X		W	HSH	X	X	F8I260376	TW034			
0827D020	06/30/08	10:00	5		X	W	HSH	X	X		TW046			
0827P022	06/30/08	10:47	5	X		W	HSH	X	X		TW010			
0826D011	06/27/08	13:45	5	X		W	HSH	X	X		TW019			
0826D015	06/27/08	14:40	5	X		W	HSH	X	X		TW016			
0826P012	06/27/08	14:50	5	X		W	HSH	X	X		TW011			
0826D006	06/27/08	11:24	5		X	W	HSH	X	X		TW052			

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
Sabina Sudoko	7/3/08	
COMPANY	TIME	COMPANY
NWT	1100	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

LABORATORY INSTRUCTIONS/COMMENTS: Per SHP for Basewide Groundwater monitoring Program for Radionuclides

COMPOSITE DESCRIPTION

SAMPLING COMMENT:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)

TEMPERATURE: ______ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN

COOLER SEAL: ☐ INTACT ☐ BROKEN

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260379

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

November 3, 2008

Case Narrative
LOT NUMBER: F8I260379

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances
Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

Due to excessive amount of precipitate the sample aliquots were reduced to 250mL.

F8I260379-002, 003, 004, 006, 007, and 008 all have strontium sulfate recoveries higher than 110% due to sample matrices.
Affected Samples:
F8I260379 (1): 0827E025
F8I260379 (2): 0826P001
F8I260379 (3): 0826D001
F8I260379 (4): 0827P023
F8I260379 (5): 0827E022
F8I260379 (6): 0827P024
F8I260379 (7): 0827D024
F8I260379 (8): 0826E013
F8I260379 (9): 0826E009
F8I260379 (10): 0826E007

The strontium carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.

Affected Samples:

F8I260379 (2): 0826P001
F8I260379 (3): 0826D001
F8I260379 (4): 0827P023
F8I260379 (6): 0827P024
F8I260379 (7): 0827D024
F8I260379 (8): 0826E013

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260379

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260379

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXP5P	001	0827E025	06/30/08	11:30
KXQG2	002	0826P001	06/30/08	11:30
KXQG3	003	0826D001	06/30/08	08:36
KXQG4	004	0827P023	06/30/08	14:25
KXQG5	005	0827E022	06/30/08	10:50
KXQG6	006	0827P024	06/30/08	14:35
KXQG7	007	0827D024	06/30/08	13:45
KXQG8	008	0826E013	06/27/08	14:30
KXQG9	009	0826E009	06/27/08	11:40
KXQHA	010	0826E007	06/27/08	11:25

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E025

Radiochemistry

Lab Sample ID: F8I260379-001
Work Order: KXP5P
Matrix: WATER

Date Collected: 06/30/08 1130
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 94**
Radium (226)	0.13	U	0.11	1.00	0.17	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 68**
Strontium 90	-1.5	U	1.2	3.0	2.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P001

Radiochemistry

Lab Sample ID: F8I260379-002
Work Order: KXQG2
Matrix: WATER

Date Collected: 06/30/08 1130
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 103**
Radium (226)	0.41	J	0.17	1.00	0.19	09/29/08	10/31/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 89**
Strontium 90	-0.36	U	0.67	3.00	1.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D001

Radiochemistry

Lab Sample ID: F8I260379-003
Work Order: KXQG3
Matrix: WATER

Date Collected: 06/30/08 0836
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 104**
Radium (226)	0.50	J	0.19	1.00	0.19	09/29/08	10/31/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 90**
Strontium 90	0.28	U	0.67	3.00	1.1	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P023

Radiochemistry

Lab Sample ID: F8I260379-004
Work Order: KXQG4
Matrix: WATER

Date Collected: 06/30/08 1425
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 100**
Radium (226)	0.79	J	0.23	1.00	0.20	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 85**
Strontium 90	0.51	U	0.74	3.00	1.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E022

Radiochemistry

Lab Sample ID: F8I260379-005
Work Order: KXQG5
Matrix: WATER

Date Collected: 06/30/08 1050
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 94**
Radium (226)	0.28	J	0.16	1.00	0.20	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 65**
Strontium 90	0.84	U	0.98	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P024

Radiochemistry

Lab Sample ID: F8I260379-006
Work Order: KXQG6
Matrix: WATER

Date Collected: 06/30/08 1435
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 97**
Radium (226)	0.93	J	0.25	1.00	0.21	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 90**
Strontium 90	-0.18	U	0.62	3.00	1.1	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D024

Radiochemistry

Lab Sample ID: F8I260379-007
Work Order: KXQG7
Matrix: WATER

Date Collected: 06/30/08 1345
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 100**
Radium (226)	0.23	J	0.14	1.00	0.19	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 88**
Strontium 90	1.82	J	0.75	3.00	1.0	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E013

Radiochemistry

Lab Sample ID: F8I260379-008
Work Order: KXQG8
Matrix: WATER

Date Collected: 06/27/08 1430
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 99**
Radium (226)	0.80	J	0.19	1.00	0.12	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 86**
Strontium 90	0.89	U	0.67	3.00	1.0	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E009

Radiochemistry

Lab Sample ID: F8I260379-009
Work Order: KXQG9
Matrix: WATER

Date Collected: 06/27/08 1140
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 101**
Radium (226)	0.43	J	0.14	1.00	0.13	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 91**
Strontium 90	-0.02	U	0.84	3.00	1.5	10/01/08	10/29/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E007

Radiochemistry

Lab Sample ID: F8I260379-010
Work Order: KXQHA
Matrix: WATER

Date Collected: 06/27/08 1125
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 98**
Radium (226)	0.87	J	0.20	1.00	0.12	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275555**	**Yld % 97**
Strontium 90	0.34	U	0.73	3.00	1.2	10/01/08	10/29/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260379
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275555**		**Yld % 66**	**F8J010000-555B**
Strontium 90	0.06	U	0.27	3.00	0.47	10/01/08	10/29/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273113**		**Yld % 94**	**F8I290000-113B**
Radium (226)	-0.005	U	0.056	1.00	0.12	09/29/08	11/01/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273112**		**Yld % 94**	**F8I290000-112B**
Radium (226)	0.016	U	0.085	1.00	0.16	09/29/08	10/29/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260379
Matrix: WATER

Parameter		Spike Amount	Result	Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**905 MOD**				**F8J010000-555C**	
Strontium 90		7.02	7.63	0.93	65	109	(73 - 135)		
	Spk 2	7.02	8.8	1.0	64	126	(73 - 135)	15	%RPD
		Batch #:	8275555		**Analysis Date:**		10/29/08		
Radium 226 by EPA 903.0 MOD			**pCi/L**	**903.0 MOD**				**F8I290000-113C**	
Radium (226)		11.3	11.3	1.1	90	100	(72 - 130)		
	Spk 2	11.3	12.0	1.1	94	106	(72 - 130)	6	%RPD
		Batch #:	8273113		**Analysis Date:**		11/01/08		
Radium 226 by EPA 903.0 MOD			**pCi/L**	**903.0 MOD**				**F8I290000-112C**	
Radium (226)		11.3	10.9	1.1	94	96	(72 - 130)		
	Spk 2	11.3	10.8	1.1	94	96	(72 - 130)	0.2	%RPD
		Batch #:	8273112		**Analysis Date:**		10/29/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TestAmerica St. Louis

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

NUMBER 33807

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036773
PROJECT LOCATION: TOTO	PROJECT NO.: 2597-070D
SAMPLER NAME: Various	AIRBILL NUMBER: 2654-3257-3
PROJECT CONTACT: Sabina Sudwo	PROJECT CONTACT PHONE NUMBER: 949-765-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	ANALYSES REQUIRED: EPA 903.1 Ra-226	EPA 905.0 Sr-90	COMMENTS
0827E025	6/30/08	1130	5	X		W	ASAP	X	X	
0826P001	6/30/08	1130	4 total 2 11	X		W	ASAP	X	X	include sample from 33800
0826D001	6/30/08	0836	3 total 2 11	X		W	ASAP	X	X	include sample from 33800
0827P023	6/30/08	1425	5	X		W	ASAP	X	X	
0827E022	6/30/08	1050	5		X	W	ASAP	X	X	
0827P024	6/30/08	1435	5	X		W	ASAP	X	X	
0827D024	6/30/08	1345	7	X		W	ASAP	X	X	
0826E013	6/27/08	1430	5	X		W	ASAP	X	X	
0826E009	6/27/08	1140	5	X		W	ASAP	X	X	
0826E007	6/27/08	1125	5		X	W	ASAP	X	X	

LABORATORY NAME: TestAmerica
LABORATORY ID (FOR LABORATORY):

RELINQUISHED BY (Signature): Robin Stutz	DATE: 09/25/08	RECEIVED BY (Signature): B-i	9/26/08
COMPANY: NWT	TIME: 0900	COMPANY: TA	0930
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	
COMPANY	TIME	COMPANY	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	
COMPANY	TIME	COMPANY	

LABORATORY INSTRUCTIONS/COMMENTS: PER SAP For Basewide Groundwate Monitoring Program for Kleinfelder

COMPOSITE DESCRIPTION

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: SAMPLE CONDITION ☐ INTACT ☐ BROKE
COOLER SEAL ☐ INTACT ☐ BROKEN

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica St. Louis

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33800

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036773
PROJECT LOCATION: TO 70	PROJECT NO.: 2597-070D
SAMPLER NAME: Various	AIRBILL NUMBER: 2654-3257-3
PROJECT CONTACT: Sabina Sudulko	PROJECT CONTACT PHONE NUMBER: 949-765-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	ANALYSES REQUIRED: Ra226 EPA 903.1	Sr-90 EPA 905.0	COMMENTS
0826E001 *	7/1/08	0920	1	X		W	ASAP	X	X	Loggedas F8I260380-010 33804
0827P029	7/1/08	0930	7	X		W	ASAP	X	X	
0826P008 *	7/1/08	1015	2	X		W	ASAP	X	X	F8I260380-003 33804
0827E026	7/1/08	1015	2	X		W	ASAP	X	X	F8I260382-007 33801
0826D001	7/1/08	1400	2		X	W	ASAP	X	X	F8I260379-003 33807
0826P001	7/1/08	1345	2	X		W	ASAP	X	X	F8I260879-002 33807
0827P026	7/1/08	0913	7	X		W	ASAP	X	X	
0827P028	7/1/08	0925	7	X		W	ASAP	X	X	
0827P027	7/1/08	0918	7		X	W	ASAP	X	X	
			N A							

RELINQUISHED BY (Signature): Columbia Duty	DATE: 09/25/08	RECEIVED BY (Signature): [illegible] 9/26/08	LABORATORY INSTRUCTIONS/COMMENTS: Per SAP for Basewide Groundwate Monitoring Program for Kleinfelder
COMPANY: NWT	TIME: 0900	COMPANY: TA 0930	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	COMPOSITE DESCRIPTION
COMPANY	TIME	COMPANY	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
COMPANY	TIME	COMPANY	TEMPERATURE: SAMPLE CONDITION: ☐ INTACT ☐ BROKE COOLER SEAL: ☐ INTACT ☐ BROKEN

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33807

10-28

ENTERED 10-17

PROJECT NAME: HPS	PURCHASE ORDER NO.: [illegible]
PROJECT LOCATION: 7070	PROJECT NO.: 5591-0710D
SAMPLER NAME: Various	AIRBILL NUMBER: [illegible]
PROJECT CONTACT: Sonia Sudduko	PROJECT CONTACT PHONE NUMBER: [illegible]

ANALYSES REQUIRED: EPA 9031; EPA 9056

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY): F8I260379

Project Information Section Do not submit to Laboratory

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	EPA 9031	EPA 9056								COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0827EC25	6/30/08	1130	5	X		W	std	X	X									TW044			
0826P001	6/30/08	1130	2	X		W	std	X	X									TW037			
0826D001	6/30/08	0836	2	X		W	std	X	X									TW038			
0827P023	6/30/08	1425	25	X		W	std	X	X									TW055			
0827E022	6/30/08	1050	5		X	W	std	X	X									TW023			
0827P024	6/30/08	1435	5	X		W	std	X	X									TW054			
0827D024	6/30/08	1345	7	X		W	std	X	X									TW061			
0826E013	6/27/08	1430	5	X		W	std	X	X									TW042			
0826E009	6/27/08	1140	5	X		W	std	X	X									TW031			
0826E007	6/27/08	1125	5		X	W	std	X	X									TW032			

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
[illegible signature]	[illegible]	
COMPANY: NUVT	TIME: 1700	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

LABORATORY INSTRUCTIONS/COMMENTS: TEK SAP for Basewide Groundwater Monitoring Program [illegible]

COMPOSITE DESCRIPTION

SAMPLING COMMENT:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: ______ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

Final Technical Memorandum for Groundwater Investigation at Parcel E-2
Feb 2009 CEKA-3001-0000-0011 App J - App B-128

ND. 903 002
NEW WORLD TECH → 9194975675B3
09/26/2008 13:30

TETRA TECH

NUMBER 33800

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: HPS	PROJECT NO.: 1036773
PROJECT MANAGER: TO 70	PROJECT NO.: 2597-070D
SAMPLE ACTION: VARIOUS	UNIT NUMBER: 2654-3257-3
SAMPLE MANAGER: Sabira Sudulko	PHONE NO. OF PROJECT MANAGER: 949-765-7592

	SAMPLE ID	DATE COLLECTED	TIME COLLECTED	SAMPLE CONTAINER	LEVEL		TYPE	TAT	Ra226 EPA 903.1	Sr-90 EPA 905.0	COMMENTS
*	0826E001	7/1/08	0920	1	X		W	ASAP	X	X	
	0827P029	7/1/08	0930	7	X		W	ASAP	X	X	
*	0826 P008	7/1/08	1015	2	X		W	ASAP	X	X	
**	0827E026	7/1/08	1015	2	X		W	ASAP	X	X	
***	0826 D001	7/1/08	1400	2		X	W	ASAP	X	X	FBI260379-003
**	0826 P001	7/1/08	1345	2	X		W	ASAP	X	X	FBI260379-002
	0827P026	7/1/08	0913	7	X		W	ASAP	X	X	
	0827P028	7/1/08	0925	7	X		W	ASAP	X	X	
	0827P027	7/1/08	0918	7		X	W	ASAP	X	X	
				N A							

ANALYSES REQUIRED

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY):

Project Information Section Do not submit to Laboratory

LOCATION	DEPTH START	DEPTH END	QC

RELINQUISHED BY (Signature): Kelvin Uuty	DATE: 09/25/08	RECEIVED BY (Signature):	
COMPANY: NWT	TIME: 0900	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	

LABORATORY INSTRUCTIONS/COMMENTS: Per SAP for Basewide Groundwater Monitoring Program for Kleinfelder

COMPOSITE DESCRIPTION:

SAMPLING COMMENT:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)

TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN

COOLER SEAL: ☐ INTACT ☐ BROKEN

* Location FBS-260380

** Location FBI 260379

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260380

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

November 3, 2008

Case Narrative
LOT NUMBER: F8I260380

This report contains the analytical results for the 10 samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances
Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices. Due to excessive precipitate sample aliquots were reduced to 500mL. Samples 003, 009, and 010 were also prepped with a 1:2 dilution due to excessive precipitate at 500mLs.
F8I260380-003, 004, 007, 008 and F8I260382-005, 008, 009 had strontium sulfate recoveries higher than 110% due to matrix interference.
Affected Samples:
F8I260380 (1): 0826E015
F8I260380 (2): 0826P030
F8I260380 (3): 0826P008
F8I260380 (4): 0826D013
F8I260380 (5): 0826E005
F8I260380 (6): 0826D005
F8I260380 (7): 0826E006
F8I260380 (8): 0826E012
F8I260380 (9): 0827P015
F8I260380 (10): 0826E001

The strontium sulfate carrier is outside upper control limits which may cause a potential low bias result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260380 (3): 0826P008
F8I260380 (4): 0826D013
F8I260380 (7): 0826E006
F8I260380 (8): 0826E012

There were no other nonconformances or observations noted with any analysis on this lot.

METHODS SUMMARY

F8I260380

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260380

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXQH3	001	0826E015	06/27/08	15:05
KXQH4	002	0826P030	06/27/08	15:02
KXQH5	003	0826P008	06/27/08	13:25
KXQH6	004	0826D013	06/27/08	14:03
KXQH7	005	0826E005	06/27/08	10:50
KXQH8	006	0826D005	06/27/08	10:38
KXQJA	007	0826E006	06/27/08	11:15
KXQJC	008	0826E012	06/27/08	14:00
KXQJD	009	0827P015	06/30/08	09:06
KXQJE	010	0826E001	06/30/08	09:42

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E015

Radiochemistry

Lab Sample ID: F8I260380-001
Work Order: KXQH3
Matrix: WATER

Date Collected: 06/27/08 1505
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 101**
Radium (226)	0.25	J	0.11	1.00	0.11	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 43**
Strontium 90	0.03	U	0.91	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P030

Radiochemistry

Lab Sample ID: F8I260380-002
Work Order: KXQH4
Matrix: WATER

Date Collected: 06/27/08 1502
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 93**
Radium (226)	0.16	U	0.11	1.00	0.16	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 47**
Strontium 90	-0.69	U	0.81	3.00	1.5	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P008

Radiochemistry

Lab Sample ID: F8I260380-003
Work Order: KXQH5
Matrix: WATER

Date Collected: 06/27/08 1325
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 106**
Radium (226)	1.72		0.28	1.00	0.13	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 90**
Strontium 90	0.04	U	0.45	3.00	0.77	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D013

Radiochemistry

Lab Sample ID: F8I260380-004
Work Order: KXQH6
Matrix: WATER

Date Collected: 06/27/08 1403
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 95**
Radium (226)	0.36	J	0.14	1.00	0.13	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 89**
Strontium 90	0.29	U	0.43	3.00	0.72	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E005

Radiochemistry

Lab Sample ID: F8I260380-005
Work Order: KXQH7
Matrix: WATER

Date Collected: 06/27/08 1050
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 99**
Radium (226)	0.26	J	0.12	1.00	0.12	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 61**
Strontium 90	0.17	U	0.69	3.00	1.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826D005

Radiochemistry

Lab Sample ID: F8I260380-006
Work Order: KXQH8
Matrix: WATER

Date Collected: 06/27/08 1038
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 100**
Radium (226)	0.42	J	0.15	1.00	0.14	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 60**
Strontium 90	0.19	U	0.67	3.00	1.1	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E006

Radiochemistry

Lab Sample ID: F8I260380-007
Work Order: KXQJA
Matrix: WATER

Date Collected: 06/27/08 1115
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 99**
Radium (226)	0.44	J	0.15	1.00	0.12	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 89**
Strontium 90	0.13	U	0.47	3.00	0.80	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E012

Radiochemistry

Lab Sample ID: F8I260380-008
Work Order: KXQJC
Matrix: WATER

Date Collected: 06/27/08 1400
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 98**
Radium (226)	0.44	J	0.16	1.00	0.15	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 89**
Strontium 90	0.63	U	0.51	3.00	0.82	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P015

Radiochemistry

Lab Sample ID: F8I260380-009
Work Order: KXQJD
Matrix: WATER

Date Collected: 06/30/08 0906
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 100**
Radium (226)	0.58	J	0.17	1.00	0.13	09/29/08	10/29/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 48**
Strontium 90	0.02	U	0.83	3.00	1.4	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826E001

Radiochemistry

Lab Sample ID: F8I260380-010
Work Order: KXQJE
Matrix: WATER

Date Collected: 06/30/08 0942
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 97**
Radium (226)	2.42		0.35	1.00	0.15	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 47**
Strontium 90	-0.22	U	0.82	3.00	1.4	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260380
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC		Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275560**		**Yld % 65**		**F8J010000-560B**
Strontium 90	0.07	U	0.21	3.00	0.36		10/01/08	10/28/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273113**		**Yld % 94**		**F8I290000-113B**
Radium (226)	-0.005	U	0.056	1.00	0.12		09/29/08	11/01/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273112**		**Yld % 94**		**F8I290000-112B**
Radium (226)	0.016	U	0.085	1.00	0.16		09/29/08	10/29/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260380
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-560C**	
Strontium 90		7.02	8.74		0.96	64	124	(73 - 135)		
	Spk 2	7.02	7.86		0.85	75	112	(73 - 135)	11	%RPD
		Batch #:	8275560			**Analysis Date:**		10/28/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-113C**	
Radium (226)		11.3	11.3		1.1	90	100	(72 - 130)		
	Spk 2	11.3	12.0		1.1	94	106	(72 - 130)	6	%RPD
		Batch #:	8273113			**Analysis Date:**		11/01/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-112C**	
Radium (226)		11.3	10.9		1.1	94	96	(72 - 130)		
	Spk 2	11.3	10.8		1.1	94	96	(72 - 130)	0.2	%RPD
		Batch #:	8273112			**Analysis Date:**		10/29/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33804

ENTERED 10-17

10-20

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036773
PROJECT LOCATION: TOTO	PROJECT NO.: 2597-070D
SAMPLER NAME: Davis	AIRBILL NUMBER: 8654-3257-3
PROJECT CONTACT: Sabina Sudzko	PROJECT CONTACT PHONE NUMBER: 949-165-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	KA226 EPA 903.1	SW 90 EPA 905.0	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0826E015	6/27/08	1505	5	X		W		X	X		TW025			
0826P030	6/27/08	1502	4	X		W		X	X		TW009			
0826P008	6/27/08	1325	1	X		W		X	X		TW045			
0826D013	6/27/08	1403	5	X		W		X	X		TW018			
0826E005	6/27/08	1050	4		X	W		X	X		PZ1386			
0826D005	6/27/08	1038	5	X		W		X	X		TW053			
0826E006	6/27/08	1115	5	X		W		X	X		TW033			
0826E012	6/27/08	1400	5	X		W		X	X		TW041			
0827P015	6/30/08	0906	8	X		W		X	X		TW026B			
0826E001	6/30/08	0942	2		X	W		X	X		TW035			

ANALYSES REQUIRED

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY): FB1260380

Project Information Section Do not submit to Laboratory

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
Robin Stutz	6/25/08	
COMPANY: NUT	TIME: 0700	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

LABORATORY INSTRUCTIONS/COMMENTS: Per SAP for Perchlorate Groundwater Monitoring Program for Klagfurter

COMPOSITE DESCRIPTION

SAMPLE CONDITION: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

Final Technical Memorandum for Groundwater Investigation at Parcel E-2
Feb 2009 CEKA-3001-0000-0011 App J - App B-145

TETRA TECH
12100 Columbia Street, Suite 750
San Diego, CA 92101 (619) 233-8696

NUMBER 33891

CHAIN-OF-CUSTODY RECORD

SITE NAME: HPS	PURCHASE ORDER NO.: 10367 [illegible]
CONTRACT NO.: TO 70	PROJECT NO.: 2597-070D
SAMPLER NAME: various	AIRBILL NUMBER: 2654-3257-3
PROJECT MANAGER: Sabina Sduko	PROJECT CONTACT PHONE NUMBER: 949-705-7598

ANALYSES REQUIRED

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Ra226 EPA 9031	Sr90 EPA 905.0	COMMENTS
GR27E028	8/6/08	10:30	7	X		W	ASAP	X	X	
GR27E024	8/6/08	9:50	1	X		W	ASAP	X	X	
GR27E030	8/6/08	14:17	5	X		W	ASAP	X	X	
GR_7E021	8/6/08	10:35	5	X		W	ASAP	X	X	
GR27E031	8/6/08	14:21	5		X	W	ASAP	X	X	
GR_6P0[illegible]	8/7/08	11:53	5	X		W	ASAP	X	X	
GR_[illegible]	8/6/08	13:20	3	X		W	ASAP	X	X	
* 0826P008	8/6/08	15:21	2	X		W	ASAP	X	X	F8I260380-003
GR27P[illegible]	8/6/08	9:17	8	X		W	ASAP	X	X	
GR27D029	8/6/08	14:30	7		X	W	ASAP	X	X	

RELINQUISHED BY (Signature): Klunstuty	DATE: 09/25/08	RECEIVED BY (Signature):	
COMPANY: NWT	TIME: 0900	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY): F8I260382

LABORATORY INSTRUCTIONS/COMMENTS: PER SAP FOR Basewide Groundwater monitoring Program for Kluntelder

COMPOSITE DESCRIPTION:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

Project Information Section
Do not submit to Laboratory

LOCATION	DEPTH START	DEPTH END	QC

SAMPLING COMMENT:

* LOGGED ON F8I 260380-003

White: Laboratory; Pink: Laboratory; Canary: Project File; Manila - Data Management

TETRATECH
[illegible] Columbia Street, Suite 500
San Diego, CA 92101 (619) 234-3636

NUMBER 33800

CHAIN-OF-CUSTODY RECORD

PROGRAM: HPS	PURCHASE ORDER NO.: 1036773
TASK ORDER NO.: TO 70	PROJECT NO.: 2597-070D
SAMPLING LOCATION: VARIOUS	ACTIVITY NUMBER: 2654-3257-3
PROJECT MANAGER: Sabina Sudulko	PROJECT MANAGER TELEPHONE NUMBER: 949-765-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	SCOOP CONTAINER	LEVEL V	LEVEL S	TYPE	TAT	Ra-226 EPA 903.1	Sr-90 EPA 905.0	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
* 0826E001	7/1/08	0920	1	X		W	ASAP	X	X		F8I260380-010			
0827P029	7/1/08	0930	7	X		W	ASAP	X	X					
* 0826P008	7/1/08	1015	2	X		W	ASAP	X	X		F8I260380-003			
** 0827E026	7/1/08	1015	2	X		W	ASAP	X	X					
*** 0826D001	7/1/08	1400	2		X	W	ASAP	X	X					
*** 0826P001	7/1/08	1345	2	X		W	ASAP	X	X					
0827P026	7/1/08	0913	7	X		W	ASAP	X	X					
0827P028	7/1/08	0925	7	X		W	ASAP	X	X					
0827P027	7/1/08	0918	7		X	W	ASAP	X	X					
			N 7 A											

ANALYSES REQUIRED

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY):

Project Information Section Do not submit to Laboratory

RELINQUISHED BY (Signature): Kevin Autry	DATE: 09/25/08	RECEIVED BY (Signature):	
COMPANY: NWT	TIME: 0900	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	
RELINQUISHED BY (Signature):	DATE:	RECEIVED BY (Signature):	
COMPANY:	TIME:	COMPANY:	

LABORATORY INSTRUCTIONS/COMMENTS: Use SAP for Basewide Groundwater Monitoring Program for Kleinfelder

COMPOSITE DESCRIPTION:

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

* Collocated FB1-260380
** Collocated FB1-260383

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

HPS Projects

Lot #: F8I260381

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.

Ivan Vania
Project Manager

October 31, 2008

Case Narrative
LOT NUMBER: F8I260381

This report contains the analytical results for the four samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.

Due to excessive amount of precipitate the sample aliquots were reduced to 250mL.
Affected Samples:
F8I260381 (1): 0827P029
F8I260381 (2): 0827P026
F8I260381 (3): 0827P028
F8I260381 (4): 0827P027

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260381

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

TestAmerica St. Louis

SAMPLE SUMMARY

F8I260381

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXQKR	001	0827P029	07/01/08	09:30
KXQLE	002	0827P026	07/01/08	09:13
KXQLF	003	0827P028	07/01/08	09:25
KXQLG	004	0827P027	07/01/08	09:18

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P029

Radiochemistry

Lab Sample ID: F8I260381-001
Work Order: KXQKR
Matrix: WATER

Date Collected: 07/01/08 0930
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 102**
Radium (226)	**0.45**	**J**	**0.16**	1.00	**0.15**	**09/29/08**	**10/29/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 70**
Strontium 90	0.53	U	0.93	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P026

Radiochemistry

Lab Sample ID: F8I260381-002
Work Order: KXQLE
Matrix: WATER

Date Collected: 07/01/08 0913
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 97**
Radium (226)	**0.33**	**J**	**0.14**	1.00	**0.13**	**09/29/08**	**10/29/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 95**
Strontium 90	0.57	U	0.71	3.00	1.2	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P028

Radiochemistry

Lab Sample ID: F8I260381-003
Work Order: KXQLF
Matrix: WATER

Date Collected: 07/01/08 0925
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 96**
Radium (226)	**0.28**	**J**	**0.14**	1.00	**0.16**	**09/29/08**	**10/29/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 70**
Strontium 90	0.6	U	1.1	3.0	1.8	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P027

Radiochemistry

Lab Sample ID: F8I260381-004
Work Order: KXQLG
Matrix: WATER

Date Collected: 07/01/08 0918
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273112**	**Yld % 93**
Radium (226)	**0.17**	**J**	**0.12**	1.00	**0.17**	**09/29/08**	**10/29/08**
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 68**
Strontium 90	-0.43	U	0.91	3.00	1.7	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260381
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			**pCi/L**	**Batch # 8275559**		**Yld % 71**	**F8J010000-559B**
Strontium 90	0.93	U	0.99	3.00	1.6	10/01/08	10/28/08
Radium 226 by EPA 903.0 MOD			**pCi/L**	**Batch # 8273112**		**Yld % 94**	**F8I290000-112B**
Radium (226)	0.016	U	0.085	1.00	0.16	09/29/08	10/29/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260381
Matrix: WATER

Parameter		Spike Amount	Result	Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC	**EPA-905 MOD**		**pCi/L**	**905 MOD**				**F8J010000-559C**	
Strontium 90		28.1	36.5	4.0	70	130	(73 - 135)		
	Spk 2	28.1	32.3	3.6	71	115	(73 - 135)	12	%RPD
		Batch #:	8275559		**Analysis Date:**		10/28/08		
Radium 226 by	**EPA 903.0 MOD**		**pCi/L**	**903.0 MOD**				**F8I290000-112C**	
Radium (226)		11.3	10.9	1.1	94	96	(72 - 130)		
	Spk 2	11.3	10.8	1.1	94	96	(72 - 130)	0.2	%RPD
		Batch #:	8273112		**Analysis Date:**		10/29/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TestAmerica St. Louis

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

NUMBER 33800

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036773	ANALYSES REQUIRED	LABORATORY NAME: TestAmerica
PROJECT LOCATION: TO 70	PROJECT NO.: 2597-070D		LABORATORY ID (FOR LABORATORY):
SAMPLER NAME: Various	AIRBILL NUMBER: 2654-3257-3		
PROJECT CONTACT: Sabina Sudulko	PROJECT CONTACT PHONE NUMBER: 949-765-7592		

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Ra226 EPA 903.1	Sr-90 EPA 905.0	COMMENTS
0826E001 *	7/1/08	0920	1	X		W	ASAP	X	X	Loggedas F8I260380-010 33804
0827P029	7/1/08	0930	7	X		W	ASAP	X	X	
0826P008 *	7/1/08	1015	2	X		W	ASAP	X	X	F8I260380-003 33804
0827E026	7/1/08	1015	2	X		W	ASAP	X	X	F8I260382-007 33801
0826D001	7/1/08	1400	2		X	W	ASAP	X	X	F8I260379-003 33807
0826P001	7/1/08	1345	2	X		W	ASAP	X	X	F8I260379-002 33807
0827P026	7/1/08	0913	7	X		W	ASAP	X	X	
0827P028	7/1/08	0925	7	X		W	ASAP	X	X	
0827P027	7/1/08	0918	7		X	W	ASAP	X	X	
			N A							

RELINQUISHED BY (Signature): Robin Autry	DATE: 09/25/08	RECEIVED BY (Signature): [illegible] 9/25/08	LABORATORY INSTRUCTIONS/COMMENTS: Per SAP for Basewide Groundwater Monitoring Program for Kleinfelder
COMPANY: NWT	TIME: 0900	COMPANY: TA 09:30	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	COMPOSITE DESCRIPTION
COMPANY	TIME	COMPANY	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
COMPANY	TIME	COMPANY	TEMPERATURE: SAMPLE CONDITION: ☐ INTACT ☐ BROKEN COOLER SEAL: ☐ INTACT ☐ BROKEN

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33800

ENTERED 10-17

10-28

PROJECT NAME	PURCHASE ORDER NO.
HPS	1136173
PROJECT LOCATION	PROJECT NO.
TC 10	2597-C10D
SAMPLER NAME	AIRBILL NUMBER
VARIOUS	674-057-3
PROJECT CONTACT	PROJECT CONTACT PHONE NUMBER
Sabrina Serino	949-165-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	ANALYSES REQUIRED	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
* 0826E001	7/1/08	0920	1	X		W	15WD	X X	* FBI260380-010	TW035			
0827P029	7/1/08	0930	7	X		W	15WD	X X		TW056			
* 0826P008	7/1/08	1015	2	X		W	15WD	X X	* FBI260380-003	TW045			
** 0827E026	7/1/08	1015	2	X		W	15WD	X X	** FBI260382-007	PZ131F			
*** 0826D001	7/1/08	1400	2		X	W	15WD	X X	*** FBI260379-003	TW038			
*** 0826P001	7/1/08	1345	2	X		W	15WD	X X	*** FBI260379-002	TW037			
0827P026	7/1/08	0913	7	X		W	15WD	X X		TW057B			
0827P028	7/1/08	0925	7	X		W	15WD	X X		TW056			
0827P027	7/1/08	0918	7		X	W	15WD	X X		TW057B			

RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)
COMPANY	TIME	COMPANY

LABORATORY NAME: TestAmerica

LABORATORY ID (FOR LABORATORY): FBI260381

LABORATORY INSTRUCTIONS/COMMENTS: Per SIP for Perchlorate from chapter monitoring program Perchlorate

COMPOSITE DESCRIPTION

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

Project Information Section Do not submit to Laboratory

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

PROJECT NO. TO70 2597.070D

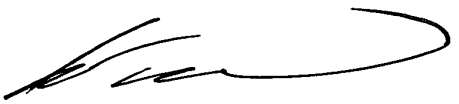
HPS Projects

Lot #: F8I260382

Lisa Bienkowski

Tetra Tech EC, Inc.
1230 Columbia Street
Suite 750
San Diego, CA 92101

TESTAMERICA LABORATORIES, INC.



Ivan Vania
Project Manager

November 3, 2008

Case Narrative
LOT NUMBER: F8I260382

This report contains the analytical results for the nine samples received under chain of custody by TestAmerica St. Louis on September 26, 2008. These samples are associated with your HPS Projects project.

The analytical results included in this report meet all applicable quality control procedure requirements except as noted on the following page.

The test results in this report meet all NELAP requirements for parameters in which accreditations are held by TestAmerica St. Louis. Any exceptions to NELAP requirements are noted in the case narrative. The case narrative is an integral part of this report.

All chemical analysis results are based upon sample as received, wet weight, unless noted otherwise. All radiochemistry results are based upon sample as dried and ground with the exception of tritium, unless requested wet weight by the client.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Strontium-90 by GFPC (EPA 905 MOD)
The samples were filtered due to high solid content in the sample matrices.
Due to excessive precipitate the sample aliquots were reduced to 500mL. Samples 008 and 009 from lot F8I260382 were also prepped with a 1:2 dilution due to excessive precipitate at 500mLs.
F8I260382-007 has a strontium sulfate recovery lower than 40% due to matrix interference.
Affected Samples:
F8I260382 (1): 0827E028
F8I260382 (3): 0827E030
F8I260382 (4): 0827E029
F8I260382 (5): 0827E031
F8I260382 (6): 0826P006
F8I260382 (7): 0827E026
F8I260382 (8): 0827P016
F8I260382 (9): 0827D025

The ample was filtered due to high solid content in the sample matrix.
Due to excessive amount of precipitate the sample aliquot was reduced to 250mL.
Affected Samples:
F8I260382 (2): 0827E024

The strontium carrier recovery is outside the upper control limit (110%). There was physical evidence of matrix interference apparent during the initial preparation of the sample. The QC samples associated with the batch have acceptable carrier recovery indicating the presence of matrix interference.
Affected Samples:
F8I260382 (2): 0827E024

The strontium carrier is outside upper control limits which may cause a potential low biased result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260382 (2): 0827E024
F8I260382 (5): 0827E031
F8I260382 (8): 0827P016
F8I260382 (9): 0827D025

Radium-226 by GFPC (EPA 903.0 MOD)
There was insufficient sample provided to perform the analysis at the method specified amount. A reduced sample amount was prepared.
Affected Samples:
F8I260382 (2): 0827E024

The barium carrier is outside upper control limits which may cause a potential low biased result. The yields were truncated at 100% to eliminate a biased result.
Affected Samples:
F8I260382 (2): 0827E024

There were no other nonconformances or observations noted with any analysis on this lot.

TestAmerica St. Louis

METHODS SUMMARY

F8I260382

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Radium-226 by GFPC	EPA 903.0 MOD	EPA 903.0
Strontium 90 by GFPC	EPA 905 MOD	

References:

EPA "EASTERN ENVIRONMENTAL RADIATION FACILITY RADIOCHEMISTRY PROCEDURES MANUAL" US EPA EPA 520/5-84-006 AUGUST 1984

SAMPLE SUMMARY

F8I260382

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
KXP5T	001	0827E028	07/01/08	10:30
KXQLW	002	0827E024	06/30/08	11:10
KXQLX	003	0827E030	07/01/08	14:17
KXQL0	004	0827E029	07/01/08	10:35
KXQL2	005	0827E031	07/01/08	14:21
KXQL3	006	0826P006	06/27/08	11:53
KXQL4	007	0827E026	06/30/08	13:20
KXQL6	008	0827P016	06/30/08	09:17
KXQL7	009	0827D025	06/30/08	14:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E028

Radiochemistry

Lab Sample ID: F8I260382-001
Work Order: KXP5T
Matrix: WATER

Date Collected: 07/01/08 1030
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 100**
Radium (226)	0.64	J	0.17	1.00	0.13	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 65**
Strontium 90	-0.08	U	0.61	3.00	1.1	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E024

Radiochemistry

Lab Sample ID: F8I260382-002
Work Order: KXQLW
Matrix: WATER

Date Collected: 06/30/08 1110
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 100**
Radium (226)	6.08		0.81	1.00	0.28	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275559**	**Yld % 89**
Strontium 90	0.55	U	0.76	3.00	1.3	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E030

Radiochemistry

Lab Sample ID: F8I260382-003
Work Order: KXQLX
Matrix: WATER

Date Collected: 07/01/08 1417
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 97**
Radium (226)	0.59	J	0.16	1.00	0.11	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 72**
Strontium 90	0.40	U	0.49	3.00	0.80	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E029

Radiochemistry

Lab Sample ID: F8I260382-004
Work Order: KXQL0
Matrix: WATER

Date Collected: 07/01/08 1035
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 99**
Radium (226)	0.73	J	0.18	1.00	0.12	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 62**
Strontium 90	0.10	U	0.48	3.00	0.83	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E031

Radiochemistry

Lab Sample ID: F8I260382-005
Work Order: KXQL2
Matrix: WATER

Date Collected: 07/01/08 1421
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 100**
Radium (226)	0.54	J	0.16	1.00	0.14	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 90**
Strontium 90	0.08	U	0.35	3.00	0.60	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0826P006

Radiochemistry

Lab Sample ID: F8I260382-006
Work Order: KXQL3
Matrix: WATER

Date Collected: 06/27/08 1153
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 96**
Radium (226)	0.18	J	0.10	1.00	0.13	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 60**
Strontium 90	0.28	U	0.54	3.00	0.91	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827E026

Radiochemistry

Lab Sample ID: F8I260382-007
Work Order: KXQL4
Matrix: WATER

Date Collected: 06/30/08 1320
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 98**
Radium (226)	0.069	U	0.073	1.00	0.11	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 29**
Strontium 90	-0.16	U	0.87	3.00	1.6	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827P016

Radiochemistry

Lab Sample ID: F8I260382-008
Work Order: KXQL6
Matrix: WATER

Date Collected: 06/30/08 0917
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				**pCi/L**		**Batch # 8273113**	**Yld % 83**
Radium (226)	0.56	J	0.17	1.00	0.14	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				**pCi/L**		**Batch # 8275560**	**Yld % 88**
Strontium 90	-0.07	U	0.29	3.00	0.52	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

TestAmerica St. Louis

Tetra Tech EC, Inc.

Client Sample ID: 0827D025

Radiochemistry

Lab Sample ID: F8I260382-009
Work Order: KXQL7
Matrix: WATER

Date Collected: 06/30/08 1400
Date Received: 09/26/08 0930

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Analysis Date
Radium 226 by EPA 903.0 MOD				pCi/L		Batch # 8273113	Yld % 96
Radium (226)	0.171	J	0.098	1.00	0.12	09/29/08	11/01/08
SR-90 BY GFPC EPA-905 MOD				pCi/L		Batch # 8275560	Yld % 87
Strontium 90	0.59	J	0.35	3.00	0.52	10/01/08	10/28/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

TestAmerica St. Louis

METHOD BLANK REPORT

Radiochemistry

Client Lot ID: F8I260382
Matrix: WATER

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	RL	MDC	Prep Date	Lab Sample ID Analysis Date
SR-90 BY GFPC EPA-905 MOD			pCi/L	Batch # 8275560		Yld % 65	F8J010000-560B
Strontium 90	0.07	U	0.21	3.00	0.36	10/01/08	10/28/08
SR-90 BY GFPC EPA-905 MOD			pCi/L	Batch # 8275559		Yld % 71	F8J010000-559B
Strontium 90	0.93	U	0.99	3.00	1.6	10/01/08	10/28/08
Radium 226 by EPA 903.0 MOD			pCi/L	Batch # 8273113		Yld % 94	F8I290000-113B
Radium (226)	-0.005	U	0.056	1.00	0.12	09/29/08	11/01/08

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

TestAmerica St. Louis

Laboratory Control Sample/LCS Duplicate Report

Radiochemistry

Client Lot ID: F8I260382
Matrix: WATER

Parameter		Spike Amount	Result		Total Uncert. (2 σ+/-)	% Yld	% Rec	QC Control Limits	Lab Sample ID Precision	
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-560C**	
Strontium 90		7.02	8.74		0.96	64	124	(73 - 135)		
	Spk 2	7.02	7.86		0.85	75	112	(73 - 135)	11	%RPD
		Batch #:	8275560			**Analysis Date:**		10/28/08		
SR-90 BY GFPC EPA-905 MOD				**pCi/L**	**905 MOD**				**F8J010000-559C**	
Strontium 90		28.1	36.5		4.0	70	130	(73 - 135)		
	Spk 2	28.1	32.3		3.6	71	115	(73 - 135)	12	%RPD
		Batch #:	8275559			**Analysis Date:**		10/28/08		
Radium 226 by EPA 903.0 MOD				**pCi/L**	**903.0 MOD**				**F8I290000-113C**	
Radium (226)		11.3	11.3		1.1	90	100	(72 - 130)		
	Spk 2	11.3	12.0		1.1	94	106	(72 - 130)	6	%RPD
		Batch #:	8273113			**Analysis Date:**		11/01/08		

NOTE(S)

Calculations are performed before rounding to avoid round-off error in calculated results

TETRA TECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33801

ENTERED 10-7-08

p-2a

PROJECT NAME: HPS	PURCHASE ORDER NO.: 10-0773
PROJECT LOCATION: TC70	PROJECT NO.: 2591-070D
SAMPLER NAME: Various	AIRBILL NUMBER: 7674-3257-3
PROJECT CONTACT: Salina Sidhu	PROJECT CONTACT PHONE NUMBER: 949-165-7582

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Ra226 Ra228	Sr90	6010B	965.0	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0827E028	07/01/08	10:30	7	X		W		X	X				PZ161D			
0827E024	07/01/08	9:50	1	X		W		X	X				TW012			
0827E030	07/01/08	14:17	5	X		W		X	X				PZ150E			
0827E029	07/01/08	10:35	5	X		W		X	X				PZ161D			
0827E031	07/01/08	14:21	5		X	W		X	X				PZ150E			
0826P006	06/27/08	11:53	5	X		W		X	X				TW003			
0827E026	06/30/08	13:20	3	X		W		X	X				PZ131F			
*0826P008	06/30/08	15:21	2	X		W		X	X			*FB1260380-003	TW045			
0827P016	06/30/08	9:17	8	X		W		X	X				TW029			
08270025	06/30/08	14:00	7		X	W		X	X				TW060			

ANALYSES REQUIRED

LABORATORY NAME: Test America

LABORATORY ID (FOR LABORATORY): FB1260382

Project Information Section Do not submit to Laboratory

	DATE	TIME	RECEIVED BY (Signature)
RELINQUISHED BY (Signature): Phil Sluty	07/2/08		
COMPANY: DWT		0700	COMPANY
RELINQUISHED BY (Signature)	DATE		RECEIVED BY (Signature)
COMPANY	TIME		COMPANY
RELINQUISHED BY (Signature)	DATE		RECEIVED BY (Signature)
COMPANY	TIME		COMPANY

LABORATORY INSTRUCTIONS/COMMENTS: Tek SHIFT EASTside Groundwater monitoring Program for Radiation

COMPOSITE DESCRIPTION

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

NUMBER 33809

CHAIN-OF-CUSTODY RECORD

10-20

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1036773
PROJECT LOCATION: TO 70	PROJECT NO.: 2597-070D
SAMPLER NAME: Various	AIRBILL NUMBER: 8664-1872-6410
PROJECT CONTACT: Sabina Siddiko	PROJECT CONTACT PHONE NUMBER: 949-765-7592

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	Ra226, EPH 903.1	Sr90, EPH 905.0	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
0827E024	7/1/08	0950	1	X		W	ASAP	X	X	dupli	TW012			
0827E024	6/30/08	1110	1	X		W	ASAP	X	X	dupli	TW012			

LABORATORY NAME: TestAmerica
LABORATORY ID (FOR LABORATORY): FBI260382-02

Project Information Section Do not submit to Laboratory

RELINQUISHED BY (Signature): [illegible] Duty	DATE: 9/30/08	RECEIVED BY (Signature)	
COMPANY: KWT	TIME: 1000	COMPANY	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	
COMPANY	TIME	COMPANY	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	
COMPANY	TIME	COMPANY	

LABORATORY INSTRUCTIONS/COMMENTS: PER SAP FOR BASEWIDE GROUNDWATER MONITORING PROGRAM FOR KLEINFELDER

COMPOSITE DESCRIPTION

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: _____ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

CHAIN-OF-CUSTODY RECORD

NUMBER 33800

ENTERED 10-17

10-28

PROJECT NAME: HPS
PURCHASE ORDER NO.: 1030473
PROJECT LOCATION: TC 10
PROJECT NO.: 3599-0010D
SAMPLER NAME: Various
AIRBILL NUMBER: 654-3557-3
PROJECT CONTACT: Sabina Sudduko
PROJECT CONTACT PHONE NUMBER: 949-465-7592
LABORATORY NAME: TA Huntington
LABORATORY ID (FOR LABORATORY): F8I260381

Project Information Section Do not submit to Laboratory

ANALYSES REQUIRED

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	[illegible]	[illegible]	COMMENTS	LOCATION	DEPTH START	DEPTH END	QC
* 0826E001	7/1/08	0920	1	X		W	ASAP	X	X	* F8I260380-010	TW035			
0827P029	7/1/08	0930	7	X		W	ASAP	X	X		TW056			
* 0826P008	7/1/08	1015	2	X		W	ASAP	X	X	* F8I260380-003	TW045			
** 0827E026	7/1/08	1015	2	X		W	ASAP	X	X	** F8I260382-007	PZ131F			
*** 0826D001	7/1/08	1400	2		X	W	ASAP	X	X	*** F8I260379-003	TW038			
*** 0826P001	7/1/08	1345	2	X		W	ASAP	X	X	*** F8I260379-002	TW037			
0827P026	7/1/08	0913	7	X		W	ASAP	X	X		TW057B			
0827P028	7/1/08	0925	7	X		W	ASAP	X	X		TW056			
0827P027	7/1/08	0918	7		X	W	ASAP	X	X		TW057B			

RELINQUISHED BY (Signature): [illegible] DATE: 7/25/08
COMPANY: TtT TIME: 0900
RECEIVED BY (Signature):
COMPANY:
RELINQUISHED BY (Signature): DATE:
COMPANY: TIME:
RECEIVED BY (Signature):
COMPANY:
RELINQUISHED BY (Signature): DATE:
COMPANY: TIME:
RECEIVED BY (Signature):
COMPANY:

LABORATORY INSTRUCTIONS/COMMENTS: Per SIP for Basewide Groundwater Monitoring Program - Kim Felder

COMPOSITE DESCRIPTION

SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
TEMPERATURE: ______ SAMPLE CONDITION: ☐ INTACT ☐ BROKEN
COOLER SEAL: ☐ INTACT ☐ BROKEN

SAMPLING COMMENT:

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

E B E R L I N E S E R V I C E S / R I C H M O N D
SAMPLE DELIVERY GROUP 8881

SDG 8881	Client Tetra Tech EC, Inc.
Contact Melissa C. Mannion	Contract 1023426

S U M M A R Y D A T A S E C T I O N

T A B L E O F C O N T E N T S

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Prepared by

Melissa Mannion

Reviewed by

Lab id	EBERL
Protocol	TTFW-TO70
Version	Ver 1.0
Form	DVD-TOC
Version	3.06
Report date	08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

SDG 8881
Contact Melissa C. Mannion

REPORT GUIDE

Client Tetra Tech EC, Inc.
Contract 1023426

ABOUT THE DATA SUMMARY SECTION

The Data Summary Section of a Data Package has all data, in several useful orders, necessary for first level, routine review of the data package for a Sample Delivery Group (SDG). This section follows the Data Package Narrative, which has an overview of the data package and a discussion of special problems. It is followed by the Raw Data Section, which has full details.

The Data Summary Section has several groups of reports:

SAMPLE SUMMARIES

The Sample and QC Summary Reports show all samples, including QC samples, reported in one SDG. These reports cross-reference client and lab sample identifiers.

PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches (lab groupings reflecting how work was organized) relevant to the reported SDG with information necessary to check the completeness and consistency of the SDG.

WORK SUMMARY

The Work Summary Report shows all samples and work done on them relevant to the reported SDG.

METHOD BLANKS

The Method Blank Reports, one for each Method Blank relevant to the SDG, show all results and primary supporting information for the blanks.

LAB CONTROL SAMPLES

The Lab Control Sample Reports, one for each Lab Control Sample relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DUPLICATES

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

SDG 8881
Contact Melissa C. Mannion

GUIDE, cont.

Client Tetra Tech EC, Inc.
Contract 1023426

ABOUT THE DATA SUMMARY SECTION

The Duplicate Reports, one for each Duplicate and Original sample pair relevant to the SDG, show all results, differences and primary supporting information for these QC samples.

MATRIX SPIKES

The Matrix Spike Reports, one for each Spiked and Original sample pair relevant to the SDG, show all results, recoveries and primary supporting information for these QC samples.

DATA SHEETS

The Data Sheet Reports, one for each client sample in the SDG, show all results and primary supporting information for these samples.

METHOD SUMMARIES

The Method Summary Reports, one for each test used in the SDG, show all results, QC and method performance data for one analyte on one or two pages. (A test is a short code for the method used to do certain work to the client's specification.)

REPORT GUIDES

The Report Guides, one for each of the above groups of reports, have documentation on how to read the associated reports.

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

LAB SAMPLE SUMMARY

SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

LAB SAMPLE ID	CLIENT SAMPLE ID	LOCATION	MATRIX	LEVEL	PROJ. NO.	CHAIN OF CUSTODY	COLLECTED
R807108-01	0826P003	HPS - TO70	WATER		TO_70	35131	06/27/08 11:15
R807108-02	0826D004	HPS - TO70	WATER		TO_70	35131	06/27/08 10:19
R807108-03	0826E004	HPS - TO70	WATER		TO_70	35131	06/27/08 10:30
R807108-04	0826P005	HPS - TO70	WATER		TO_70	35131	06/27/08 11:42
R807108-05	0826D008	HPS - TO70	WATER		TO_70	35131	06/27/08 11:53
R807108-06	0827D019	HPS - TO70	WATER		TO_70	35131	06/30/08 09:35
R807108-07	0827E017	HPS - TO70	WATER		TO_70	35131	06/30/08 09:25
R807108-08	Lab Control Sample		WATER		TO_70		
R807108-09	Method Blank		WATER		TO_70		
R807108-10	Duplicate (R807108-01)	HPS - TO70	WATER		TO_70		06/27/08 11:15
R807108-11	Spike (R807108-01)	HPS - TO70	WATER		TO_70		06/27/08 11:15

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-LS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SDG 8881
Contact Melissa C. Mannion

SAMPLE DELIVERY GROUP 8881

QC SUMMARY

Client Tetra Tech EC, Inc.
Contract 1023426

QC BATCH	CHAIN OF CUSTODY	CLIENT SAMPLE ID	MATRIX	% MOIST	SAMPLE AMOUNT	BASIS AMOUNT	DAYS SINCE RECEIVED	DAYS SINCE COLL	LAB SAMPLE ID	DEPARTMENT SAMPLE ID
8881	35131	0826D004	WATER		2.8 L		07/18/08	21	R807108-02	8881-002
		0826D008	WATER		2.8 L		07/18/08	21	R807108-05	8881-005
		0826E004	WATER		2.8 L		07/18/08	21	R807108-03	8881-003
		0826P003	WATER		4.8 L		07/18/08	21	R807108-01	8881-001
		0826P005	WATER		2.8 L		07/18/08	21	R807108-04	8881-004
		0827D019	WATER		2.8 L		07/18/08	18	R807108-06	8881-006
		0827E017	WATER		2.8 L		07/18/08	18	R807108-07	8881-007
		Method Blank	WATER						R807108-09	8881-009
		Lab Control Sample	WATER						R807108-08	8881-008
		Duplicate (R807108-01)	WATER		4.8 L		07/18/08	21	R807108-10	8881-010
		Spike (R807108-01)	WATER		4.8 L		07/18/08	21	R807108-11	8881-011

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-QS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

PREP BATCH SUMMARY

SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

TEST	MATRIX	METHOD	PREPARATION BATCH	ERROR 2σ %	PLANCHETS ANALYZED CLIENT	MORE	RE	BLANK	LCS	DUP/ORIG	MS/ORIG	QUALIFIERS
Beta Counting												
CS	WATER	Cesium-137 in Water	6156-069	10.4	7			1	1	1/1		
SR	WATER	Strontium-90 in Water	6156-069	10.4	7			1	1	1/1	1/1	X
Gamma Spectroscopy												
GAM	WATER	Gamma Scan	6156-069	7.0	1			1	1	1/1		
Radon Counting												
RA	WATER	Radium-226 in Water	6156-069	16.4	7			1	1	1/1		

Duplicates and Matrix Spikes are those with original (Client) sample in this Sample Delivery Group.
Blank and LCS planchets are those in the same preparation batch as some Client, Duplicate or Spike sample.

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-PBS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

LAB WORK SUMMARY

SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

LAB SAMPLE / COLLECTED / RECEIVED	CLIENT SAMPLE ID / LOCATION / CUSTODY	Proj. No.	MATRIX	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
R807108-01	0826P003			8881-001	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-001	GAM		07/25/08	08/05/08	CSS	Gamma Scan
07/18/08	35131	TO_70		8881-001	RA		08/11/08	08/12/08	BW	Radium-226 in Water
				8881-001	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-02	0826D004			8881-002	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-002	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-002	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-03	0826E004			8881-003	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-003	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-003	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-04	0826P005			8881-004	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-004	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-004	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-05	0826D008			8881-005	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-005	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-005	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-06	0827D019			8881-006	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/30/08	HPS - TO70		WATER	8881-006	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-006	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-07	0827E017			8881-007	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/30/08	HPS - TO70		WATER	8881-007	RA		08/11/08	08/12/08	BW	Radium-226 in Water
07/18/08	35131	TO_70		8881-007	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-08	Lab Control Sample			8881-008	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
			WATER	8881-008	GAM		07/25/08	08/05/08	CSS	Gamma Scan
		TO_70		8881-008	RA		08/11/08	08/12/08	BW	Radium-226 in Water
				8881-008	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-09	Method Blank			8881-009	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
			WATER	8881-009	GAM		07/25/08	08/05/08	CSS	Gamma Scan
		TO_70		8881-009	RA		08/11/08	08/12/08	BW	Radium-226 in Water
				8881-009	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water

Lab id EBERL
Protocol TTFW-TO70
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

SDG 8881
Contact Melissa C. Mannion

WORK SUMMARY, cont.

Client Tetra Tech EC, Inc.
Contract 1023426

LAB SAMPLE / COLLECTED / RECEIVED	CLIENT SAMPLE ID / LOCATION / CUSTODY	Proj. No.	MATRIX	PLANCHET	TEST	SUF-FIX	ANALYZED	REVIEWED	BY	METHOD
R807108-10	Duplicate (R807108-01)			8881-010	CS		08/15/08	08/18/08	MWT	Cesium-137 in Water
06/27/08	HPS - TO70		WATER	8881-010	GAM		07/26/08	08/05/08	CSS	Gamma Scan
07/18/08		TO_70		8881-010	RA		08/11/08	08/12/08	BW	Radium-226 in Water
				8881-010	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
R807108-11	Spike (R807108-01)			8881-011	SR		08/14/08	08/18/08	MWT	Strontium-90 in Water
06/27/08	HPS - TO70		WATER							
07/18/08		TO_70								

COUNTS OF TESTS BY SAMPLE TYPE

TEST	Proj. No.	METHOD	REFERENCE	CLIENT	MORE	RE	BLANK	LCS	DUP	SPIKE	TOTAL
CS	TO_70	Cesium-137 in Water	EPA 901.0 Modified	7			1	1	1		10
GAM	TO_70	Gamma Scan	EPA 901.1	1			1	1	1		4
RA	TO_70	Radium-226 in Water	EPA 903.1	7			1	1	1		10
SR	TO_70	Strontium-90 in Water	EPA 905.0	7			1	1	1	1	11
TOTALS				22			4	4	4	1	35

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-009 **Method Blank**

METHOD BLANK

SDG	8881	Client	Tetra Tech EC, Inc.
Contact	Melissa C. Mannion	Contract	1023426
Lab sample id	R807108-09	Client sample id	Method Blank
Dept sample id	8881-009	Material/Matrix	WATER
		Proj. No.	TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Strontium-90	10098-97-2	-0.116	0.12	0.260	2.00	U	SR
Cobalt-60	10198-40-0	U		7.45	25.0	U	GAM
Cesium-137	10045-97-3	0.166	0.25	0.443	10.0	U	CS
Radium-226	688-73-3	0.005	0.019	0.037	1.00	U	RA

QC-BLANK #66550

Lab id	EBERL
Protocol	TTFW-TO70
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-008 Lab Control Sample

LAB CONTROL SAMPLE

SDG 8881 Client Tetra Tech EC, Inc.

Contact Melissa C. Mannion Contract 1023426

Lab sample id R807108-08 Client sample id Lab Control Sample

Dept sample id 8881-008 Material/Matrix WATER

Proj. No. TO 70

ANALYTE	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	REC %	2σ LMTS (TOTAL)	PROTOCOL LIMITS
Strontium-90	9.29	1.1	0.221	2.00		SR	9.28	0.37	100	88-112	75-125
Cobalt-60	219	20	7.13	25.0		GAM	212	8.5	103	90-110	75-125
Americium-241	234	49	56.9			GAM	254	10	92	80-120	75-125
Cesium-137	19.4	2.2	0.473	10.0		CS	18.6	0.74	104	88-112	75-125
Radium-226	5.37	0.91	0.063	1.00		RA	5.58	0.22	96	83-117	75-125

QC-LCS #66549

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-LCS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-010 0826P003

DUPLICATE

SDG 8881 Client Tetra Tech EC, Inc.

Contact Melissa C. Mannion Contract 1023426

DUPLICATE		ORIGINAL		
Lab sample id	R807108-10	Lab sample id	R807108-01	Client sample id 0826P003
Dept sample id	8881-010	Dept sample id	8881-001	Location/Matrix HPS - TO70 WATER
		Received	07/18/08	Collected/Volume 06/27/08 11:15 4.8 L
				Custody/Proj. No. 35131 TO 70

ANALYTE	DUPLICATE pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ORIGINAL pCi/L	2σ ERR (TOTAL)	MDA pCi/L	QUALI-FIERS	RPD %	2σ TOT	DER σ
Strontium-90	0.040	0.29	0.489	2.00	U	SR	-0.018	0.37	0.638	U	-		0.2
Cobalt-60	U		21.6	25.0	U	GAM	U		17.5	U	-		0.3
Cesium-137	0.077	0.69	1.26	10.0	U	CS	0.699	0.52	0.846	U	-		1.4
Radium-226	0.255	0.31	0.509	1.00	U	RA	0.165	0.33	0.576	U	-		0.4

QC-DUP#1 66551

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1
Cobalt-60 Method - EPA 901.1

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-DUP
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-011 0826P003

MATRIX SPIKE

SDG 8881 Client Tetra Tech EC, Inc.

Contact Melissa C. Mannion Contract 1023426

MATRIX SPIKE **ORIGINAL**

Lab sample id R807108-11 Lab sample id R807108-01 Client sample id 0826P003

Dept sample id 8881-011 Dept sample id 8881-001 Location/Matrix HPS - TO70 WATER

Received 07/18/08 Collected/Volume 06/27/08 11:15 4.8 L

Custody/Proj. No. 35131 TO 70

ANALYTE	SPIKE pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST	ADDED pCi/L	2σ ERR pCi/L	ORIGINAL pCi/L	2σ ERR (TOTAL)	REC %	2σ LMTS (TOTAL)	PROTOCOL LIMITS
Strontium-90	33.8	3.9	0.763	2.00	X	SR	37.2	1.5	-0.018	0.37	91	89-111	75-125

QC-MS#1 66552

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1
Cobalt-60 Method - EPA 901.1

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-MS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-001 **0826P003**

DATA SHEET

SDG	8881	Client	Tetra Tech EC, Inc.
Contact	Melissa C. Mannion	Contract	1023426
Lab sample id	R807108-01	Client sample id	0826P003
Dept sample id	8881-001	Location/Matrix	HPS - TO70 WATER
Received	07/18/08	Collected/Volume	06/27/08 11:15 4.8 L
		Custody/Proj. No.	35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Strontium-90	10098-97-2	-0.018	0.37	0.638	2.00	U	SR
Cobalt-60	10198-40-0	U		17.5	25.0	U	GAM
Cesium-137	10045-97-3	0.699	0.52	0.846	10.0	U	CS
Radium-226	688-73-3	0.165	0.33	0.576	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1
Cobalt-60 Method - EPA 901.1

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Lab id	EBERL
Protocol	TTFW-TO70
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-002 **0826D004**

DATA SHEET

SDG	8881	Client	Tetra Tech EC, Inc.
Contact	Melissa C. Mannion	Contract	1023426
Lab sample id	R807108-02	Client sample id	0826D004
Dept sample id	8881-002	Location/Matrix	HPS - TO70 WATER
Received	07/18/08	Collected/Volume	06/27/08 10:19 2.8 L
		Custody/Proj. No.	35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Strontium-90	10098-97-2	0.278	0.35	0.627	2.00	U	SR
Cesium-137	10045-97-3	0.276	0.42	0.750	10.0	U	CS
Radium-226	688-73-3	0.416	0.35	0.525	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id	EBERL
Protocol	TTFW-TO70
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/20/08

EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-003 **0826E004**

DATA SHEET

SDG	8881	Client	Tetra Tech EC, Inc.
Contact	Melissa C. Mannion	Contract	1023426
Lab sample id	R807108-03	Client sample id	0826E004
Dept sample id	8881-003	Location/Matrix	HPS - TO70 WATER
Received	07/18/08	Collected/Volume	06/27/08 10:30 2.8 L
		Custody/Proj. No.	35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Strontium-90	10098-97-2	0.362	0.34	0.582	2.00	U	SR
Cesium-137	10045-97-3	0.200	0.31	0.552	10.0	U	CS
Radium-226	688-73-3	0.324	0.31	0.498	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id	EBERL
Protocol	TTFW-TO70
Version	Ver 1.0
Form	DVD-DS
Version	3.06
Report date	08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-004 **0826P005**

DATA SHEET

SDG 8881 Client Tetra Tech EC, Inc.
Contact Melissa C. Mannion Contract 1023426

Lab sample id R807108-04 Client sample id 0826P005
Dept sample id 8881-004 Location/Matrix HPS - TO70 WATER
Received 07/18/08 Collected/Volume 06/27/08 11:42 2.8 L
Custody/Proj. No. 35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Strontium-90	10098-97-2	0	0.22	0.426	2.00	U	SR
Cesium-137	10045-97-3	0.192	0.48	0.840	10.0	U	CS
Radium-226	688-73-3	0.288	0.30	0.480	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-DS
Version 3.06
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-005 **0826D008**

DATA SHEET

SDG 8881 Client Tetra Tech EC, Inc.
Contact Melissa C. Mannion Contract 1023426

Lab sample id R807108-05 Client sample id 0826D008
Dept sample id 8881-005 Location/Matrix HPS - TO70 WATER
Received 07/18/08 Collected/Volume 06/27/08 11:53 2.8 L
Custody/Proj. No. 35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALI-FIERS	TEST
Strontium-90	10098-97-2	0.437	0.27	0.447	2.00	U	SR
Cesium-137	10045-97-3	0.613	0.57	0.941	10.0	U	CS
Radium-226	688-73-3	0.275	0.33	0.538	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
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EBERLINE SERVICES / RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-006 **0827D019**

DATA SHEET

SDG 8881 Client Tetra Tech EC, Inc.
Contact Melissa C. Mannion Contract 1023426

Lab sample id R807108-06 Client sample id 0827D019
Dept sample id 8881-006 Location/Matrix HPS - TO70 WATER
Received 07/18/08 Collected/Volume 06/30/08 09:35 2.8 L
Custody/Proj. No. 35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Strontium-90	10098-97-2	-0.055	0.37	0.735	2.00	U	SR
Cesium-137	10045-97-3	0.037	0.41	0.761	10.0	U	CS
Radium-226	688-73-3	0.375	0.36	0.566	1.00	U	RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-DS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

8881-007 **0827E017**

DATA SHEET

SDG	8881	Client	Tetra Tech EC, Inc.
Contact	Melissa C. Mannion	Contract	1023426
Lab sample id	R807108-07	Client sample id	0827E017
Dept sample id	8881-007	Location/Matrix	HPS - TO70 WATER
Received	07/18/08	Collected/Volume	06/30/08 09:25 2.8 L
		Custody/Proj. No.	35131 TO_70

ANALYTE	CAS NO	RESULT pCi/L	2σ ERR (TOTAL)	MDA pCi/L	RDL pCi/L	QUALIFIERS	TEST
Strontium-90	10098-97-2	0.181	0.28	0.522	2.00	U	SR
Cesium-137	10045-97-3	0.171	0.30	0.523	10.0	U	CS
Radium-226	688-73-3	0.616	0.39	0.530	1.00		RA

Strontium-90 Method - EPA 905.0
Cesium-137 Method - EPA 901.0 Modified
Radium-226 Method - EPA 903.1

Lab id	EBERL
Protocol	TTFW-TO70
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

Test CS Matrix WATER
SDG 8881
Contact Melissa C. Mannion

LAB METHOD SUMMARY

CESIUM-137 IN WATER

BETA COUNTING

Client Tetra Tech EC, Inc.
Contract 1023426

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Cesium-137	
Preparation batch 6156-069						
R807108-01			8881-001	0826P003	U	
R807108-02			8881-002	0826D004	U	
R807108-03			8881-003	0826E004	U	
R807108-04			8881-004	0826P005	U	
R807108-05			8881-005	0826D008	U	
R807108-06			8881-006	0827D019	U	
R807108-07			8881-007	0827E017	U	
R807108-08			8881-008	Lab Control Sample	ok	
R807108-09			8881-009	Method Blank	U	
R807108-10			8881-010	Duplicate (R807108-01)	-	U
Nominal values and limits from method				RDLs (pCi/L)	10.0	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6156-069			2σ prep error 10.4 %	Reference Lab Notebook #6156, pg. 69												
R807108-01			0826P003	0.846	0.500			40	400				49	08/15/08	08/15	GRB-223
R807108-02			0826D004	0.750	0.500			45	400				49	08/15/08	08/15	GRB-224
R807108-03			0826E004	0.552	0.500			72	400				49	08/15/08	08/15	GRB-225
R807108-04			0826P005	0.840	0.500			42	400				49	08/15/08	08/15	GRB-227
R807108-05			0826D008	0.941	0.500			35	400				49	08/15/08	08/15	GRB-228
R807108-06			0827D019	0.761	0.500			50	400				46	08/15/08	08/15	GRB-229
R807108-07			0827E017	0.523	0.500			71	400				46	08/15/08	08/15	GRB-230
R807108-08			Lab Control Sample	0.473	0.500			88	400					08/15/08	08/15	GRB-231
R807108-09			Method Blank	0.443	0.500			90	400					08/15/08	08/15	GRB-232
R807108-10			Duplicate (R807108-01)	1.26	0.500			27	400				49	08/15/08	08/15	GRB-217
Nominal values and limits from method				10.0	0.500			20-105	200				180			

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

LAB METHOD SUMMARY, cont.

CESIUM-137 IN WATER

BETA COUNTING

Test CS Matrix WATER
SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

PROCEDURES	REFERENCE	EPA 901.0 Modified
	SPP-041	Filtered Water Dissolution, rev 1
	DWP-550	Cesium in Drinking Water, rev 6

AVERAGES ± 2 SD FOR 10 SAMPLES
MDA 0.739 ± 0.505
YIELD 56 ± 45

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-LMS
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

LAB METHOD SUMMARY

STRONTIUM-90 IN WATER

BETA COUNTING

Test SR Matrix WATER
SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Strontium-90	
Preparation batch 6156-069						
R807108-01			8881-001	0826P003	U	
R807108-02			8881-002	0826D004	U	
R807108-03			8881-003	0826E004	U	
R807108-04			8881-004	0826P005	U	
R807108-05			8881-005	0826D008	U	
R807108-06			8881-006	0827D019	U	
R807108-07			8881-007	0827E017	U	
R807108-08			8881-008	Lab Control Sample	ok	
R807108-09			8881-009	Method Blank	U	
R807108-10			8881-010	Duplicate (R807108-01)	-	U
R807108-11			8881-011	Spike (R807108-01)	ok	X
Nominal values and limits from method				RDLs (pCi/L)	2.00	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6156-069			2σ prep error 10.4 %	Reference Lab Notebook #6156, pg. 69												
R807108-01			0826P003	0.638	0.500			60		217			48	08/14/08	08/14	GRB-220
R807108-02			0826D004	0.627	0.500			73		120			48	08/14/08	08/14	GRB-204
R807108-03			0826E004	0.582	0.500			81		120			48	08/14/08	08/14	GRB-225
R807108-04			0826P005	0.426	0.500			109		120			48	08/14/08	08/14	GRB-227
R807108-05			0826D008	0.447	0.500			92		120			48	08/14/08	08/14	GRB-204
R807108-06			0827D019	0.735	0.500			60		120			45	08/14/08	08/14	GRB-221
R807108-07			0827E017	0.522	0.500			83		120			45	08/14/08	08/14	GRB-222
R807108-08			Lab Control Sample	0.221	1.00			86		120				08/14/08	08/14	GRB-202
R807108-09			Method Blank	0.260	1.00			84		120				08/14/08	08/14	GRB-224
R807108-10			Duplicate (R807108-01)	0.489	0.500			68		200			48	08/14/08	08/14	GRB-221
R807108-11			Spike (R807108-01)	0.763	0.500			51		120			48	08/14/08	08/14	GRB-203
Nominal values and limits from method				2.00	1.00			35-105		100			180			

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Version Ver 1.0
Form DVD-LMS
Version 3.06
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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

LAB METHOD SUMMARY, cont.

STRONTIUM-90 IN WATER

BETA COUNTING

Test SR Matrix WATER
SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
Contract 1023426

PROCEDURES	REFERENCE	EPA 905.0
	SPP-041	Filtered Water Dissolution, rev 1
	DWP-380	Strontium in Drinking Water, rev 7

AVERAGES ± 2 SD	MDA	0.519	±	0.350
FOR 11 SAMPLES	YIELD	77	±	33

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EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

Test GAM Matrix WATER
SDG 8881
Contact Melissa C. Mannion

LAB METHOD SUMMARY

GAMMA SCAN

GAMMA SPECTROSCOPY

Client Tetra Tech EC, Inc.
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RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Cobalt-60	Cesium-137	Americium-241
Preparation batch 6156-069							
R807108-01			8881-001	0826P003	U		
R807108-08			8881-008	Lab Control Sample	ok		ok
R807108-09			8881-009	Method Blank	U		
R807108-10			8881-010	Duplicate (R807108-01)	- U		
Nominal values and limits from method				RDLs (pCi/L)	25.0	119	

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6156-069			2σ prep error 7.0 %		Reference Lab Notebook #6156, pg. 69											
R807108-01			0826P003		0.500					287			28	07/25/08	07/25	MB,06,00
R807108-08			Lab Control Sample		1.00					287				07/25/08	07/25	MB,08,00
R807108-09			Method Blank		1.00					201				07/25/08	07/25	MB,08,00
R807108-10			Duplicate (R807108-01)		0.500					214			29	07/25/08	07/26	MB,06,00
Nominal values and limits from method				5.00	1.00					100			180			

PROCEDURES REFERENCE EPA 901.1
DWP-100 Preparation of Drinking Water Samples for Gamma Spectroscopy, rev 5

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SAMPLE DELIVERY GROUP 8881

Test RA Matrix WATER
SDG 8881
Contact Melissa C. Mannion

LAB METHOD SUMMARY

RADIUM-226 IN WATER

RADON COUNTING

Client Tetra Tech EC, Inc.
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RESULTS

LAB SAMPLE ID	RAW TEST	SUF-FIX	PLANCHET	CLIENT SAMPLE ID	Radium-226
Preparation batch 6156-069					
R807108-01			8881-001	0826P003	U
R807108-02			8881-002	0826D004	U
R807108-03			8881-003	0826E004	U
R807108-04			8881-004	0826P005	U
R807108-05			8881-005	0826D008	U
R807108-06			8881-006	0827D019	U
R807108-07			8881-007	0827E017	0.616
R807108-08			8881-008	Lab Control Sample	ok
R807108-09			8881-009	Method Blank	U
R807108-10			8881-010	Duplicate (R807108-01)	- U
Nominal values and limits from method				RDLs (pCi/L)	1.00

METHOD PERFORMANCE

LAB SAMPLE ID	RAW TEST	SUF-FIX	CLIENT SAMPLE ID	MDA pCi/L	ALIQ L	PREP FAC	DILU-TION	YIELD %	EFF %	COUNT min	FWHM keV	DRIFT KeV	DAYS HELD	PREPARED	ANAL-YZED	DETECTOR
Preparation batch 6156-069			2σ prep error 16.4 %	Reference Lab Notebook #6156, pg. 69												
R807108-01			0826P003	0.576	0.100			100		111			45	08/11/08	08/11	RN-011
R807108-02			0826D004	0.525	0.100			100		111			45	08/11/08	08/11	RN-012
R807108-03			0826E004	0.498	0.100			100		111			45	08/11/08	08/11	RN-015
R807108-04			0826P005	0.480	0.100			100		90			45	08/11/08	08/11	RN-011
R807108-05			0826D008	0.538	0.100			100		90			45	08/11/08	08/11	RN-012
R807108-06			0827D019	0.566	0.100			100		90			42	08/11/08	08/11	RN-014
R807108-07			0827E017	0.530	0.100			100		90			42	08/11/08	08/11	RN-015
R807108-08			Lab Control Sample	0.063	1.00			100		102				08/11/08	08/11	RN-009
R807108-09			Method Blank	0.037	1.00			100		90				08/11/08	08/11	RN-010
R807108-10			Duplicate (R807108-01)	0.509	0.100			100		90			45	08/11/08	08/11	RN-016
Nominal values and limits from method				1.00	1.00					50			180			

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LAB METHOD SUMMARY, cont.

RADIUM-226 IN WATER

RADON COUNTING

Test RA Matrix WATER
SDG 8881
Contact Melissa C. Mannion

Client Tetra Tech EC, Inc.
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PROCEDURES	REFERENCE	EPA 903.1
	SPP-041	Filtered Water Dissolution, rev 1
	DWP-881A	Ra-226 Screening in Drinking Water, rev 6

AVERAGES ± 2 SD FOR 10 SAMPLES
MDA 0.432 ± 0.407
YIELD 100 ± 0

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SAMPLE DELIVERY GROUP 8881

SDG 8881
Contact Melissa C. Mannion

REPORT GUIDE

Client Tetra Tech EC, Inc.
Contract 1023426

SAMPLE SUMMARY

The Sample and QC Summary Reports show all samples, including QC samples, reported in one Sample Delivery Group (SDG).

The Sample Summary Report fully identifies client samples and gives the corresponding lab sample identification. The QC Summary Report shows at the sample level how the lab organized the samples into batches and generated QC samples. The Preparation Batch and Method Summary Reports show this at the analysis level.

The following notes apply to these reports:

* LAB SAMPLE ID is the lab's primary identification for a sample.

* DEPARTMENT SAMPLE ID is an alternate lab id, for example one assigned by a radiochemistry department in a lab.

* CLIENT SAMPLE ID is the client's primary identification for a sample. It includes any sample preparation done by the client that is necessary to identify the sample.

* QC BATCH is a lab assigned code that groups samples to be processed and QCed together. These samples should have similar matrices.

  QC BATCH is not necessarily the same as SDG, which reflects samples received and reported together.

* All Lab Control Samples, Method Blanks, Duplicates and Matrix Spikes are shown that QC any of the samples. Due to possible reanalyses, not all results for all these QC samples may be relevant to the SDG. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

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PREPARATION BATCH SUMMARY

The Preparation Batch Summary Report shows all preparation batches in one Sample Delivery Group (SDG) with information necessary to check the completeness and consistency of the SDG.

The following notes apply to this report:

* The preparation batches are shown in the same order as the Method Summary Reports are printed.

* Only analyses of planchets relevant to the SDG are included.

* Each preparation batch should have at least one Method Blank and LCS in it to validate client sample results.

* The QUALIFIERS shown are all qualifiers other than U, J, B, L and H that occur on any analysis in the preparation batch. The Method Summary Report has these qualifiers on a per sample basis.

  These qualifiers should be reviewed as follows:

  X Some data has been manually entered or modified. Transcription errors are possible.

  P One or more results are 'preliminary'. The data is not ready for final reporting.

  2 There were two or more results for one analyte on one planchet imported at one time. The results in DVD may not be the same as on the raw data sheets.

  Other lab defined qualifiers may occur. In general, these should be addressed in the SDG narrative.

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WORK SUMMARY

The Work Summary Report shows all samples, including QC samples, and all relevant analyses in one Sample Delivery Group (SDG). This report is often useful as supporting documentation for an invoice.

The following notes apply to this report:

* TEST is a code for the method used to measure associated analytes. Results and related information for each analyte are on the Data Sheet Report. In special cases, a test code used in the summary data section is not the same as in associated raw data. In this case, both codes are shown on the Work Summary.

* SUFFIX is the lab's code to distinguish multiple analyses (recounts, reworks, reanalyses) of a fraction of the sample. The suffix indicates which result is being reported. An empty suffix normally identifies the first attempt to analyze the sample.

* The LAB SAMPLE ID, TEST and SUFFIX uniquely identify all supporting data for a result. The Method Summary Report for each TEST has method performance data, such as yield, for each lab sample id and suffix and procedures used in the method.

* PLANCHET is an alternate lab identifier for work done for one test. It, combined with the TEST and SUFFIX, may be the best link to raw data.

* For QC samples, only analyses that directly QC some regular sample are shown. The Lab Control Sample, Method Blank, Duplicate, Matrix Spike and Method Summary Reports detail these relationships.

* The SAS (Special Analytical Services) Number is a client or lab assigned code that reflects special processing for samples, such as rapid turn around. Counts of tests done are lists by SAS number since it is likely to affect prices.

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DATA SHEET

The Data Sheet Report shows all results and primary supporting information for one client sample or Method Blank. This report corresponds to both the CLP Inorganics and Organics Data Sheet.

The following notes apply to this report:

* TEST is a code for the method used to measure an analyte. If the TEST is empty, no data is available; the analyte was not analyzed for.

* The LAB SAMPLE ID and TEST uniquely identify work within the Summary Data Section of a Data Package. The Work Summary and Method Summary Reports further identify raw data that underlies this work.

  The Method Summary Report for each TEST has method performance data, such as yield, for each Lab Sample ID and a list of procedures used in the method.

* ERRORs can be labeled TOTAL or COUNT. TOTAL implies a preparation (non-counting method) error has been added, as square root of sum of squares, to the counting error denoted by COUNT. The preparation errors, which may vary by preparation batch, are shown on the Method Summary Report.

* A RESULT can be 'N.R.' (Not Reported). This means the lab did this work but chooses not to report it now, possibly because it was reported at another time.

* When reporting a Method Blank, a RESULT can be 'N.A.' (Not Applicable). This means there is no reported client sample work in the same preparation batch as the Blank's result. This is likely to occur when the Method Blank is associated with reanalyses of selected work for a few samples in the SDG.

The following qualifiers are defined by the DVD system:

U The RESULT is less than the MDA (Minimum Detectable Activity). If the MDA is blank, the ERROR is used as the limit.

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J The RESULT is less than the RDL (Required Detection Limit) and no U qualifier is assigned.

B A Method Blank associated with this sample had a result without a U flag and, after correcting for possibly different aliquots, that result is greater than or equal to the MDA for this sample.

Normally, B is not assigned if U is. When method blank subtraction is shown on this report, B flags are assigned based on the unsubtracted values while U's are assigned based on the subtracted ones. Both flags can be assigned in this case.

For each sample result, all Method Blank results in the same preparation batch are compared. The Method Summary Report documents this and other QC relationships.

L Some Lab Control Sample that QC's this sample had a low recovery. The lab can disable assignment of this qualifier.

H Similar to 'L' except the recovery was high.

P The RESULT is 'preliminary'.

X Some data necessary to compute the RESULT, ERROR or MDA was manually entered or modified.

2 There were two or more results available for this analyte. The reported result may not be the same as in the raw data.

Other qualifiers are lab defined. Definitions should be in the SDG narrative.

The following values are underlined to indicate possible problems:

* An MDA is underlined if it is bigger than its RDL.

* An ERROR is underlined if the 1.645 sigma counting error is bigger than both the MDA and the RESULT, implying that the MDA

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DATA SHEET

may not be a good estimate of the 'real' minimum detectable activity.

* A negative RESULT is underlined if it is less than the negative of its 2 sigma counting ERROR.

* When reporting a Method Blank, a RESULT is underlined if greater than its MDA. If the MDA is blank, the 2 sigma counting error is used in the comparison.

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LAB CONTROL SAMPLE

The Lab Control Sample Report shows all results, recoveries and primary supporting information for one Lab Control Sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. Refer to its Report Guide for details.

* An amount ADDED is the lab's value for the actual amount spiked into this sample with its ERROR an estimate of the error of this amount.

  An amount added is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The error of RESULT, including that introduced by rounding the result prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

* The recovery is underlined if it is outside either of these ranges.

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DUPLICATE

The Duplicate Report shows all results, differences and primary supporting information for one Duplicate and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Duplicate and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Duplicate has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* The RPD (Relative Percent Difference) is the absolute value of the difference of the RESULTs divided by their average expressed as a percent.

  If both RESULTs are less than their MDAs, no RPD is computed and a '-' is printed.

  For an analyte, if the lab did work for both samples but has data for only one, the MDA from the sample with data is used as the other's result in the RPD.

* The first, computed limit is the sum, as square root of sum of squares, of the errors of the results divided by the average result as a percent, hence the relative error of the difference rather than the error of the relative difference. The errors include those introduced by rounding the RESULTs prior to printing.

  If this limit is labeled TOT, it includes the preparation error in the RESULTs. If labeled CNT, it does not.

  This value reported for this limit is at most 999.

* The second limit for the RPD is the larger of:

  1. A fixed percentage specified in the protocol.

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2. A protocol factor (typically 2) times the average MDA as a percent of the average result. This limit applies when the results are close to the MDAs.

* The RPD is underlined if it is greater than either limit.

* If specified by the lab, the second limit column is replaced by the Difference Error Ratio (DER), which is the absolute value of the difference of the results divided by the quadratic sum of their one sigma errors, the same errors as used in the first limit.

  Except for differences due to rounding, the DER is the same as the RPD divided by the first RPD limit with the limit scaled to 1 sigma.

* The DER is underlined if it is greater than the sigma factor, typically 2 or 3, shown in the header for the first RPD limit.

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MATRIX SPIKE

The Matrix Spike Report shows all results, recoveries and primary supporting information for one Matrix Spike and associated Original sample.

The following notes apply to this report:

* All fields in common with the Data Sheet Report have similar usage. This applies both to the Spiked and Original sample data. Refer to the Data Sheet Report Guide for details.

  If the Spike has data for a TEST and the lab did not do this test to the Original, the Original's RESULTs are underlined.

* An amount ADDED is the lab's value for the actual amount spiked into the Spike sample with its ERROR an estimate of the error of this amount.

  An amount is underlined if its ratio to the corresponding RDL is outside protocol specified limits.

* REC (Recovery) is the Spike RESULT minus the Original RESULT divided by ADDED expressed as a percent.

* The first, computed limits for the recovery reflect:

  1. The errors of the two RESULTs, including those introduced by rounding them prior to printing.

     If the limits are labeled (TOTAL), they include preparation error in the result. If labeled (COUNT), they do not.

  2. The error of ADDED.

  3. A lab specified, per analyte bias. The bias changes the center of the computed limits.

* The second limits are protocol defined upper and lower QC limits for the recovery.

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MATRIX SPIKE

These limits are left blank if the Original RESULT is more than a protocol defined factor (typically 4) times ADDED. This is a way of accounting for that when the spike is small compared to the amount in the original sample, the recovery is unreliable.

* The recovery is underlined (out of spec) if it is outside either of these ranges.

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METHOD SUMMARY

The Method Summary Report has two tables. One shows up to five results measured using one method. The other has performance data for the method. There is one report for each TEST, as used on the Data Sheet Report.

The following notes apply to this report:

* Each table is subdivided into sections, one for each preparation batch. A preparation batch is a group of aliquots prepared at roughly the same time in one work area of the lab using the same method.

  There should be Lab Control Sample and Method Blank results in each preparation batch since this close correspondence makes the QC meaningful. Depending on lab policy, Duplicates need not occur in each batch since they QC sample dependencies such as matrix effects.

* The RAW TEST column shows the test code used in the raw data to identify a particular analysis if it is different than the test code in the header of the report. This occurs in special cases due to method specific details about how the lab labels work.

  The Lab Sample or Planchet ID combined with the (Raw) Test Code and Suffix uniquely identify the raw data for each analysis.

* If a result is less than both its MDA and RDL, it is replaced by just 'U' on this report. If it is greater than or equal to the RDL but less than the MDA, the result is shown with a 'U' flag.

  The J and X flags are as on the data sheet.

* Non-U results for Method Blanks are underlined to indicate possible contamination of other samples in the preparation batch. The Method Blank Report has supporting data.

* Lab Control Sample and Matrix Spike results are shown as: ok, No data, LOW or HIGH, with the last two underlined. 'No data' means no amount ADDED was specified. 'LOW' and 'HIGH'

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correspond to when the recovery is underlined on the Lab Control Sample or Matrix Spike Report. See these reports for supporting data.

* Duplicate sample results are shown as: ok, No data, or OUT, with the last two underlined. 'No data' means there was no original sample data found for this duplicate. 'OUT' corresponds to when the RPD is underlined on the Duplicate Report. See this report for supporting data.

* If the MDA column is labeled 'MAX MDA', there was more than one result measured by the reported method and the MDA shown is the largest MDA. If not all these results have the same RDL, the MAX MDA reflects only those results with RDL equal to the smallest one.

  MDAs are underlined if greater than the printed RDL.

* Aliquots are underlined if less than the nominal value specified for the method.

* Prepareation factors are underlined if greater than the nominal value specified for the method.

* Dilution factors are underlined if greater than the nominal value specified for the method.

* Residues are underlined if outside the range specified for the method. Residues are not printed if yields are.

* Yields, which may be gravimetric, radiometric or some type of recovery depending on the method, are underlined if outside the range specified for the method.

* Efficiencies are underlined if outside the range specified for the method. Efficiencies are detector and geometry dependent so this test is only approximate.

* Count times are underlined if less than the nominal value

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M E T H O D S U M M A R Y

specified for the method.

* Resolutions (as FWHM; Full Width at Half Max) are underlined if greater than the method specified limit.

* Tracer drifts are underlined if their absolute values are greater than the method specified limit. Tracer drifts are not printed if percent moistures are.

* Days Held are underlined if greater than the holding time specified in the protocol.

* Analysis dates are underlined if before their planchet's preparation date or, if a limit is specified, too far after it.

For some methods, ratios as percentages and error estimates for them are computed for pairs of results. A ratio column header like '1÷3' means the ratio of the first result column and the third result column.

Ratios are not computed for Lab Control Sample, Method Blank or Matrix Spike results since their matrices are not necessarily similar to client samples'.

The error estimate for a ratio of results from one planchet reflects only counting errors since other errors should be correlated. For a ratio involving different planchets, if QC limits are computed based on total errors, the error for the ratio allows for the preparation errors for the planchets.

The ratio is underlined (out of spec) if the absolute value of its difference from the nominal value is greater than its error estimate. If no nominal value is specified, this test is not done.

For Gross Alpha or Gross Beta results, there may be a column showing the sum of other Alpha or Beta emitters. This sum includes all relevant results in the DVD database, whether reported or not. Results in the sum are weighted by a particles/decay value specified by the lab for each relevant analyte. Results less than their MDA are not included.

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 08/20/08

EBERLINE SERVICES/RICHMOND

SAMPLE DELIVERY GROUP 8881

SDG 8881
Contact Melissa C. Mannion

GUIDE, cont.

Client Tetra Tech EC, Inc.
Contract 1023426

METHOD SUMMARY

No sums are computed for Lab Control, Method Blank or Matrix Spike samples since their various planchets may not be physically related.

If a ratio of total isotopic to Gross Alpha or Beta is shown, the error for the ratio reflects both the error in the Gross result and the sum, as square root of sum of squares, of the errors in the isotopic results.

For total elemental uranium or thorium results, there may be a column showing the total weight computed from associated isotopic results. Ignoring results less than their MDAs, this is a weighted sum of the isotopic results. The weights depend on the molecular weight and half-life of each isotope so as to convert activities (decays) to weight (atoms).

If a ratio of total computed to measured elemental uranium or thorium is shown, the error for the ratio reflects the errors in all the measurements.

Lab id EBERL
Protocol TTFW-TO70
Version Ver 1.0
Form DVD-RG
Version 3.06
Report date 08/20/08

TETRATECH
1230 Columbia Street, Suite 750
San Diego, CA 92101 (619) 234-8696

NUMBER 35131

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: HPS	PURCHASE ORDER NO.: 1035A 1023426
PROJECT LOCATION: TO 70	PROJECT NO.: 2597-070D
SAMPLER NAME: VARIOUS (Kleinfelder)	AIRBILL NUMBER: COURIER
PROJECT CONTACT: Paul Wall	PROJECT CONTACT PHONE NUMBER: 415-671-1990

LABORATORY NAME: Eberline

LABORATORY ID (FOR LABORATORY): 8881

ANALYSES REQUIRED: CS137 EPA 901.0 mod; RA-226 EPA 903.1; SR-90 EPA 905.0; CO-60 EPA 901.1 mod

SAMPLE ID	DATE COLLECTED	TIME COLLECTED	NO. OF CONTAINER	LEVEL 3	LEVEL 4	TYPE	TAT	COMMENTS
0826P003	6/27/08	1115	10		X	W	21 DAY	RUN MS FOR SR 90 ONL
0826D004	6/27/08	1019	6		X	W	21 DAY	
0826E004	6/27/08	1030	6		X	W	21 DAY	
0826P005	6/27/08	1142	6		X	W	21 DAY	
0826D008	6/27/08	1153	6		X	W	21 DAY	
0827D019	6/30/08	0935	6		X	W	21 DAY	
0827E017	6/30/08	0925	6		X	W	21 DAY	
			4					

RELINQUISHED BY (Signature): [signature]	DATE: 7-7-08	RECEIVED BY (Signature): Shelley Youngs	LABORATORY INSTRUCTIONS/COMMENTS: PER SAP FOR BASEWIDE Groundwater MONITORING PROGRAM FOR KLEINFELDER
COMPANY: NAVY	TIME: 3:30	COMPANY: Universal Shipping	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	COMPOSITE DESCRIPTION
COMPANY	TIME	COMPANY: Eberline Services	
RELINQUISHED BY (Signature)	DATE	RECEIVED BY (Signature)	SAMPLE CONDITION UPON RECEIPT (FOR LABORATORY)
COMPANY	TIME	COMPANY	TEMPERATURE: N/A SAMPLE CONDITION: ☑ INTACT ☐ BROK COOLER SEAL: ☐ INTACT ☐ BROKEN N/A

White - Laboratory; Pink - Laboratory; Canary - Project File; Manila - Data Management

EBERLINE

RICHMOND, CA LABORATORY

SAMPLE RECEIPT CHECKLIST

Client: TETRA TECH City SF. State CA

Date/Time received 07/17/08 16:40 CoC No. 35131

Container I.D. No. ICE CHESTS Requested TAT (Days) 21 P.O. Received Yes [ ] No [X]

INSPECTION

1.	Custody seals on shipping container intact?	Yes [X]	No [ ]	N/A [ ]
2.	Custody seals on shipping container dated & signed?	Yes [X]	No [ ]	N/A [ ]
3.	Custody seals on sample containers intact?	Yes [ ]	No [ ]	N/A [X]
4.	Custody seals on sample containers dated & signed?	Yes [ ]	No [ ]	N/A [X]
5.	Packing material is:	Wet [ ]	Dry [X]	
6.	Number of samples in shipping container: 7	Sample Matrix W		
7.	Number of containers per sample: _____	(Or see CoC X)		
8.	Samples are in correct container	Yes [X]	No [ ]	
9.	Paperwork agrees with samples?	Yes [X]	No [ ]	
10.	Samples have: Tape [ ] Hazard labels [ ] Rad labels [ ]	Appropriate sample labels [X]		
11.	Samples are: In good condition [X] Leaking [ ] Broken Container [ ]	Missing [ ]		
12.	Samples are: Preserved [X] Not preserved [ ] pH _____	Preservative _____		
13.	Describe any anomalies:			
14.	Was P.M. notified of any anomalies?	Yes [ ]	No [ ]	Date _____
15.	Inspected by [signature]	Date: 07/18/08	Time: 07:45	

Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	Wipe	Customer Sample No.	Beta/Gamma cpm	Ion Chamber mR/hr	wipe
All samples	462						

Ion Chamber Ser. No. _____ Calibration date _____

Alpha Meter Ser. No. _____ Calibration date _____

Beta/Gamma Meter Ser. No. 99574 Calibration date 08 MAY 09

Form SCP-02, 07-30-07

"over 55 years of quality nuclear services"

ORTEC g v - i (3263) wan32 G53W2.06 30-JUL-2008 13:33:08
New World Technology Spectrum name: 1K000001.An1

Sample description
Parcel E-2 TW005 0826P007 265ml
6/27/08 13:17

Acquisition information
Start time: 14-Jul-2008 11:01:02
Live time: 72000
Real time: 72062

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	1.2041E-01	4.3998E-02	4.4224E-02	0.323E-01
AM-241	#A	-7.2837E-01	-1.6128E+00	-1.6130E+00	0.148E+00
Bi-212	F	1.3921E-01	8.4475E-02	8.4632E-02	0.664E-01
BI-214	F	1.8397E-01	3.3879E-02	3.4561E-02	0.169E-01
CO-60	#F	1.5401E-02	1.0156E-02	1.0172E-02	0.584E-02
CS-137	#B	-1.5187E-02	-1.9302E-02	-1.9311E-02	0.109E-01
EU-152	A	-2.0105E-02	-4.8184E-02	-4.8190E-02	0.211E-01
EU-154	#A	-5.8456E-03	8.9524E+02	8.9524E+02	0.145E-01
K-40		4.5148E+00	2.5878E-01	3.0832E-01	0.752E-01
Pa-234	B	2.0117E-02	2.5955E-02	2.5966E-02	0.202E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-1.1466E-01	-6.0506E-02	-6.0655E-02	0.191E-01
Pb-214	B	1.8218E-02	1.9287E-02	1.9299E-02	0.202E-01
RA-226		5.8684E-01	2.1889E-01	2.1997E-01	0.173E+00
Th-230	#B	-2.7856E+01	-1.1644E+02	-1.1644E+02	0.553E+01
Th-234	#B	-7.8482E+00	-9.4201E+00	-9.4246E+00	0.724E+00
Tl-208	F	6.0016E-02	2.2081E-02	2.2193E-02	0.167E-01
U-235	B	-1.4535E+00	-1.8118E+00	-1.8126E+00	0.302E-01

- All peaks for activity calculation had bad shape.
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A - Activity printed, but activity < MDA.
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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 5.6206312E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 09:45:25
New World Technology Spectrum name: 1K000002.An1

Sample description
Parcel E-2 TW036 0826E002 262ml
6/27/08 09:55

Acquisition information
Start time: 15-Jul-2008 07:30:51
Live time: 7200
Real time: 7207

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	2 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	#F	3.8408E-01	1.7266E-01	1.7325E-01	0.100E+00
AM-241	#A	-9.5373E-01	-2.3028E+01	-2.3028E+01	0.341E+00
Bi-212	B	1.1585E-02	1.9160E-01	1.9160E-01	0.158E+00
BI-214	F	1.9713E-01	1.0719E-01	1.0744E-01	0.474E-01
CO-60	#B	-4.5815E-04	-9.3880E-03	-9.3881E-03	0.997E-02
CS-137		4.0488E-02	3.6718E-02	3.6749E-02	0.272E-01
EU-152	C	7.3141E-02	1.0578E-01	1.0581E-01	0.602E-01
EU-154	A	-5.9126E-03	3.2334E+02	3.2334E+02	0.390E-01
K-40	#	4.7688E+00	7.0602E-01	7.2788E-01	0.127E+00
Pa-234	F	8.4993E-02	9.6843E-02	9.6894E-02	0.751E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-9.7783E-02	-1.7509E-01	-1.7512E-01	0.571E-01
Pb-214	F	9.8221E-02	7.0767E-02	7.0861E-02	0.550E-01
RA-226	#B	-1.2166E+00	-4.1449E+00	-4.1451E+00	0.693E+00
Th-230	#B	-2.2909E+01	-1.0739E+02	-1.0739E+02	0.156E+02
Th-234	#B	-8.0110E+00	-2.5008E+01	-2.5010E+01	0.205E+01
Tl-208	F	9.8510E-02	5.5339E-02	5.5459E-02	0.336E-01
U-235	#B	-1.4573E+00	-3.8625E+00	-3.8628E+00	0.974E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 5.5872464E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 11:57:09
New World Technology Spectrum name: 1K000003.An1

Sample description
Parcel E-2 TW015 0826D016 279ml
6/27/08 15:00

Acquisition information
Start time: 15-Jul-2008 09:48:01
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	2 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	F	2.2368E-01	1.3200E-01	1.3226E-01	0.790E-01
AM-241	#A	-7.6236E-01	-2.2340E+00	-2.2342E+00	0.280E+00
Bi-212	B	1.5713E-01	2.2828E-01	2.2835E-01	0.175E+00
BI-214	F	2.3697E-01	1.1296E-01	1.1330E-01	0.514E-01
CO-60	#B	4.2735E-03	1.1104E-02	1.1105E-02	0.107E-01
CS-137		4.1368E-02	2.9772E-02	2.9812E-02	0.208E-01
EU-152	#A	1.8455E-02	3.0962E-02	3.0970E-02	0.579E-01
EU-154	C	7.5074E-02	5.5285E-02	5.5355E-02	0.428E-01
K-40		4.6259E+00	6.5997E-01	6.8195E-01	0.109E+00
Pa-234	F	2.0701E-01	1.5571E-01	1.5590E-01	0.672E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-4.4568E-02	-4.5193E-02	-4.5223E-02	0.570E-01
Pb-214	F	9.2674E-02	8.3474E-02	8.3545E-02	0.569E-01
RA-226	#B	-7.2820E-01	-1.6386E+00	-1.6388E+00	0.603E+00
Th-230	#B	-2.5912E+01	-3.2111E+02	-3.2111E+02	0.180E+02
Th-234	#B	-7.4968E+00	-3.3003E+01	-3.3004E+01	0.231E+01
Tl-208	#B	-1.4597E-03	-1.9623E-03	-1.9631E-03	0.376E-01
U-235	#B	-1.3817E+00	-6.7310E+00	-6.7312E+00	0.922E-01

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A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.2 to 2629.9 keV) 5.2205977E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 14:03:14
 New World Technology            Spectrum name: 1K000004.An1

 Sample description
      Parcel E-2 TW040 0826E010 255ml
      6/27/08 13:20

Acquisition information
        Start time:                15-Jul-2008 12:00:04
        Live time:               7200
        Real time:               7206

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    2.5521E-01   1.3610E-01    1.3642E-01  0.819E-01
 AM-241 #A   -9.2428E-01  -9.0225E+00   -9.0226E+00  0.395E+00
 Bi-212  F    4.5093E-01   2.3090E-01    2.3150E-01  0.144E+00
 BI-214 #F    1.7003E-01   6.7717E-02    6.8010E-02  0.353E-01
 CO-60  #F    2.5419E-02   3.0271E-02    3.0286E-02  0.166E-01
 CS-137       4.1725E-02   3.0302E-02    3.0341E-02  0.209E-01
 EU-152 #A   -4.3680E-02  -1.0245E+00   -1.0245E+00  0.536E-01
 EU-154  C    5.3145E-02   4.0251E-02    4.0299E-02  0.460E-01
 K-40   #     4.3308E+00   6.7611E-01    6.9496E-01  0.122E+00
 Pa-234 #B    5.6761E-02   6.9160E-02    6.9192E-02  0.690E-01
 Pb-210 #F    0.0000E+00   0.0000E+00    0.0000E+00  0.000E+00
 Pb-212 #B   -3.0110E-02  -3.9886E-02   -3.9902E-02  0.620E-01
 Pb-214  F    9.5839E-02   9.1375E-02    9.1444E-02  0.614E-01
 RA-226 #B   -1.1692E+00  -3.3880E+00   -3.3882E+00  0.681E+00
 Th-230 #B   -2.0810E+01  -8.2214E+01   -8.2218E+01  0.163E+02
 Th-234 #B   -7.1045E+00  -1.9791E+01   -1.9793E+01  0.244E+01
 Tl-208 #B   -3.2414E-02  -1.0395E-01   -1.0396E-01  0.472E-01
 U-235  #B   -1.4934E+00  -3.3758E+00   -3.3762E+00  0.995E-01

   # - All peaks for activity calculation had bad shape.
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   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2629.9 keV) 5.3445430E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 16:24:55
New World Technology Spectrum name: 1K000005.An1

Sample description
Parcel E-2 TW037 0826P001 251ml
6/27/08 09:29

Acquisition information
Start time: 15-Jul-2008 14:07:02
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	3.4375E-01	1.7735E-01	1.7780E-01	0.923E-01
AM-241	#A	-1.0186E+00	-2.3128E+02	-2.3128E+02	0.362E+00
Bi-212	B	1.6488E-02	1.8882E-01	1.8883E-01	0.155E+00
BI-214	F	2.2278E-01	1.0878E-01	1.0909E-01	0.524E-01
CO-60	#F	5.1040E-02	2.8322E-02	2.8386E-02	0.108E-01
CS-137		5.5786E-02	3.2785E-02	3.2850E-02	0.218E-01
EU-152	#A	3.5978E-02	5.0881E-02	5.0898E-02	0.662E-01
EU-154	A	2.5278E-02	4.8976E-02	4.8985E-02	0.489E-01
K-40		4.8066E+00	7.5863E-01	7.7934E-01	0.175E+00
Pa-234	F	1.0267E-01	9.1650E-02	9.1728E-02	0.906E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	1.4062E-02	1.8428E-02	1.8435E-02	0.609E-01
Pb-214	F	1.3798E-01	9.4380E-02	9.4518E-02	0.690E-01
RA-226	#B	-1.2361E+00	-3.6420E+00	-3.6423E+00	0.674E+00
Th-230	#B	-1.1163E+01	-4.2772E+01	-4.2774E+01	0.173E+02
Th-234	#B	-7.3482E+00	-1.7732E+01	-1.7734E+01	0.232E+01
Tl-208	#F	5.6437E-02	2.2351E-02	2.2449E-02	0.331E-01
U-235	#B	-1.5239E+00	-4.2478E+00	-4.2481E+00	0.101E+00

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H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.2 to 2629.9 keV) 5.6179032E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 10:09:21
New World Technology Spectrum name: 1K000006.An1

Sample description
Parcel E-2 TW027B 0827P014 253ml
6/30/08 08:50

Acquisition information
Start time: 15-Jul-2008 16:44:48
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#F	2.0921E-01	1.3447E-01	1.3469E-01	0.838E-01
AM-241	#A	-8.8175E-01	-5.5573E+00	-5.5574E+00	0.398E+00
Bi-212	F	3.4520E-01	3.7483E-01	3.7505E-01	0.199E+00
BI-214	F	1.6553E-01	1.0105E-01	1.0124E-01	0.520E-01
CO-60	#B	1.1387E-02	3.1341E-02	3.1344E-02	0.186E-01
CS-137	F	3.0129E-02	3.1256E-02	3.1276E-02	0.230E-01
EU-152	A	-1.1480E-02	-2.2538E-02	-2.2542E-02	0.677E-01
EU-154	A	4.1064E-03	4.3701E-02	4.3702E-02	0.361E-01
K-40		4.6817E+00	6.6617E-01	6.8847E-01	0.550E-01
Pa-234	B	3.6922E-02	6.0528E-02	6.0544E-02	0.729E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-7.7485E-02	-1.2742E-01	-1.2745E-01	0.625E-01
Pb-214	B	5.6018E-02	7.0722E-02	7.0753E-02	0.586E-01
RA-226	#B	-9.7780E-01	-2.5231E+00	-2.5234E+00	0.707E+00
Th-230	#B	-3.2194E+01	1.3923E+05	1.3923E+05	0.159E+02
Th-234	#B	-7.7320E+00	-2.1788E+01	-2.1789E+01	0.240E+01
Tl-208	#B	2.7115E-02	1.8550E-02	1.8577E-02	0.443E-01
U-235	B	-1.4910E+00	-2.6210E+00	-2.6216E+00	0.101E+00

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H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 5.0564952E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 22:07:02
 New World Technology            Spectrum name: 1K000007.An1

 Sample description
      Parcel E-2 PZ138E 0826E005 255ml
      6/27/08 10:50

Acquisition information
        Start time:                15-Jul-2008 19:31:33
        Live time:              7200
        Real time:              7206

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #F    3.2912E-01   1.4821E-01    1.4871E-01  0.793E-01
 AM-241 #A   -7.2179E-01  -3.0104E+00   -3.0105E+00  0.411E+00
 Bi-212  B    2.0115E-01   2.6490E-01    2.6500E-01  0.202E+00
 BI-214  F    2.1234E-01   7.0975E-02    7.1412E-02  0.420E-01
 CO-60  #B    4.4505E-03   1.6441E-02    1.6441E-02  0.121E-01
 CS-137       5.1702E-02   3.4935E-02    3.4987E-02  0.245E-01
 EU-152 #A   -4.9028E-02   7.2380E+02    7.2380E+02  0.700E-01
 EU-154  A    2.7437E-02   3.2650E-02    3.2666E-02  0.312E-01
 K-40   #     5.2322E+00   7.4338E-01    7.6834E-01  0.128E+00
 Pa-234 #F    6.2974E-02   6.2035E-02    6.2079E-02  0.504E-01
 Pb-210 #F    0.0000E+00   0.0000E+00    0.0000E+00  0.000E+00
 Pb-212 #B   -5.0896E-02  -5.4719E-02   -5.4751E-02  0.617E-01
 Pb-214  F    1.2811E-01   8.1454E-02    8.1593E-02  0.687E-01
 RA-226 #B   -1.3224E+00  -5.0101E+00   -5.0104E+00  0.708E+00
 Th-230 #B   -1.6390E+01  -6.1822E+01   -6.1825E+01  0.171E+02
 Th-234 #B   -8.1551E+00  -2.3836E+01   -2.3838E+01  0.212E+01
 Tl-208 #B   -5.1077E-03  -2.1257E-02   -2.1258E-02  0.201E-01
 U-235   B   -1.4682E+00  -1.8289E+00   -1.8297E+00  0.981E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2629.9 keV) 5.8253546E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 08:05:34
New World Technology Spectrum name: 1K000008.An1

Sample description
Parcel E-2 TW012 0827E024 253ml
6/30/08 11:10

Acquisition information
Start time: 15-Jul-2008 22:04:55
Live time: 7200
Real time: 7206

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	2.7951E-01	1.0719E-01	1.0769E-01	0.800E-01
AM-241	#A	-8.1157E-01	-3.6834E+00	-3.6836E+00	0.379E+00
Bi-212	F	3.4060E-01	3.5658E-01	3.5680E-01	0.186E+00
BI-214	#F	2.3362E-01	1.1702E-01	1.1734E-01	0.520E-01
CO-60	#B	4.0544E-03	1.4841E-02	1.4842E-02	0.114E-01
CS-137		7.8520E-02	3.7776E-02	3.7889E-02	0.248E-01
EU-152	#A	-7.0414E-03	-1.7729E-02	-1.7731E-02	0.719E-01
EU-154	A	1.8326E-02	2.8165E-02	2.8173E-02	0.471E-01
K-40		5.4104E+00	7.1574E-01	7.4339E-01	0.550E-01
Pa-234	#F	9.8143E-02	7.4135E-02	7.4224E-02	0.707E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-1.1533E-01	-1.6105E-01	-1.6110E-01	0.573E-01
Pb-214	F	1.3176E-01	8.6487E-02	8.6625E-02	0.673E-01
RA-226	#B	-8.3958E-01	-1.9589E+00	-1.9591E+00	0.680E+00
Th-230	#B	-2.2899E+01	-9.3124E+01	-9.3128E+01	0.156E+02
Th-234	#B	-6.6901E+00	-1.8233E+01	-1.8234E+01	0.259E+01
Tl-208	#B	-7.9266E-03	-5.8249E-02	-5.8249E-02	0.310E-01
U-235	#B	-1.5076E+00	-3.8131E+00	-3.8135E+00	0.101E+00

- All peaks for activity calculation had bad shape.
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& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 6.0020671E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 11:52:17
New World Technology Spectrum name: 1K000009.An1

Sample description
Parcel E-2 TW044 0827E025 249ml
6/30/08 11:30

Acquisition information
Start time: 16-Jul-2008 09:41:39
Live time: 7200
Real time: 7206

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	2.6400E-01	1.2697E-01	1.2735E-01	0.885E-01
AM-241	#A	-6.4693E-01	-2.3200E+00	-2.3202E+00	0.419E+00
Bi-212	F	2.2348E-01	2.6436E-01	2.6449E-01	0.199E+00
BI-214	F	2.1874E-01	7.6799E-02	7.7227E-02	0.472E-01
CO-60	#B	-1.7968E-03	-1.1353E-02	-1.1354E-02	0.857E-02
CS-137		4.4877E-02	3.9042E-02	3.9077E-02	0.288E-01
EU-152	A	4.1451E-02	5.3617E-02	5.3639E-02	0.663E-01
EU-154	C	5.5632E-02	5.9006E-02	5.9042E-02	0.444E-01
K-40		4.9698E+00	6.9159E-01	7.1578E-01	0.559E-01
Pa-234	#F	8.3928E-02	9.8051E-02	9.8100E-02	0.695E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	#B	-1.0744E-01	-1.6018E-01	-1.6023E-01	0.610E-01
Pb-214	F	1.0658E-01	8.1775E-02	8.1870E-02	0.613E-01
RA-226	#B	-2.1178E-01	-8.9637E-01	-8.9641E-01	0.663E+00
Th-230	#B	-3.1900E+01	-1.3098E+03	-1.3098E+03	0.168E+02
Th-234	#B	-8.1902E+00	-2.9040E+01	-2.9041E+01	0.250E+01
Tl-208	#F	5.3378E-02	3.2532E-02	3.2593E-02	0.277E-01
U-235	B	-1.5377E+00	-4.9338E+00	-4.9341E+00	0.103E+00

- All peaks for activity calculation had bad shape.
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& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 5.4974647E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 14:08:19
 New World Technology            Spectrum name: 1K000010.An1

 Sample description
      Parcel E-2 TW010 0827P022 253ml
      6/30/08 10:47

Acquisition information
        Start time:                16-Jul-2008 11:54:37
        Live time:              7200
        Real time:              7206

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #F    3.0799E-01   1.9951E-01    1.9984E-01  0.106E+00
 AM-241 #A   -9.9316E-01  -2.3208E+01   -2.3208E+01  0.319E+00
 Bi-212  F    2.1567E-01   2.2743E-01    2.2757E-01  0.167E+00
 BI-214 #F    2.5010E-01   9.1271E-02    9.1742E-02  0.370E-01
 CO-60  #F    6.0772E-02   3.0441E-02    3.0524E-02  0.110E-01
 CS-137       3.6068E-02   3.2066E-02    3.2094E-02  0.232E-01
 EU-152 #A    5.6869E-02   5.1715E-02    5.1758E-02  0.620E-01
 EU-154       4.8161E-02   4.9902E-02    4.9934E-02  0.363E-01
 K-40         4.0559E+00   6.4635E-01    6.6365E-01  0.112E+00
 Pa-234 #F    2.4901E-01   1.5466E-01    1.5493E-01  0.868E-01
 Pb-210 #F    0.0000E+00   0.0000E+00    0.0000E+00  0.000E+00
 Pb-212 #B   -1.3998E-01  -2.4382E-01   -2.4388E-01  0.613E-01
 Pb-214  B    5.6018E-02   7.1408E-02    7.1438E-02  0.646E-01
 RA-226 #B   -7.7646E-01  -1.8548E+00   -1.8551E+00  0.695E+00
 Th-230 #B   -2.7134E+01  -1.9832E+02   -1.9832E+02  0.161E+02
 Th-234 #B   -7.3666E+00  -1.8457E+01   -1.8459E+01  0.233E+01
 Tl-208 #F    1.7823E-01   5.5793E-02    5.6184E-02  0.156E-01
 U-235  #B   -1.5073E+00  -4.0611E+00   -4.0615E+00  0.102E+00

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   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2629.9 keV) 5.1380978E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 16:27:43
New World Technology Spectrum name: 1K000011.An1

Sample description
Parcel E-2 TW043 0827E027 244ml
6/30/08 14:25

Acquisition information
Start time: 16-Jul-2008 14:10:52
Live time: 7200
Real time: 7206

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	3.6971E-01	1.8588E-01	1.8638E-01	0.955E-01
AM-241	#A	-7.5433E-01	-2.4490E+00	-2.4492E+00	0.383E+00
Bi-212	F	4.3035E-01	3.6317E-01	3.6352E-01	0.206E+00
BI-214	F	1.9768E-01	8.6926E-02	8.7235E-02	0.450E-01
CO-60	#F	7.3907E-03	7.3612E-03	7.3663E-03	0.599E-02
CS-137	B	3.2116E-02	4.2787E-02	4.2804E-02	0.331E-01
EU-152	C	1.2640E-01	1.1254E-01	1.1264E-01	0.585E-01
EU-154		8.7741E-02	6.5068E-02	6.5149E-02	0.464E-01
K-40		5.1965E+00	7.6128E-01	7.8534E-01	0.135E+00
Pa-234	#F	1.0282E-01	1.1814E-01	1.1820E-01	0.787E-01
Pb-210	#F	0.0000E+00	0.0000E+00	0.0000E+00	0.000E+00
Pb-212	B	-1.4199E-01	-2.1721E-01	-2.1728E-01	0.597E-01
Pb-214	F	1.2467E-01	9.1413E-02	9.1530E-02	0.666E-01
RA-226	#B	-1.2340E+00	-3.5992E+00	-3.5995E+00	0.709E+00
Th-230	#B	-2.7898E+01	-2.3927E+02	-2.3927E+02	0.201E+02
Th-234	#B	-7.1199E+00	-1.7201E+01	-1.7203E+01	0.248E+01
Tl-208	#B	1.4216E-03	5.7218E-02	5.7218E-02	0.406E-01
U-235	#B	-1.5653E+00	-3.8176E+00	-3.8181E+00	0.103E+00

- All peaks for activity calculation had bad shape.
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A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2629.9 keV) 5.8516040E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 18:33:42
 New World Technology            Spectrum name: 1K000012.An1

 Sample description
      Parcel E-2 PZ161D 0827E029 250ml
      7/01/08 10:35

Acquisition information
        Start time:                16-Jul-2008 16:30:34
        Live time:                 7200
        Real time:                 7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #F     2.8544E-01   1.4516E-01    1.4554E-01  0.848E-01
 AM-241 #A    -1.0300E+00  -2.6945E+01   -2.6946E+01  0.291E+00
 Bi-212  F     3.1222E-01   2.7758E-01    2.7782E-01  0.204E+00
 BI-214  F     3.7913E-01   1.1029E-01    1.1118E-01  0.499E-01
 CO-60  #B     8.0314E-03   1.5321E-02    1.5324E-02  0.106E-01
 CS-137  F     3.1489E-02   3.1892E-02    3.1913E-02  0.234E-01
 EU-152  A     2.3290E-02   3.7666E-02    3.7675E-02  0.608E-01
 EU-154  A     3.1894E-02   5.5088E-02    5.5100E-02  0.472E-01
 K-40          4.7661E+00   7.3758E-01    7.5851E-01  0.141E+00
 Pa-234  B     7.7737E-02   7.0401E-02    7.0459E-02  0.856E-01
 Pb-210 #F     0.0000E+00   0.0000E+00    0.0000E+00  0.000E+00
 Pb-212 #B    -8.7496E-02  -1.3276E-01   -1.3280E-01  0.610E-01
 Pb-214  F     8.6595E-02   7.6025E-02    7.6092E-02  0.659E-01
 RA-226 #B    -1.2451E+00  -3.9490E+00   -3.9492E+00  0.709E+00
 Th-230 #B    -2.3229E+01  -9.4951E+01   -9.4955E+01  0.155E+02
 Th-234 #B    -5.9251E+00  -1.3847E+01   -1.3849E+01  0.262E+01
 Tl-208 #B     2.1400E-02   2.8145E-02    2.8156E-02  0.340E-01
 U-235  #B    -1.5166E+00  -2.9027E+00   -2.9032E+00  0.101E+00

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   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2629.9 keV) 5.7428799E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 07:31:27
New World Technology Spectrum name: 2K000001.An1

Sample description
Parcel E-2 TW007 0826P010 266ml
6/27/08 13:45

Acquisition information
Start time: 14-Jul-2008 10:16:18
Live time: 72000
Real time: 72145

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	3.6716E-02	3.6726E-02	3.6752E-02	0.303E-01
AM-241	#B	-5.4183E-02	-3.0777E-01	-3.0778E-01	0.122E-01
Bi-212	B	-8.4516E-02	-2.3250E-01	-2.3252E-01	0.473E-01
BI-214	F	7.8039E-02	2.2317E-02	2.2505E-02	0.123E-01
CO-60	B	3.9199E-03	5.4403E-03	5.4422E-03	0.597E-02
CS-137		4.0097E-02	9.5582E-03	9.6736E-03	0.699E-02
EU-152	F	2.6963E-02	3.1254E-02	3.1270E-02	0.130E-01
EU-154	B	4.2215E-03	4.4819E-03	4.4846E-03	0.103E-01
K-40		1.4115E+00	1.4135E-01	1.5076E-01	0.799E-01
Pa-234	#F	1.6469E-02	2.3304E-02	2.3312E-02	0.154E-01
Pb-210	B	2.4855E-02	1.4316E-01	1.4316E-01	0.106E+00
Pb-212	#B	-6.7909E-03	-1.5659E-02	-1.5661E-02	0.115E-01
Pb-214	F	5.3513E-02	1.6003E-02	1.6126E-02	0.126E-01
RA-226	#B	-3.1396E-01	-3.0175E-01	-3.0197E-01	0.160E+00
Th-230	#B	-8.1059E+00	-7.7120E+01	-7.7120E+01	0.933E+00
Th-234		3.4991E-01	1.6094E-01	1.6146E-01	0.111E+00
Tl-208	F	1.0684E-01	2.0636E-02	2.1014E-02	0.849E-02
U-235	#B	-1.2446E-01	-9.2284E-02	-9.2399E-02	0.114E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (43.1 to 2749.4 keV) 2.0399222E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 09:48:59
 New World Technology            Spectrum name: 2K000002.An1

 Sample description
      Parcel E-2 TW021 0826D009 263ml
      6/27/08 13:15

Acquisition information
        Start time:                15-Jul-2008 07:34:14
        Live time:               7200
        Real time:               7215

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    9.3307E-02   7.6563E-02    7.6642E-02  0.695E-01
 AM-241 #B   -2.4212E-02  -1.2986E-01   -1.2986E-01  0.393E-01
 Bi-212  B    2.1419E-02   1.8204E-01    1.8204E-01  0.159E+00
 BI-214  F    1.5058E-01   7.0134E-02    7.0356E-02  0.329E-01
 CO-60  #B    1.4937E-02   3.1965E-02    3.1969E-02  0.169E-01
 CS-137       6.6939E-02   2.9519E-02    2.9624E-02  0.192E-01
 EU-152  F    1.2537E-01   7.0413E-02    7.0566E-02  0.358E-01
 EU-154 #F    6.5542E-02   5.9133E-02    5.9183E-02  0.314E-01
 K-40         2.4428E+00   4.7332E-01    4.8194E-01  0.102E+00
 Pa-234 #F    1.0713E-01   8.5958E-02    8.6050E-02  0.389E-01
 Pb-210  B    2.7653E-02   5.1801E-01    5.1801E-01  0.362E+00
 Pb-212  B    1.7958E-02   3.9861E-02    3.9867E-02  0.350E-01
 Pb-214  F    1.0836E-01   6.8373E-02    6.8491E-02  0.379E-01
 RA-226 #B   -2.1657E-01  -7.5225E-01   -7.5229E-01  0.479E+00
 Th-230 #B   -8.0704E+00  -1.4419E+02   -1.4419E+02  0.297E+01
 Th-234 #     1.1065E+00   4.7774E-01    4.7951E-01  0.314E+00
 Tl-208 #F    9.6160E-02   4.0797E-02    4.0953E-02  0.194E-01
 U-235  #B   -1.1473E-01  -2.1833E-01   -2.1837E-01  0.369E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 4.2038403E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 12:05:28
 New World Technology            Spectrum name: 2K000003.An1

 Sample description
      Parcel E-2 TW011 0826P012 259ml
      6/27/08 14:50

Acquisition information
        Start time:                15-Jul-2008 09:51:47
        Live time:              7200
        Real time:              7214

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    1.9051E-01   8.7734E-02    8.8019E-02  0.729E-01
 AM-241 #B   -4.8638E-02  -2.7867E-01   -2.7867E-01  0.306E-01
 Bi-212  B    3.4764E-02   1.8969E-01    1.8969E-01  0.165E+00
 BI-214  F    1.0048E-01   5.2809E-02    5.2941E-02  0.348E-01
 CO-60  #     2.5236E-02   1.1014E-02    1.1054E-02  0.733E-02
 CS-137       4.0677E-02   2.7222E-02    2.7264E-02  0.191E-01
 EU-152 #F    8.6450E-02   3.2107E-02    3.2267E-02  0.296E-01
 EU-154  F    1.0435E-01   6.1536E-02    6.1658E-02  0.305E-01
 K-40   #     1.6731E+00   4.5788E-01    4.6208E-01  0.156E+00
 Pa-234 #F    2.2054E-01   1.2044E-01    1.2072E-01  0.522E-01
 Pb-210  B    6.2116E-02   4.0575E-01    4.0575E-01  0.318E+00
 Pb-212 #B   -3.6181E-03  -4.2239E-02   -4.2240E-02  0.346E-01
 Pb-214  F    1.1519E-01   5.8960E-02    5.9115E-02  0.343E-01
 RA-226 #B   -1.0635E+00  -8.7076E+00   -8.7077E+00  0.535E+00
 Th-230 #B   -7.1538E+00  -4.1202E+01   -4.1203E+01  0.350E+01
 Th-234  F    6.6589E-01   3.7522E-01    3.7603E-01  0.315E+00
 Tl-208  F    9.2064E-02   2.7795E-02    2.8004E-02  0.412E-01
 U-235   B   -1.1696E-01  -1.8090E-01   -1.8095E-01  0.333E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.0315902E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 14:09:41
 New World Technology            Spectrum name: 2K000004.An1

 Sample description
      Parcel E-2 TW042 0826E013 259ml
      6/27/08 14:30

Acquisition information
        Start time:                15-Jul-2008 12:08:06
        Live time:               7200
        Real time:               7213

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B    5.4043E-02   5.3724E-02    5.3761E-02  0.640E-01
 AM-241 #B   -7.2489E-03  -9.2981E-02   -9.2982E-02  0.460E-01
 Bi-212  B    6.0401E-02   1.8282E-01    1.8283E-01  0.157E+00
 BI-214  F    6.2138E-02   5.1412E-02    5.1464E-02  0.380E-01
 CO-60  #F    1.1953E-02   8.4854E-03    8.4970E-03  0.676E-02
 CS-137       6.2508E-02   2.8468E-02    2.8563E-02  0.184E-01
 EU-152 #B   -3.5552E-03   2.6019E+02    2.6019E+02  0.421E-01
 EU-154 #F    3.1790E-02   2.2831E-02    2.2861E-02  0.276E-01
 K-40   #     2.2846E+00   5.6317E-01    5.6953E-01  0.165E+00
 Pa-234  F    1.5019E-01   1.0468E-01    1.0483E-01  0.390E-01
 Pb-210  F    4.1099E-01   5.1231E-01    5.1254E-01  0.344E+00
 Pb-212 #B    2.4333E-02   5.8119E-02    5.8126E-02  0.395E-01
 Pb-214  F    9.2917E-02   7.4334E-02    7.4414E-02  0.409E-01
 RA-226  B    5.7090E-02   5.5277E-01    5.5277E-01  0.495E+00
 Th-230 #B   -7.6737E+00  -6.1286E+01   -6.1286E+01  0.325E+01
 Th-234       5.6067E-01   3.4059E-01    3.4123E-01  0.311E+00
 Tl-208  F    8.0210E-02   3.9580E-02    3.9692E-02  0.197E-01
 U-235  #B   -1.2981E-01  -3.1442E-01   -3.1445E-01  0.367E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.1430285E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 16:26:29
New World Technology Spectrum name: 2K000005.An1

Sample description
Parcel E-2 TW053 0826D005 254ml
6/27/08 10:38

Acquisition information
Start time: 15-Jul-2008 14:11:47
Live time: 7200
Real time: 7213

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	5.3590E-02	3.9010E-02	3.9061E-02	0.603E-01
AM-241	#B	-9.5375E-04	-5.1798E-02	-5.1798E-02	0.380E-01
Bi-212	B	8.9342E-02	1.8775E-01	1.8777E-01	0.159E+00
BI-214	F	1.1780E-01	6.5132E-02	6.5279E-02	0.344E-01
CO-60	#F	9.8766E-03	9.2152E-03	9.2225E-03	0.737E-02
CS-137		4.3899E-02	3.0527E-02	3.0570E-02	0.219E-01
EU-152	F	1.4850E-01	5.8245E-02	5.8506E-02	0.418E-01
EU-154	B	2.5080E-02	4.1284E-02	4.1294E-02	0.274E-01
K-40	#	2.1435E+00	4.1335E-01	4.2095E-01	0.461E-01
Pa-234	F	1.2944E-01	8.5160E-02	8.5296E-02	0.401E-01
Pb-210	#B	-1.4403E-01	-6.6768E-01	-6.6770E-01	0.340E+00
Pb-212	B	7.7835E-03	4.3170E-02	4.3171E-02	0.381E-01
Pb-214	F	1.4065E-01	6.2374E-02	6.2592E-02	0.402E-01
RA-226	B	2.0805E-01	5.6139E-01	5.6145E-01	0.498E+00
Th-230	#B	-5.0121E+00	-1.5905E+01	-1.5906E+01	0.350E+01
Th-234		1.2994E+00	4.9616E-01	4.9851E-01	0.353E+00
Tl-208	F	9.4196E-02	2.7794E-02	2.8014E-02	0.306E-01
U-235	#B	-1.2968E-01	-3.1208E-01	-3.1212E-01	0.388E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (43.1 to 2749.4 keV) 3.7452793E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 21:24:07
New World Technology Spectrum name: 2K000006.An1

Sample description
Parcel E-2 TW045 0826P008 249ml
6/27/08 13:25

Acquisition information
Start time: 15-Jul-2008 16:49:17
Live time: 7200
Real time: 7213

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	2 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	F	1.1692E-01	1.1563E-01	1.1571E-01	0.754E-01
AM-241	#B	-4.2252E-02	-1.9679E-01	-1.9679E-01	0.347E-01
Bi-212	B	5.3196E-02	1.8450E-01	1.8451E-01	0.160E+00
BI-214	F	2.0648E-01	8.1439E-02	8.1799E-02	0.363E-01
CO-60	#B	6.6128E-03	1.2049E-02	1.2052E-02	0.870E-02
CS-137		7.3220E-02	2.9820E-02	2.9944E-02	0.186E-01
EU-152	F	8.7858E-02	5.3537E-02	5.3637E-02	0.419E-01
EU-154	F	9.6906E-02	6.9978E-02	7.0071E-02	0.303E-01
K-40	#	1.7827E+00	3.8101E-01	3.8672E-01	0.471E-01
Pa-234	#F	9.8880E-02	7.9790E-02	7.9875E-02	0.443E-01
Pb-210	#B	5.2219E-02	4.0765E-01	4.0765E-01	0.322E+00
Pb-212	#B	-1.9115E-02	-7.5487E-02	-7.5490E-02	0.399E-01
Pb-214	F	9.4841E-02	4.6883E-02	4.7015E-02	0.336E-01
RA-226	B	3.6956E-02	5.5724E-01	5.5725E-01	0.502E+00
Th-230	#B	-4.1113E+00	-1.2993E+01	-1.2994E+01	0.370E+01
Th-234		1.1318E+00	4.7602E-01	4.7787E-01	0.380E+00
Tl-208	F	9.4677E-02	3.1799E-02	3.1992E-02	0.282E-01
U-235	#B	-1.4018E-01	-4.0875E-01	-4.0878E-01	0.390E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (43.1 to 2749.4 keV) 3.2890382E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 22:07:11
New World Technology Spectrum name: 2K000007.An1

Sample description
Parcel E-2 PZ144E 0827E016 249ml
6/30/08 09:20

Acquisition information
Start time: 15-Jul-2008 19:44:03
Live time: 7200
Real time: 7215

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	1.3181E-01	1.0233E-01	1.0245E-01	0.712E-01
AM-241	#B	-4.4396E-02	-2.4963E-01	-2.4964E-01	0.398E-01
Bi-212	B	1.9145E-02	1.8824E-01	1.8824E-01	0.165E+00
BI-214	F	1.4873E-01	8.4768E-02	8.4948E-02	0.396E-01
CO-60	F	2.7233E-02	1.6102E-02	1.6134E-02	0.221E-01
CS-137		5.2521E-02	2.9784E-02	2.9848E-02	0.204E-01
EU-152	F	1.9202E-01	5.7898E-02	5.8335E-02	0.431E-01
EU-154	#F	1.1346E-01	4.2136E-02	4.2347E-02	0.350E-01
K-40		2.1966E+00	4.6794E-01	4.7500E-01	0.107E+00
Pa-234	F	6.3361E-02	8.4627E-02	8.4659E-02	0.366E-01
Pb-210	#B	-7.2576E-02	-4.7165E-01	-4.7166E-01	0.318E+00
Pb-212	B	4.8618E-03	4.3180E-02	4.3181E-02	0.383E-01
Pb-214	F	1.1065E-01	5.6361E-02	5.6511E-02	0.326E-01
RA-226	#B	-3.7066E-01	-1.0870E+00	-1.0871E+00	0.542E+00
Th-230	#B	-6.9275E+00	-3.1191E+01	-3.1192E+01	0.369E+01
Th-234		1.0037E+00	4.8967E-01	4.9109E-01	0.347E+00
Tl-208	F	9.3949E-02	4.1723E-02	4.1868E-02	0.205E-01
U-235	#B	-1.1523E-01	-1.8983E-01	-1.8988E-01	0.376E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (43.1 to 2749.4 keV) 3.6061385E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 08:09:19
 New World Technology            Spectrum name: 2K000008.An1

 Sample description
      Parcel E-2 TW054 0827P024 245ml
      6/30/08 14:35

Acquisition information
        Start time:                15-Jul-2008 22:10:53
        Live time:               7200
        Real time:               7215

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  B    4.3614E-03   3.0193E-03    3.0236E-03  0.655E-01
 AM-241 #B   -4.1882E-02  -1.9900E-01   -1.9901E-01  0.356E-01
 Bi-212 #B    4.2191E-03   7.9232E-03    7.9247E-03  0.149E+00
 BI-214 #F    1.6103E-01   7.4268E-02    7.4509E-02  0.356E-01
 CO-60  #F    7.7725E-03   8.2430E-03    8.2481E-03  0.590E-02
 CS-137 #     8.3760E-02   3.6385E-02    3.6518E-02  0.170E-01
 EU-152  B   -3.7584E-03   2.5615E+02    2.5615E+02  0.414E-01
 EU-154  F    5.4000E-02   4.5087E-02    4.5132E-02  0.335E-01
 K-40         2.8174E+00   4.8218E-01    4.9341E-01  0.478E-01
 Pa-234 #B   -7.6306E-03  -8.0397E-01   -8.0397E-01  0.504E-01
 Pb-210 #B   -2.8785E-02  -4.3111E-01   -4.3111E-01  0.328E+00
 Pb-212 #B   -2.0700E-02  -7.6667E-02   -7.6671E-02  0.394E-01
 Pb-214  F    9.4177E-02   5.9578E-02    5.9681E-02  0.334E-01
 RA-226 #B   -2.3836E-01  -8.8020E-01   -8.8025E-01  0.547E+00
 Th-230 #B   -8.0833E+00  -7.7627E+01   -7.7628E+01  0.399E+01
 Th-234  F    7.7940E-01   4.0778E-01    4.0881E-01  0.334E+00
 Tl-208  F    8.9056E-02   4.1580E-02    4.1711E-02  0.208E-01
 U-235   B   -1.2083E-01  -2.1226E-01   -2.1231E-01  0.386E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 4.0248127E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 11:55:39
 New World Technology            Spectrum name: 2K000009.An1

 Sample description
      Parcel E-2 TW060 0827D025 247ml
      6/30/08 14:00

Acquisition information
        Start time:                16-Jul-2008 09:45:18
        Live time:               7200
        Real time:               7214

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    1.3692E-01   1.0641E-01    1.0653E-01  0.746E-01
 AM-241 #B   -3.2296E-02  -1.4626E-01   -1.4627E-01  0.380E-01
 Bi-212  B    4.6636E-03   1.8222E-01    1.8222E-01  0.162E+00
 BI-214  F    1.3859E-01   1.1571E-01    1.1582E-01  0.440E-01
 CO-60  #F    1.0831E-02   1.0457E-02    1.0465E-02  0.585E-02
 CS-137       5.1112E-02   2.9476E-02    2.9537E-02  0.202E-01
 EU-152  F    1.1060E-01   5.7056E-02    5.7204E-02  0.428E-01
 EU-154 #F    9.9583E-02   7.4258E-02    7.4350E-02  0.330E-01
 K-40         2.1941E+00   4.8899E-01    4.9573E-01  0.118E+00
 Pa-234  F    5.9761E-02   7.0196E-02    7.0232E-02  0.416E-01
 Pb-210 #F    4.5326E-01   5.6571E-01    5.6596E-01  0.377E+00
 Pb-212 #B   -8.4343E-03  -5.1418E-02   -5.1419E-02  0.371E-01
 Pb-214  F    8.5126E-02   6.9545E-02    6.9617E-02  0.405E-01
 RA-226 #B   -4.0846E-01  -1.1165E+00   -1.1166E+00  0.529E+00
 Th-230 #B   -9.1570E+00  -9.8539E+01   -9.8540E+01  0.242E+01
 Th-234  F    9.2937E-01   4.9198E-01    4.9319E-01  0.377E+00
 Tl-208  B   -4.7066E-03  -1.4616E-02   -1.4617E-02  0.427E-01
 U-235   B   -1.3359E-01  -2.6854E-01   -2.6858E-01  0.359E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.6457641E+00  pCi/ml

Laboratory:  New World Technology
```

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 14:12:05
 New World Technology            Spectrum name: 2K000010.An1

 Sample description
      Parcel E-2 TW058 0827P021 245ml
      6/30/08 10:27

Acquisition information
        Start time:                16-Jul-2008 11:57:56
        Live time:              7200
        Real time:              7214

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    9.9512E-02   8.7516E-02    8.7594E-02  0.725E-01
 AM-241 #B    2.1365E-02   5.2553E-02    5.2559E-02  0.386E-01
 Bi-212 #B    1.3617E-01   2.8830E-01    2.8834E-01  0.178E+00
 BI-214 #F    1.3624E-01   7.5993E-02    7.6162E-02  0.389E-01
 CO-60  #F    3.0280E-02   3.1554E-02    3.1574E-02  0.150E-01
 CS-137       6.9810E-02   3.2969E-02    3.3071E-02  0.221E-01
 EU-152 #B   -3.7584E-03   2.7733E+02    2.7733E+02  0.449E-01
 EU-154  B   -4.3722E-02   1.8506E+02    1.8506E+02  0.299E-01
 K-40         2.2099E+00   5.2577E-01    5.3214E-01  0.154E+00
 Pa-234 #F    1.0076E-01   1.0185E-01    1.0192E-01  0.499E-01
 Pb-210  B    1.0435E-01   4.5519E-01    4.5520E-01  0.348E+00
 Pb-212  B    1.2574E-02   4.4982E-02    4.4984E-02  0.395E-01
 Pb-214  F    9.0910E-02   5.5859E-02    5.5961E-02  0.382E-01
 RA-226 #B   -9.1910E-02  -6.9739E-01   -6.9740E-01  0.543E+00
 Th-230 #B   -8.5045E+00  -1.2821E+02   -1.2821E+02  0.363E+01
 Th-234       9.9817E-01   3.8320E-01    3.8499E-01  0.306E+00
 Tl-208 #F    1.1097E-01   4.5142E-02    4.5330E-02  0.208E-01
 U-235   B   -1.2145E-01  -2.1243E-01   -2.1248E-01  0.383E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.6160040E+00  pCi/ml

Laboratory:  New World Technology
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     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 16:31:32
 New World Technology            Spectrum name: 2K000011.An1

 Sample description
      Parcel E-2 PZ150E 0827E030 249ml
      7/01/08 14:17

Acquisition information
        Start time:                16-Jul-2008 14:15:13
        Live time:              7200
        Real time:              7214

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml        pCi/ml


 ____________________________________________________________________________
 Ac-228  F    2.1013E-01   1.0873E-01    1.0901E-01  0.667E-01
 AM-241 #B   -4.4337E-02  -1.8570E-01   -1.8571E-01  0.319E-01
 Bi-212  B    1.2949E-01   1.1865E-01    1.1874E-01  0.177E+00
 BI-214  F    1.5558E-01   7.9402E-02    7.9612E-02  0.391E-01
 CO-60  #F    2.8356E-02   2.9296E-02    2.9315E-02  0.158E-01
 CS-137       5.9347E-02   3.1469E-02    3.1546E-02  0.215E-01
 EU-152  F    3.8406E-02   4.6243E-02    4.6265E-02  0.374E-01
 EU-154  B    1.5881E-02   2.5479E-02    2.5486E-02  0.272E-01
 K-40   #     1.7221E+00   3.7453E-01    3.7995E-01  0.471E-01
 Pa-234  F    1.7421E-01   1.2289E-01    1.2306E-01  0.479E-01
 Pb-210  B    2.6287E-01   4.0973E-01    4.0985E-01  0.318E+00
 Pb-212  B   -6.5816E-03  -1.4752E-02   -1.4754E-02  0.374E-01
 Pb-214  F    1.3836E-01   7.6380E-02    7.6553E-02  0.430E-01
 RA-226 #B   -1.9980E-01  -7.8210E-01   -7.8214E-01  0.518E+00
 Th-230 #B   -6.3344E+00  -2.3941E+01   -2.3942E+01  0.379E+01
 Th-234 #     8.5957E-01   4.9270E-01    4.9373E-01  0.345E+00
 Tl-208  F    6.2223E-02   2.6764E-02    2.6864E-02  0.256E-01
 U-235  #B   -1.4010E-01  -4.0241E-01   -4.0244E-01  0.388E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.1091502E+00  pCi/ml

Laboratory:  New World Technology
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     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 18:42:12
 New World Technology            Spectrum name: 2K000012.An1

 Sample description
      Parcel E-2 TW057B 0827P027 250ml
      7/01/08 09:18

Acquisition information
        Start time:                16-Jul-2008 16:34:35
        Live time:              7200
        Real time:              7214

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    1.2222E-01   1.0134E-01    1.0145E-01  0.691E-01
 AM-241 #B   -5.3662E-02  -4.5404E-01   -4.5404E-01  0.346E-01
 Bi-212  B    8.5273E-02   2.1196E-01    2.1199E-01  0.179E+00
 BI-214 #F    1.2462E-01   1.0087E-01    1.0098E-01  0.453E-01
 CO-60  #B    9.7905E-04   2.1957E-03    2.1960E-03  0.621E-02
 CS-137       5.9237E-02   2.9517E-02    2.9599E-02  0.196E-01
 EU-152  F    9.2216E-02   6.0266E-02    6.0363E-02  0.312E-01
 EU-154  B    2.1739E-02   3.4310E-02    3.4320E-02  0.336E-01
 K-40   #     1.8513E+00   4.5203E-01    4.5723E-01  0.115E+00
 Pa-234 #F    1.3191E-01   1.1495E-01    1.1506E-01  0.492E-01
 Pb-210 #B   -5.0033E-02  -4.2521E-01   -4.2521E-01  0.332E+00
 Pb-212  B    2.5754E-02   7.8490E-02    7.8496E-02  0.368E-01
 Pb-214  F    1.1833E-01   8.2109E-02    8.2227E-02  0.324E-01
 RA-226 #B   -8.6945E-02  -6.6776E-01   -6.6776E-01  0.524E+00
 Th-230 #B   -6.7372E+00  -3.5299E+01   -3.5300E+01  0.378E+01
 Th-234       7.9310E-01   4.1875E-01    4.1978E-01  0.319E+00
 Tl-208  F    1.4059E-01   4.2951E-02    4.3267E-02  0.226E-01
 U-235  #B   -1.4412E-01  -5.0449E-01   -5.0452E-01  0.394E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   43.1 to  2749.4 keV) 3.0688550E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) Wan32 G53W2.10 15-JUL-2008 07:35:27
New World Technology Spectrum name: 3K000001.An1

Sample description
Parcel E-2 TW006 0826P004 267ml
6/27/08 11:36

Acquisition information
Start time: 14-Jul-2008 09:04:31
Live time: 72000
Real time: 72131

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	1.1589E-01	6.0670E-02	6.1093E-02	0.309E-01
AM-241	#B	-4.5373E-02	1.4778E-01	1.4783E-01	0.148E-01
Bi-212	B	-2.0141E-01	2.8367E-01	2.8394E-01	0.728E-01
BI-214	F	7.3887E-02	3.7072E-02	3.7343E-02	0.194E-01
CO-60	#B	-1.9283E-03	1.3799E-02	1.3800E-02	0.876E-02
CS-137		2.4107E-02	1.0148E-02	1.0255E-02	0.777E-02
EU-152	F	1.4662E-02	1.2347E-02	1.2390E-02	0.141E-01
EU-154	F	2.6355E-02	2.7094E-02	2.7158E-02	0.911E-02
K-40		2.4592E+00	2.5037E-01	2.9337E-01	0.152E+00
Pa-234	B	-1.7218E-02	3.1790E-02	3.1817E-02	0.148E-01
Pb-210		6.2040E-01	2.0242E-01	2.0805E-01	0.125E+00
Pb-212	#B	-1.3037E-01	5.7729E-02	5.8343E-02	0.160E-01
PB-214	B	-1.6017E-01	1.6094E-01	1.6126E-01	0.211E-01
RA-226	#B	-3.1538E-01	3.0577E-01	3.0645E-01	0.145E+00
Th-230	#B	-2.1632E+02	4.8133E+02	4.8220E+02	0.361E+01
Th-234	#B	-1.2526E+01	5.2615E+00	5.4295E+00	0.271E+00
Tl-208	F	3.4136E-02	1.0239E-02	1.0446E-02	0.768E-02
U-235	B	6.7826E-03	1.1043E-02	1.1052E-02	0.901E-02

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (39.2 to 2495.3 keV) 3.254E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) Wan32 G53W2.10 15-JUL-2008 10:12:08
New World Technology Spectrum name: 3K000002.An1

Sample description
Parcel E-2 TW018 0826D012 265ml
6/27/08 13:58

Acquisition information
Start time: 15-Jul-2008 07:38:55
Live time: 7200
Real time: 7215

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#F	1.1302E-01	8.4047E-02	8.4338E-02	0.107E+00
AM-241	#B	-4.7346E-03	5.8996E-02	5.8997E-02	0.434E-01
Bi-212	#B	-8.6601E-02	3.6650E-01	3.6654E-01	0.215E+00
BI-214	F	1.6788E-01	8.4753E-02	8.5363E-02	0.427E-01
CO-60	#B	-3.4037E-04	9.4510E-03	9.4510E-03	0.282E-01
CS-137		2.9995E-02	2.3553E-02	2.3624E-02	0.160E-01
EU-152	F	5.4839E-02	4.4706E-02	4.4873E-02	0.460E-01
EU-154	F	6.0045E-02	4.3523E-02	4.3728E-02	0.294E-01
K-40	#	3.0270E+00	9.5146E-01	9.6991E-01	0.238E+00
Pa-234	#B	4.5179E-02	8.2090E-02	8.2162E-02	0.555E-01
Pb-210		9.9941E-01	5.8721E-01	5.9229E-01	0.351E+00
Pb-212	B	-1.1251E-01	1.3663E-01	1.3683E-01	0.491E-01
PB-214	B	-1.5938E-01	7.9864E-01	7.9870E-01	0.685E-01
RA-226	#B	-1.6180E-01	7.4691E-01	7.4699E-01	0.486E+00
Th-230	#B	-2.1119E+02	3.4974E+02	3.5087E+02	0.115E+02
Th-234	#B	-1.3197E+01	9.6196E+01	9.6207E+01	0.869E+00
Tl-208	F	9.5164E-02	5.5902E-02	5.6199E-02	0.227E-01
U-235	B	1.1064E-02	4.1041E-02	4.1048E-02	0.279E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (39.2 to 2495.3 keV) 4.319E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) Wan32 G53W2.10 15-JUL-2008 12:11:21
New World Technology Spectrum name: 3K000003.An1

Sample description
Parcel E-2 TW016 0826D015 261ml
6/27/08 14:40

Acquisition information
Start time: 15-Jul-2008 09:56:28
Live time: 7200
Real time: 7214

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	2 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	B	7.7507E-03	3.3925E-01	3.3925E-01	0.964E-01
AM-241	#B	-4.1887E-02	2.6345E-01	2.6347E-01	0.395E-01
Bi-212	#B	-1.9780E-01	8.2255E-01	8.2264E-01	0.229E+00
BI-214	B	-2.8083E-02	1.6268E-01	1.6269E-01	0.545E-01
CO-60	F	2.6633E-02	2.4627E-02	2.4681E-02	0.181E-01
CS-137		3.9511E-02	3.3611E-02	3.3698E-02	0.246E-01
EU-152	F	6.0463E-02	6.4235E-02	6.4377E-02	0.410E-01
EU-154	F	1.0034E-01	7.4844E-02	7.5178E-02	0.308E-01
K-40	#	3.1542E+00	9.8745E-01	1.0067E+00	0.248E+00
Pa-234	B	4.2723E-02	5.7021E-02	5.7114E-02	0.447E-01
Pb-210	#B	2.2139E-01	4.6793E-01	4.6825E-01	0.329E+00
Pb-212	#B	-1.0570E-01	1.0601E-01	1.0623E-01	0.455E-01
PB-214	#B	-7.0931E-02	7.7890E-02	7.8019E-02	0.721E-01
RA-226	B	1.8243E-01	5.3508E-01	5.3521E-01	0.474E+00
Th-230	#B	-2.1373E+02	3.4754E+02	3.4871E+02	0.118E+02
Th-234	#B	-1.2685E+01	1.4275E+01	1.4339E+01	0.875E+00
Tl-208	#F	4.0434E-02	7.4133E-02	7.4173E-02	0.254E-01
U-235	B	9.8791E-03	8.1721E-02	8.1723E-02	0.253E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (39.2 to 2495.3 keV) 3.220E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) Wan32 G53W2.10 17-JUL-2008 09:41:21
New World Technology Spectrum name: 3K000004.An1

Sample description
Parcel E-2 TW023 0827E022 251ml
6/30/08 10:50

Acquisition information
Start time: 16-Jul-2008 13:00:21
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	-9.9795E-02	9.4100E+00	9.4100E+00	0.142E+00
AM-241	#B	-3.0564E-02	1.7760E-01	1.7762E-01	0.505E-01
Bi-212	#B	-2.3477E-01	1.1076E+00	1.1077E+00	0.280E+00
BI-214	#F	1.4344E-01	2.8688E-01	2.8701E-01	0.472E-01
CO-60	#B	4.6857E-03	2.1932E-01	2.1932E-01	0.680E-01
CS-137	#B	1.2916E-03	9.5125E-03	9.5128E-03	0.882E-02
EU-152	F	7.2977E-02	5.9055E-02	5.9279E-02	0.347E-01
EU-154	F	5.1263E-02	5.8586E-02	5.8697E-02	0.199E-01
K-40		9.1487E+00	2.4977E+00	2.5616E+00	0.140E+01
Pa-234	B	2.8620E-02	1.5867E-01	1.5869E-01	0.512E-01
Pb-210	#F	6.3576E-01	1.1386E+00	1.1397E+00	0.458E+00
Pb-212	#B	-5.1064E-02	3.1998E-02	3.2168E-02	0.570E-01
PB-214	B	-7.6521E-02	5.5549E-02	5.5758E-02	0.665E-01
RA-226	#B	-6.5943E-01	2.2764E+00	2.2768E+00	0.517E+00
Th-230	#B	-2.5492E+02	2.8326E+03	2.8328E+03	0.129E+02
Th-234	#B	-1.4619E+01	2.2163E+01	2.2219E+01	0.989E+00
Tl-208	F	3.9793E-02	3.3299E-02	3.3386E-02	0.283E-01
U-235	F	4.5247E-02	3.6198E-02	3.6316E-02	0.279E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (39.0 to 2490.0 keV) 9.194E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) Wan32 G53W2.10 16-JUL-2008 17:53:14
New World Technology Spectrum name: 3K000005.An1

Sample description
Parcel E-2 PZ161D 0827E028 243ml
7/01/08 10:30

Acquisition information
Start time: 16-Jul-2008 15:17:09
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-6.5145E-03	1.3135E-02	1.3141E-02	0.134E+00
AM-241	B	6.6669E-04	6.5388E-02	6.5388E-02	0.557E-01
Bi-212	#B	-2.8381E-01	1.4636E+00	1.4637E+00	0.273E+00
BI-214	F	4.5776E-02	7.1272E-02	7.1326E-02	0.350E-01
CO-60	#B	-8.7522E-03	9.7669E-01	9.7669E-01	0.734E-01
CS-137		3.9899E-02	3.4201E-02	3.4287E-02	0.248E-01
EU-152	B	4.7368E-03	1.3865E-02	1.3869E-02	0.356E-01
EU-154	F	1.0689E-01	6.5659E-02	6.6090E-02	0.296E-01
K-40	#	7.3983E+00	4.4803E+00	4.5038E+00	0.122E+01
Pa-234	F	3.1264E-01	1.6849E-01	1.7016E-01	0.664E-01
Pb-210	#	1.3450E+00	1.1249E+00	1.1296E+00	0.449E+00
Pb-212	#B	-9.5040E-02	9.0526E-02	9.0735E-02	0.524E-01
PB-214	B	-1.2055E-01	4.2370E-01	4.2377E-01	0.714E-01
RA-226	#B	-8.1116E-01	4.1077E+00	4.1080E+00	0.591E+00
Th-230	#B	-2.6063E+02	8.0674E+02	8.0749E+02	0.135E+02
Th-234	#B	-1.5316E+01	3.4252E+01	3.4291E+01	0.103E+01
Tl-208	#F	7.1456E-02	3.5528E-02	3.5791E-02	0.176E-01
U-235	F	3.1733E-02	3.5892E-02	3.5951E-02	0.282E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (39.0 to 2490.0 keV) 8.961E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 07:41:06
New World Technology Spectrum name: 4K000001.An1

Sample description
Parcel E-2 TW003 0826P006 265ml
6/27/08 11:53

Acquisition information
Start time: 14-Jul-2008 12:53:04
Live time: 65745
Real time: 65835

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	1.9381E-01	6.7513E-02	6.8371E-02	0.333E-01
AM-241	#A	-6.1031E-02	-2.2055E-01	-2.2058E-01	0.242E-01
Bi-212	#B	-5.0591E-01	-8.9004E-01	-8.9048E-01	0.979E-01
BI-214		1.5381E-01	4.0040E-02	4.0947E-02	0.200E-01
CO-60	F	1.1715E-02	1.8727E-02	1.8738E-02	0.100E-01
CS-137	F	1.2085E-02	1.8363E-02	1.8375E-02	0.986E-02
EU-152	B	-1.0988E-02	2.2199E+03	2.2199E+03	0.177E-01
EU-154	#B	-1.2501E-02	-2.4757E-02	-2.4767E-02	0.128E-01
K-40		4.5601E+00	4.8637E-01	5.4874E-01	0.191E+00
Pa-234	B	-1.4967E-01	-7.0853E-01	-7.0858E-01	0.298E-01
Pb-210		9.6917E-01	4.3797E-01	4.4125E-01	0.196E+00
Pb-212	#B	-6.3420E-02	-7.0777E-02	-7.0865E-02	0.199E-01
PB-214	F	5.9630E-02	5.0064E-02	5.0174E-02	0.222E-01
RA-226	B	1.9281E-01	4.2962E-01	4.2975E-01	0.249E+00
Th-230	#B	-1.7049E+01	-6.0890E+01	-6.0898E+01	0.266E+01
Th-234		1.1273E+00	3.1820E-01	3.2428E-01	0.230E+00
Tl-208	F	1.9415E-01	3.7241E-02	3.8780E-02	0.158E-01
U-235	#B	-1.1626E+00	-8.2365E-01	-8.2619E-01	0.287E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 7.2578797E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 10:02:11
New World Technology Spectrum name: 4K000002.An1

Sample description
Parcel E-2 TW033 0826E006 263ml
6/27/08 11:15

Acquisition information
Start time: 15-Jul-2008 07:44:21
Live time: 7200
Real time: 7214

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Uncertainty (Counting) pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	F	5.1953E-01	2.7911E-01	2.8060E-01	0.816E-01
AM-241	#A	-4.0458E-02	-3.3641E-01	-3.3642E-01	0.734E-01
Bi-212	B	-6.1246E-02	-1.2544E-01	-1.2549E-01	0.288E+00
BI-214		1.3343E-01	1.0677E-01	1.0703E-01	0.531E-01
CO-60		5.2666E-02	3.7502E-02	3.7617E-02	0.221E-01
CS-137	#B	-1.0038E-03	2.5187E+02	2.5187E+02	0.215E-01
EU-152	F	1.1012E-01	1.5857E-01	1.5869E-01	0.663E-01
EU-154	#B	-3.0843E-02	-1.1624E-01	-1.1625E-01	0.519E-01
K-40	#	4.2392E+00	1.2247E+00	1.2472E+00	0.538E+00
Pa-234	B	7.7021E-02	8.1550E-02	8.1662E-02	0.890E-01
Pb-210		1.5277E+00	1.4620E+00	1.4644E+00	0.620E+00
Pb-212	#B	-3.5671E-02	-1.4548E-01	-1.4549E-01	0.586E-01
PB-214	F	1.3295E-01	1.5482E-01	1.5500E-01	0.660E-01
RA-226	B	3.3286E-01	1.2470E+00	1.2471E+00	0.721E+00
Th-230	#B	-1.6090E+01	-1.2518E+02	-1.2519E+02	0.794E+01
Th-234	F	1.6967E+00	1.2166E+00	1.2202E+00	0.680E+00
Tl-208	#F	2.2634E-01	1.1071E-01	1.1143E-01	0.401E-01
U-235	#B	-1.1675E+00	-2.0576E+00	-2.0587E+00	0.843E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 4.2893872E+00 pCi/ml

Laboratory: New World Technology

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     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 12:15:36
 New World Technology            Spectrum name: 4K000003.An1

 Sample description
      Parcel E-2 TW041 0826E012 259ml
      6/27/08 14:00

Acquisition information
        Start time:                15-Jul-2008 10:06:08
        Live time:               7200
        Real time:               7211

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    1.6226E-01   1.8596E-01    1.8618E-01  0.957E-01
 AM-241 #A   -3.7852E-02  -3.0158E-01   -3.0158E-01  0.719E-01
 Bi-212  B   -1.8383E-01  -3.8016E-01   -3.8030E-01  0.303E+00
 BI-214       1.2332E-01   1.6743E-01    1.6757E-01  0.584E-01
 CO-60  #F    5.1401E-02   6.7228E-02    6.7289E-02  0.234E-01
 CS-137  F    2.9621E-02   4.7363E-02    4.7391E-02  0.238E-01
 EU-152  F    8.3037E-02   1.3857E-01    1.3865E-01  0.617E-01
 EU-154 #B   -6.2510E-02   4.8693E+02    4.8693E+02  0.525E-01
 K-40         4.4669E+00   1.2520E+00    1.2765E+00  0.542E+00
 Pa-234  F    1.4837E-01   1.3995E-01    1.4020E-01  0.893E-01
 Pb-210 #     9.4176E-01   1.1652E+00    1.1664E+00  0.557E+00
 Pb-212  B    7.2004E-03   9.9523E-02    9.9524E-02  0.598E-01
 PB-214  F    3.6938E-01   1.8569E-01    1.8683E-01  0.699E-01
 RA-226       9.7633E-01   1.3323E+00    1.3334E+00  0.750E+00
 Th-230 #B   -1.6668E+01  -1.2824E+02   -1.2824E+02  0.750E+01
 Th-234       1.6666E+00   9.7261E-01    9.7699E-01  0.706E+00
 Tl-208  F    1.8875E-01   1.0318E-01    1.0372E-01  0.407E-01
 U-235  #B   -1.2210E+00  -4.2793E+00   -4.2798E+00  0.888E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   42.8 to  3401.7 keV) 8.9467716E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 14:19:20
New World Technology Spectrum name: 4K000004.An1

Sample description
Parcel E-2 TW039 0826E011 259ml
6/27/08 13:35

Acquisition information
Start time: 15-Jul-2008 12:17:45
Live time: 7200
Real time: 7211

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	F	3.0833E-01	1.9567E-01	1.9642E-01	0.862E-01
AM-241	A	3.2331E-02	1.2823E-01	1.2824E-01	0.718E-01
Bi-212	#B	-3.0021E-01	-1.0286E+00	-1.0288E+00	0.287E+00
BI-214		3.1315E-01	2.0783E-01	2.0857E-01	0.669E-01
CO-60	#F	5.1589E-02	5.7180E-02	5.7252E-02	0.203E-01
CS-137		4.3476E-02	5.3482E-02	5.3537E-02	0.264E-01
EU-152	F	7.4776E-02	1.4390E-01	1.4396E-01	0.651E-01
EU-154	B	2.2703E-02	3.3689E-02	3.3713E-02	0.501E-01
K-40		4.9666E+00	1.3574E+00	1.3853E+00	0.546E+00
Pa-234	B	5.8745E-02	9.3832E-02	9.3889E-02	0.894E-01
Pb-210		7.7723E-01	1.0996E+00	1.1005E+00	0.538E+00
Pb-212	B	8.1844E-03	3.3511E-02	3.3514E-02	0.598E-01
PB-214	F	4.9249E-01	1.8039E-01	1.8246E-01	0.711E-01
RA-226	#B	-2.8604E-01	-1.7300E+00	-1.7301E+00	0.728E+00
Th-230	#B	-6.7832E+00	-2.6087E+01	-2.6090E+01	0.769E+01
Th-234		1.9845E+00	1.0085E+00	1.0144E+00	0.675E+00
Tl-208	#F	2.3562E-01	1.1113E-01	1.1190E-01	0.407E-01
U-235	#B	-1.1504E+00	-1.6419E+00	-1.6432E+00	0.877E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 8.6804628E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 16:30:39
New World Technology Spectrum name: 4K000005.An1

Sample description
Parcel E-2 TW034 0826D002 249ml
6/27/08 09:51

Acquisition information
Start time: 15-Jul-2008 14:21:35
Live time: 7200
Real time: 7209

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	#F	2.8362E-01	2.5213E-01	2.5262E-01	0.984E-01
AM-241	#A	-4.6735E-02	-3.9095E-01	-3.9096E-01	0.768E-01
Bi-212	B	-1.2159E-01	-2.5134E-01	-2.5143E-01	0.319E+00
BI-214		1.6972E-01	1.4149E-01	1.4180E-01	0.647E-01
CO-60	#B	1.0766E-02	2.1993E-02	2.2001E-02	0.125E-01
CS-137	B	1.9760E-02	4.7140E-02	4.7153E-02	0.244E-01
EU-152	B	4.0321E-02	8.3512E-02	8.3542E-02	0.708E-01
EU-154	B	1.3407E-02	2.8891E-02	2.8901E-02	0.531E-01
K-40		5.5436E+00	1.3766E+00	1.4108E+00	0.558E+00
Pa-234	B	3.7603E-02	6.9174E-02	6.9206E-02	0.947E-01
Pb-210		1.3384E+00	1.2038E+00	1.2061E+00	0.570E+00
Pb-212	#B	-5.6404E-02	-1.9384E-01	-1.9387E-01	0.628E-01
PB-214	F	4.1824E-01	1.8125E-01	1.8274E-01	0.672E-01
RA-226	#B	-4.0123E-01	-2.3048E+00	-2.3049E+00	0.846E+00
Th-230	#B	-1.4149E+01	-7.3548E+01	-7.3552E+01	0.855E+01
Th-234	F	1.0098E+00	1.0291E+00	1.0306E+00	0.746E+00
Tl-208	F	1.9942E-01	1.1584E-01	1.1637E-01	0.461E-01
U-235	#B	-1.1820E+00	-1.3919E+00	-1.3935E+00	0.892E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 8.9627895E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 19:48:44
New World Technology Spectrum name: 4K000006.An1

Sample description
Parcel E-2 PZ150D 0827D023 260ml
6/30/08 11:10

Acquisition information
Start time: 15-Jul-2008 16:54:55
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	3.5780E-01	2.4961E-01	2.5040E-01	0.853E-01
AM-241	#A	-4.7152E-02	-4.1026E-01	-4.1027E-01	0.751E-01
Bi-212	#B	-1.8758E-01	-3.0677E-01	-3.0695E-01	0.276E+00
BI-214		1.5957E-01	1.4091E-01	1.4119E-01	0.634E-01
CO-60	#F	4.7463E-02	6.6498E-02	6.6550E-02	0.233E-01
CS-137	F	2.6680E-02	4.7934E-02	4.7957E-02	0.244E-01
EU-152	F	6.3168E-02	1.3983E-01	1.3987E-01	0.532E-01
EU-154	F	4.7947E-02	1.1143E-01	1.1146E-01	0.442E-01
K-40		5.0475E+00	1.3359E+00	1.3652E+00	0.535E+00
Pa-234	F	1.1266E-01	1.4394E-01	1.4408E-01	0.829E-01
Pb-210		1.0221E+00	1.3874E+00	1.3886E+00	0.628E+00
Pb-212	#B	-6.9942E-02	-2.3876E-01	-2.3879E-01	0.624E-01
PB-214	F	3.3790E-01	1.6491E-01	1.6598E-01	0.617E-01
RA-226	B	2.7911E-01	1.1760E+00	1.1761E+00	0.687E+00
Th-230	#B	-1.9462E+01	-7.5932E+02	-7.5932E+02	0.745E+01
Th-234	F	1.2504E+00	9.1166E-01	9.1430E-01	0.707E+00
Tl-208	F	2.4373E-01	1.1234E-01	1.1316E-01	0.406E-01
U-235	#B	-1.1823E+00	-2.3765E+00	-2.3774E+00	0.876E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (42.8 to 3401.7 keV) 6.8780947E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 22:16:17
New World Technology Spectrum name: 4K000007.An1

Sample description
Parcel E-2 TW046 0827D020 257ml
6/30/08 10:00

Acquisition information
Start time: 15-Jul-2008 19:52:13
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	F	2.7792E-01	2.5087E-01	2.5135E-01	0.902E-01
AM-241	#A	-5.9732E-03	-1.5016E-01	-1.5016E-01	0.747E-01
Bi-212	#B	-6.1599E-02	-6.1295E-02	-6.1391E-02	0.286E+00
BI-214		2.2107E-01	2.1598E-01	2.1633E-01	0.733E-01
CO-60	#F	3.3168E-02	4.4129E-02	4.4167E-02	0.248E-01
CS-137	B	1.4060E-02	5.8598E-02	5.8603E-02	0.314E-01
EU-152	B	-1.1330E-02	6.4772E+02	6.4772E+02	0.699E-01
EU-154	B	-1.3586E-02	-5.1774E-02	-5.1779E-02	0.533E-01
K-40		4.8933E+00	1.2684E+00	1.2973E+00	0.527E+00
Pa-234	F	1.4803E-01	1.8517E-01	1.8535E-01	0.894E-01
Pb-210		9.4576E-01	1.0251E+00	1.0265E+00	0.565E+00
Pb-212	B	-5.0591E-02	-1.2580E-01	-1.2583E-01	0.612E-01
PB-214	F	3.8611E-01	1.8479E-01	1.8603E-01	0.672E-01
RA-226	B	2.7179E-01	1.3828E+00	1.3829E+00	0.796E+00
Th-230	#B	-1.4479E+01	-8.1083E+01	-8.1087E+01	0.818E+01
Th-234	F	1.0362E+00	1.2392E+00	1.2406E+00	0.707E+00
Tl-208	#F	2.2939E-01	1.0948E-01	1.1022E-01	0.411E-01
U-235	#B	-1.1717E+00	-1.8985E+00	-1.8996E+00	0.890E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (42.8 to 3401.7 keV) 7.9897895E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 08:12:18
New World Technology Spectrum name: 4K000008.An1

Sample description
Parcel E-2 TW028B 0827P018 255ml
6/30/08 09:36

Acquisition information
Start time: 15-Jul-2008 22:19:21
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/ml	Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228 #F	3.3275E-01	2.3010E-01	2.3085E-01	0.823E-01
AM-241 #A	-3.7771E-02	-3.1310E-01	-3.1311E-01	0.757E-01
Bi-212 #B	-4.2018E-01	-1.5511E+00	-1.5513E+00	0.290E+00
BI-214 #	2.1416E-01	1.9037E-01	1.9075E-01	0.652E-01
CO-60 #B	4.7167E-03	3.0470E-02	3.0471E-02	0.102E-01
CS-137 B	1.2014E-02	3.8382E-02	3.8388E-02	0.200E-01
EU-152 F	1.7945E-01	1.9434E-01	1.9460E-01	0.660E-01
EU-154 B	4.9763E-02	8.5294E-02	8.5338E-02	0.514E-01
K-40 #	4.7083E+00	1.2516E+00	1.2788E+00	0.535E+00
Pa-234 F	1.1977E-01	1.2961E-01	1.2978E-01	0.823E-01
Pb-210	1.0773E+00	1.1686E+00	1.1701E+00	0.565E+00
Pb-212 B	-1.9533E-02	-9.9252E-02	-9.9258E-02	0.575E-01
PB-214 F	2.0471E-01	1.9126E-01	1.9160E-01	0.749E-01
RA-226 #B	-3.2859E-02	-1.4120E+00	-1.4120E+00	0.791E+00
Th-230 #B	-1.4000E+01	-7.2228E+01	-7.2232E+01	0.816E+01
Th-234 F	1.2927E+00	1.2684E+00	1.2704E+00	0.718E+00
Tl-208 #F	2.5688E-01	1.1709E-01	1.1796E-01	0.414E-01
U-235 #B	-1.1973E+00	-2.2380E+00	-2.2390E+00	0.896E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 8.0869188E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 13:50:26
New World Technology Spectrum name: 4K000009.An1

Sample description
Parcel E-2 TW024 0826E014 259ml
6/27/08 14:55

Acquisition information
Start time: 16-Jul-2008 11:39:02
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	1.8439E-01	1.7943E-01	1.7973E-01	0.858E-01
AM-241	#A	-9.1809E-02	7.1533E+02	7.1533E+02	0.772E-01
Bi-212	#B	-4.3452E-01	-1.6396E+00	-1.6397E+00	0.284E+00
BI-214		2.7052E-01	1.7663E-01	1.7727E-01	0.625E-01
CO-60	#F	2.3449E-02	3.5910E-02	3.5933E-02	0.207E-01
CS-137	B	2.9474E-02	5.9833E-02	5.9855E-02	0.312E-01
EU-152	F	5.7382E-02	1.2450E-01	1.2454E-01	0.494E-01
EU-154	#B	-2.1013E-02	-1.1030E-01	-1.1031E-01	0.469E-01
K-40		4.7360E+00	1.3816E+00	1.4065E+00	0.561E+00
Pa-234	F	1.3572E-01	1.5917E-01	1.5935E-01	0.896E-01
Pb-210	F	6.1237E-01	1.0058E+00	1.0064E+00	0.563E+00
Pb-212	#B	-3.9679E-02	-1.5586E-01	-1.5588E-01	0.601E-01
PB-214	F	2.0612E-01	1.1013E-01	1.1073E-01	0.546E-01
RA-226		1.0100E+00	1.2796E+00	1.2808E+00	0.721E+00
Th-230	#B	-1.3507E+01	-6.7594E+01	-6.7598E+01	0.803E+01
Th-234		1.3257E+00	9.9049E-01	9.9322E-01	0.692E+00
Tl-208	F	2.4920E-01	1.1359E-01	1.1443E-01	0.407E-01
U-235	#B	-1.2327E+00	-5.9282E+00	-5.9286E+00	0.896E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 7.7757282E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 15:52:53
New World Technology Spectrum name: 4K000010.An1

Sample description
Parcel E-2 TW031 0826E008 251ml
6/27/08 11:35

Acquisition information
Start time: 16-Jul-2008 13:52:39
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	F	4.8465E-01	2.8839E-01	2.8965E-01	0.919E-01
AM-241	#A	-4.8859E-02	-3.4238E-01	-3.4239E-01	0.640E-01
Bi-212	#B	-4.8401E-01	-1.9747E+00	-1.9749E+00	0.293E+00
BI-214		2.3601E-01	1.2492E-01	1.2561E-01	0.578E-01
CO-60	#	6.0839E-02	4.3999E-02	4.4129E-02	0.229E-01
CS-137	B	1.2611E-02	5.6914E-02	5.6918E-02	0.305E-01
EU-152	F	8.2071E-02	9.8948E-02	9.9053E-02	0.595E-01
EU-154	B	9.2627E-03	2.8048E-02	2.8053E-02	0.494E-01
K-40		5.5347E+00	1.2749E+00	1.3116E+00	0.526E+00
Pa-234	B	4.7139E-02	1.0331E-01	1.0334E-01	0.886E-01
Pb-210		1.5793E+00	1.1281E+00	1.1315E+00	0.538E+00
Pb-212	#B	-6.0287E-02	-1.9759E-01	-1.9762E-01	0.611E-01
PB-214	F	2.8889E-01	1.8472E-01	1.8542E-01	0.633E-01
RA-226	B	4.2896E-01	1.3884E+00	1.3886E+00	0.796E+00
Th-230	#B	-1.7233E+01	-1.5088E+02	-1.5089E+02	0.854E+01
Th-234	F	1.0570E+00	1.2121E+00	1.2135E+00	0.717E+00
Tl-208	F	2.4780E-01	1.1552E-01	1.1634E-01	0.420E-01
U-235	#B	-1.2160E+00	-2.3113E+00	-2.3123E+00	0.915E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (42.8 to 3401.7 keV) 8.4321785E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 18:12:52
 New World Technology            Spectrum name: 4K000011.An1

 Sample description
      Parcel E-2 TW057B 0827P026 245ml
      7/01/08 09:13

Acquisition information
        Start time:                16-Jul-2008 16:09:41
        Live time:              7200
        Real time:              7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  F    2.7884E-01   1.9612E-01    1.9673E-01  0.878E-01
 AM-241 #A   -5.5486E-02  -5.1794E-01   -5.1794E-01  0.808E-01
 Bi-212 #B   -6.3653E-01  -5.6740E+00   -5.6741E+00  0.328E+00
 BI-214       2.9219E-01   1.9971E-01    2.0037E-01  0.671E-01
 CO-60  #F    1.4369E-02   2.2566E-02    2.2580E-02  0.855E-02
 CS-137  B    2.3227E-02   5.9185E-02    5.9199E-02  0.311E-01
 EU-152  F    1.2463E-01   1.5784E-01    1.5799E-01  0.653E-01
 EU-154 #F    6.9325E-02   8.2055E-02    8.2145E-02  0.550E-01
 K-40         4.8170E+00   1.3938E+00    1.4194E+00  0.585E+00
 Pa-234  B    4.8430E-02   8.2003E-02    8.2047E-02  0.873E-01
 Pb-210 #     7.7973E-01   1.1453E+00    1.1461E+00  0.571E+00
 Pb-212 #B   -3.3180E-02  -1.4823E-01   -1.4824E-01  0.631E-01
 PB-214  F    9.3798E-02   1.3065E-01    1.3075E-01  0.703E-01
 RA-226  B    3.8577E-02   1.3876E+00    1.3876E+00  0.808E+00
 Th-230 #B   -1.5403E+01  -8.0603E+01   -8.0607E+01  0.794E+01
 Th-234       1.6491E+00   1.1987E+00    1.2022E+00  0.748E+00
 Tl-208  F    2.5885E-01   1.1930E-01    1.2017E-01  0.431E-01
 U-235   B   -1.2559E+00  -2.5173E+00   -2.5182E+00  0.926E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   42.8 to  3401.7 keV) 8.1694746E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 08:21:11
New World Technology Spectrum name: 5K000001.An1

Sample description
Parcel E-2 TW022 0826D010 259ml
6/27/08 13:30

Acquisition information
Start time: 14-Jul-2008 14:14:48
Live time: 60941
Real time: 61038

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	-4.3026E-01	-6.0121E-01	-6.0169E-01	0.567E-01
AM-241	#B	-1.4434E-01	-9.5861E-01	-9.5864E-01	0.225E-01
Bi-212	F	7.5890E-02	1.3769E-01	1.3775E-01	0.747E-01
BI-214	B	-3.7589E-02	1.9749E+03	1.9749E+03	0.252E-01
CO-60	B	1.1012E-03	2.1662E-03	2.1671E-03	0.105E-01
CS-137	F	8.9152E-03	1.6494E-02	1.6501E-02	0.885E-02
EU-152	B	4.9451E-03	7.8140E-03	7.8188E-03	0.196E-01
EU-154	B	4.6397E-03	1.0872E-02	1.0875E-02	0.138E-01
K-40		3.6466E+00	4.4466E-01	4.8877E-01	0.185E+00
Pa-234	B	1.9956E-02	2.9341E-02	2.9362E-02	0.221E-01
Pb-210		3.1211E-01	3.9677E-01	3.9715E-01	0.185E+00
Pb-212	B	-1.8858E-01	-1.2478E-01	-1.2522E-01	0.218E-01
PB-214	B	-1.2494E-01	-1.8248E-01	-1.8261E-01	0.270E-01
RA-226	#B	-6.6793E-02	-4.0357E-01	-4.0358E-01	0.207E+00
Th-230	#B	-1.6051E+01	-1.1610E+02	-1.1610E+02	0.172E+01
Th-234	B	-6.6607E-01	-7.3804E-01	-7.3896E-01	0.184E+00
Tl-208	B	-7.5843E-02	-2.2502E-02	-2.2894E-02	0.231E-01
U-235	#B	-1.2290E+00	-1.0220E+01	-1.0221E+01	0.288E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 3.9586873E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 10:07:38
 New World Technology            Spectrum name: 5K000002.An1

 Sample description
      Parcel E-2 TW002 0826P009 266ml
      6/27/08 13:38

Acquisition information
        Start time:                15-Jul-2008 07:47:34
        Live time:               7200
        Real time:               7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B   -4.7355E-01  -3.2621E+00   -3.2622E+00  0.156E+00
 AM-241 #B   -4.0541E-02  -1.7525E-01   -1.7526E-01  0.605E-01
 Bi-212 #B   -1.2138E-02  -7.1982E-01   -7.1982E-01  0.213E+00
 BI-214 #B   -3.6599E-02   9.5293E+02    9.5293E+02  0.527E-01
 CO-60  #F    1.6555E-02   1.0947E-02    1.0986E-02  0.150E-01
 CS-137  B    8.5754E-03   3.8648E-02    3.8651E-02  0.205E-01
 EU-152 #F    1.0333E-01   9.9467E-02    9.9632E-02  0.535E-01
 EU-154  F    5.3048E-02   1.0105E-01    1.0109E-01  0.320E-01
 K-40         3.3308E+00   1.1186E+00    1.1338E+00  0.508E+00
 Pa-234  F    6.1157E-02   1.4593E-01    1.4597E-01  0.519E-01
 Pb-210  F    5.5562E-01   1.0664E+00    1.0668E+00  0.505E+00
 Pb-212  B   -1.4845E-01  -2.3645E-01   -2.3659E-01  0.587E-01
 PB-214  F    8.6201E-01   1.1636E-01    1.2586E-01  0.764E-01
 RA-226 #B   -4.1832E-02  -1.0494E+00   -1.0494E+00  0.565E+00
 Th-230 #B   -5.5103E+00  -1.8506E+01   -1.8509E+01  0.555E+01
 Th-234  F    5.0942E-01   3.3470E-01    3.3589E-01  0.475E+00
 Tl-208 #B   -1.8341E-01   6.7068E+02    6.7068E+02  0.635E-01
 U-235  #B   -1.1871E+00  -8.9013E+00   -8.9016E+00  0.796E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.3 to  2632.8 keV) 3.3308384E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 12:19:20
 New World Technology            Spectrum name: 5K000003.An1

 Sample description
      Parcel E-2 TW004 0826P011 252ml
      6/27/08 14:24

Acquisition information
        Start time:                15-Jul-2008 10:10:00
        Live time:              7200
        Real time:              7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B   -5.2656E-01  -4.2178E+00   -4.2179E+00  0.144E+00
 AM-241 #B   -1.4091E-01  -1.6865E+00   -1.6865E+00  0.665E-01
 Bi-212 #B   -2.9623E-02  -7.2554E-01   -7.2555E-01  0.909E-01
 BI-214 #F    9.0913E-02   9.9725E-02    9.9853E-02  0.482E-01
 CO-60  #B   -9.7505E-03  -1.1104E-01   -1.1105E-01  0.172E-01
 CS-137 #B    9.1811E-03   2.8982E-02    2.8986E-02  0.141E-01
 EU-152  F    9.7670E-02   1.5571E-01    1.5580E-01  0.581E-01
 EU-154 #B   -1.6138E-02   3.8381E+02    3.8381E+02  0.414E-01
 K-40         3.4326E+00   1.0639E+00    1.0809E+00  0.502E+00
 Pa-234  F    7.0226E-02   1.1370E-01    1.1377E-01  0.645E-01
 Pb-210       7.3602E-01   8.9507E-01    8.9600E-01  0.464E+00
 Pb-212  B   -1.8995E-01  -3.2665E-01   -3.2682E-01  0.618E-01
 PB-214  F    7.6159E-01   1.0479E-01    1.1303E-01  0.757E-01
 RA-226       8.4762E-01   1.0485E+00    1.0495E+00  0.583E+00
 Th-230 #B   -1.7240E+01   5.7360E+04    5.7360E+04  0.619E+01
 Th-234  B    2.4484E-02   1.5990E-02    1.6047E-02  0.556E+00
 Tl-208  B   -1.4862E-01  -1.9167E-01   -1.9184E-01  0.674E-01
 U-235  #B   -1.2575E+00  -1.5461E+01   -1.5461E+01  0.864E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.3 to  2632.8 keV) 5.0162516E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 14:26:18
New World Technology Spectrum name: 5K000004.An1

Sample description
Parcel E-2 TW031 0826E009 259ml
6/27/08 11:40

Acquisition information
Start time: 15-Jul-2008 12:23:17
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide	Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228 #B	-5.0777E-01	-3.3030E+00	-3.3031E+00	0.139E+00
AM-241 #B	-8.8723E-02	-3.8227E-01	-3.8230E-01	0.636E-01
Bi-212 #B	-3.3339E-02	-2.7931E+00	-2.7931E+00	0.158E+00
BI-214 #F	9.2526E-02	1.0496E-01	1.0509E-01	0.427E-01
CO-60 #B	-1.3518E-03	-6.8997E-03	-6.9001E-03	0.157E-01
CS-137 #	4.2204E-02	5.7605E-02	5.7653E-02	0.219E-01
EU-152 F	6.5780E-02	6.3842E-02	6.3946E-02	0.550E-01
EU-154 F	8.6080E-02	1.1031E-01	1.1041E-01	0.321E-01
K-40	2.8227E+00	1.0287E+00	1.0406E+00	0.499E+00
Pa-234 B	-2.3865E-02	5.0112E+02	5.0112E+02	0.541E-01
Pb-210 #F	5.5363E-01	1.1229E+00	1.1233E+00	0.524E+00
Pb-212 B	-1.8532E-01	-3.0262E-01	-3.0279E-01	0.585E-01
PB-214 F	8.4297E-01	1.2371E-01	1.3231E-01	0.728E-01
RA-226 B	8.5310E-02	1.0185E+00	1.0185E+00	0.591E+00
Th-230 #B	-5.8617E+00	-1.9481E+01	-1.9484E+01	0.569E+01
Th-234 F	6.2124E-01	3.9806E-01	3.9955E-01	0.499E+00
Tl-208 #F	1.0746E-01	3.3940E-02	3.4463E-02	0.652E-01
U-235 #B	-1.2261E+00	-1.9024E+01	-1.9024E+01	0.835E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 2.8648934E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 16:31:58
New World Technology Spectrum name: 5K000005.An1

Sample description
Parcel E-2 TW030B 0826P002 245ml
6/27/08 11:08

Acquisition information
Start time: 15-Jul-2008 14:28:37
Live time: 7200
Real time: 7208

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	#B	-5.6210E-01	-1.6092E+01	-1.6092E+01	0.154E+00
AM-241	#B	-1.6115E-01	-7.5996E+00	-7.5996E+00	0.553E-01
Bi-212	B	8.5067E-02	2.9984E-01	2.9988E-01	0.160E+00
BI-214	#B	4.7501E-02	5.8989E-02	5.9048E-02	0.520E-01
CO-60	#B	-7.6818E-03	-5.4046E-02	-5.4048E-02	0.154E-01
CS-137	F	3.0476E-02	5.2405E-02	5.2432E-02	0.265E-01
EU-152	B	4.3226E-02	9.3846E-02	9.3877E-02	0.625E-01
EU-154	F	7.7991E-02	7.3958E-02	7.4085E-02	0.343E-01
K-40		4.1739E+00	1.1557E+00	1.1788E+00	0.516E+00
Pa-234	B	2.0013E-02	7.3030E-02	7.3038E-02	0.514E-01
Pb-210		1.9331E+00	1.0617E+00	1.0671E+00	0.578E+00
Pb-212	B	-1.7355E-01	-3.1048E-01	-3.1063E-01	0.673E-01
PB-214	F	8.0095E-01	1.3479E-01	1.4197E-01	0.748E-01
RA-226	B	1.3691E-01	9.5278E-01	9.5281E-01	0.559E+00
Th-230	#B	-1.2938E+01	-6.2009E+01	-6.2014E+01	0.606E+01
Th-234	B	2.9143E-01	2.2275E-01	2.2333E-01	0.539E+00
Tl-208	B	-1.9913E-01	7.2816E+02	7.2816E+02	0.689E-01
U-235	#B	-1.2958E+00	-1.9702E+01	-1.9702E+01	0.887E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 6.1070728E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 19:50:23
New World Technology Spectrum name: 5K000006.An1

Sample description
Parcel E-2 TW025 0826E015 239ml
6/27/08 15:05

Acquisition information
Start time: 15-Jul-2008 16:57:39
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	-4.0503E-01	-1.2795E+00	-1.2797E+00	0.166E+00
AM-241	#B	-1.3828E-01	-9.1500E-01	-9.1503E-01	0.591E-01
Bi-212	B	2.1803E-02	2.5565E-01	2.5565E-01	0.143E+00
BI-214	#B	-4.0734E-02	9.3401E+02	9.3401E+02	0.592E-01
CO-60	#B	1.5561E-02	1.8148E-02	1.8168E-02	0.177E-01
CS-137	#	8.4095E-02	9.3800E-02	9.3916E-02	0.292E-01
EU-152	#B	3.0421E-02	9.0514E-02	9.0529E-02	0.614E-01
EU-154	F	1.1783E-01	1.3256E-01	1.3272E-01	0.399E-01
K-40		3.7908E+00	1.2496E+00	1.2673E+00	0.556E+00
Pa-234	F	1.5936E-01	1.3390E-01	1.3420E-01	0.721E-01
Pb-210	B	2.3241E-01	1.2892E+00	1.2893E+00	0.594E+00
Pb-212	B	-1.8969E-01	-3.1947E-01	-3.1964E-01	0.656E-01
PB-214	F	7.9345E-01	1.2065E-01	1.2848E-01	0.785E-01
RA-226	B	2.7773E-01	1.1037E+00	1.1038E+00	0.634E+00
Th-230	#B	-1.7797E+01	-7.2750E+02	-7.2750E+02	0.528E+01
Th-234	B	3.2861E-01	2.2232E-01	2.2306E-01	0.553E+00
Tl-208	B	-2.0413E-01	7.4644E+02	7.4644E+02	0.706E-01
U-235	#B	-1.2862E+00	-3.0970E+00	-3.0979E+00	0.879E-01

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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 3.8748803E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 22:21:10
New World Technology Spectrum name: 5K000007.An1

Sample description
Parcel E-2 TW049 0827E020 261ml
6/30/08 10:20

Acquisition information
Start time: 15-Jul-2008 19:56:17
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	-5.1293E-01	-3.8139E+00	-3.8140E+00	0.137E+00
AM-241	#B	-1.0052E-01	-4.9521E-01	-4.9524E-01	0.639E-01
Bi-212	F	2.2415E-01	4.1562E-01	4.1581E-01	0.215E+00
BI-214	F	2.2110E-01	1.6895E-01	1.6940E-01	0.519E-01
CO-60	#B	-1.5624E-02	-2.2732E-01	-2.2732E-01	0.153E-01
CS-137	B	1.3841E-02	5.2762E-02	5.2768E-02	0.281E-01
EU-152	F	6.0921E-02	9.2892E-02	9.2954E-02	0.557E-01
EU-154	F	5.8388E-02	8.6247E-02	8.6308E-02	0.378E-01
K-40		4.2532E+00	1.1154E+00	1.1403E+00	0.484E+00
Pa-234	B	2.4623E-02	8.2167E-02	8.2178E-02	0.660E-01
Pb-210	#B	-5.0626E-02	-9.1476E-01	-9.1477E-01	0.462E+00
Pb-212	B	-1.7237E-01	-3.0743E-01	-3.0758E-01	0.622E-01
PB-214	B	-7.8809E-02	-1.1128E-01	-1.1137E-01	0.767E-01
RA-226	B	1.2402E-01	1.0223E+00	1.0223E+00	0.591E+00
Th-230	#B	-1.6518E+01	-1.7943E+03	-1.7943E+03	0.477E+01
Th-234	#B	-6.7041E-01	-1.9279E+00	-1.9282E+00	0.484E+00
Tl-208	B	-1.8816E-01	-9.3471E-01	-9.3477E-01	0.649E-01
U-235	#B	-1.1879E+00	-4.1881E+00	-4.1886E+00	0.826E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 4.4742475E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 08:22:09
New World Technology Spectrum name: 5K000008.An1

Sample description
Parcel E-2 TW026B 0827P015 256ml
6/30/08 09:06

Acquisition information
Start time: 15-Jul-2008 22:23:35
Live time: 7200
Real time: 7206

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	#B	-4.8487E-01	-2.2718E+00	-2.2720E+00	0.143E+00
AM-241	#B	-1.3079E-01	-8.4588E-01	-8.4591E-01	0.524E-01
Bi-212	B	9.4957E-02	4.0416E-01	4.0419E-01	0.218E+00
BI-214	#F	7.5586E-02	6.0603E-02	6.0749E-02	0.400E-01
CO-60	#B	6.4450E-03	1.2439E-02	1.2444E-02	0.153E-01
CS-137	F	2.0361E-02	3.9135E-02	3.9151E-02	0.195E-01
EU-152	F	5.5972E-02	9.0873E-02	9.0926E-02	0.523E-01
EU-154	F	1.0578E-01	9.8997E-02	9.9170E-02	0.398E-01
K-40		3.6598E+00	1.1545E+00	1.1723E+00	0.510E+00
Pa-234	F	7.9859E-02	7.8620E-02	7.8745E-02	0.636E-01
Pb-210	B	9.5585E-03	1.0569E+00	1.0569E+00	0.525E+00
Pb-212	B	-1.6403E-01	-2.8245E-01	-2.8260E-01	0.632E-01
PB-214	F	8.7478E-01	1.2436E-01	1.3355E-01	0.754E-01
RA-226	B	4.0087E-01	1.0536E+00	1.0538E+00	0.599E+00
Th-230	#B	-1.3976E+01	-1.2318E+02	-1.2319E+02	0.593E+01
Th-234	B	3.5904E-01	2.5924E-01	2.6000E-01	0.496E+00
Tl-208	#B	-1.9058E-01	8.4910E+02	8.4910E+02	0.803E-01
U-235	#B	-1.2286E+00	-8.3648E+00	-8.3651E+00	0.851E-01

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C - Area < Critical level.
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H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 3.6597674E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 11:38:51
New World Technology Spectrum name: 5K000009.An1

Sample description
Parcel E-2 TW048 0827D022 251ml
6/30/08 10:40

Acquisition information
Start time: 16-Jul-2008 09:30:21
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	#B	-5.5573E-01	-1.2534E+01	-1.2534E+01	0.139E+00
AM-241	#B	-9.3367E-02	-4.1078E-01	-4.1081E-01	0.661E-01
Bi-212	#F	4.7656E-01	3.5932E-01	3.6030E-01	0.115E+00
BI-214	#B	3.5063E-02	5.9962E-02	5.9994E-02	0.600E-01
CO-60	#B	7.7341E-03	2.2935E-02	2.2939E-02	0.201E-01
CS-137	B	7.4253E-03	4.2727E-02	4.2729E-02	0.229E-01
EU-152	F	2.5910E-01	2.0263E-01	2.0314E-01	0.448E-01
EU-154	F	5.7236E-02	8.2334E-02	8.2395E-02	0.394E-01
K-40		3.4469E+00	1.1970E+00	1.2122E+00	0.537E+00
Pa-234	F	6.9303E-02	1.2073E-01	1.2079E-01	0.517E-01
Pb-210	#B	-1.3648E-02	-1.2272E+00	-1.2272E+00	0.573E+00
Pb-212	B	-1.5301E-01	-2.2784E-01	-2.2800E-01	0.601E-01
PB-214	F	7.7671E-01	1.1705E-01	1.2478E-01	0.834E-01
RA-226	B	4.1880E-01	9.6845E-01	9.6873E-01	0.555E+00
Th-230	#B	-1.3079E+01	-6.2689E+01	-6.2694E+01	0.557E+01
Th-234	B	1.4571E-01	1.3818E-01	1.3841E-01	0.528E+00
Tl-208	B	-4.2453E-02	-2.2444E-02	-2.2568E-02	0.672E-01
U-235	#B	-1.2687E+00	-3.3109E+01	-3.3109E+01	0.864E-01

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F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.3 to 2632.8 keV) 3.4469435E+00 pCi/ml

Laboratory: New World Technology

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     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 13:54:08
 New World Technology            Spectrum name: 5K000010.An1

 Sample description
      Parcel E-2 TW050 0827E023 251ml
      6/30/08 11:00

Acquisition information
        Start time:                16-Jul-2008 11:42:07
        Live time:              7200
        Real time:              7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B   -2.8680E-01  -8.6923E-01   -8.6937E-01  0.159E+00
 AM-241 #B   -1.2838E-01  -9.8299E-01   -9.8302E-01  0.674E-01
 Bi-212 #B   -4.1860E-02   3.0140E+03    3.0140E+03  0.179E+00
 BI-214  F    1.8788E-01   1.4470E-01    1.4508E-01  0.526E-01
 CO-60  #F    6.0819E-02   5.0292E-02    5.0405E-02  0.180E-01
 CS-137  B    1.7069E-03   3.7088E-02    3.7088E-02  0.203E-01
 EU-152  F    8.8432E-02   1.0730E-01    1.0742E-01  0.525E-01
 EU-154  B    9.3274E-03   3.6125E-02    3.6128E-02  0.413E-01
 K-40         3.3076E+00   1.1430E+00    1.1577E+00  0.526E+00
 Pa-234  B    1.1675E-02   3.8047E-02    3.8052E-02  0.666E-01
 Pb-210       7.3189E-01   8.8540E-01    8.8633E-01  0.512E+00
 Pb-212  B   -1.6372E-01  -2.8406E-01   -2.8420E-01  0.650E-01
 PB-214  F    7.6527E-01   1.1674E-01    1.2427E-01  0.766E-01
 RA-226  B    1.5884E-01   9.0451E-01    9.0455E-01  0.531E+00
 Th-230 #B   -1.4869E+01  -1.2781E+02   -1.2781E+02  0.607E+01
 Th-234  B    4.6871E-01   3.3478E-01    3.3579E-01  0.534E+00
 Tl-208 #B   -1.9009E-01  -1.1534E+00   -1.1534E+00  0.672E-01
 U-235  #B   -1.2711E+00  -6.2837E+01   -6.2837E+01  0.863E-01

   # - All peaks for activity calculation had bad shape.
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   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.3 to  2632.8 keV) 4.2881536E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 16:00:30
New World Technology Spectrum name: 5K000011.An1

Sample description
Parcel E-2 TW056 0827P029 241ml
7/01/08 09:30

Acquisition information
Start time: 16-Jul-2008 13:56:22
Live time: 7200
Real time: 7207

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	#B	-5.8246E-01	1.9549E+03	1.9549E+03	0.149E+00
AM-241	#B	-1.0111E-01	-4.0132E-01	-4.0136E-01	0.619E-01
Bi-212	F	3.3173E-01	3.7914E-01	3.7959E-01	0.183E+00
BI-214	#F	1.3911E-01	8.9258E-02	8.9593E-02	0.663E-01
CO-60	#B	1.4820E-02	2.3037E-02	2.3051E-02	0.159E-01
CS-137	#B	-1.1755E-03	2.1944E+02	2.1944E+02	0.237E-01
EU-152	#B	8.2310E-03	2.7694E-02	2.7698E-02	0.477E-01
EU-154	B	3.6640E-02	1.3790E-01	1.3792E-01	0.428E-01
K-40		3.6142E+00	1.1150E+00	1.1330E+00	0.525E+00
Pa-234	F	8.5793E-02	1.0508E-01	1.0518E-01	0.555E-01
Pb-210	B	2.5985E-01	1.1967E+00	1.1968E+00	0.688E+00
Pb-212	B	-2.1735E-01	-4.6475E-01	-4.6491E-01	0.696E-01
PB-214	F	7.8982E-01	1.2410E-01	1.3165E-01	0.764E-01
RA-226	B	1.5039E-01	1.0909E+00	1.0910E+00	0.631E+00
Th-230	#B	-1.8027E+01	5.1015E+04	5.1015E+04	0.483E+01
Th-234	B	2.7181E-01	1.8163E-01	1.8226E-01	0.570E+00
Tl-208	B	-6.3131E-02	-4.4423E-02	-4.4561E-02	0.700E-01
U-235	#B	-1.2970E+00	-6.0516E+00	-6.0520E+00	0.893E-01

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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.3 to 2632.8 keV) 3.9458899E+00 pCi/ml

Laboratory: New World Technology

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     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 18:19:47
 New World Technology            Spectrum name: 5K000012.An1

 Sample description
      Parcel E-2 PZ131F 0827E026 246ml
      6/30/08 13:20

Acquisition information
        Start time:                16-Jul-2008 16:18:23
        Live time:              7200
        Real time:              7207

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B   -5.5982E-01  -5.0765E+00   -5.0766E+00  0.139E+00
 AM-241 #B   -1.6400E-01   6.4150E+02    6.4150E+02  0.692E-01
 Bi-212 #B   -4.1153E-02  -1.4795E+01   -1.4795E+01  0.160E+00
 BI-214 #F    9.1473E-02   1.1528E-01    1.1540E-01  0.581E-01
 CO-60  #B   -1.7001E-02  -1.7172E-01   -1.7172E-01  0.149E-01
 CS-137 #     6.8266E-02   6.4027E-02    6.4139E-02  0.209E-01
 EU-152  F    1.1254E-01   1.8960E-01    1.8971E-01  0.588E-01
 EU-154 #B   -1.6532E-02   3.9492E+02    3.9492E+02  0.426E-01
 K-40         3.3345E+00   1.2601E+00    1.2737E+00  0.556E+00
 Pa-234 #F    8.5075E-02   9.6226E-02    9.6342E-02  0.663E-01
 Pb-210 #B   -3.2345E-01  -1.3367E+00   -1.3369E+00  0.554E+00
 Pb-212  B   -2.1516E-01  -4.3604E-01   -4.3620E-01  0.657E-01
 PB-214  F    6.0738E-01   1.0136E-01    1.0685E-01  0.848E-01
 RA-226  B    1.3676E-01   1.0254E+00    1.0254E+00  0.596E+00
 Th-230 #B   -1.6562E+01  -1.7083E+02   -1.7083E+02  0.440E+01
 Th-234  B   -1.7215E-02  -3.4706E-02   -3.4719E-02  0.553E+00
 Tl-208 #B   -8.0750E-02  -8.3173E-02   -8.3294E-02  0.831E-01
 U-235  #B   -1.2795E+00  -8.9514E+00   -8.9517E+00  0.883E-01

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   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.3 to  2632.8 keV) 3.4027638E+00  pCi/ml

Laboratory:  New World Technology
```

```
     ORTEC g v - i (3263) wan32  G53W2.06  31-JUL-2008 12:31:57
 New World Technology            Spectrum name: 5K000013.An1

 Sample description
      Parcel E-2 TW004 0826P011 242ml
      6/30/08 15:00

Acquisition information
        Start time:                 31-Jul-2008 10:22:34
        Live time:                7200
        Real time:                7208

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  2 Sigma
 Nuclide    Activity        Counting     Total          MDA
                pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228 #B   -5.3733E-01  -1.8340E+00   -1.8341E+00  0.148E+00
 AM-241 #B   -1.2556E-01  -5.2206E-01   -5.2208E-01  0.679E-01
 Bi-212  B    2.1604E-01   2.8591E-01    2.8603E-01  0.223E+00
 BI-214 #B    4.1468E-02   4.0339E-02    4.0368E-02  0.608E-01
 CO-60  #F    2.5707E-02   2.7957E-02    2.7973E-02  0.189E-01
 CS-137  F    3.4566E-02   3.6794E-02    3.6816E-02  0.278E-01
 EU-152  F    9.2557E-02   8.6863E-02    8.6931E-02  0.505E-01
 EU-154  F    1.1639E-01   7.9782E-02    7.9898E-02  0.432E-01
 K-40   #     6.4274E+00   8.7395E-01    9.0590E-01  0.179E+00
 Pa-234  B    4.5314E-02   8.5510E-02    8.5527E-02  0.681E-01
 Pb-210  F    5.5312E-01   6.1886E-01    6.1920E-01  0.541E+00
 Pb-212  B   -1.4802E-01  -1.6146E-01   -1.6156E-01  0.659E-01
 PB-214  F    7.1656E-01   7.7330E-02    8.1771E-02  0.678E-01
 RA-226 #B   -3.5002E-01  -1.2307E+00   -1.2307E+00  0.642E+00
 Th-230 #B   -1.4114E+01  -4.3178E+01   -4.3181E+01  0.504E+01
 Th-234  B    1.4000E-01   8.4627E-02    8.4785E-02  0.538E+00
 Tl-208  B   -4.4921E-02  -1.7203E-02   -1.7283E-02  0.705E-01
 U-235  #B   -1.2940E+00  -4.4291E+00   -4.4293E+00  0.892E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.3 to  2632.8 keV) 6.4273534E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 07:48:00
New World Technology Spectrum name: 6K000001.An1

Sample description
Parcel E-2 PZ138F 0826E003 265ml
6/27/08 10:25

Acquisition information
Start time: 14-Jul-2008 14:32:44
Live time: 59919
Real time: 59959

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	B	-5.2475E-01	-4.0080E-01	-4.0186E-01	0.576E-01
AM-241	#A	-7.3572E-02	-3.2919E-01	-3.2921E-01	0.213E-01
Bi-212	#B	-5.8406E-01	-1.0433E+00	-1.0438E+00	0.953E-01
BI-214	F	1.7271E-01	5.3834E-02	5.4687E-02	0.185E-01
CO-60	B	-9.6984E-02	-4.2675E-01	-4.2678E-01	0.146E-01
CS-137	F	1.1210E-02	1.6930E-02	1.6941E-02	0.906E-02
EU-152	#B	-3.1218E-02	1.0795E+03	1.0795E+03	0.140E-01
EU-154	B	-3.6959E-02	-2.4940E-01	-2.4941E-01	0.139E-01
K-40		3.2721E+00	4.6334E-01	4.9793E-01	0.248E+00
Pa-234	#B	-6.2937E-02	-2.0313E-01	-2.0316E-01	0.199E-01
Pb-210		9.9563E-01	3.7997E-01	3.8400E-01	0.176E+00
Pb-212	B	-1.1819E-01	-8.7190E-02	-8.7439E-02	0.195E-01
PB-214	B	-4.9393E-02	-6.7394E-02	-6.7450E-02	0.220E-01
RA-226	#B	-2.6775E-01	-5.0274E-01	-5.0296E-01	0.219E+00
Th-230	#B	-3.9039E+01	-8.7576E+02	-8.7576E+02	0.225E+01
Th-234	#B	-2.5245E-01	-4.1552E-01	-4.1576E-01	0.204E+00
Tl-208	#B	-6.0561E-02	-7.8305E-02	-7.8378E-02	0.137E-01
U-235	#B	-6.1887E-01	-8.0656E-01	-8.0730E-01	0.219E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 4.4404731E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 10:11:16
New World Technology Spectrum name: 6K000002.An1

Sample description
Parcel E-2 TW017 0826D014 267ml
6/27/08 14:20

Acquisition information
Start time: 15-Jul-2008 07:50:24
Live time: 7200
Real time: 7207

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-3.1699E-01	-6.9456E-01	-6.9479E-01	0.160E+00
AM-241	#A	-5.3302E-02	-4.4827E-01	-4.4828E-01	0.584E-01
Bi-212	#B	2.1202E-01	1.1244E-01	1.1306E-01	0.253E+00
BI-214	F	1.2088E-01	1.0758E-01	1.0779E-01	0.522E-01
CO-60	#B	1.3806E-02	1.0547E-02	1.0575E-02	0.389E-01
CS-137	B	1.1253E-02	3.5853E-02	3.5859E-02	0.188E-01
EU-152	#B	-3.0984E-02	4.8738E+02	4.8738E+02	0.526E-01
EU-154	B	3.5991E-02	8.5164E-02	8.5188E-02	0.385E-01
K-40		4.8789E+00	1.2833E+00	1.3118E+00	0.587E+00
Pa-234	#B	-6.2499E-02	-5.7606E-01	-5.7607E-01	0.535E-01
Pb-210		1.0138E+00	1.1172E+00	1.1187E+00	0.504E+00
Pb-212	B	-9.4266E-02	-1.6919E-01	-1.6927E-01	0.506E-01
PB-214	F	1.7344E-01	1.1522E-01	1.1562E-01	0.588E-01
RA-226	F	6.0827E-01	1.0186E+00	1.0192E+00	0.591E+00
Th-230	#B	-3.5595E+01	-2.1246E+02	-2.1247E+02	0.694E+01
Th-234	#B	-3.7634E-01	-1.7094E+00	-1.7095E+00	0.611E+00
Tl-208	#B	-7.2690E-02	-2.4184E-01	-2.4187E-01	0.372E-01
U-235	#B	-6.2376E-01	-2.9732E+00	-2.9734E+00	0.617E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 6.0136299E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 12:26:46
 New World Technology            Spectrum name: 6K000003.An1

 Sample description
      Parcel E-2 TW032 0826E007 250ml
      6/27/08 11:25

Acquisition information
        Start time:                15-Jul-2008 10:14:45
        Live time:               7200
        Real time:               7206

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  B   -2.9371E-01  -6.9374E-01   -6.9393E-01  0.172E+00
 AM-241 #A   -9.1326E-02  -1.7808E+00   -1.7808E+00  0.415E-01
 Bi-212 #B   -4.4396E-01  -1.3503E+00   -1.3505E+00  0.280E+00
 BI-214  F    2.3575E-01   1.7274E-01    1.7324E-01  0.532E-01
 CO-60  #B    1.8594E-04   3.9743E-04    3.9757E-04  0.380E-01
 CS-137  B    1.6872E-02   4.2872E-02    4.2882E-02  0.223E-01
 EU-152  F    5.4003E-02   1.7257E-01    1.7259E-01  0.481E-01
 EU-154 #F    8.4158E-02   1.0574E-01    1.0584E-01  0.412E-01
 K-40         4.2227E+00   1.4351E+00    1.4542E+00  0.654E+00
 Pa-234 #F    1.2733E-01   2.0166E-01    2.0179E-01  0.706E-01
 Pb-210       1.8125E+00   9.7434E-01    9.7956E-01  0.515E+00
 Pb-212  B   -1.1105E-01  -2.1994E-01   -2.2003E-01  0.577E-01
 PB-214  F    1.4101E-01   8.7286E-02    8.7639E-02  0.668E-01
 RA-226  B    1.4658E-01   1.0855E+00    1.0855E+00  0.644E+00
 Th-230 #B   -3.5807E+01  -1.5257E+02   -1.5258E+02  0.728E+01
 Th-234  B    2.1239E-01   1.2996E+00    1.2997E+00  0.640E+00
 Tl-208 #B   -1.4690E-01  -1.8457E+00   -1.8457E+00  0.424E-01
 U-235  #B   -6.6922E-01  -3.8673E+00   -3.8675E+00  0.677E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2613.8 keV) 6.2709217E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 14:28:56
New World Technology Spectrum name: 6K000004.An1

Sample description
Parcel E-2 TW035 0826E001 253ml
6/27/08 09:31

Acquisition information
Start time: 15-Jul-2008 12:28:44
Live time: 7200
Real time: 7205

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	B	-4.7261E-01	-7.0640E-01	-7.0689E-01	0.154E+00
AM-241	#A	-6.5964E-02	-6.1945E-01	-6.1946E-01	0.600E-01
Bi-212	#B	-6.0112E-01	-3.0616E+00	-3.0617E+00	0.294E+00
BI-214	F	2.9187E-01	1.8177E-01	1.8249E-01	0.550E-01
CO-60	#B	-1.0449E-01	-6.4419E-01	-6.4422E-01	0.350E-01
CS-137	B	6.9257E-03	3.5563E-02	3.5565E-02	0.190E-01
EU-152	#F	1.0751E-01	1.4483E-01	1.4495E-01	0.584E-01
EU-154	F	4.9553E-02	6.2102E-02	6.2164E-02	0.429E-01
K-40		4.3618E+00	1.3765E+00	1.3978E+00	0.696E+00
Pa-234	#B	-3.9315E-02	-2.6036E-01	-2.6037E-01	0.614E-01
Pb-210	#	1.7214E+00	1.2822E+00	1.2858E+00	0.558E+00
Pb-212	#B	-1.1543E-01	-2.2975E-01	-2.2984E-01	0.570E-01
PB-214	F	1.3535E-01	8.0977E-02	8.1327E-02	0.656E-01
RA-226	B	6.3110E-02	1.0696E+00	1.0696E+00	0.638E+00
Th-230	#B	-3.4931E+01	-1.7950E+02	-1.7951E+02	0.791E+01
Th-234	B	3.4230E-01	1.3396E+00	1.3397E+00	0.639E+00
Tl-208	#B	-6.3715E-02	-1.3282E-01	-1.3287E-01	0.343E-01
U-235	#B	-6.7087E-01	-5.7299E+00	-5.7300E+00	0.652E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 6.3751369E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 16:34:39
 New World Technology            Spectrum name: 6K000005.An1

 Sample description
      Parcel E-2 TW051 0826D003 250ml
      6/27/08 10:14

Acquisition information
        Start time:                15-Jul-2008 14:32:47
        Live time:              7200
        Real time:              7204

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
                pCi/ml        pCi/ml        pCi/ml        pCi/ml


 ____________________________________________________________________________
 Ac-228  B   -2.4783E-01  -4.7961E-01   -4.7981E-01  0.161E+00
 AM-241 #A   -5.7822E-02  -3.5645E-01   -3.5646E-01  0.544E-01
 Bi-212 #B   -6.3839E-01  -3.6141E+00   -3.6143E+00  0.291E+00
 BI-214  F    2.9328E-01   1.9096E-01    1.9166E-01  0.578E-01
 CO-60  #B   -1.8497E-02  -1.5061E-02   -1.5096E-02  0.417E-01
 CS-137 #     7.2047E-02   6.4700E-02    6.4824E-02  0.217E-01
 EU-152  B    5.3781E-03   9.7326E-02    9.7327E-02  0.543E-01
 EU-154  F    4.3746E-02   1.1828E-01    1.1830E-01  0.383E-01
 K-40         4.9523E+00   1.4578E+00    1.4837E+00  0.650E+00
 Pa-234 #F    7.0154E-02   1.4559E-01    1.4565E-01  0.657E-01
 Pb-210       8.0561E-01   9.5819E-01    9.5924E-01  0.533E+00
 Pb-212  B   -1.0243E-01  -2.1563E-01   -2.1571E-01  0.600E-01
 PB-214  F    1.5631E-01   9.4860E-02    9.5259E-02  0.670E-01
 RA-226 #B   -2.4279E-01  -1.4221E+00   -1.4222E+00  0.652E+00
 Th-230 #B   -3.8934E+01  -3.4426E+02   -3.4426E+02  0.797E+01
 Th-234 #B   -8.2899E-02  -1.0558E+00   -1.0558E+00  0.600E+00
 Tl-208 #B   -1.8744E-02  -9.2310E-02   -9.2316E-02  0.379E-01
 U-235  #B   -6.7185E-01  -3.4766E+00   -3.4768E+00  0.636E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2613.8 keV) 6.1232815E+00  pCi/ml

Laboratory:  New World Technology
```

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 19:00:23
New World Technology Spectrum name: 6K000006.An1

Sample description
Parcel E-2 TW014 0827D017 260ml
6/30/08 09:20

Acquisition information
Start time: 15-Jul-2008 17:00:09
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-4.4484E-01	-1.1458E+00	-1.1460E+00	0.168E+00
AM-241	#A	-3.4978E-02	-2.7420E-01	-2.7421E-01	0.616E-01
Bi-212	#B	2.4482E-02	2.1822E-02	2.1865E-02	0.268E+00
BI-214	F	2.6430E-01	1.6300E-01	1.6367E-01	0.497E-01
CO-60	#B	-1.0932E-01	-1.1560E+00	-1.1560E+00	0.335E-01
CS-137	B	1.1318E-02	4.3707E-02	4.3711E-02	0.232E-01
EU-152	F	1.0824E-01	1.0681E-01	1.0698E-01	0.540E-01
EU-154	#F	4.4257E-02	5.5531E-02	5.5586E-02	0.416E-01
K-40		5.5280E+00	1.4201E+00	1.4531E+00	0.616E+00
Pa-234	#B	-2.1186E-02	-1.3425E-01	-1.3426E-01	0.610E-01
Pb-210		1.2331E+00	1.2582E+00	1.2601E+00	0.547E+00
Pb-212	B	-1.0170E-01	-2.0998E-01	-2.1005E-01	0.570E-01
PB-214	F	1.1245E-01	5.7676E-02	5.8015E-02	0.614E-01
RA-226	B	1.0705E-01	9.8326E-01	9.8328E-01	0.590E+00
Th-230	#B	-3.9018E+01	-7.1226E+02	-7.1226E+02	0.691E+01
Th-234	#B	-6.2451E-01	-1.6233E+00	-1.6236E+00	0.595E+00
Tl-208	#B	1.5742E-02	7.1539E-02	7.1544E-02	0.351E-01
U-235	B	-6.4538E-01	-4.0026E+00	-4.0028E+00	0.649E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 7.0254064E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 22:24:48
New World Technology Spectrum name: 6K000007.An1

Sample description
Parcel E-2 TW059 0827P013 251ml
6/30/08 08:35

Acquisition information
Start time: 15-Jul-2008 19:59:47
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	B	-5.7137E-01	-1.3044E+00	-1.3048E+00	0.174E+00
AM-241	A	4.5419E-02	1.3139E-01	1.3141E-01	0.614E-01
Bi-212	#B	4.7410E-02	2.4759E-02	2.4899E-02	0.247E+00
BI-214	F	2.0981E-01	1.0356E-01	1.0422E-01	0.438E-01
CO-60	#B	-9.3472E-02	-5.4045E-01	-5.4048E-01	0.416E-01
CS-137		3.9243E-02	3.6783E-02	3.6848E-02	0.164E-01
EU-152	B	2.8798E-02	9.9304E-02	9.9317E-02	0.521E-01
EU-154	#B	-4.7277E-02	3.9495E+02	3.9495E+02	0.426E-01
K-40		4.4772E+00	1.4623E+00	1.4834E+00	0.743E+00
Pa-234	#B	9.2138E-04	1.2458E-01	1.2458E-01	0.625E-01
Pb-210		1.6267E+00	1.0474E+00	1.0513E+00	0.491E+00
Pb-212	B	-1.1491E-01	-2.3823E-01	-2.3832E-01	0.591E-01
PB-214	F	1.2183E-01	6.8485E-02	6.8821E-02	0.639E-01
RA-226	B	9.8666E-02	1.0808E+00	1.0808E+00	0.643E+00
Th-230	#B	-4.0581E+01	-9.7064E+02	-9.7064E+02	0.762E+01
Th-234	#B	-2.2333E-01	-1.1747E+00	-1.1748E+00	0.600E+00
Tl-208	B	8.0117E-05	8.7794E-02	8.7794E-02	0.412E-01
U-235	#B	-6.7530E-01	-5.2032E+00	-5.2033E+00	0.648E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.2 to 2613.8 keV) 6.3529544E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 08:26:58
New World Technology Spectrum name: 6K000008.An1

Sample description
Parcel E-2 TW061 0827D024 259ml
6/30/08 13:45

Acquisition information
Start time: 15-Jul-2008 22:27:11
Live time: 7200
Real time: 7205

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-5.2318E-01	-1.0730E+00	-1.0734E+00	0.168E+00
AM-241	#A	-5.8075E-02	-3.4925E-01	-3.4927E-01	0.490E-01
Bi-212	#B	-5.1119E-01	-1.9682E+00	-1.9684E+00	0.283E+00
BI-214	F	1.7325E-01	1.0652E-01	1.0696E-01	0.491E-01
CO-60	#B	-4.4868E-02	-1.4748E-01	-1.4750E-01	0.375E-01
CS-137	B	1.1104E-02	3.5766E-02	3.5772E-02	0.187E-01
EU-152	F	2.5802E-01	1.6156E-01	1.6220E-01	0.419E-01
EU-154	#F	7.3427E-02	9.2348E-02	9.2439E-02	0.393E-01
K-40		4.6662E+00	1.3342E+00	1.3593E+00	0.619E+00
Pa-234	#F	2.1290E-01	1.9659E-01	1.9695E-01	0.665E-01
Pb-210	#F	5.8096E-01	9.9436E-01	9.9489E-01	0.493E+00
Pb-212	B	-2.3974E-01	5.8711E+02	5.8711E+02	0.633E-01
PB-214	F	2.0268E-01	1.4085E-01	1.4130E-01	0.649E-01
RA-226	#B	-5.3035E-01	-1.8374E+00	-1.8377E+00	0.601E+00
Th-230	#B	-3.1309E+01	-1.1683E+02	-1.1684E+02	0.768E+01
Th-234	#B	-2.7336E-01	-1.5058E+00	-1.5059E+00	0.612E+00
Tl-208	#B	-3.7196E-02	-1.2300E-01	-1.2301E-01	0.371E-01
U-235	#B	-6.2535E-01	-1.8684E+00	-1.8687E+00	0.637E-01

- All peaks for activity calculation had bad shape.
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A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
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H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 4.8394718E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 11:42:39
New World Technology Spectrum name: 6K000009.An1

Sample description
Parcel E-2 TW029 0827P017 249ml
6/30/08 09:22

Acquisition information
Start time: 16-Jul-2008 09:32:53
Live time: 7200
Real time: 7206

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-3.0641E-01	-5.2359E-01	-5.2387E-01	0.160E+00
AM-241	#A	-5.7380E-02	-5.3364E-01	-5.3364E-01	0.663E-01
Bi-212	#B	-3.7180E-01	-5.3597E-01	-5.3637E-01	0.268E+00
BI-214	F	2.3266E-01	1.2980E-01	1.3045E-01	0.421E-01
CO-60	#B	-1.0695E-01	-8.4702E-01	-8.4704E-01	0.360E-01
CS-137	B	1.3055E-02	4.9349E-02	4.9354E-02	0.263E-01
EU-152	#B	-3.3224E-02	6.1142E+02	6.1142E+02	0.492E-01
EU-154	F	1.0708E-01	1.1770E-01	1.1785E-01	0.392E-01
K-40		4.4978E+00	1.6108E+00	1.6301E+00	0.685E+00
Pa-234	F	2.0449E-01	2.4651E-01	2.4677E-01	0.807E-01
Pb-210		1.7681E+00	8.9306E-01	8.9848E-01	0.470E+00
Pb-212	B	-1.2162E-01	-2.6009E-01	-2.6018E-01	0.605E-01
PB-214	F	2.0617E-01	1.1100E-01	1.1159E-01	0.712E-01
RA-226	B	1.1708E-01	1.1190E+00	1.1190E+00	0.663E+00
Th-230	#B	-3.9559E+01	-3.7121E+02	-3.7121E+02	0.743E+01
Th-234	#B	-2.8795E-01	-1.8184E+00	-1.8185E+00	0.683E+00
Tl-208	#B	-2.1485E-02	-1.1750E-01	-1.1750E-01	0.400E-01
U-235	#B	-6.4720E-01	-1.8677E+00	-1.8680E+00	0.669E-01

- All peaks for activity calculation had bad shape.
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& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 6.7030878E+00 pCi/ml

Laboratory: New World Technology

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     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 13:57:07
 New World Technology            Spectrum name: 6K000010.An1

 Sample description
      Parcel E-2 TW055 0827P023 245ml
      6/30/08 14:25

Acquisition information
        Start time:                16-Jul-2008 11:45:02
        Live time:              7200
        Real time:              7206

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 Ac-228  B   -3.0875E-01  -8.5843E-01   -8.5860E-01  0.184E+00
 AM-241 #A   -6.7434E-02  -5.7847E-01   -5.7849E-01  0.591E-01
 Bi-212 #B   -7.2083E-01  -6.6132E+00   -6.6133E+00  0.291E+00
 BI-214  F    2.3118E-01   1.1379E-01    1.1451E-01  0.492E-01
 CO-60  #B   -9.3085E-02  -3.1974E-01   -3.1978E-01  0.372E-01
 CS-137  B    2.2737E-02   4.6430E-02    4.6447E-02  0.238E-01
 EU-152  B    4.7302E-02   8.8635E-02    8.8675E-02  0.595E-01
 EU-154 #F    7.7297E-02   1.4355E-01    1.4362E-01  0.415E-01
 K-40         4.5618E+00   1.4889E+00    1.5105E+00  0.668E+00
 Pa-234 #B    4.6721E-03   1.5339E-02    1.5341E-02  0.638E-01
 Pb-210       1.3454E+00   9.6753E-01    9.7043E-01  0.524E+00
 Pb-212  B   -1.0696E-01  -2.1194E-01   -2.1203E-01  0.588E-01
 PB-214  F    1.4047E-01   7.3532E-02    7.3948E-02  0.696E-01
 RA-226  B    4.8337E-01   1.0529E+00    1.0533E+00  0.620E+00
 Th-230 #B   -3.7697E+01  -1.7047E+02   -1.7048E+02  0.739E+01
 Th-234 #B   -3.7159E-01  -1.6604E+00   -1.6605E+00  0.637E+00
 Tl-208 #B   -6.9047E-02  -1.4946E-01   -1.4951E-01  0.381E-01
 U-235  #B   -6.9674E-01  -8.4966E+00   -8.4967E+00  0.688E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
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   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.2 to  2613.8 keV) 6.1383076E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 16:01:02
New World Technology Spectrum name: 6K000011.An1

Sample description
Parcel E-2 TW018 0826D013 252ml
6/27/08 14:03

Acquisition information
Start time: 16-Jul-2008 13:59:29
Live time: 7200
Real time: 7205

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-3.7362E-01	-7.5317E-01	-7.5346E-01	0.165E+00
AM-241	#A	-5.2265E-02	-2.5990E-01	-2.5992E-01	0.475E-01
Bi-212	#B	-1.0850E-01	-7.6720E-02	-7.6958E-02	0.276E+00
BI-214	F	1.3899E-01	1.1851E-01	1.1876E-01	0.519E-01
CO-60	#B	-9.2997E-02	-4.3287E-01	-4.3290E-01	0.376E-01
CS-137	F	1.9928E-02	3.4863E-02	3.4881E-02	0.172E-01
EU-152	B	-1.6080E-02	-2.8472E-01	-2.8472E-01	0.551E-01
EU-154	F	5.6930E-02	7.3517E-02	7.3585E-02	0.405E-01
K-40		5.2899E+00	1.4357E+00	1.4657E+00	0.635E+00
Pa-234	#B	-1.8698E-02	-1.8026E-01	-1.8026E-01	0.687E-01
Pb-210	#	1.9153E+00	1.3499E+00	1.3542E+00	0.557E+00
Pb-212	B	-1.0480E-01	-2.1445E-01	-2.1453E-01	0.584E-01
PB-214	F	1.8132E-01	9.9984E-02	1.0049E-01	0.668E-01
RA-226	B	1.2475E-01	1.1155E+00	1.1155E+00	0.660E+00
Th-230	#B	-3.7808E+01	-2.5378E+02	-2.5379E+02	0.778E+01
Th-234	#B	4.5431E-01	1.4206E+00	1.4208E+00	0.662E+00
Tl-208	#B	-6.1840E-02	-1.4141E-01	-1.4145E-01	0.383E-01
U-235	#B	-6.5689E-01	-2.9771E+00	-2.9773E+00	0.670E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
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C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 7.3442006E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 18:20:52
New World Technology Spectrum name: 6K000012.An1

Sample description
Parcel E-2 TW008 0827P025 243ml
6/30/08 14:53

Acquisition information
Start time: 16-Jul-2008 16:20:39
Live time: 7200
Real time: 7206

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
Ac-228	B	-5.0226E-01	-9.0102E-01	-9.0146E-01	0.177E+00
AM-241	#A	-3.5816E-02	-3.0456E-01	-3.0457E-01	0.683E-01
Bi-212	#F	3.8828E-01	2.0592E-01	2.0705E-01	0.282E+00
BI-214	F	1.6807E-01	1.1896E-01	1.1932E-01	0.564E-01
CO-60	#B	-4.5829E-02	-1.3160E-01	-1.3163E-01	0.386E-01
CS-137	B	9.5335E-03	4.8214E-02	4.8217E-02	0.259E-01
EU-152	B	3.9756E-02	1.0586E-01	1.0588E-01	0.535E-01
EU-154	F	1.7756E-01	1.4118E-01	1.4153E-01	0.426E-01
K-40		5.3619E+00	1.6425E+00	1.6695E+00	0.689E+00
Pa-234	#F	1.7930E-01	2.4153E-01	2.4174E-01	0.679E-01
Pb-210		1.2716E+00	1.1877E+00	1.1898E+00	0.548E+00
Pb-212	B	-9.8043E-02	-2.1151E-01	-2.1158E-01	0.608E-01
PB-214	F	9.4218E-02	9.6324E-02	9.6467E-02	0.700E-01
RA-226	#B	-1.8033E-01	-1.2851E+00	-1.2851E+00	0.641E+00
Th-230	#B	-4.1609E+01	-6.3085E+02	-6.3086E+02	0.712E+01
Th-234	#B	-5.9181E-02	-1.0453E+00	-1.0453E+00	0.607E+00
Tl-208	#B	-8.1110E-03	-1.0086E-01	-1.0086E-01	0.410E-01
U-235	#B	-6.6911E-01	-2.1504E+00	-2.1507E+00	0.684E-01

- All peaks for activity calculation had bad shape.
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< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 6.8015900E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 31-JUL-2008 12:33:32
New World Technology Spectrum name: 6K000013.An1

Sample description
Parcel E-2 TW004 0826P011 252ml
7/01/08 09:45

Acquisition information
Start time: 31-Jul-2008 10:25:13
Live time: 7200
Real time: 7204

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 2 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
Ac-228	B	-1.4479E-01	-1.4983E-01	-1.4992E-01	0.177E+00
AM-241	#A	-3.7750E-02	-1.9539E-01	-1.9539E-01	0.623E-01
Bi-212	#B	1.8985E-01	7.4466E-02	7.4799E-02	0.269E+00
BI-214	F	2.0683E-01	1.0631E-01	1.0659E-01	0.511E-01
CO-60	#F	2.6257E-02	2.4537E-02	2.4556E-02	0.184E-01
CS-137	B	1.9650E-02	3.3356E-02	3.3364E-02	0.261E-01
EU-152	#B	1.9787E-02	4.5477E-02	4.5482E-02	0.495E-01
EU-154	#B	1.2573E-02	1.9148E-02	1.9153E-02	0.421E-01
K-40		4.6388E+00	1.1156E+00	1.1289E+00	0.684E+00
Pa-234	#B	-3.4447E-03	-6.9601E-03	-6.9613E-03	0.697E-01
Pb-210	#	2.0813E+00	9.8094E-01	9.8398E-01	0.590E+00
Pb-212	B	-1.4242E-01	-1.9660E-01	-1.9667E-01	0.562E-01
PB-214	F	1.6597E-01	7.5562E-02	7.5813E-02	0.662E-01
RA-226	B	1.1075E-01	7.3926E-01	7.3927E-01	0.657E+00
Th-230	#B	-3.9007E+01	-2.1088E+02	-2.1089E+02	0.690E+01
Th-234	#B	1.8126E-01	8.5043E-01	8.5045E-01	0.630E+00
Tl-208	#B	-2.9490E-02	-7.0378E-02	-7.0386E-02	0.372E-01
U-235	#B	-6.2792E-01	-1.0041E+00	-1.0044E+00	0.662E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.2 to 2613.8 keV) 6.9269695E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 10:18:29
New World Technology Spectrum name: 7K000001.An1

Sample description
Parcel E-2 TW020 0826D007 265ml
6/27/08 11:48

Acquisition information
Start time: 14-Jul-2008 15:11:01
Live time: 57693
Real time: 57725

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
AC-228	F	1.5408E-01	5.9818E-02	6.0430E-02	0.311E-01
AM-241	#B	-2.8907E-02	-9.0172E-02	-9.0187E-02	0.204E-01
BI-212	#B	-1.1343E-01	-3.2505E-01	-3.2511E-01	0.721E-01
BI-214	F	1.1695E-01	3.5513E-02	3.6106E-02	0.177E-01
CO-60		2.2273E-02	1.9285E-02	1.9325E-02	0.870E-02
CS-137		1.2950E-02	1.6832E-02	1.6848E-02	0.894E-02
EU-152	#B	-1.7797E-01	1.6472E+03	1.6472E+03	0.222E-01
EU-154	#B	6.3329E-03	3.2944E-02	3.2946E-02	0.132E-01
K-40		3.8116E+00	3.7269E-01	4.2895E-01	0.161E+00
PA-234	#F	5.1479E-02	5.7966E-02	5.8036E-02	0.188E-01
PB-210		6.3981E-01	3.4808E-01	3.4990E-01	0.170E+00
PB-212	F	6.3462E-02	2.8729E-02	2.8945E-02	0.155E-01
PB-214	B	-7.8933E-02	-1.0207E-01	-1.0216E-01	0.232E-01
RA-226	#B	-7.8303E-01	-1.3491E+00	-1.3498E+00	0.217E+00
Th-230	#B	-1.4990E+01	-1.6317E+01	-1.6338E+01	0.203E+01
TH-234	F	7.5182E-01	2.8718E-01	2.9022E-01	0.156E+00
TL-208	F	1.6712E-01	3.4190E-02	3.5435E-02	0.132E-01
U-235	#B	-1.0170E+00	-1.7719E+00	-1.7728E+00	0.260E-01

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A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.9 to 2667.9 keV) 5.7400651E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 10:17:47
New World Technology Spectrum name: 7K000002.An1

Sample description
Parcel E-2 TW019 0826D011 277ml
6/27/08 13:45

Acquisition information
Start time: 15-Jul-2008 07:56:22
Live time: 7200
Real time: 7203

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***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty 3 Sigma Counting pCi/ml	Total pCi/ml	MDA pCi/ml
AC-228	F	3.7809E-01	2.5865E-01	2.5950E-01	0.785E-01
AM-241	#B	-2.2633E-02	-1.8436E-01	-1.8436E-01	0.505E-01
BI-212	B	1.9720E-01	2.7103E-01	2.7125E-01	0.198E+00
BI-214	F	1.7390E-01	1.0749E-01	1.0792E-01	0.512E-01
CO-60	#F	6.6136E-03	1.1854E-02	1.1860E-02	0.511E-02
CS-137	F	2.2314E-02	4.0823E-02	4.0842E-02	0.207E-01
EU-152	B	-2.0163E-03	-1.8307E-03	-1.8342E-03	0.588E-01
EU-154	F	5.9056E-02	9.0479E-02	9.0539E-02	0.315E-01
K-40		4.0490E+00	1.0531E+00	1.0770E+00	0.404E+00
PA-234	B	-2.8406E-02	6.2377E+02	6.2377E+02	0.444E-01
PB-210		1.0109E+00	8.2214E-01	8.2406E-01	0.450E+00
PB-212	F	8.6238E-02	8.0364E-02	8.0507E-02	0.425E-01
PB-214	F	9.2149E-02	6.0177E-02	6.0395E-02	0.640E-01
RA-226	#B	-5.5754E-01	-2.1034E+00	-2.1036E+00	0.519E+00
Th-230	#B	-1.6548E+01	-8.9288E+01	-8.9293E+01	0.574E+01
TH-234	B	3.1195E-01	7.6977E-01	7.6996E-01	0.427E+00
TL-208	#F	8.4200E-02	1.0263E-01	1.0274E-01	0.422E-01
U-235	#B	-9.7744E-01	-6.6412E+00	-6.6414E+00	0.716E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.9 to 2667.9 keV) 5.7822976E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 12:31:40
New World Technology Spectrum name: 7K000003.An1

Sample description
Parcel E-2 TW009 0826P030 265ml
6/27/08 15:02

Acquisition information
Start time: 15-Jul-2008 10:19:50
Live time: 7200
Real time: 7203

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Time of Count Activity pCi/ml	Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
AC-228	B	-4.3262E-02	-1.6572E-01	-1.6574E-01	0.973E-01
AM-241	#B	-6.0765E-03	-1.2020E-01	-1.2020E-01	0.568E-01
BI-212	B	5.6586E-02	3.4677E-01	3.4678E-01	0.203E+00
BI-214	F	3.1669E-01	1.4094E-01	1.4204E-01	0.478E-01
CO-60	F	4.4573E-02	4.3380E-02	4.3451E-02	0.189E-01
CS-137	#B	-9.7613E-04	2.8566E+02	2.8566E+02	0.178E-01
EU-152	#B	-1.4559E-01	-9.3592E-01	-9.3595E-01	0.610E-01
EU-154	F	9.1814E-02	1.0056E-01	1.0069E-01	0.369E-01
K-40	#	4.0872E+00	1.1248E+00	1.1476E+00	0.433E+00
PA-234	#F	9.2366E-02	1.1021E-01	1.1033E-01	0.525E-01
PB-210		1.5553E+00	1.2077E+00	1.2108E+00	0.510E+00
PB-212	F	7.6927E-02	7.5641E-02	7.5763E-02	0.402E-01
PB-214	F	1.2486E-01	8.0165E-02	8.0466E-02	0.699E-01
RA-226	#B	-6.0414E-01	-2.3398E+00	-2.3400E+00	0.552E+00
Th-230	#B	-2.0849E+01	-1.9496E+02	-1.9496E+02	0.471E+01
TH-234	#B	2.5707E-01	7.2379E-01	7.2393E-01	0.380E+00
TL-208	#F	2.1921E-01	9.3016E-02	9.3814E-02	0.253E-01
U-235	#B	-1.0146E+00	-4.6022E+00	-4.6026E+00	0.737E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.9 to 2667.9 keV) 6.2999439E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 14:35:19
 New World Technology            Spectrum name: 7K000004.An1

 Sample description
      Parcel E-2 TW052 0826D006 251ml
      6/27/08 11:24

Acquisition information
        Start time:                15-Jul-2008 12:33:51
        Live time:              7200
        Real time:              7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228  F    3.2159E-01   2.3456E-01    2.3524E-01  0.759E-01
 AM-241 #B   -5.9339E-02  -6.8456E-01   -6.8457E-01  0.396E-01
 BI-212 #B    1.5497E-01   2.1352E-01    2.1370E-01  0.173E+00
 BI-214  F    2.9852E-01   1.2995E-01    1.3101E-01  0.455E-01
 CO-60  #F    4.6147E-02   5.9200E-02    5.9256E-02  0.192E-01
 CS-137  F    2.0522E-02   3.8152E-02    3.8170E-02  0.191E-01
 EU-152  B   -2.8548E-02  -8.7453E-02   -8.7467E-02  0.649E-01
 EU-154  F    9.8354E-02   1.0416E-01    1.0430E-01  0.344E-01
 K-40         3.9577E+00   1.0833E+00    1.1055E+00  0.435E+00
 PA-234 #F    1.2714E-01   1.1494E-01    1.1515E-01  0.440E-01
 PB-210       1.1484E+00   8.9037E-01    8.9266E-01  0.487E+00
 PB-212  F    8.5312E-02   8.6571E-02    8.6701E-02  0.461E-01
 PB-214  F    1.6451E-01   8.2544E-02    8.3051E-02  0.684E-01
 RA-226 #B   -4.8843E-01  -2.1391E+00   -2.1392E+00  0.631E+00
 Th-230 #B   -1.7302E+01  -1.0498E+02   -1.0498E+02  0.712E+01
 TH-234  B    2.6729E-01   1.1300E+00    1.1301E+00  0.510E+00
 TL-208 #F    2.0301E-01   9.2766E-02    9.3453E-02  0.268E-01
 U-235  #B   -1.0697E+00  -4.4456E+00   -4.4460E+00  0.773E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 6.0607419E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 16:39:11
 New World Technology            Spectrum name: 7K000005.An1

 Sample description
      Parcel E-2 TW038 0826D001 253ml
      6/27/08 09:24

Acquisition information
        Start time:                15-Jul-2008 14:37:11
        Live time:               7200
        Real time:               7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228  F    2.3056E-01   1.7442E-01    1.7490E-01  0.845E-01
 AM-241 #B   -6.9768E-02   6.9683E+02    6.9683E+02  0.496E-01
 BI-212  B    5.6380E-02   3.7532E-01    3.7533E-01  0.220E+00
 BI-214  F    1.8157E-01   1.5009E-01    1.5043E-01  0.524E-01
 CO-60  #B    6.4163E-03   1.2843E-02    1.2848E-02  0.105E-01
 CS-137       3.1596E-02   3.9743E-02    3.9781E-02  0.189E-01
 EU-152  B   -1.6475E-01  -1.5921E+00   -1.5921E+00  0.643E-01
 EU-154  F    6.5415E-02   8.1401E-02    8.1482E-02  0.385E-01
 K-40   #     4.5998E+00   1.1347E+00    1.1632E+00  0.432E+00
 PA-234 #B    3.4324E-02   1.5597E-01    1.5599E-01  0.673E-01
 PB-210       1.7508E+00   8.9245E-01    8.9777E-01  0.470E+00
 PB-212  F    1.0146E-01   8.4946E-02    8.5134E-02  0.446E-01
 PB-214  F    1.2128E-01   8.9970E-02    9.0224E-02  0.694E-01
 RA-226 #B   -6.4651E-01  -2.5999E+00   -2.6001E+00  0.594E+00
 Th-230 #B   -1.8923E+01  -9.6029E+01   -9.6035E+01  0.578E+01
 TH-234  F    8.3594E-01   9.7587E-01    9.7698E-01  0.455E+00
 TL-208 #F    1.7321E-01   8.6300E-02    8.6838E-02  0.265E-01
 U-235  #B   -1.0687E+00  -6.4862E+00   -6.4865E+00  0.778E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 7.9050050E+00  pCi/ml

Laboratory:  New World Technology
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     ORTEC g v - i (3263) wan32  G53W2.06  15-JUL-2008 19:03:42
 New World Technology            Spectrum name: 7K000006.An1

 Sample description
      Parcel E-2 TW001 0827E021 251ml
      6/30/08 10:35

Acquisition information
        Start time:                15-Jul-2008 17:03:31
        Live time:              7200
        Real time:              7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228  F    4.6762E-01   2.3724E-01    2.3867E-01  0.725E-01
 AM-241 #B   -1.9098E-02  -1.5533E-01   -1.5534E-01  0.486E-01
 BI-212  F    2.8782E-01   3.6634E-01    3.6669E-01  0.226E+00
 BI-214  F    3.0199E-01   1.5969E-01    1.6058E-01  0.478E-01
 CO-60  #B    2.4328E-03   2.2807E-02    2.2808E-02  0.123E-01
 CS-137  F    2.3985E-02   4.3901E-02    4.3921E-02  0.222E-01
 EU-152  B   -3.7029E-02  -4.0204E-02   -4.0257E-02  0.526E-01
 EU-154  F    7.4869E-02   1.0038E-01    1.0047E-01  0.360E-01
 K-40         4.8769E+00   1.2095E+00    1.2397E+00  0.448E+00
 PA-234 #B    1.9912E-02   5.9272E-02    5.9282E-02  0.590E-01
 PB-210       7.2103E-01   1.0812E+00    1.0819E+00  0.518E+00
 PB-212  F    1.0082E-01   8.2670E-02    8.2861E-02  0.433E-01
 PB-214  F    1.0911E-01   7.1263E-02    7.1522E-02  0.694E-01
 RA-226 #B   -4.2830E-01  -1.8926E+00   -1.8927E+00  0.615E+00
 Th-230 #B   -1.8533E+01  -1.1174E+02   -1.1174E+02  0.658E+01
 TH-234  B    4.3048E-01   9.9157E-01    9.9186E-01  0.469E+00
 TL-208  F    1.8557E-01   8.8934E-02    8.9533E-02  0.268E-01
 U-235   B   -1.0738E+00  -5.2668E+00   -5.2672E+00  0.775E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 6.6539531E+00  pCi/ml

Laboratory:  New World Technology
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ORTEC g v - i (3263) wan32 G53W2.06 15-JUL-2008 22:30:16
New World Technology Spectrum name: 7K000007.An1

Sample description
Parcel E-2 TW029 0827P016 249ml
6/30/08 09:17

Acquisition information
Start time: 15-Jul-2008 20:04:15
Live time: 7200
Real time: 7204

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
AC-228	F	2.9037E-01	2.1855E-01	2.1915E-01	0.700E-01
AM-241	#B	-4.1625E-02	-4.1852E-01	-4.1852E-01	0.625E-01
BI-212	B	1.8727E-01	3.9335E-01	3.9349E-01	0.221E+00
BI-214	#F	2.1056E-01	1.6891E-01	1.6931E-01	0.562E-01
CO-60	#B	1.5327E-04	7.0637E-03	7.0637E-03	0.619E-02
CS-137	#B	1.4832E-02	3.7084E-02	3.7094E-02	0.167E-01
EU-152	#B	-1.5388E-01	-8.1731E-01	-8.1736E-01	0.581E-01
EU-154	F	7.0452E-02	8.0718E-02	8.0814E-02	0.354E-01
K-40		3.9252E+00	1.0275E+00	1.0505E+00	0.424E+00
PA-234	F	2.1949E-01	1.7557E-01	1.7600E-01	0.575E-01
PB-210	#	1.1322E+00	1.1181E+00	1.1199E+00	0.508E+00
PB-212	F	5.2648E-02	8.2014E-02	8.2066E-02	0.448E-01
PB-214	B	2.8242E-02	3.8448E-02	3.8481E-02	0.758E-01
RA-226	#B	-2.4226E-01	-1.3777E+00	-1.3778E+00	0.593E+00
Th-230	#B	-2.0039E+01	-1.1415E+02	-1.1415E+02	0.614E+01
TH-234	B	2.1623E-01	8.7985E-01	8.7993E-01	0.491E+00
TL-208	#F	2.3329E-01	9.8993E-02	9.9843E-02	0.270E-01
U-235	#B	-1.0671E+00	-3.5344E+00	-3.5349E+00	0.792E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------
Total Activity (41.9 to 2667.9 keV) 5.7916136E+00 pCi/ml

Laboratory: New World Technology

ORTEC g v - i (3263) wan32 G53W2.06 16-JUL-2008 11:47:34
New World Technology Spectrum name: 7K000008.An1

Sample description
Parcel E-2 TW013 0827D018 243ml
6/30/08 09:30

Acquisition information
Start time: 16-Jul-2008 09:36:47
Live time: 7200
Real time: 7203

- -

***** S U M M A R Y O F N U C L I D E S I N S A M P L E *****

Nuclide		Activity pCi/ml	Time of Count Uncertainty Counting pCi/ml	3 Sigma Total pCi/ml	MDA pCi/ml
AC-228	F	3.3136E-01	2.0689E-01	2.0771E-01	0.684E-01
AM-241	B	3.2065E-03	1.0445E-01	1.0445E-01	0.592E-01
BI-212	#B	9.9510E-02	1.6517E-01	1.6526E-01	0.222E+00
BI-214	F	2.8421E-01	1.7954E-01	1.8024E-01	0.549E-01
CO-60	#F	2.9997E-02	4.4387E-02	4.4418E-02	0.163E-01
CS-137	#B	6.1800E-03	1.9979E-02	1.9982E-02	0.102E-01
EU-152	B	-1.6331E-01	-1.0799E+00	-1.0799E+00	0.625E-01
EU-154	#B	8.8232E-03	3.6155E-02	3.6158E-02	0.406E-01
K-40		3.8067E+00	1.0895E+00	1.1100E+00	0.449E+00
PA-234	#F	2.1628E-01	1.9812E-01	1.9848E-01	0.571E-01
PB-210		1.0062E+00	9.7830E-01	9.7990E-01	0.540E+00
PB-212	F	7.2961E-02	8.0792E-02	8.0894E-02	0.433E-01
PB-214	F	9.5994E-02	6.9672E-02	6.9877E-02	0.737E-01
RA-226	#B	-4.0866E-01	-1.9147E+00	-1.9148E+00	0.650E+00
Th-230	#B	-2.4211E+01	6.0257E+04	6.0257E+04	0.650E+01
TH-234	F	7.0077E-01	8.5161E-01	8.5250E-01	0.464E+00
TL-208	#F	2.1788E-01	9.7368E-02	9.8122E-02	0.276E-01
U-235	#B	-1.0929E+00	-3.5308E+00	-3.5313E+00	0.810E-01

- All peaks for activity calculation had bad shape.
* - Activity omitted from total
& - Activity omitted from total and all peaks had bad shape.
< - MDA value printed.
A - Activity printed, but activity < MDA.
B - Activity < MDA and failed test.
C - Area < Critical level.
F - Failed fraction or key line test.
H - Halflife limit exceeded

---------- S U M M A R Y ----------

Total Activity (41.9 to 2667.9 keV) 6.4501071E+00 pCi/ml

Laboratory: New World Technology

```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 14:01:37
 New World Technology            Spectrum name: 7K000009.An1

 Sample description
      Parcel E-2 TW047 0827D021 243ml
      6/30/08 10:25

Acquisition information
        Start time:                16-Jul-2008 11:49:39
        Live time:               7200
        Real time:               7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228  F    2.8142E-01   2.3006E-01    2.3059E-01  0.738E-01
 AM-241 #B   -2.7928E-02  -2.5712E-01   -2.5713E-01  0.581E-01
 BI-212 #B   -3.5066E-02  -4.8978E-01   -4.8979E-01  0.226E+00
 BI-214  F    2.5545E-01   1.5195E-01    1.5262E-01  0.515E-01
 CO-60  #F    2.3002E-02   2.3011E-02    2.3046E-02  0.600E-02
 CS-137  B    2.1259E-02   4.2751E-02    4.2767E-02  0.217E-01
 EU-152  B   -5.0758E-02  -7.6559E-02   -7.6611E-02  0.556E-01
 EU-154  F    4.9451E-02   7.3750E-02    7.3802E-02  0.356E-01
 K-40         4.2089E+00   1.1406E+00    1.1645E+00  0.451E+00
 PA-234 #F    5.5760E-02   6.8951E-02    6.9021E-02  0.535E-01
 PB-210       1.4723E+00   1.2922E+00    1.2948E+00  0.563E+00
 PB-212  F    7.6767E-02   8.2622E-02    8.2733E-02  0.442E-01
 PB-214  F    1.0624E-01   5.9871E-02    6.0163E-02  0.734E-01
 RA-226 #B   -7.6185E-01  -3.1797E+00   -3.1800E+00  0.622E+00
 Th-230 #B   -1.9065E+01  -8.2586E+01   -8.2593E+01  0.636E+01
 TH-234  F    5.8513E-01   9.0349E-01    9.0408E-01  0.495E+00
 TL-208 #B   -1.1582E-02  -1.5014E-02   -1.5028E-02  0.670E-01
 U-235  #B   -1.1231E+00  -1.1859E+01   -1.1859E+01  0.795E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 6.2948260E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 16:04:13
 New World Technology            Spectrum name: 7K000010.An1

 Sample description
      Parcel E-2 PZ150E 0827E031 254ml
      7/01/08 14:21

Acquisition information
        Start time:                16-Jul-2008 14:04:03
        Live time:              7200
        Real time:              7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228  F    1.7175E-01   1.7691E-01    1.7717E-01  0.728E-01
 AM-241 #B   -6.9494E-02   6.6203E+02    6.6203E+02  0.481E-01
 BI-212 #F    3.6009E-01   5.0529E-01    5.0568E-01  0.192E+00
 BI-214  F    2.1614E-01   1.5150E-01    1.5198E-01  0.489E-01
 CO-60  #F    5.6871E-02   5.9363E-02    5.9447E-02  0.179E-01
 CS-137  B    1.8931E-02   4.0678E-02    4.0691E-02  0.207E-01
 EU-152 #B   -5.0830E-02  -5.2320E-02   -5.2396E-02  0.554E-01
 EU-154 #B   -4.0336E-03   6.2241E+02    6.2241E+02  0.394E-01
 K-40   #     4.5376E+00   1.2206E+00    1.2465E+00  0.450E+00
 PA-234 #F    5.9603E-02   1.0061E-01    1.0067E-01  0.456E-01
 PB-210       7.3624E-01   8.8241E-01    8.8336E-01  0.494E+00
 PB-212  F    9.6395E-02   8.3437E-02    8.3610E-02  0.439E-01
 PB-214  F    1.2588E-01   6.5517E-02    6.5891E-02  0.629E-01
 RA-226 #B   -5.4314E-01  -2.3223E+00   -2.3225E+00  0.622E+00
 Th-230 #B   -2.1365E+01  -1.0563E+02   -1.0563E+02  0.428E+01
 TH-234 #B    3.6676E-01   8.9321E-01    8.9344E-01  0.439E+00
 TL-208 #F    2.3764E-01   1.0084E-01    1.0170E-01  0.264E-01
 U-235  #B   -1.0252E+00  -2.2291E+00   -2.2298E+00  0.774E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 6.4126801E+00  pCi/ml

Laboratory:  New World Technology
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```
     ORTEC g v - i (3263) wan32  G53W2.06  16-JUL-2008 18:24:58
 New World Technology            Spectrum name: 7K000011.An1

 Sample description
      Parcel E-2 TW056 0827P028 253ml
      7/01/08 09:25

Acquisition information
        Start time:                16-Jul-2008 16:24:47
        Live time:               7200
        Real time:               7203

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 *****   S U M M A R Y   O F   N U C L I D E S   I N   S A M P L E   *****
          Time of Count   Uncertainty  3 Sigma
 Nuclide    Activity        Counting     Total          MDA
               pCi/ml         pCi/ml        pCi/ml         pCi/ml


 ____________________________________________________________________________
 AC-228 #F     2.0653E-01   1.2378E-01    1.2432E-01  0.853E-01
 AM-241 #B    -1.6164E-02  -1.7431E-01   -1.7431E-01  0.618E-01
 BI-212 #B     1.6090E-01   3.9900E-01    3.9910E-01  0.185E+00
 BI-214 #F     2.2267E-01   1.7037E-01    1.7082E-01  0.559E-01
 CO-60  #F     2.5820E-02   2.7042E-02    2.7081E-02  0.913E-02
 CS-137 #F     3.1354E-02   4.8363E-02    4.8395E-02  0.187E-01
 EU-152 #B    -1.8642E-01   5.6154E+02    5.6154E+02  0.531E-01
 EU-154 #F     5.8750E-02   6.1662E-02    6.1749E-02  0.277E-01
 K-40          4.7919E+00   1.0951E+00    1.1271E+00  0.417E+00
 PA-234  F     2.4133E-01   1.7773E-01    1.7824E-01  0.595E-01
 PB-210        1.1733E+00   9.6286E-01    9.6508E-01  0.469E+00
 PB-212  F     7.4885E-02   8.9379E-02    8.9477E-02  0.480E-01
 PB-214  F     1.1899E-01   7.2351E-02    7.2654E-02  0.684E-01
 RA-226 #B    -7.2324E-01  -3.0076E+00   -3.0079E+00  0.598E+00
 Th-230 #B    -1.3593E+01  -4.1807E+01   -4.1814E+01  0.592E+01
 TH-234  F     8.9911E-01   8.5054E-01    8.5201E-01  0.458E+00
 TL-208 #F     2.0141E-01   9.2032E-02    9.2714E-02  0.265E-01
 U-235  #B    -1.0683E+00  -6.5232E+00   -6.5235E+00  0.782E-01

   # - All peaks for activity calculation had bad shape.
   * - Activity omitted from total
   & - Activity omitted from total and all peaks had bad shape.
   < - MDA value printed.
   A - Activity printed, but activity < MDA.
   B - Activity < MDA and failed test.
   C - Area < Critical level.
   F - Failed fraction or key line test.
   H - Halflife limit exceeded
 ----------------------------   S U M M A R Y   ----------------------------
 Total Activity (   41.9 to  2667.9 keV) 7.3632512E+00  pCi/ml

Laboratory:  New World Technology
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