National Aeronautics and Space Administration

2009 REGIONAL GROUNDWATER REMEDIATION PROGRAM PROGRESS REPORT

RESTORATION PROGRAM

NASA AMES RESEARCH CENTER
Moffett Field, California

NASA Ames Research Center
Moffett Field, CA

May 2010

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National Aeronautics and Space Administration

2009 Regional Groundwater Remediation Program Progress Report

Restoration Program

NASA Ames Research Center
Moffett Field, California

May 2010

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Acronyms

1,1,1-TCA	1,1,1-Trichloroethane
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethene (*cis*- and *trans*- isomers)
AOI	Area of Investigation
BRAC	Base Closure and Realignment Commission
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CUP	Comprehensive Use Plan
DTSC	Department of Toxic Substance Control
EPA	Environmental Protection Agency
Freon 113	1,1,2-Trichloro-1,2,2-trifluoroethane
GAC	Granular Activated Carbon
gpm	gallons per minute
GWTS	Groundwater Treatment System
HRS	Hazardous Ranking System
IRP	Installation Restoration Program
LSA	Local Study Area
LSI	Listing Site Inspection
MCL	Maximum Contaminant Level
MEW	Middlefield-Ellis-Whisman
µg/L	micrograms per liter
mg/L	milligrams per liter
NAS	Naval Air Station
NASA	National Aeronautics and Space Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
PCE	Tetrachloroethene (Perchloroethene)
RGRP	Regional Groundwater Remediation Program
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbons
TPH-D	Total Petroleum Hydrocarbons as Diesel
TPH-G	Total Petroleum Hydrocarbons as Gasoline
TPH-JP5	Total Petroleum Hydrocarbons as Jet Fuel #5
TPH-JP8	Total Petroleum Hydrocarbons as Jet Fuel #8
TPH-MO	Total Petroleum Hydrocarbons as Motor Oil
VOCs	Volatile Organic Compounds
VTOL	Vertical Takeoff and Landing
WATS	West Side Aquifer Treatment System (Navy)

1.0 INTRODUCTION

The United States (US) Environmental Protection Agency (EPA) Region IX issued guidance establishing submission dates and reporting format for facility-specific Annual Regional Groundwater Remediation Program (RGRP) reports. The National Aeronautics and Space Administration (NASA) Ames Research Center (Ames) Environmental Services Division, Moffett Field, California, has requested that Integrated Science Solutions, Inc. (ISSi) prepare this 2009 Annual RGRP Progress Report (Annual Report). The purpose of this facility-specific Annual Report is to document the effectiveness of the NASA Ames RGRP groundwater extraction and treatment system (GWTS) and progress toward addressing program deficiencies as identified in the "*Final First Five-Year Review Report for Middlefield-Ellis-Whisman (MEW) Superfund Study Area, Mountain View, California*" (EPA, 2004). This Annual Report summarizes the NASA GWTS operation and maintenance; associated hydrogeologic flow and groundwater chemical data; other related, miscellaneous activities; and upcoming 2010 activities. This Report also summarizes additional groundwater-related investigations at NASA Ames, including Area of Investigation (AOI) 4, AOI 6, and AOI 17 (NASA Ames AOI 4/Orion Park Boundary Zone Air Sparge System) groundwater sampling programs.

1.1. Site Background

NASA Ames is a federal aerospace facility located approximately 35 miles southeast of San Francisco, California, and 10 miles northwest of San Jose, California (Figure 1). NASA Ames is located at the southern end of the San Francisco Bay in Santa Clara County and adjacent to the cities of Mountain View and Sunnyvale

Construction of Naval Air Station (NAS) Sunnyvale was initiated in 1930, with the base being commissioned in 1933. The NAS Sunnyvale was used in the past to support the Navy's lighter-than-air program on the west coast. The dirigible USS Macon was stationed at NAS Sunnyvale. After the loss of the Macon in 1935, the airfield was transferred to the US Army as an air training field. The facility was returned to the Navy during World War II and was renamed NAS Moffett Field (NASMF) (Figure 2). In 1991, the Federal Base Closure and Realignment Commission (BRAC) decided to close NASMF. In accordance with the BRAC, the U.S. Department of Defense transferred stewardship of the property, except for the military housing, to NASA. NASA took over administration of the former NASMF on July 1, 1994. The reuse of NASMF was originally addressed in the Moffett Field Comprehensive Use Plan (CUP) and its associated Environmental Assessment, which resulted in a Finding of No Significant Impact in 1994. The CUP was replaced by the NASA Ames Development Plan and its associated Environmental Impact Statement and Record of Decision in 2002.

Figure 1
Site Location Map

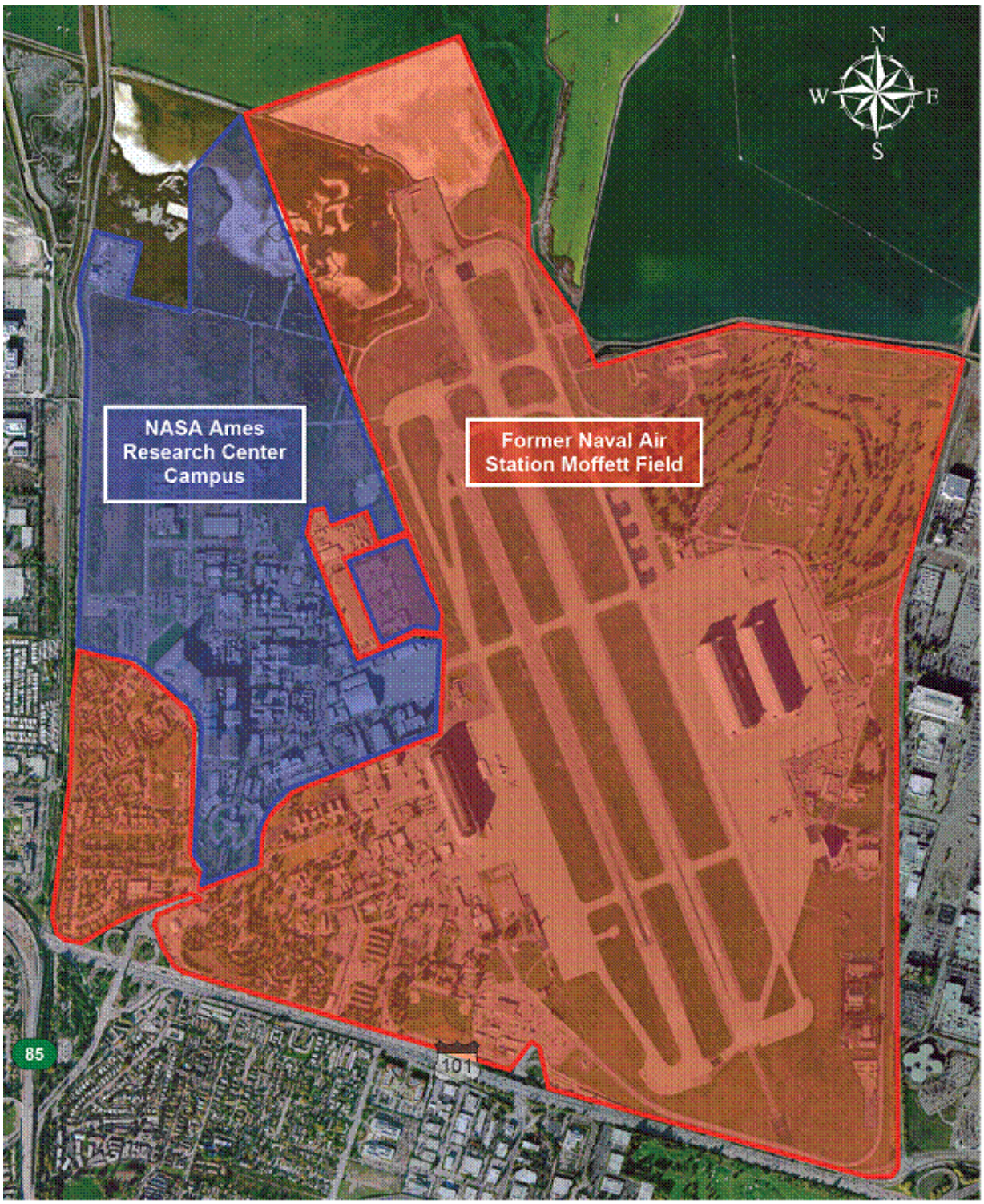


Figure 2
Aerial View of NASA Ames Research Center

Since 1988, numerous investigations have been performed at NASA Ames to study suspected sources of soil and groundwater contamination. During 1992, Erler & Kalinowski, Inc. (EKI, 1992) completed an EPA Listing Site Inspection (LSI). The primary objective of the 1992 LSI was to generate a preliminary site ranking using the revised Hazardous Ranking System (HRS) developed by the EPA. The HRS is the primary method used by the EPA to determine whether a site is to be included on the National Priorities List (NPL), commonly known as Superfund. Based on the final HRS score of 15.77, the NASA Ames site was classified as a non-NPL site (not a Superfund site).

Additional site work was completed in 1994. The "*Center-Wide Sampling and Analysis Program"* (EKI, 1994a) provided an overview of the requirements for a comprehensive site evaluation. As part of this plan, NASA Ames was divided into 12 Areas of Investigation (AOIs) for detailed studies that currently are in various stages of characterization, cleanup, or have received closure (Figure 3). Table 1 indicates the regulatory oversight agency, the AOI-specific contaminated media, the primary chemical of concern, and the current status of the original 12 AOIs, as well as the status of additional AOIs identified by NASA since the initial EKI designations.

Table 1
Area of Investigation Summary

AOI	Agency	Media	Primary COC	Status
1 - Fuel Farm	EPA/RWQCB	Soil & GW	TPH	Combined with AOI 3
2 – N239A Area	EPA	Soil	VOC	Combined with AOI 3
3 - N211 Area	EPA/RWQCB	Soil & GW	TPH/VOC	Investigation
4 - NFAC	DTSC	Soil & GW	TPH	O&M
4 - TCE	EPA	GW	VOC	Remediation (AOI 17)
5 - N225B	DTSC	Soil	TPH	Closed
5 - N225B	DTSC	GW	VOC	Investigation
6 - Lindbergh Ditch	EPA	Soil & GW	Lead/PCBs	No Further Action
7 - VTOL Pad Area	EPA	GW	VOC	O&M
8 - Navarro Farms	DTSC	Soil & GW	TPH	Closed
9 - N245 Area	EPA	GW	VOC	O&M
10 - Substations	DTSC	Soil	PCBs	Closed
11 - USTs	DTSC	Soil & GW	TPH	Closed
12 - USTs	EPA/RWQCB	Soil & GW	TPH/VOC	Combined with AOI 3
13 - Wetlands	EPA	Soil	PCBs/Lead	Navy Site 25
14 - Soil Fill Areas	EPA	Soil	PCBs/Lead	Remedial Design
15 – NASA Fuel Line	EPA	Soil	TPH	Remediation
16 – N218 Demo	EPA	Soil	PCBs/Lead	Final Phase Demo
17 – Orion Park Plume	EPA	GW	VOC	Remediation

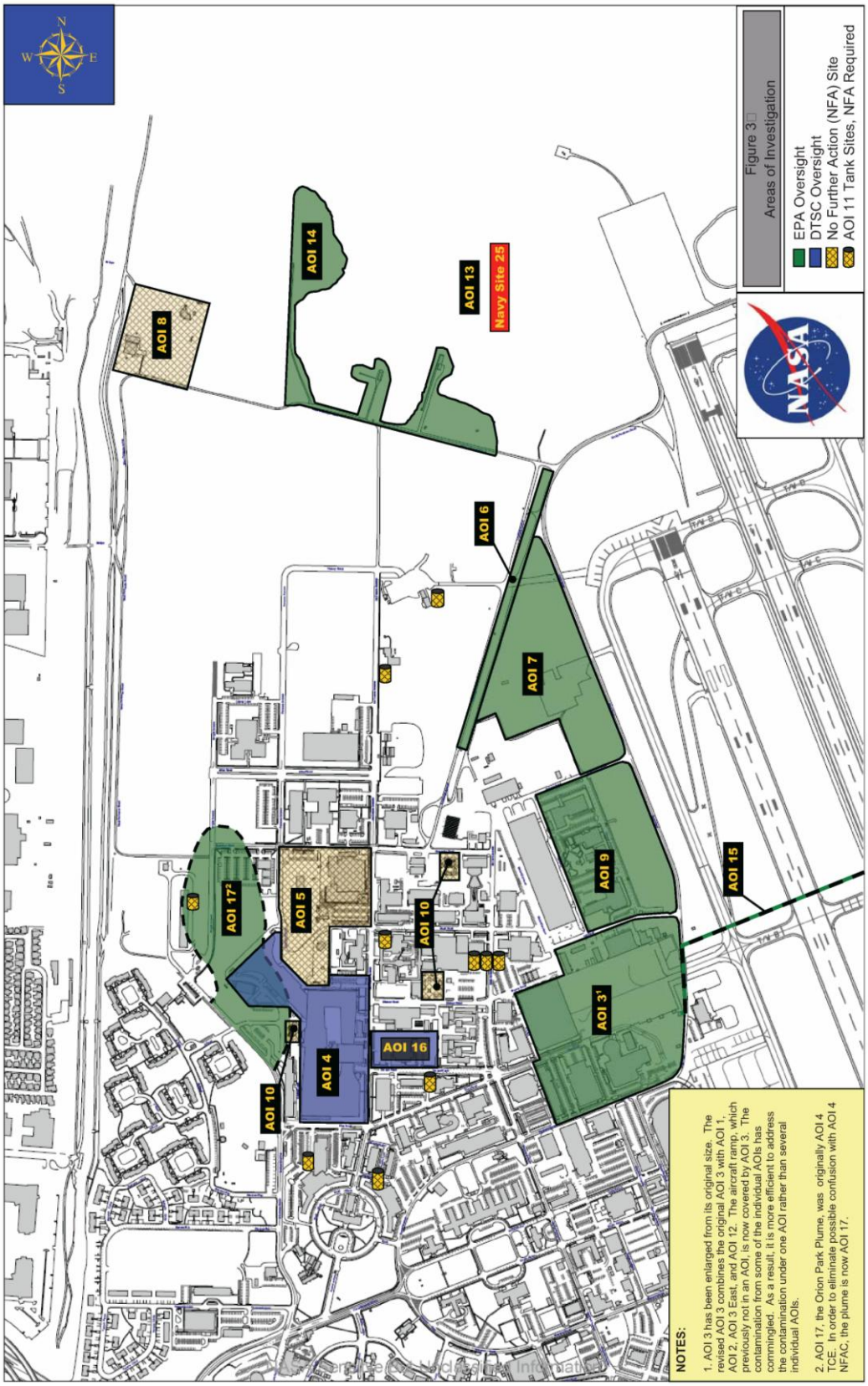


Figure 3
NASA Ames Areas of Investigation

The MEW Local Study Area (LSA) is located adjacent to (south of) NASA Ames. The LSA consists of three NPL sites, as well as several non-Superfund sites. The MEW Regional Study Area includes the LSA, as well as the former NASMF and NASA Ames. Various owners or occupants in the LSA are or were involved in the manufacture of semiconductors, metal finishing operations, parts cleaning, aircraft maintenance, and other activities requiring the use of a variety of chemicals. During 1981 and 1982, preliminary investigations of facilities within the LSA indicated significant concentrations of contaminants in soil and groundwater. The primary cause of the subsurface contamination was from leaking storage tanks and lines, and poor waste management practices. By 1985, three sites within the LSA were proposed for the NPL (EPA, 1989).

At NASMF, wastes had been generated through maintenance operations, fuel management, and fire training since the early 1930s. An Initial Assessment Study for NASMF was conducted from July 1983 to April 1984 as part of the Navy's Installation Restoration Program. Based on information from historical records, aerial photographs, surface surveys, and personnel interviews, it was concluded that numerous sites could pose a threat to human health or to the environment (IT, 1991). NASMF was placed on the NPL in July 1987.

At present, NASA Ames has a network of 133 shallow and four deep groundwater monitoring wells throughout the facility (Plate 1) which are screened in the following aquifer zones (shallowest to deepest): A1, A2/B1 (shallow wells) and C (deep wells). Definitions for these aquifer zones are provided in Section 1.3. Figure 4 shows the locations of NASA Ames' 13 RGRP long-term monitoring wells, four groundwater extraction wells, and existing non-RGRP monitoring wells in the area. Various wells are sampled throughout the year, with the frequencies depending on regulatory or data requirements. The sampling schedule for NASA Ames monitoring wells is designed to provide geographically relevant and comprehensive data that will allow more accurate characterization of specific locations associated with activities at NASA Ames, the former NASMF, and MEW sites. NASA Ames, the Navy, and the MEW companies routinely sample specified wells and participate in a data exchange program, which facilitates the evaluation of remedial effectiveness of the overall RGRP. Additionally, analytical results are used to characterize NASA's AOIs, to monitor shifts in local and regional plume boundaries, to monitor operation of NASA Ames' groundwater treatment system (GWTS), and to define trends in groundwater chemistry.

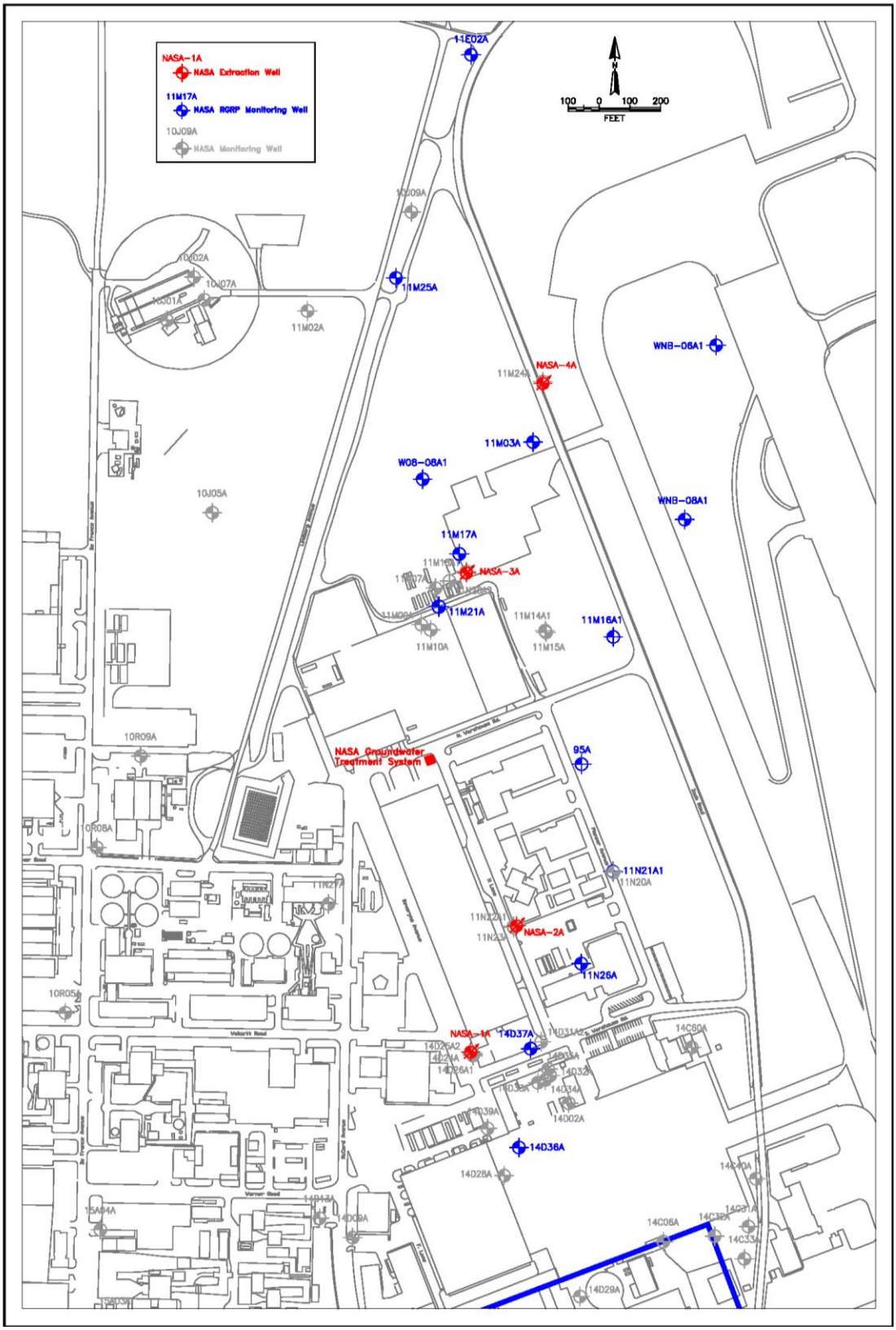


Figure 4
NASA Monitoring and Extraction Well Locations

1.2. Remedy Description and Remedial Action Summary

In 1998, NASA entered into an "*Allocation and Settlement Agreement For Remedial Program Management Between NASA and Fairchild Semiconductor Corporation, Raytheon Company, and Intel Corporation*" (NASA, 1998). Under this Agreement, various geographical divisions of responsibility**,** chemicals of concern, and system design, installation, operations, and maintenance responsibilities were allocated between the parties. This Agreement pertained to the requirements established under the "*Record of Decision*" for the RGRP (EPA, 1989).

The locations selected for NASA's groundwater extraction wells were based on lithologic, chemical, and groundwater modeling data as presented in the 1995 EKI document "*Proposed Locations of NASA Ames Groundwater Extraction Wells in the VTOL Pad and South Navy Warehouse Areas*."

Final design calculations and details were provided in the 1999 Locus Technologies report "*100 Percent Design, NASA-ARC/RGRP Groundwater Treatment System*." For the basis of design, Locus used the 1995 EKI report and Smith Environmental's' "*Revised Final Design, Regional Ground Water Remediation Program, North of U.S. Highway 101, Middlefield-Ellis-Whisman Site*" (Smith, 1996).

The remedial objective of the NASA GWTS is to extract and treat the groundwater contaminants down-gradient of known and/or suspected sources located on NASA Ames and to fulfill NASA's portion of the RGRP. Two areas have been identified to address NASA's contribution to the Regional Plume.

NASA RGRP extraction wells NASA-1A and NASA-2A are located down-gradient from a suspected source area near building N240, north of building N211. Although historic soils data do not identify a source in local soils, historic groundwater data available during the time of the design phase for the "*North of US Highway 101 RGRP*" (Smith, 1996) indicated the presence of TCE in groundwater at concentrations above cleanup levels in this area. Wells NASA-1A and NASA-2A were installed in 2000 and groundwater extraction was initiated in late 2001.

NASA RGRP extraction wells NASA-3A and NASA-4A are located down-gradient from a known source area in the vicinity of Navy Site 8 North and NASA's Vertical Takeoff and Landing (VTOL) Pad. Historic information and data revealed contamination of both soil and groundwater in this area where drums of miscellaneous oils and solvents had previously been stored. Previous actions in this area included the removal of both contaminated soil (excavation and disposal) and groundwater (excavation pit dewatering, treatment, and discharge). Wells NASA-3A and NASA-4A were installed in 2000 and groundwater extraction began in late 2001.

To date, the NASA RGRP GWTS has functioned as designed, in that the GWTS appears to be capturing the majority of contaminated groundwater within the localized sand channels into which the extraction wells were installed.

1.3. Site Hydrogeology

NASA Ames lies at the northern end of the Santa Clara Valley along the southwestern rim of San Francisco Bay. The Santa Clara Valley is located between the Santa Cruz Mountains to the west and the Diablo Range to the east. The area is underlain by a sequence of Pliocene-Pleistocene and Upper Quaternary unconsolidated sediments up to 1,500 feet thick. Sediments underlying NASA Ames were derived from the Santa Cruz Mountains and deposited in alluvial, estuarine and sublittoral environments. Additionally, fine-grained sediments were transported by waters of the San Francisco Bay.

Underlying NASA Ames are alluvial or fluvial aquifers separated by lower permeability silts and clays. These aquifers are divided into two sequences based on the location of a laterally-extensive clayey layer which separates the shallower, unconfined or semi-confined sequence from the deeper, confined sequence. The shallower sequence consists of the “A” and “B” aquifers, while the lower sequence is comprised of the “C” and “Deep” aquifers. Groundwater is encountered at the site from 5 to 7 feet below ground surface (bgs). Presently and historically the groundwater flow direction has been to the northeast.

The “A” aquifer consists of stringer-like alluvial channel deposits composed of sand and gravel inter-bedded with fine-grained flood plain deposits. These channel deposits, oriented generally south to north, provide complex pathways for groundwater and contaminant transport. Although the degree of channel continuity is variable, the depositional environment of the A1 aquifer materials has been interpreted as a low-lying flood basin subject to periodic flooding events (PRC, 1997). The A1 aquifer extends from about 5 to 25 feet bgs. Most of NASA Ames groundwater monitoring wells have been installed to monitor contaminants in the A1 aquifer. A few wells have been screened in the deeper A2 aquifer, which generally extends from 30 to 50 feet bgs.

According to the “*West-Side Aquifer Treatment System, Long-Term Groundwater Monitoring Plan*” (PRC, 1997), the A1-zone is separated from the A2/B1-aquifer by a discontinuous, lower permeability horizon located between 25 and 30 feet bgs. Subsequent to deposition of these discontinuous aquitard materials, a cemented caliche horizon formed at the top of the aquitard that, in turn, provided increased resistance to future scouring flood events. The caliche zone marks the top of this horizon, and although it is not a hydraulic boundary, where present, it is useful in delineating the A1/A2 boundary.

Groundwater flow in the A1 aquifer is greatly affected by the presence of engineered structures in the subsurface (deep, gravel-filled pipe trenches; compacted, engineered fill; and building basements). At the northern edge of NASA Ames, the alluvial aquifers inter-finger with relatively impermeable marine and estuarine sediments that restrict groundwater flow towards San Francisco Bay. A schematic of the generalized depositional environment characteristic of the subsurface at NASA Ames is shown in Figure 5.

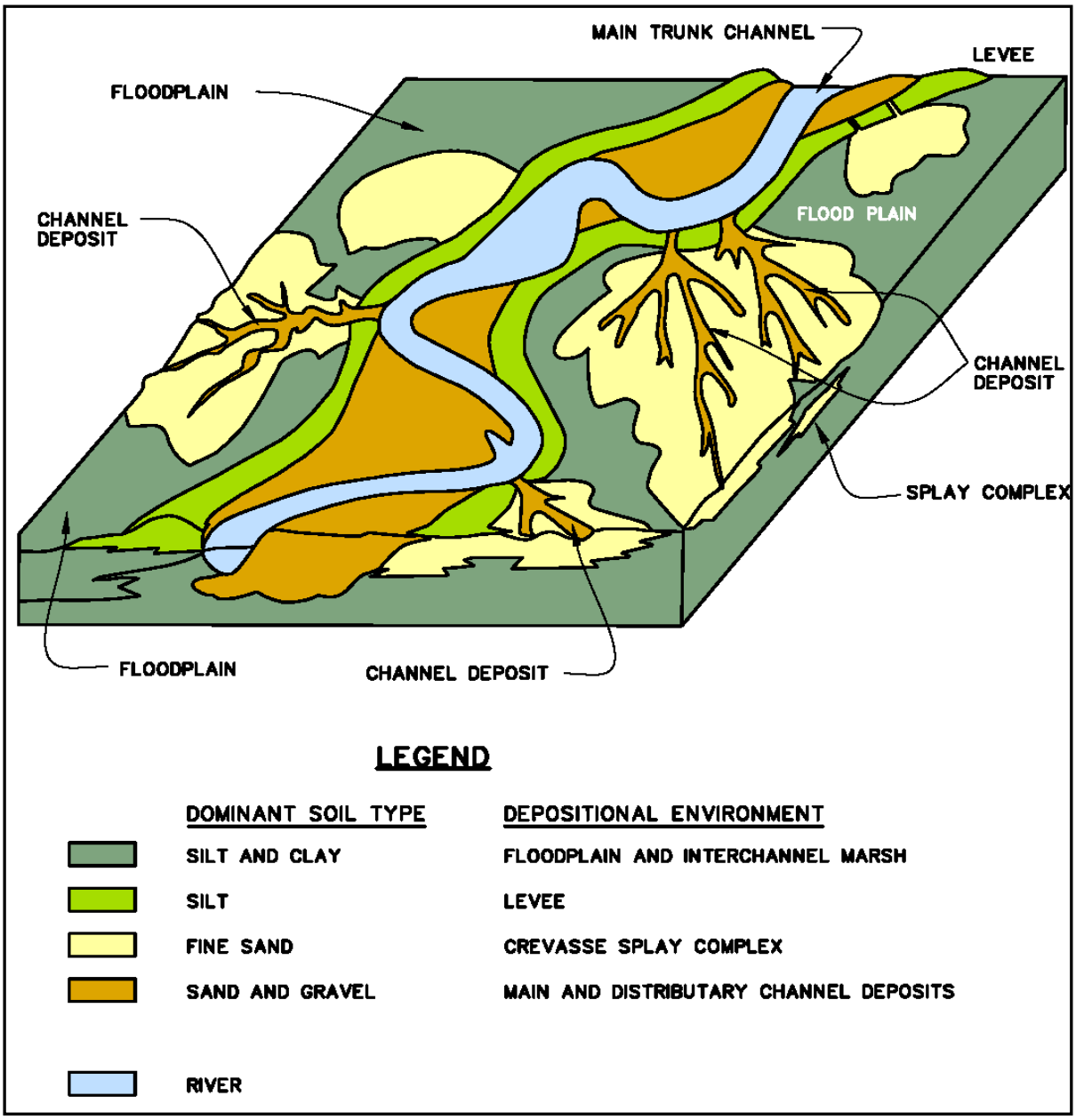


Figure 5
Generalized Depositional Environment

1.4. 2009 Site Activities and Deliverables Summary

Site activities associated with the RGRP conducted by NASA during 2009 are summarized in Table 2.

Table 2
2009 Site Activities and Deliverables Summary

Activity	Date
Continuing groundwater extraction and treatment	On-Going
Continuing routine system operations and maintenance	On-Going
Quarter 4, 2008 NPDES Self-Monitoring Report	January 29, 2009
2008 Annual NPDES Self-Monitoring Report	January 29, 2009
Monthly GWTS NPDES Sampling	January 28, 2009
Monthly GWTS NPDES sampling	February 17, 2009
Monthly GWTS NPDES sampling	March 19, 2009
Quarter 1 groundwater sampling	March 19-25, 2009
Regional depth-to-water gauging	March 26, 2009
Quarter 1 NPDES Self-Monitoring Report	April 2, 2009
Monthly GWTS NPDES sampling	April 27, 2009
Pumping from NASA-2A and NASA-4A terminated	April 28, 2009
EPA Inspection of NASA GWTS	May 7, 2009
Monthly GWTS NPDES sampling	May 20, 2009
Quarter 2 groundwater sampling	June 9-10, 2009
Monthly GWTS NPDES sampling	June 23, 2009
2008 Annual Report	May, 30,2009
Monthly GWTS NPDES sampling	July 20, 2009
Quarter 2 NPDES Self-Monitoring Report	July 30, 2009
NASA GWTS GAC replacement	August 6, 2009
Monthly GWTS NPDES sampling	August 27, 2009
Monthly GWTS NPDES sampling	September 21, 2009
Quarter 3 groundwater sampling	September 21-24, 2009
Quarter 3 NPDES Self-Monitoring Report	October 8, 2009
Monthly GWTS NPDES sampling	October 27, 2009
Regional depth-to-water gauging	November 19, 2009
Monthly GWTS NPDES sampling	November 24, 2009
Quarter 4 groundwater sampling	December 14-16, 2009
Monthly GWTS NPDES sampling	December 15, 2009

2.0 2009 REMEDIAL ACTION PROGRESS

This section provides a greater level of detail regarding NASA Ames RGRP GWTS related activities, performance and remedial progress. For reference purposes, a copy of the "*2009 Annual NPDES Self-Monitoring Report for the NASA Ames RGRP GWTS*" (ISSi, 2010) is attached as Appendix A. This report includes system configuration information, figures, and tables.

2.1. Remedial Action Objective

The remedial objective of the NASA Ames GWTS is to extract and treat groundwater contaminants down-gradient from known and/or suspected sources located at NASA Ames. The VOC and TPH groundwater cleanup levels for the site are shown in Table 3.

Table 3
Groundwater Cleanup Levels

Chemical	Cleanup Level (µg/L)
Volatile Organic Compounds[1]	
1,1-DCA	5.0
1,1-DCE	6.0
1,1,1-TCA	200
1,2-DCA	0.50
cis-1,2-DCE	6.0
trans-1,2-DCE	10
Chloroform	80
Freon 113	1,200
PCE	5.0
TCE	5.0
Vinyl Chloride	0.50
Petroleum Hydrocarbons	
Benzene[1]	1.0
Ethylbenzene[1]	300
Toluene[1]	150
Xylenes[1]	1,750
TPH-gasoline[2]	50
TPH-diesel[2]	700
TPH-jet fuel[2]	700
TPH-motor oil[3]	640

[1] Federal/State Drinking Water Maximum Contaminant Level
[2] PRC, 1994, Petroleum Sites Cleanup Level Analysis Technical Memorandum, NAS Moffett Field, CA
[3] DTSC, 2005, Comments on Draft AOI 8 Operation and Maintenance Summary Report

2.2. Groundwater Extraction and Treatment System Description and Performance

The NASA Ames GWTS is located at the corner of North Warehouse Road and H Lane (Figure 6). Quarterly and annual 2008 system Operations and Maintenance (O&M) reports were prepared in accordance with the Self-Monitoring Program reporting requirements contained in the National Pollutant Discharge Elimination System (NPDES) Permit Number CAG912003, Order 99-051-75 (File Numbers 2189.8009, 1210.48 FA), WDID: 2438009003, issued by the California Regional Water Quality Control Board (CRWQCB) to NASA on September 9, 2004.

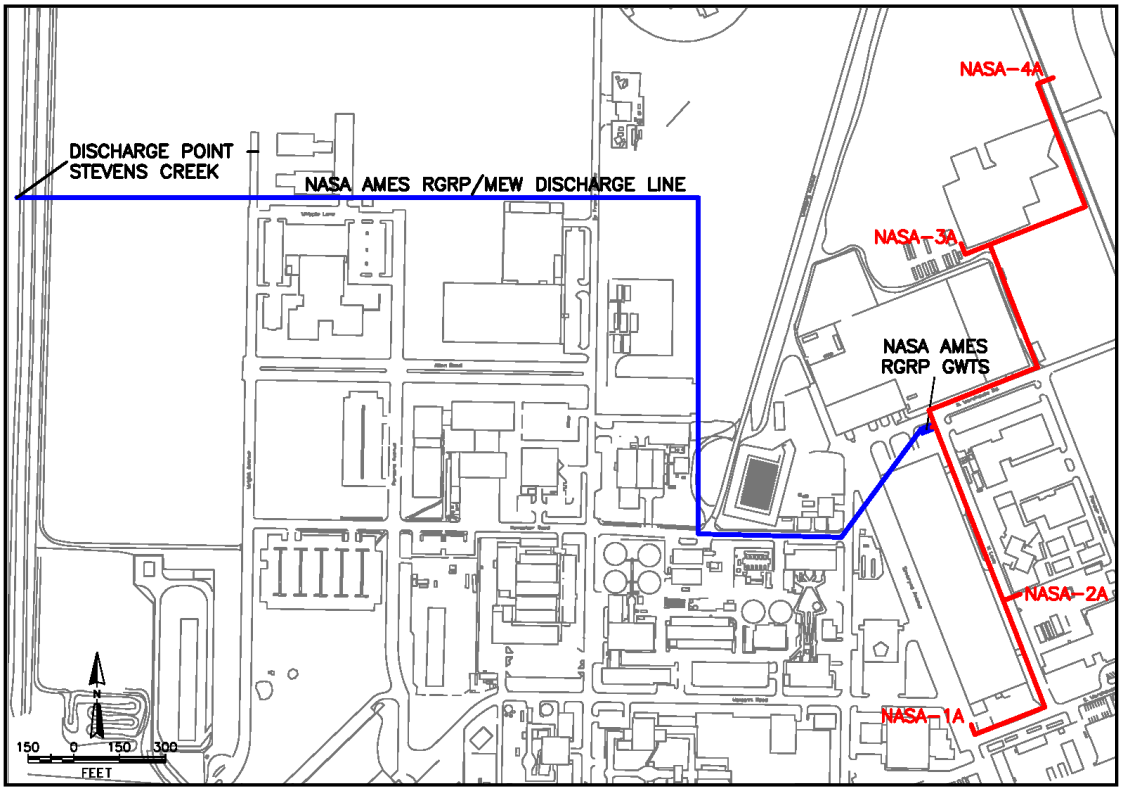


Figure 6
NASA Ames GWTS Location and Layout

2.2.1. System Description

Groundwater extracted from NASA extraction wells NASA-1A, NASA-2A, NASA-3A, and NASA-4A is pre-filtered by two 10-micron bag filters operating in parallel, prior to passing through two 5,000-pound granulated activated carbon (GAC) vessels operating in series. Treated groundwater is then discharged to Stevens Creek in accordance with the NPDES permit. Figure 6 presents NASA's extraction wells and the discharge route to Stevens Creek. The construction of the NASA Ames GWTS was completed in August 2001 and started operations on September 10, 2001. Figure 7 presents the treatment process and influent (NASA-I) and effluent (NASA-E) sample points.

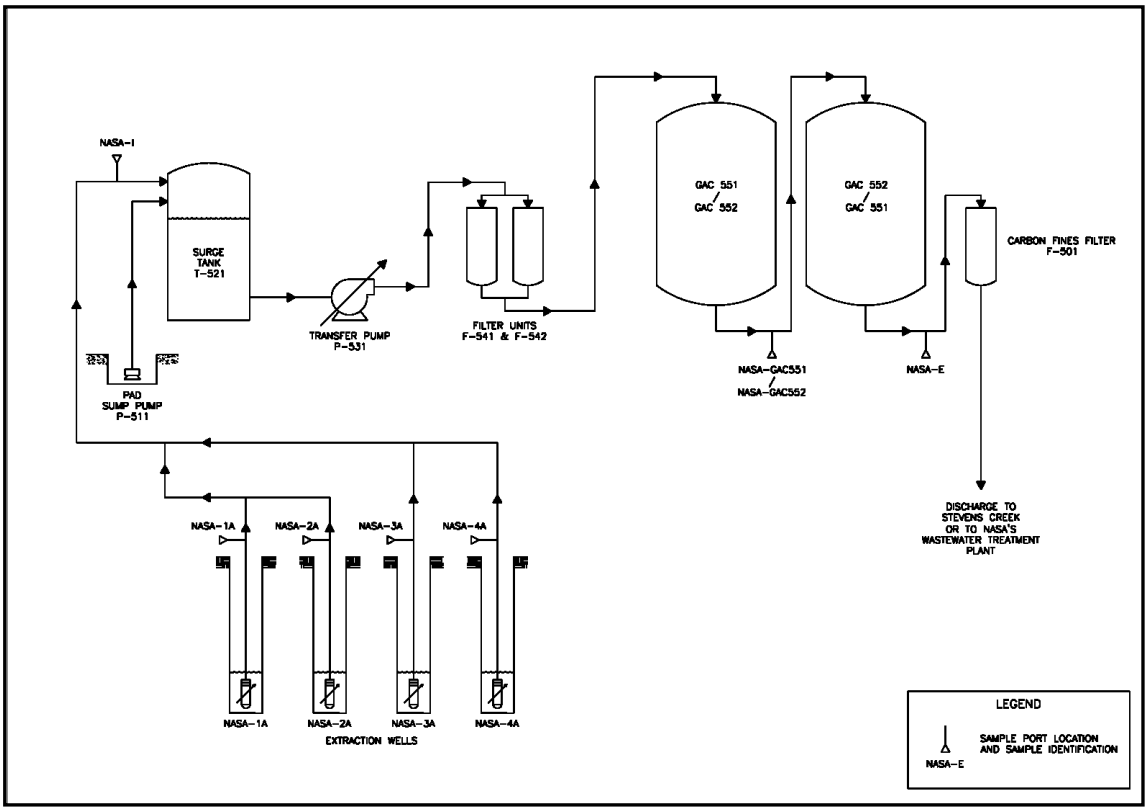


Figure 7
NASA Ames GWTS Treatment Process and Sample Points

2.2.2. NASA Extraction Well Pump Rates

During the 2009 reporting period, the pump rates were periodically adjusted. The designed pump rate for each extraction well is provided in Table 4. It is noted here that extraction well NASA-2A operates in a cyclical fashion due to slow recharge of the local aquifer (see Section 4.1.1 for further discussion). Average annual flow rates and total gallons extracted for 2009 are also summarized in Table 4.

Table 4
NASA Extraction Well Pump Rate Details

Well Number	Designed Pump Rate (gpm)	Average Annual Flow Rate (gpm)	Total Gallons Extracted in 2009[1]
NASA-1A	8.0	7.3	3,828,908
NASA-2A	3.0	0.1	79,419
NASA-3A	6.0	5.8	3,110,124
NASA-4A	3.0	0.5	277,615

[1] note: values may not add up to total discharge volume due to meter differences

2.2.3. 2.2.3 System Influent and Effluent Data

Table 3 of Appendix A summarizes the results of water quality analyses of influent and effluent water samples collected from the NASA Ames RGRP GWTS during 2009. Table 4 of Appendix A details the results of temperature, pH, and other water quality analyses conducted during 2009. The influent and effluent sample points are shown in Figure 7**.**

During 2009, the NASA Ames RGRP GWTS removed a total of 4.72 pounds of total VOCs from 7,830,490 gallons of groundwater. The average flow rate into the system was 15.8 gpm. The monthly influent VOC concentrations for selected chemicals are presented in Figure 8. Figure 9 presents the monthly effluent flow for 2009. Figure 10 presents the monthly total VOC and TCE mass removal information for 2009.

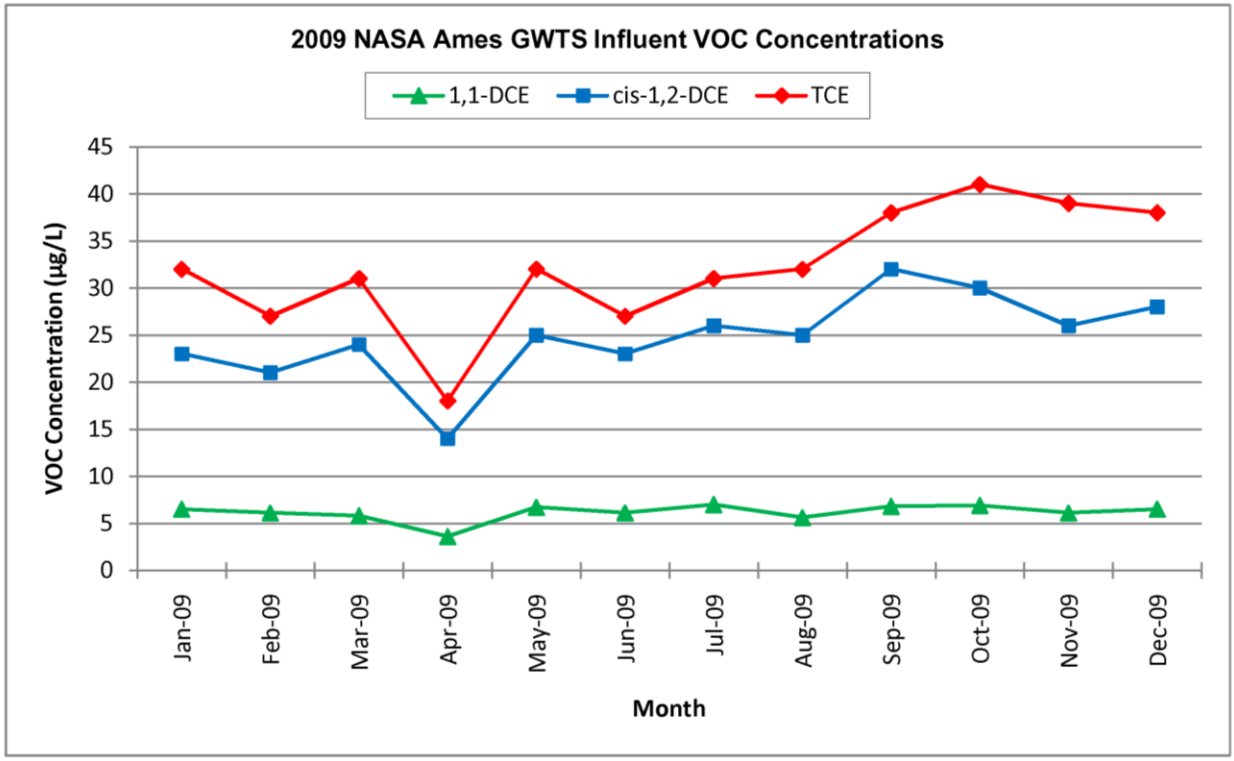


Figure 8
NASA Ames GWTS Monthly Influent VOC Concentrations

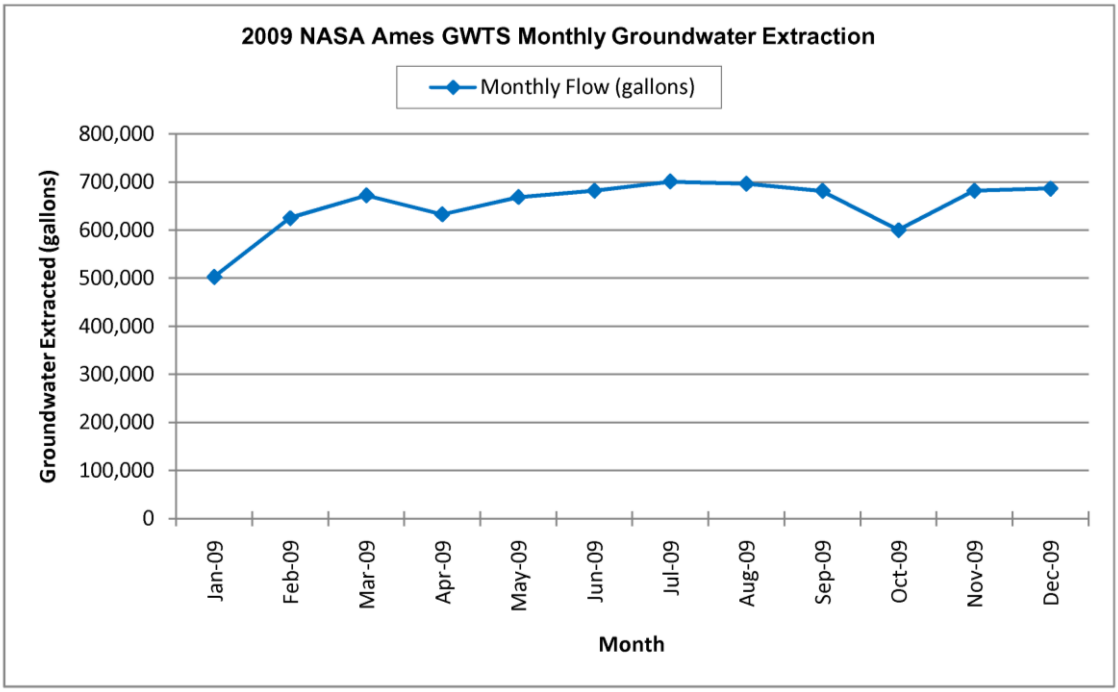


Figure 9
2009 NASA Ames GWTS Monthly Groundwater Extraction

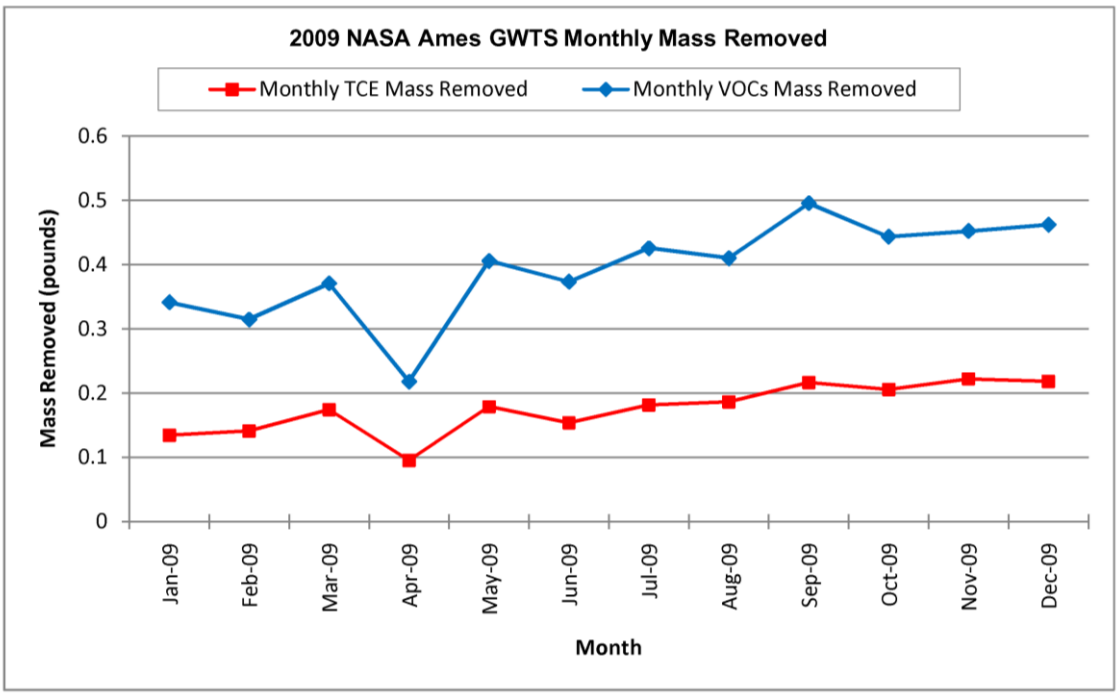


Figure 10
2009 NASA Ames GWTS Monthly Mass Removed

2.2.4. System Performance

During 2009, the NASA Ames RGRP GWTS was fully operational for greater than 95 percent of the year.

During 2009, the NASA Ames GWTS experienced several automatic system-wide shutdowns. These automatic system-wide shutdowns resulted from problems with electrical systems and/or power disruptions. Dates and durations of these shutdowns are detailed below in Table 5.

Table 5
2009 NASA Ames GWTS
System Shutdown Data

Date(s)	Duration (hours)	Cause
1/1/09 – 1/6/09	120	System-Wide Electrical Malfunction
1/17/09 – 1/20/09	79	System-Wide Electrical Malfunction
1/22/09	10	System Shut-down for Electrical Repairs
2/2/09	7	Electrical Problem (NASA-1A only)
2/11/09	10	Electrical Problem (NASA-1A only)
2/26/09	2	Electrical Problem (squirrels damaged electrical wires)
4/22/09	3	Electrical Problem (NASA-1A only)
4/29/09 – 5/1/09	30	Electrical Problem (NASA-1A only)
5/5/09	1	Electrical Problem
5/22/09	7	Electrical Problem (NASA-1A only)
6/18/09	3	Electrical Problem (NASA-1A only)
7/29/09 – 7/30/09	8	Electrical Problem (NASA-1A only)
8/6/09	2	Electrical Problem
8/11/09	3	Electrical Problem (NASA-1A only)
10/7/09	9	Electrical Power Disruption
10/12/09 – 10/14/09	22	Electrical Short-Circuit in LDV-14 Vault
10/14/09 – 10/17/09	81	Electrical Short-Circuit in LDV-14 Vault (NASA-3A only)
10/17/09 – 10/20/09	48	System Shut-down to troubleshoot and repair electrical short-circuit
12/18/2009	2	System Shut-down to repair electrical system

2.2.5. System Operations and Maintenance

During 2009, the NASA Ames RGRP GWTS treated influent groundwater as designed.

2.2.5.1. Suspension of Pumping at NASA-2A and NASA-4A

On April 28, 2009, after discussions with the US EPA and California Regional Water Quality Control Board, NASA suspended operation of extraction wells NASA-2A and NASA-4A. As discussed in NASA's "*2008 Draft Regional Groundwater Remediation Program Progress Report,*" the performance of these wells had been less than designed and anticipated. In addition, groundwater extracted from NASA-4A had been below cleanup levels.

The extraction rates from wells NASA-1A and NASA-3A were adjusted to maintain NASA's 15 gallons per minute (gpm) discharge limit. NASA-1A is currently operating at 7.1 gpm and NASA-3A is operating at 7.1 gpm. Wells NASA-2A and NASA-4A are turned on for approximately two hours per week to maintain operability.

2.2.5.2. Carbon Replacement

On August 6, 2009, the granulated activated carbon (GAC) within vessel GAC-552 was replaced (see Figure 2). Vessel GAC-552 served as the secondary GAC vessel from September 19, 2007 to September 30, 2008 (12 months of service) and the primary GAC vessel from September 30, 2008 to August 6, 2009 (11 months of service). No system shutdown was required during the carbon replacement.

2.3. Hydraulic Control and Capture Zone Analyses

The following sections describe how the capture zones for the NASA Ames GWTS area were estimated and discuss the effectiveness of the capture zones. Capture zones have been estimated for NASA's four extraction wells using flow net analyses of March 26 and November 19, 2009 groundwater elevation data and potentiometric surfaces in the A1 aquifer. The four NASA Ames extraction wells are completed in the A1 aquifer; therefore, the following sections are relative only to the A1 aquifer.

2.3.1. Analysis Methodology

The capture zone of an extraction well may be interpreted graphically from the shape of the potentiometric surface. The shape of the potentiometric surface is influenced by many factors, especially the extraction well zone of influence, aquifer/aquitard heterogeneities, geologic materials, and discharge/recharge boundaries.

The use of the flow-net analysis methodology is considered most appropriate for estimating capture zones at NASA Ames. The flow net analysis method provides a simple graphical solution that reflects site-specific aquifer heterogeneities and

hydraulic interference effects from other extraction wells that cannot be incorporated into an analytical estimate of capture zones without the development of an extensive groundwater model (which also involves making assumptions for geologic and hydrogeologic variables). The limitation of using flow-net analysis is that groundwater and contaminant transport through preferential pathways and "channelized" groundwater flow is not adequately reflected (e.g. effects may be minimized). The graphical depictions of capture zones for the March 26 and November 19, 2009 gauging events are provided in Section 2.3.2.3.

Included under Step 6–"Interpret Actual Capture" is a discussion on how geologic characteristics and groundwater chemistry were used to refine the flow-net based capture zones.

2.3.2. Estimated 2009 Capture Zones

2.3.2.1. Step 1 – Review Site Data, Conceptual Model, Remedial Objectives

The evaluation of the NASA Ames GWTS is based on the following site data reviews:

- Water level data
- Chemical concentrations
- Mass of VOCs removed
- Extent of dissolved chemicals of concern (COCs) exceeding cleanup standards
- Hydraulic capture and control of plumes
- Groundwater balance in extraction well capture zones
- Treatment system effectiveness and efficiency in removing COCs from extracted groundwater

2.3.2.2. Step 2 – Define Site-Specific Target Capture Zones

The NASA Ames GWTS was designed to address two areas that were discussed in the "*Proposed Locations of NASA Ames Groundwater Extraction Wells in the VTOL Pad and South Navy Warehouse Areas*" (EKI, 1995). The first area of concern is located south of the former Navy Warehouse (building N144), between buildings N240 and N259. Although no soil source area was identified, a suspected source area of TCE groundwater contamination was identified in the A1 aquifer during groundwater investigations conducted in 1994. The suspected source area is shown in Figure 11. NASA extraction wells NASA-1A and NASA-2A were installed in the A1 aquifer to address this area. Although the installation of NASA-2A was initially designed to be dependent on the performance of NASA-1A (EKI, 1995), NASA decided to install and operate it concurrent with NASA-1A.

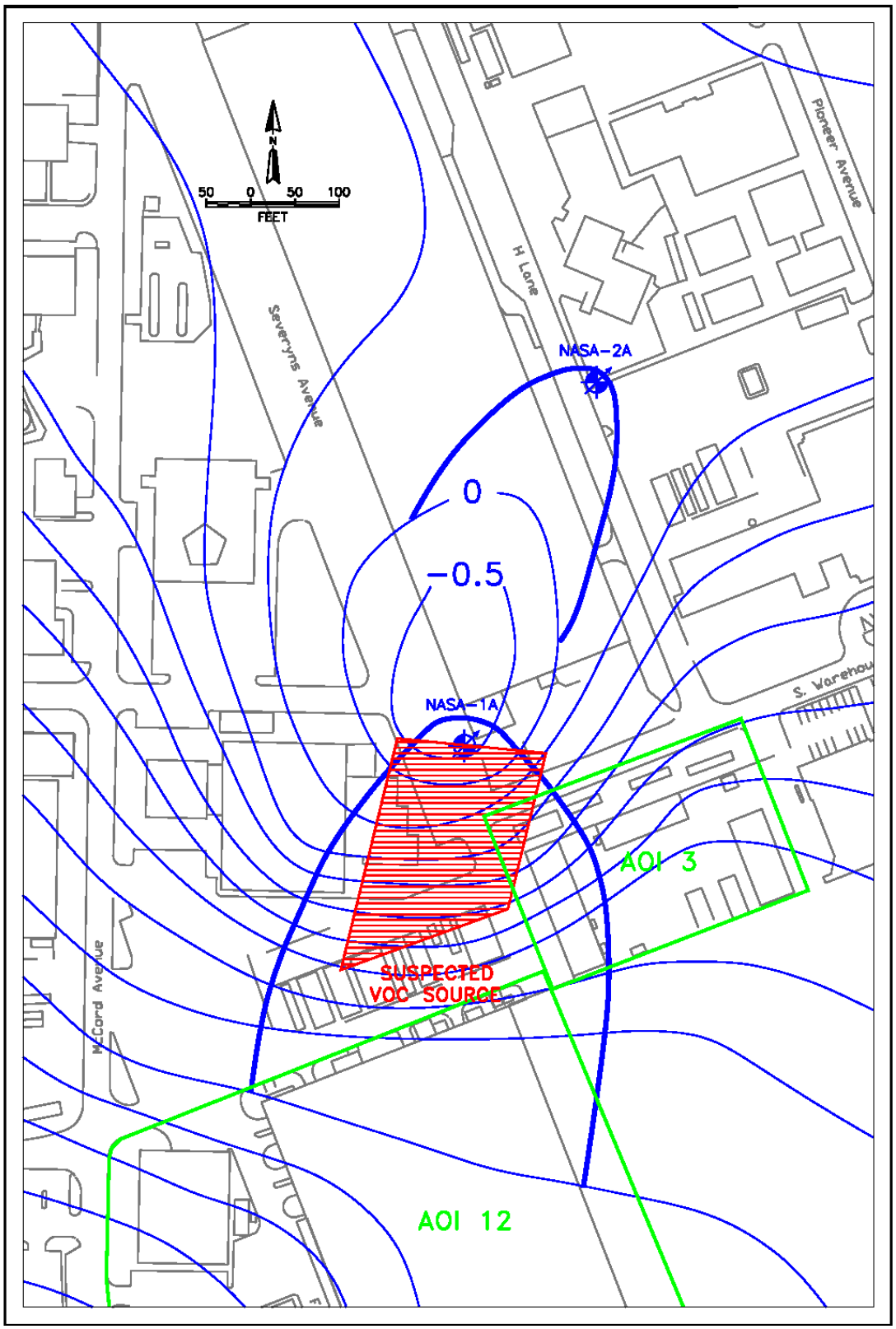


Figure 11
Suspected Source Area, Former Navy Warehouse Area

The second area of concern is located down-gradient of Navy Site 8 North, near the southwest corner of the Vertical Take-Off and Landing (VTOL) pad. According to the "*Center-Wide Sampling and Analysis Program, Volume VII: Work Plan for Area of Investigation 7*" (EKI, 1994b), "…the source for the chemicals present in the area north of the Navy Storage Yard [Navy IRP Site 8] is likely to be the Navy storage yard. However, NASA indicated to EKI that NASA has assumed responsibility for the characterization and remediation, if needed, of this area…" In 1994, NASA removed solvent-contaminated soil exceeding cleanup levels by excavating over 3,000 cubic yards of soil ("*Site 8-North Soil Excavation & Source Removal*" (NASA, 1994). The area of excavation is shown on Figure 12. NASA extraction wells NASA-3A and NASA-4A were installed in the A1 aquifer to address residual groundwater contamination down-gradient of this area. Although the installation of NASA-4A was initially designed to be dependent on the performance of NASA-3A (EKI, 1995), NASA decided to install and operate it concurrent with NASA-3A.

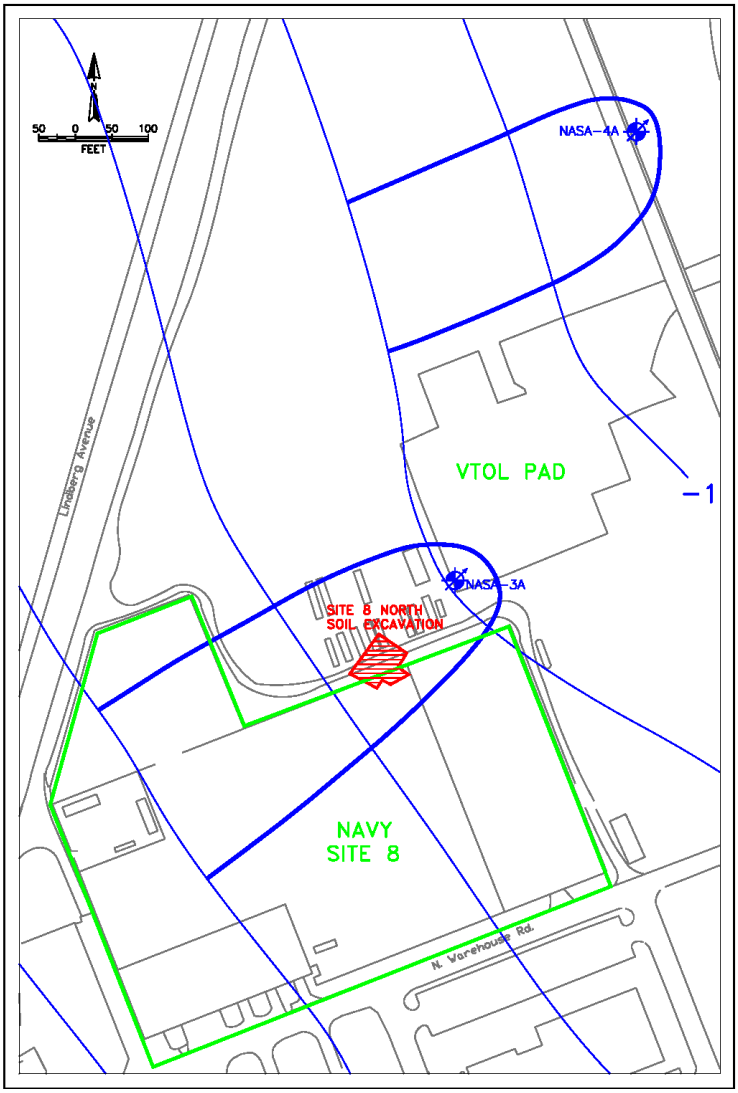


Figure 12
Navy Site 8 North/VTOL Pad, Removed Source Area

2.3.2.3. Step 3 – Interpret Water Levels

NASA, the Navy and the MEW companies collect semi-annual groundwater elevation data on a pre-arranged day. Depth-to-water measurements were recorded for NASA Ames monitoring wells in the A1 aquifer as part of the MEW site data exchange program. Depth-to-water measurements were collected on March 26 and November 19, 2009 and are included in Appendix B. These data were used to generate groundwater elevation contour maps of the A1 aquifer (see Horizontal and Vertical Gradients Section below). The maps were generated using AutoCAD and contoured using GIS\Key Solutions with QuickSurf v. 5 using the following settings: Grid-Standard, Derivative-None, Blend Order-First, Weighting-Honor Local Extrema.

Hydrographs

Hydrographs were prepared from the groundwater elevation data to aid in the evaluation of local and site-specific trends and to illustrate the hydraulic impact of groundwater extraction. The hydrographs are included in Appendix C. Well selections were based on monitoring well location (relation to plume and proximity to extraction wells) and completeness of data. Groundwater elevation measurements for some wells (outliers) were not used in the generation of some hydrographs. These wells were excluded due to miss-measurement, duplicate data, incorrect well identification, and close spacing with adjacent monitoring wells completed at similar depths.

Most of the A1 aquifer monitoring wells exhibit seasonal groundwater elevation trends. The wet- and dry-season differences during 2009 averaged 1.27 feet, varying from 0.40 feet to 2.03 feet in the A1 aquifer. The highest groundwater elevations typically occur during the wet season and the lowest elevations during the dry season.

All of the hydrographs for the wells show a slight rise in groundwater elevations from the early 1990s until the initiation of groundwater extraction by the Navy and MEW Companies beginning in 1998. NASA groundwater monitoring wells in the vicinity of the Navy's WATS area and the MEW RGRP area demonstrated a decline in groundwater elevation beginning in December 1998, most likely attributable to extraction well operation. Figure 13 illustrates the hydrogeologic response in well 14D12A, which is located approximately 15 feet up-gradient of MEW extraction well REG-6A. Depressed water levels have persisted in these wells, although a gradual rise in water levels is occurring. The decline in groundwater elevation is greatest in the wells closest to the extraction wells and decreases with distance from the extraction wells. The declines in groundwater levels in the distal monitoring wells is most likely due to a general lowering of the local potentiometric surface cause by the pumping of extraction wells.

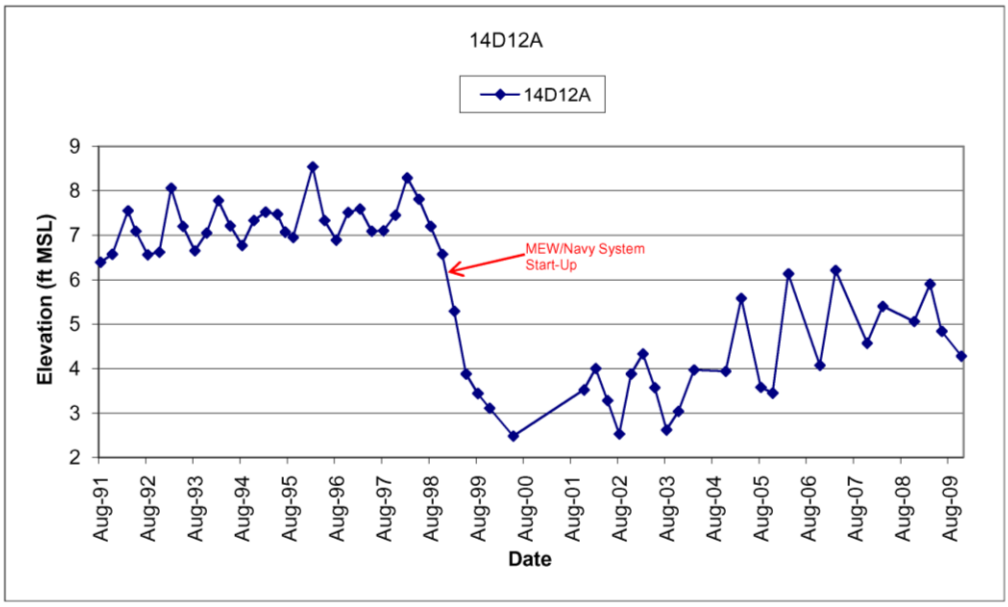


Figure 13
Hydrograph of Well 14D12A

A similar observation was noted in the vicinity of NASA's four extraction wells, coinciding with the initiation of NASA groundwater extraction in September 2001. A water level decline of 2.5 feet occurred near NASA-1A. Figure 14 illustrates the hydrogeologic response in well 14D26A1, which is located approximately 10 feet up-gradient of NASA extraction well NASA-1A.

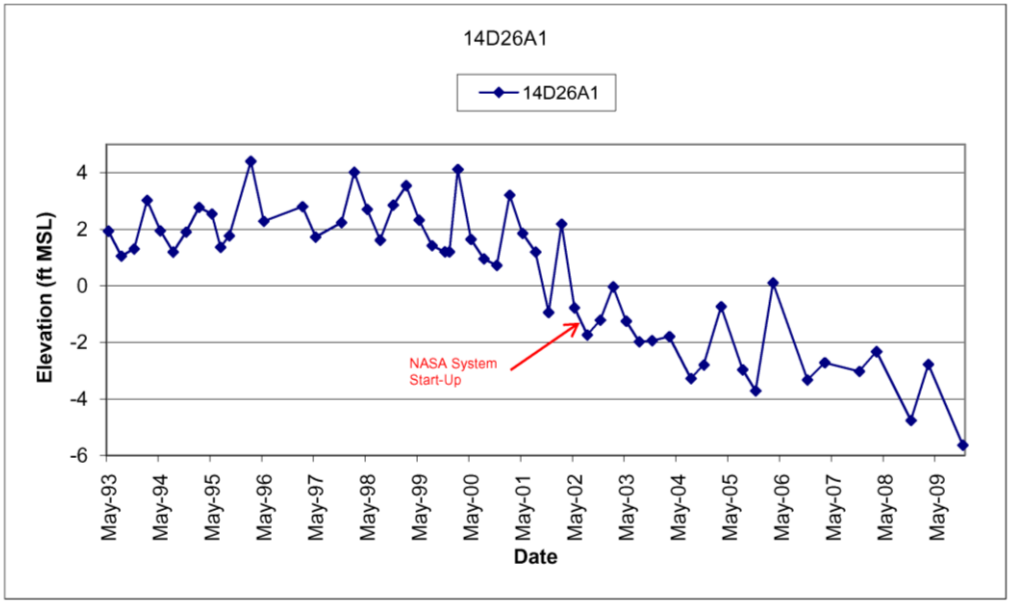


Figure 14
Hydrograph of Well 14D26A1

Horizontal and Vertical Gradients

Depth-to-water measurements collected on March 26 and November 19, 2009 (Appendix B) were used to monitor local and regional groundwater gradients and to generate groundwater elevation contour maps of the A1 aquifer (Figures 15 and 18, respectively). The following sections provide a discussion of the groundwater gradients estimated for each gauging event.

Quarter 1, 2009

A groundwater elevation contour map was generated from water levels measured on March 26 and is shown on Figure 15. Groundwater generally flows north to northeast, toward San Francisco Bay. During Quarter 1, 2009, the average horizontal gradient was approximately 0.0027 feet/foot (ft/ft). The groundwater gradient in the southern portion of NASA Ames (south of Hunsaker Road) was approximately 0.0054 ft/ft, while the average gradient in the northern portion was approximately 0.0015 ft/ft.

Vertical gradients between the A1 aquifer and A2 aquifer were determined using the March 26 groundwater elevation data (Appendix B). Wells located within eight horizontal feet of each other are considered a pair. In the eastern portion of NASA Ames, a local upward groundwater gradient of 5.87 feet exists between the A2 aquifer and the A1 aquifer (well pair 14D25A2/14D26A1). This well pair is located within 10 feet of extraction well NASA-1A (Figure 15). The relationship between well 14D25A2, 14D26A1, and the A1/A2 boundary is illustrated in Figure 16. Prior to groundwater extraction, this well pair indicated a local upward gradient of about 1.0 feet. The upward vertical gradient of 5.13 feet means that the water level in well 14D25A2 is 5.87 feet higher than the water level in well 14D26A1. This observed upward vertical gradient indicates that at this location groundwater from the lower A2 aquifer would prefer to be at a higher elevation. However, because of the low vertical hydraulic conductivity of the clay materials comprising the A1/A2 aquitard and its thickness, upward vertical flow can be regarded as negligible. Figure 17 shows that while well 14D26A1 experienced a noticeable response to initiation of pumping, well 14D25A2 exhibited little response.

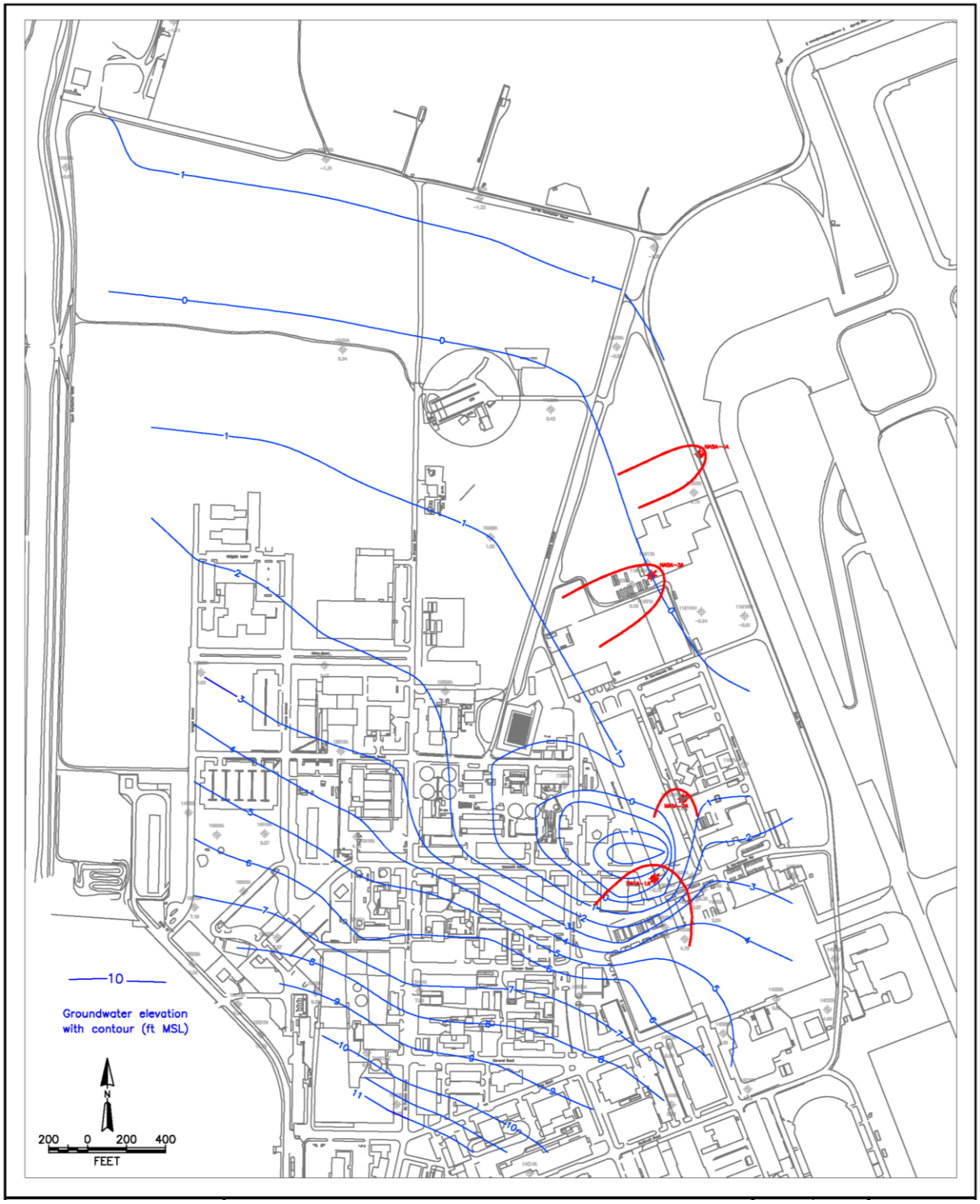


Figure 15
Groundwater Elevation Contours and Capture Zones
March 26, 2009

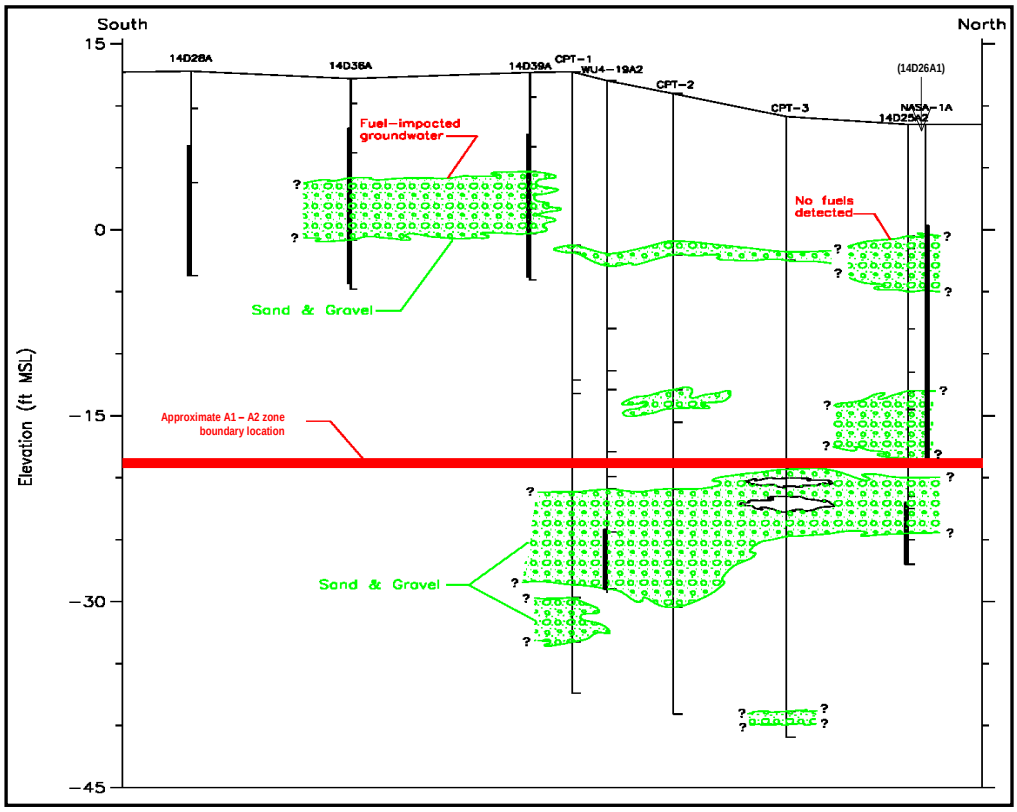


Figure 16
Geologic Cross Section near Extraction Well NASA-1A

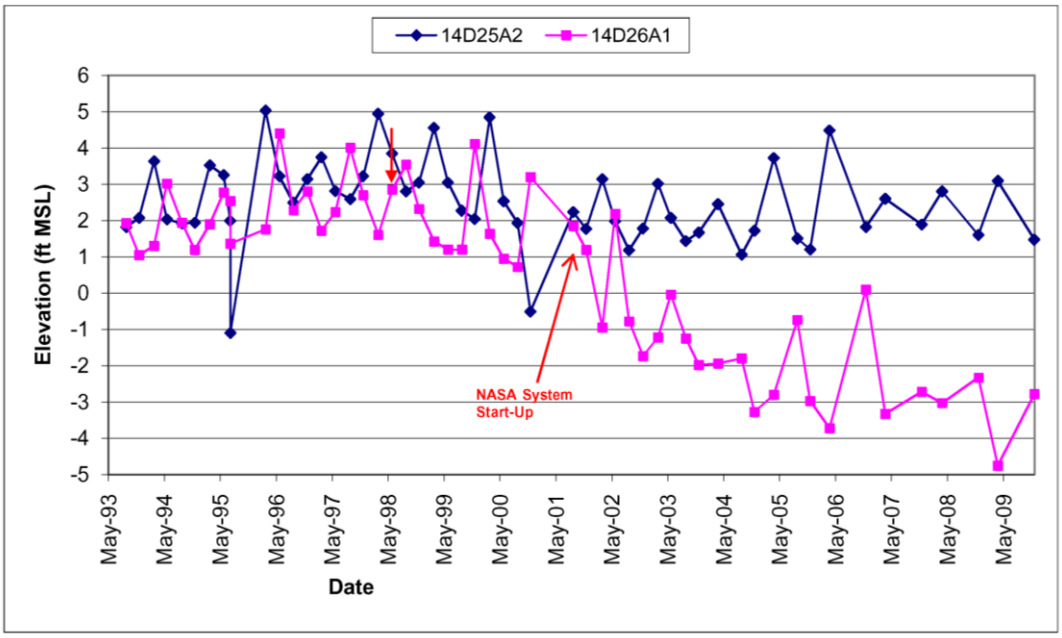


Figure 17
Hydrograph of Wells 14D25A2 and 14D26A1

Quarter 4, 2009

A groundwater elevation contour map was generated from water levels measured on November 19 and is shown on Figure 18. Based on information obtained during the Quarter 4, 2009 monitoring event, groundwater generally flowed north to northeast toward the San Francisco Bay at an average horizontal gradient of approximately 0.0025 ft/ft. However, along the western edge of the site, the groundwater flow direction changed to a more northerly orientation. During this quarter, the groundwater gradient in the southern portion of NASA Ames was approximately 0.0050 ft/ft, while the average gradient in the northern portion was approximately 0.0013 ft/ft.

Vertical gradients between the A1 aquifer and A2 aquifer were determined using the November 19 groundwater elevation data (Appendix B). In the eastern portion of NASA Ames, a local upward groundwater gradient of 7.11ft/ft exists between the A2 aquifer and the A1 aquifer (well pair 14D25A2/14D26A1).

Figure 18
Groundwater Elevation Contours and Capture Zones
November 19, 2009

2.3.2.4. Step 4 – Perform Appropriate Calculations

A horizontal capture zone analysis was completed for the NASA GWTS area to estimate the pumping rates required for capture based on groundwater flow through the mapped plume extent. Flow budget calculations were completed for effectiveness evaluation of the system as originally designed (EKI, 1995) and also relative to capture of the Regional Plume component on NASA Ames.

Data values used for completion of the flow budget calculations were selected from *"Proposed Locations of NASA Ames Groundwater Extractions Wells in the VTOL Pad and South Navy Warehouse Areas"* (EKI, 1995) for the "Designed" component of the calculations, and from the 2008 NASA Ames groundwater data (included in this report) for the "Regional" component of the calculations. The system effectiveness evaluations for NASA-1A and NASA-3A are presented in the following Table 6, while the flow budget calculations are included as Appendix D. Since NASA-2A and NASA-4A were originally proposed as potential "contingent" wells only (EKI 1995), flow budget calculations were not completed for these wells.

A simple horizontal capture zone analyses method was used to complete the NASA GWTS flow budget calculations and is based on the following formula where **Q** = (**K**) x (**b** x **w**) x ***i*** x **factor** (Q = well extraction rate; K = aquifer hydraulic conductivity; b = aquifer saturated thickness; w = plume width; ***i*** = regional hydraulic gradient; and factor = "rule of thumb" is 1.5 to 2.0, intended to account for other contributions to the pumping well, such as induced vertical flow from another unit).

As shown in the Appendix D flow budget calculations, data values selected for use in the calculations are from the original system "Designed" document (EKI, 1995) or from the 2008 NASA Ames groundwater data presented in this report. When reviewing the "Designed" portion of the calculations, it is noted here that the hydraulic conductivity "**K**" is 300 ft/day for NASA-1A and 250 ft/day for NASA-3A. The lower "**K**" value for NASA-3A is based on the extraction well location within the "distal", finer grained portion of the depositional system compared to the more "central", coarser grained, up-gradient location of the NASA-1A extraction well. The plume width "**w**" for the "Designed" component is based on the width of the hydraulically conductive aquifer materials located at the two extractions wells, NASA-1A (see Figure 19) and NASA-3A (see Figure 23), not the originally modeled "capture zones," which included adjacent sediments with low to no hydraulic conductivity.

When reviewing the "Regional" portion of the calculations, it is noted here that the hydraulic conductivity "**K**" is 150 ft/day for NASA-1A and 130 ft/day for NASA-3A. The lower "**K**" value for NASA-3A verses NASA-1A "Regional" component is based on the same premise as for the "Designed" component, the "distal" location of NASA-3A extraction well. The "**K**" values for the "Regional" calculations are also lower based on "actual" well pumping data for each well area and not the "model" hydraulic conductivities (EKI, 1995). The plume width "**w**" for the "Regional" component is based on the width of the 5 µg/L TCE contour line near the two extractions wells (see Figure 26).

A “contribution” factor or “**f**” value of 1.5 was selected for both “Designed” and “Regional” calculations based on potential contribution to groundwater from the underlying aquifer materials, plus seasonal rainwater, site surface watering, and storm-drain system “leakage” in the extraction well area.

As shown in Table 6**,** the system pumping rates exceeded the calculated flow budgets in the A1 aquifer when evaluating the system effectiveness relative to the sand channels into which the extraction wells were installed. However, as also shown in Table 6, the system pumping rates were inadequate when compared to the flow budgets of the Regional Plume. This would indicate, as stated in the EPA Five-Year Review, that the Regional Plume in this area is not being completely captured by any of the three existing onsite groundwater treatment systems (EPA, 2004).

Table 6
Flow Budget Calculations

Capture Zone Calculations and Analysis
NASA RGRP GWTS, Moffett Field, California

A1 Aquifer	Designed		Regional	
Well	**NASA-1A**	**NASA-3A**	**NASA-1A**	**NASA-3A**
K	300 ft/day	250 ft/day	150ft/day	130ft/day
b	10 ft.	11 ft.	18 ft.	20 ft.
w	120 ft	175	407 ft.	1,006 ft.
I	0.002	0.0014	0.0045	0.0016
factor	1.5	1.5	1.5	1.5
flow budget (gpm)	5.61 gpm	5.25 gpm	38.54 gpm	81.53 gpm
Well pumping rate (gpm)	8 gpm	6 gpm	7.00 gpm	7.00 gpm

(see Notes below table)

LINE OF EVIDENCE	IS CAPTURE SUFFICIENT?		COMMENTS
Water Levels	***Designed***	***Regional***	
Potentiometric surface maps	Yes	No	Potentiometric maps indicate horizontal capture is present at NASA-1A. Regional Plume not fully captured.
water level pairs	Yes at -1A No at other 3 (-2A,-3A,-4A)	No	Potentiometric maps and low gpm at NASA-2A and -4A indicate non-capture. No significant draw-down at NASA-3A.
Calculations flow budgets	Yes	No	Current pumping rates sufficient for capture based on system design criteria. Flow budget calculations indicate lack of Regional Plume capture (see Note #2).
Concentration Trends downgradient monitoring wells	No	No	NASA-3A extraction appears sufficient to capture the "channelized" plume from Site 8 North/VTOL Pad area; however, NASA-4A is not located to adequately extract from this "channelized" plume trend. No appreciable decrease in down-gradient wells. NASA GWTS area effected by Regional Plume.

Note #1: The flow budget calculations for NASA-1A and NASA-3A are presented in Appendix D
"Designed" values from EKI 1995 Report. "Regional" values from 2009 NASA groundwater data, unless otherwise stated.

Note #2: "Designed" plume width based on hydraulically conductive aquifer material at extraction well (EKI 1995). "Regional" plume width based on 5.0 ug/l TCE contour (2009 TCE Plume Map).

Note #3: The NASA RGRP GWTS was originally designed to capture local and "suspected" source areas located on NASA Ames but not the Regional Plume. Therefore, the "Regional" component of the flow budget calculations is not applicable to the NASA GWTS performance.

Note # 4: Since NASA-2A & NASA-4A were originally proposed as potential "contingent" wells only (EKI 1995), flow budget calculations were not completed for these wells.

2.3.2.5. Step 5 - Concentration Trends at monitoring wells

TCE, *cis*-1,2-DCE, and vinyl chloride are the major VOCs of concern in site groundwater. A more detailed discussion of these three groundwater contaminants is included in Section 2.4.1. In general, TCE concentrations have been increasing at NASA extraction well NASA-4A (concentrations remain below cleanup level) and NASA-2A. Declining TCE concentrations have been observed at extraction wells NASA-1A and NASA-3A. C*is*-1,2-DCE concentrations have been decreasing in wells NASA-1A, NASA-2A, and NASA-3A and have become relatively stable in NASA-4A (concentrations remain below cleanup level). At the two NASA extraction wells that contain vinyl chloride (NASA-1A and NASA-2A), concentrations of vinyl chloride have become relatively stable.

2.3.2.6. Step 6 – Interpret Actual Capture

The water levels in the extraction wells were not used to calculate/map groundwater capture zones due to possible cascading effect of groundwater within the well casing possible differential effects due to formation verses filter-pack permeability, and/or pump cycling due to aquifer recharge limitations. These conditions might indicate a greater interpreted draw-down than truly exists at the extraction well location.

To best illustrate the hydrogeology that controls the performance of the NASA GWTS extraction wells, the “Distribution of Sand and Gravel Thickness” maps from the 1995 EKI system design document are included as Figures 19 and 23. As shown on these figures, there appears to be depositional trends where relatively permeable sandy and gravelly sediments were deposited adjacent to silty and clayey sediments. Based upon the thicknesses and distributions of these differing sediment types, especially the linear-like nature of the thicker sandy, gravely sediment trends, these sediments were most likely deposited originally by localized stream or “channelized” flow. It is assumed that there is an appreciable amount of inter-connection among the sand and gravel deposits within a channel boundary.

NASA-1A Extraction Well

In general, the capture zone for NASA-1A (Figures 15 and 18) is considered conservative because the groundwater elevation from the extraction well is not used to derive the potentiometric surface and resultant capture zone.

NASA-1A is located in an approximately 120-foot wide channel deposit (Figure 19) and is screened across approximately 4 feet of fine- to medium-grained sand, 2 feet of coarse-grained sand, and 4 feet of fine-grained gravel (Figure 20).

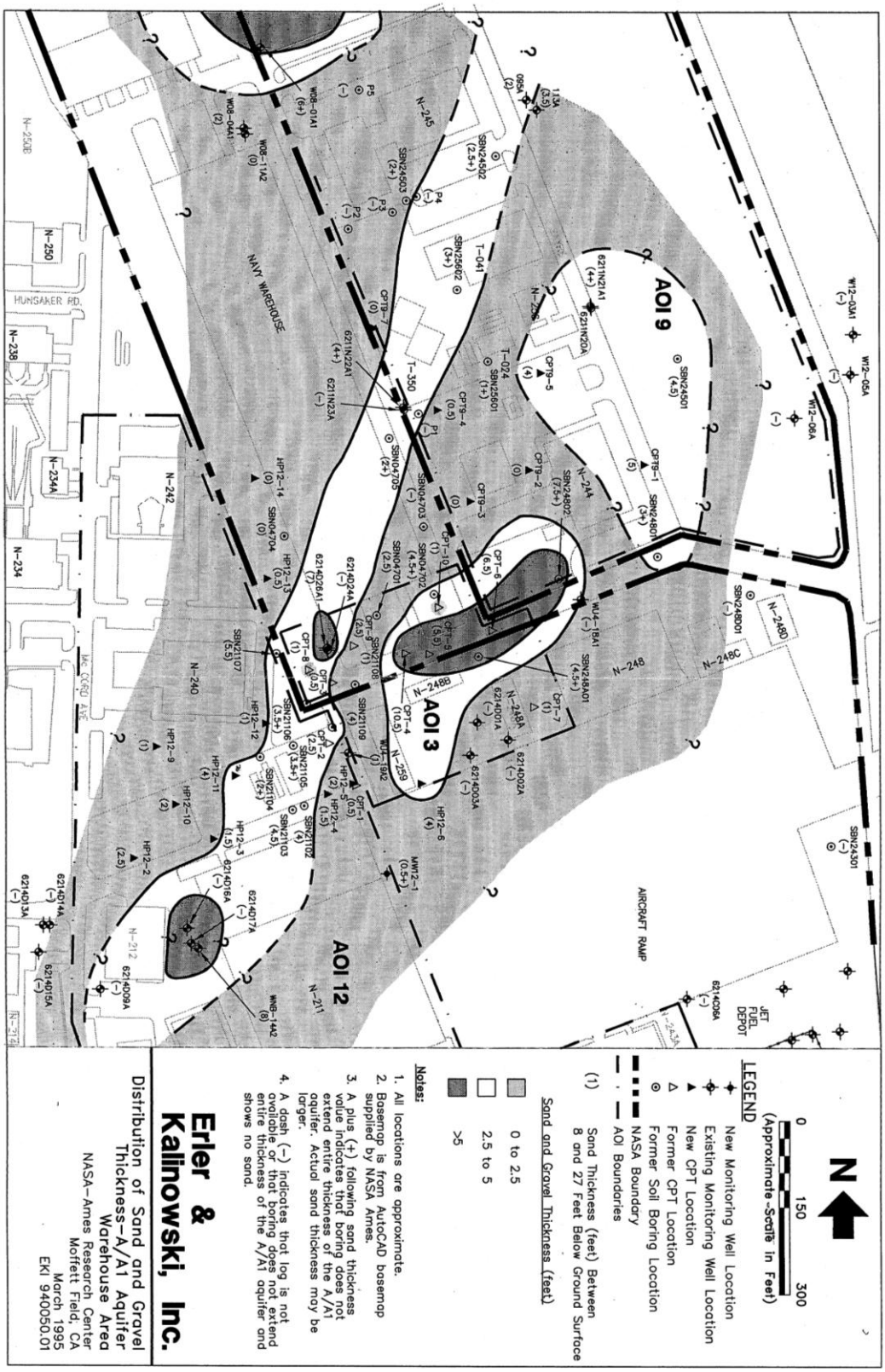
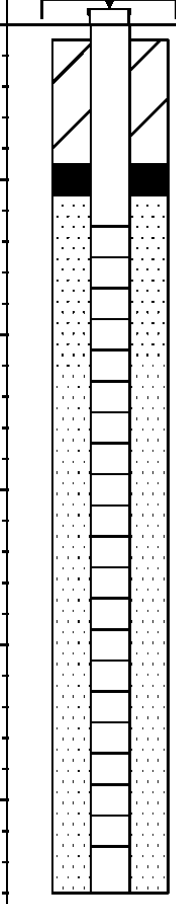


Figure 19
Distribution of Sand and Gravel Thickness, A/A1 Aquifer, Warehouse Area

	Permit No.: 99W00195	Site Id: NASA-1A	Purpose: Extraction Well, Shallow
	Permit Date: 03/15/99	Location: AOI 3/9	
	Consulting Firm: SAIC	X Coordinate: 1547985.50	Y Coordinate: 337820.90
	Logged By: BR/SAIC	Total Depth: 28.00'	Completed Depth: 28.00'
	Certified By: GMT/SAIC	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'	
Date(s): 04/14/99 - 04/14/99	Measuring Point: 7.84'		
Contractor: Gregg Drilling	Datum: Mean Sea Level	Blank Casing: type: Stainless dia: 6.00in fm: -0.5' to: 6.50'	
Borehole Dia.: 14.50in	Static Water Level:	Screens: type: Slotted size: 0.010india: 6.00in fm: 6.50' to: 26.50'	
Drilling Method: Hollow Stem Auger		Annular Fill: type: Grout fm: 0.50' to: 4.50' type: Betonite fm: 4.50' to: 5.50' type: #2/12 Sand fm: 5.50' to: 28.00' type: fm: to:	
Remarks: 14D50A			

Elevation (ft)	Recovery	Sample No.	Blow Count	Depth (ft)	USCS Code	Material Description
10					CL	SILTY CLAY: dusky yellow green becoming mottled grayish green at 6.5' and light olive brown at 8.5'; slightly to moderately plastic; moist, becoming wet with depth. Trace to no sand, calcareous nodules from 6.5' to 8.0', trace organics at 9.0'.
		N/A	10 11 14	5		
		N/A	10 13 18			
		N/A	9 12 17		SC	CLAYEY SAND: moderate olive brown; approximately 70% very fine-grained sand; saturated.
		N/A	10 15 17	10		
0		N/A	11 22 25		SP	SAND with SILT: olive gray; sand is well sorted, subrounded fine- to medium-grained. Saturated. Iron-stained clay lenses below 11.5'.
		N/A	8 11 11			
		N/A	9 10 13	15	CL	CLAY: moderate yellowish brown; abundant organics; slightly to moderately plastic, plasticity increases with depth. Occasional small (<1/8") decomposed sandstone fragments.
		N/A	4 6 6			
		N/A	5 6 8		ML	CLAYEY SILT: light olive brown; slightly plastic; sticky; trace very fine-grained sand; saturated.
		N/A	18 26 30		CL	SILTY CLAY with SAND: light olive brown; 10% sand at 20'. Grades to CLAYEY SAND with GRAVEL.
-10		N/A	15 29 35	20		
		N/A	40 40 40		SP	SAND grading to GRAVEL: olive gray; well sorted sand from 21.5' to 23.0'; approximately 80% very coarse-grained, subangular; grades to FINE GRAVEL near 23.0' (most 1/4", up to 1/2").
		N/A	48 32 25			
		N/A	18 24 31	25	GP	
					CL	SILTY CLAY: grayish olive with moderate yellow-brown staining (iron staining); nonplastic.

Well Construction



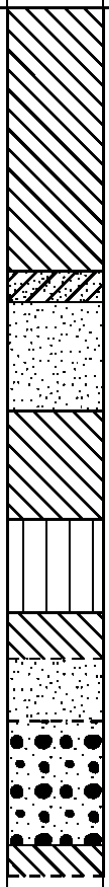


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Figure 20
NASA-1A Well Construction Detail and Lithology

Figures 15 and 18 show that wells 14D36A and 14D39A are within the graphically-derived capture zone of NASA-1A. These two monitoring wells have historically contained elevated concentrations of various fuel constituents. JP5/JP8 was detected at concentrations as high as 2,100 µg/L during 2009. However, fuel constituents have not been detected in groundwater samples collected from NASA-1A (with the exception of the minor gasoline detection in Quarter 2, 2007), nor adjacent monitoring wells 14D24A and 14D26A1. This highlights one of the limitations of using flow-net analysis to determine capture zones. In this instance, "channelized" flow is the controlling factor.

These observations suggest that the groundwater capture near NASA-1A is controlled by the hydrogeology of the site. In the "*Proposed Locations of NASA Ames Groundwater Extraction Wells*" report (EKI, 1995), two distinct channel deposits are shown (see Figure 19), one in which NASA-1A is located, and one to the south where the AOI 3 fuel contamination is located. This channelization is illustrated in the geologic cross-section shown in Figure 21.

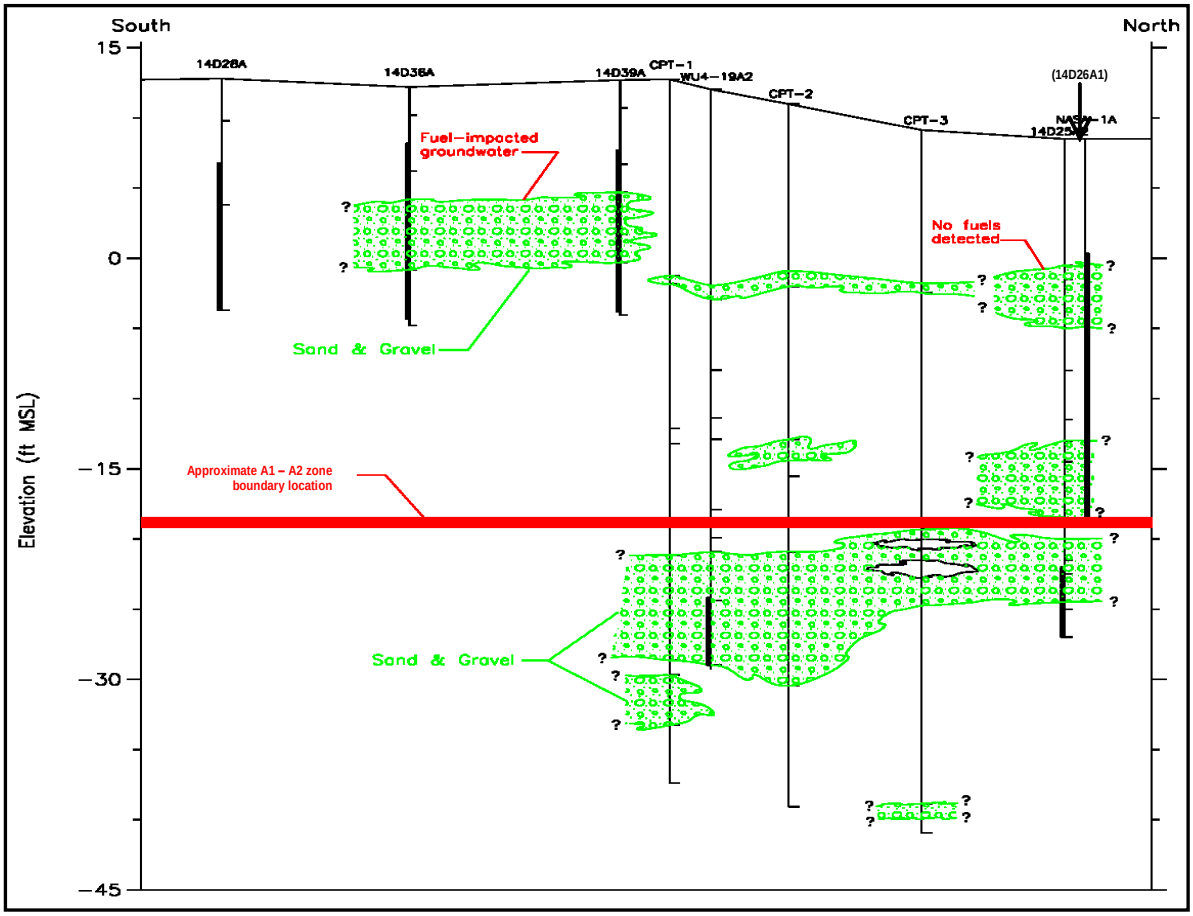


Figure 21
Geologic Cross Section Near Extraction Well NASA-1A

Although a slight lowering in groundwater levels in the adjacent channel is observed, it appears that the fuel contamination in this adjacent channel sequence has limited ability to migrate across the inter-channel boundary to the NASA-1A extraction well. Actual capture is limited to the channel boundaries, with limited hydraulic control being exerted outside of the channel.

NASA-2A Extraction Well

According to the 1995 EKI report, NASA-2A is located down-gradient from NASA-1A, in the same channel deposit. Figure 19 shows a general pinching and thinning of the channel deposit, which may explain the poor extraction rates sustainable in this well. Even though the extraction rate of this well is 1.0 gpm, draw-down in the well is such that the pump cycles on and off on a regular basis. The resultant capture zone for NASA-2A is, therefore, smaller than indicated by the flow-net analysis (Figures 15).

NASA-2A is in the same channel as NASA-1A, but at a location where the channel has narrowed to approximately 90 feet in width and has thinned somewhat (Figure 19). The extraction well is screened across approximately 4 feet of fine- to medium-grained silty and clayey sands, inter-bedded with clays and silts (Figure 22).

Actual capture and hydraulic control at NASA-2A is limited to the immediate vicinity of the extraction well.

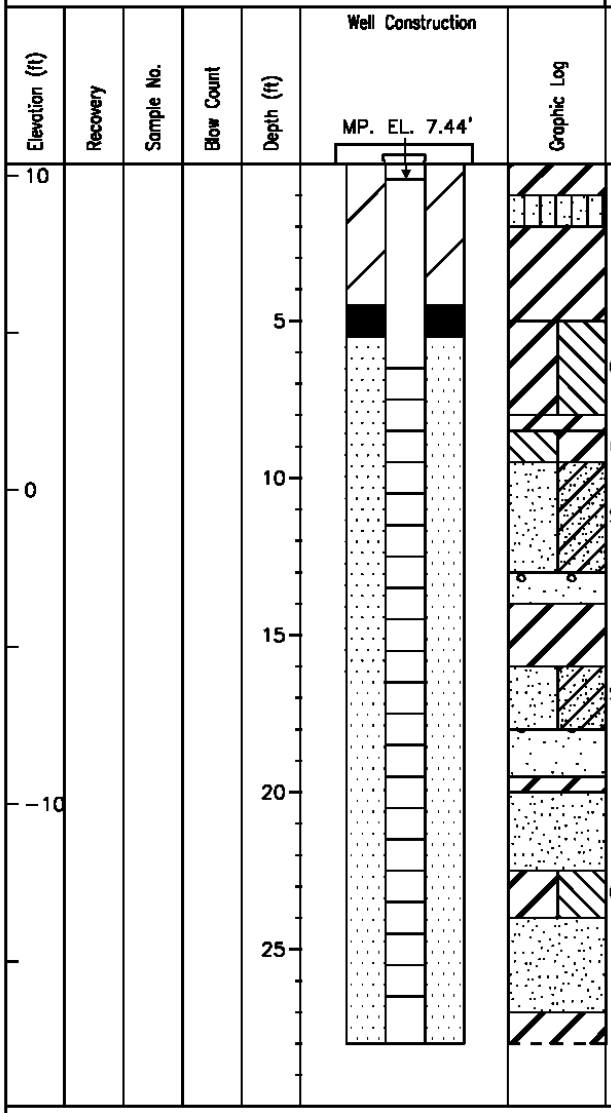
NASA-3A Extraction Well

In general, the capture zone for NASA-3A (Figures 15 and 18) is also considered conservative because the groundwater elevation from the extraction well is not used to derive the potentiometric surface and resultant capture zone.

Although the extraction rate from this well is 7.0 gpm, little draw-down is observed in the adjacent groundwater monitoring wells. NASA-3A is located in a thick, coarse-sand and gravel channel immediately down-gradient from Navy Site 8 North. NASA-3A is located in an approximately 175-foot wide channel deposit (Figure 23) and is screened across approximately 5 feet of fine- to medium-grained silty sand, 4 feet of medium- to coarse-grained sand, and 2 feet of sandy gravel (Figure 24). A geologic cross section near NASA-3A is provided in Figure 25.

High hydraulic conductivity at this location allows for relatively high groundwater extraction rates, but makes lateral capture difficult, especially when considering the relatively large width of the channel. Because of its proximity to the former spill site, and the decreasing TCE levels in down-gradient well 11M03A, it is assumed that this well is capturing the majority of the residual dissolved solvent. However, additional piezometers are needed to further define the capture zone.

	Permit No.: 99W00196	Site Id: NASA-2A	Purpose: Extraction Well, Shallow
	Permit Date: 03/15/99	Location: AOI 9/Child Care Center	
	Consulting Firm: SAIC	X Coordinate: 1548134.20	Y Coordinate: 338229.30
	Logged By: BR/SAIC	Total Depth: 28.00'	Completed Depth: 28.00'
	Certified By: GMT/SAIC	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'	
Date(s): 04/16/99 - 04/16/99	Measuring Point: 7.44'		
Contractor: Gregg Drilling	Datum: Mean Sea Level	Blank Casing: type: Stainless dia: 6.00in fm: 0.5' to: 6.50'	
Borehole Dia.: 14.00in	Static Water Level: 7.70'	Screens: type: Slotted size: 0.010india: 6.00in fm: 6.50' to: 26.50'	
Drilling Method: Hollow Stem Auger			
Remarks: 11N28A		Annular Fill: type: Grout fm: 0.00' to: 4.50' type: Betonite fm: 4.50' to: 5.50' type: #2/12 Sand fm: 5.50' to: 28.00' type: fm: to:	



USCS Code	Material Description
CH	SANDY CLAY: very dark gray (7.5YR 3/0); well graded sand (medium to fine); 5% angular gravel to 1/2"; roots; firm; high plasticity.
SM	SILTY SAND: yellowish brown (10YR 5/4); poorly graded fine sand; 5-10% rounded gravel to 3/4"
CH	SILTY CLAY: very dark gray; 5% fine sand; organic matter; high plasticity.
CH/CL	SILTY CLAY: very dark gray mottled light gray (10YR 7/2); firm to stiff; medium plasticity.
CH	CLAY: very dark gray; stiff; very high plasticity.
CL/CH	SILTY CLAY: light olive brown (2.5Y 5/3); 10% fine sand; stiff; medium plasticity; very moist.
SP/SC	SAND with Clay: dark gray; 3% rounded gravel to 1/4"; poorly graded sand (1% coarse; 14% medium; 74% fine sand); 8% fines; wet.
SW	SAND with Gravel: dark gray; 36% subrounded gravel to 3/4"; well graded sand (4% coarse; 26% medium; 29% fine sand); 5% fines; wet.
CH	SILTY CLAY: brown (7.5YR 5/4); sticky; firm; high plasticity; wet.
SP/SC	SAND with Clay: dark gray; 2% subrounded gravel to 1/2"; poorly graded sand (1% coarse; 13% medium; 71% fine sand); 13% fines; wet.
SW	SAND: dark gray; 1% rounded gravel to 5/8"; well graded sand (2% coarse; 32% medium; 62% fine sand); 3% fines; wet.
CH	CLAY: yellowish brown; 5% gravel to 1/2"; stiff; high plasticity; very moist.
SP	SAND: 3% gravel to 5/8"; poorly graded sand (2% coarse; 15% medium; 76% fine sand); 4% fines; wet.
CH/CL	SILTY CLAY: brown (10YR 5/3); 10% fine sand; soft; medium plasticity; very moist.
SP	SAND: 1% gravel to 1/4"; poorly graded sand (1% coarse; 11% medium; 82% fine sand); 5% fines; wet.
CH	SILTY CLAY: brown; <5% fine sand; high plasticity; moist.

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Figure 22
NASA-2A Well Construction Detail and Lithologic Log

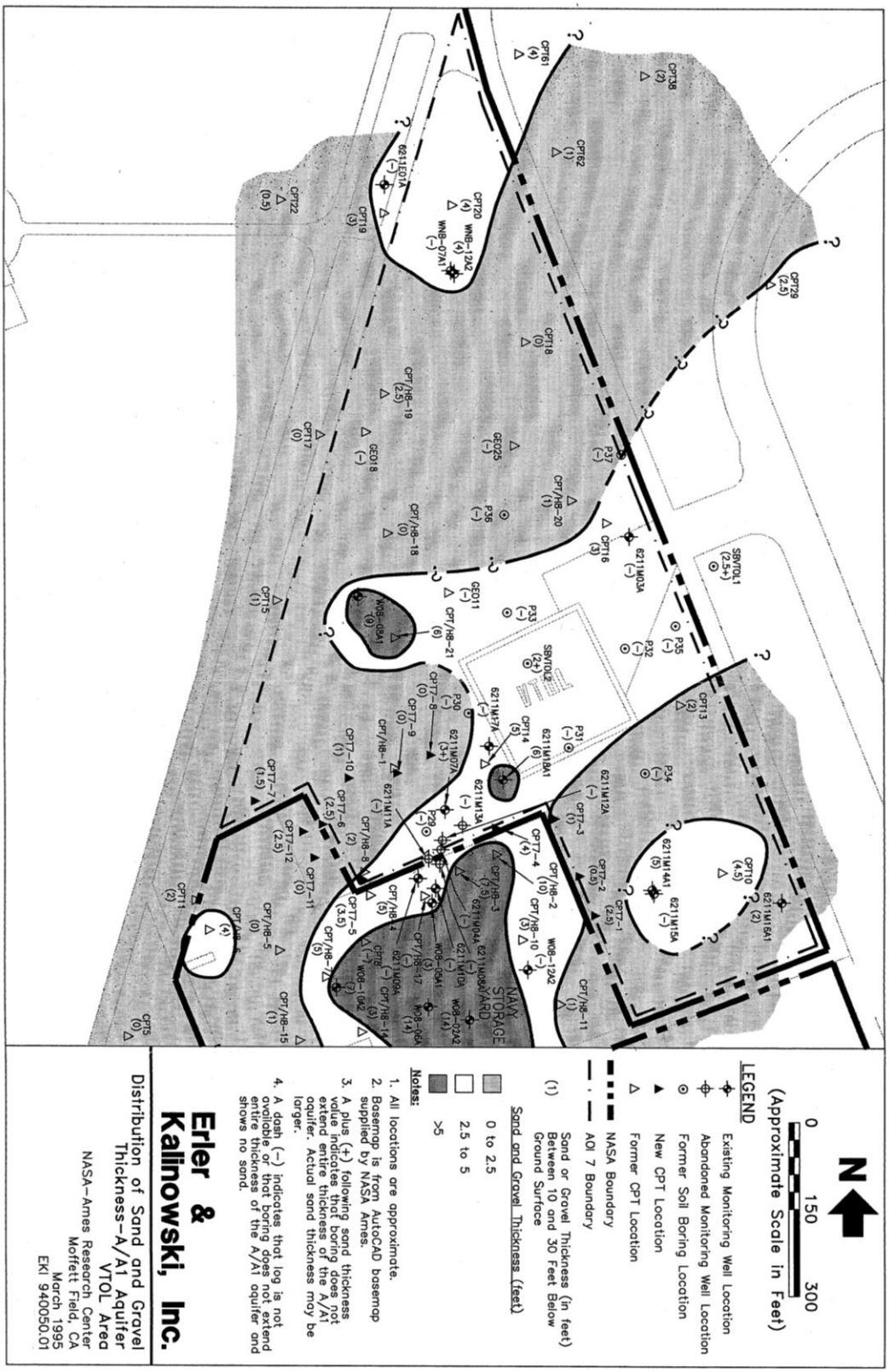

Figure 23
Distribution of Sand and Gravel Thickness, A/A1 Aquifer, VTOL Area

	Permit No.: 99W00155	Site Id: NASA-3A	Purpose: Extraction Well, Shallow
	Permit Date: 03/02/99	Location: VTOL pad	
	Consulting Firm: SAIC	X Coordinate: 1547972.10	Y Coordinate: 339370.80
	Logged By: BR/SAIC	Total Depth: 28.00'	Completed Depth: 28.00'
	Certified By: GMT/SAIC	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'	
Date(s): 03/02/99 - 03/02/99	Measuring Point: 3.49'		
Contractor: Gregg Drilling	Datum: Mean Sea Level	Blank Casing: type: Stainless dia: 6.00in fm: -0.5' to: 6.50'	
Borehole Dia.: 14.50in	Static Water Level:	Screens: type: Slotted size: 0.010in dia: 6.00in fm: 6.50' to: 26.50'	
Drilling Method: Hollow Stem Auger			
Remarks: 11M22A		Annular Fill: type: Grout fm: 0.50' to: 4.50' type: Betonite fm: 4.50' to: 5.50' type: #2/12 Sand fm: 5.50' to: 28.00' type: fm: to:	

Elevation (ft)	Recovery	Sample No.	Blow Count	Depth (ft)	Well Construction	Graphic Log	USCS Code	Material Description
					MP. EL. 3.49'			
							ML	GRAVELLY SILT: light olive gray; nonplastic; moist becoming saturated at 6.0'.
				5				
0							SC	CLAYEY SAND: light olive gray; 50% to 60% sand.
							SM	SILTY SAND: moderate olive brown grading to light olive brown; 50% sand; 50% fines; saturated; sticky; large calcareous nodules at 7.5'; stiff clay interbedded from 7.7' to 8.0'.
				10				
							ML	SANDY SILT: 30% sand.
							CL	CLAY: light olive brown mottled moderate olive brown; abundant organics; slightly plastic; very stiff.
				15				
-10							ML	SANDY SILT: light olive brown; 20% to 30% sand; soft. Sand is poorly sorted. Gravel becomes abundant from 16.5' to 18.0'.
							CL	CLAY grading to SANDY CLAY with GRAVEL: light olive brown; iron stained; stiff; slightly plastic; gravel with serpentinites.
				20			GW	SANDY GRAVEL with SILT: olive gray; poorly sorted. CLAYEY SAND interbedded from 20.5' to 21.0'.
							SW	SAND: olive gray; moderately sorted, medium to coarse grained; 5% fine gravel; 5% or less fines.
				25				SAND: clean sand, very poorly sorted with CLAY. 5% or less fines.
-20							CL	CLAY: light olive brown mottled with light olive gray; soft; slightly plastic to moderately plastic.

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Figure 24
NASA-3A Well Construction Detail and Lithologic Log

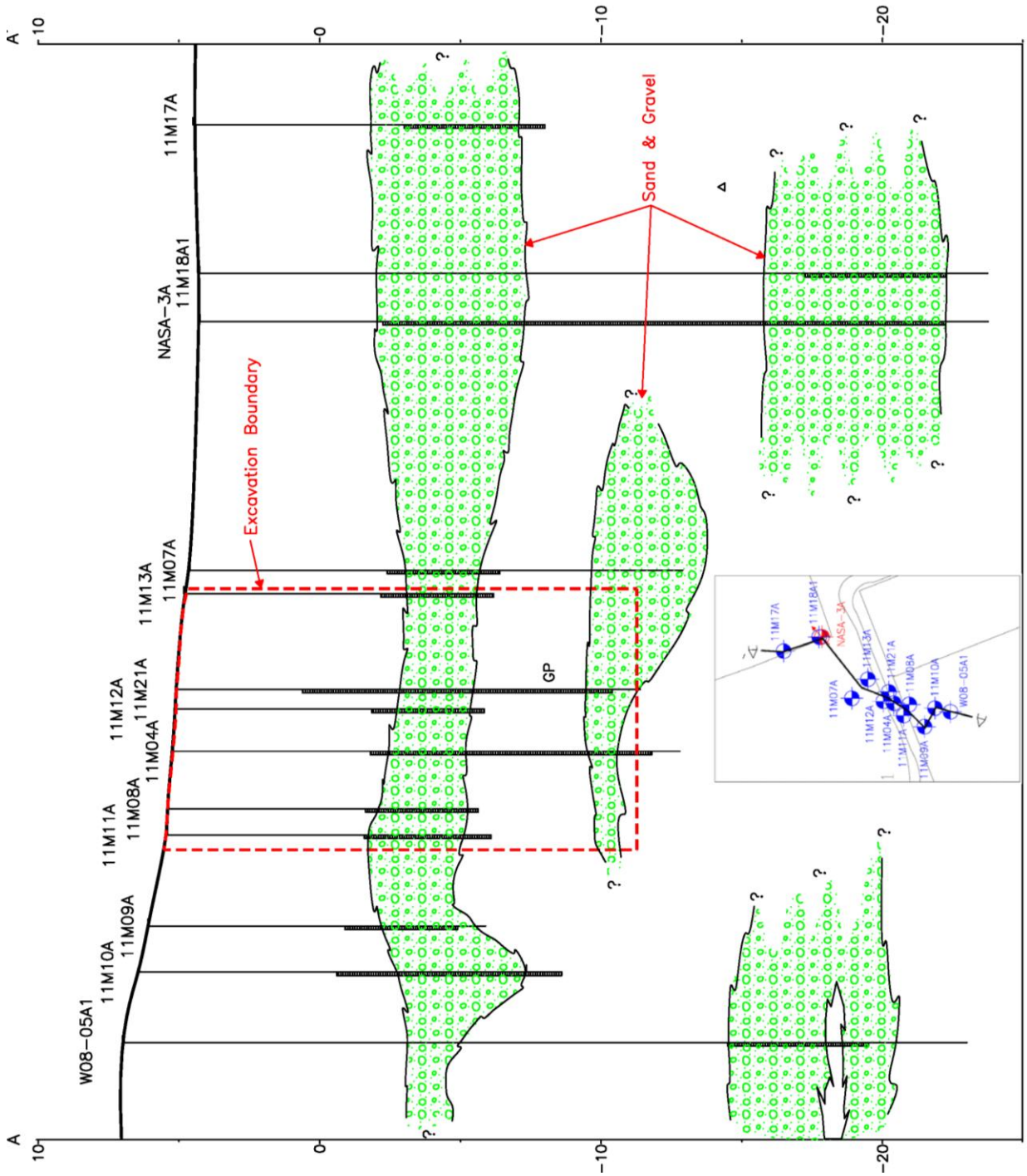


Figure 25
Geologic Cross Section near Extraction Well NASA-3A

NASA-4A Extraction Well

In general, the capture zone for NASA-4A (Figure 15) is considered conservative because the groundwater elevation from the extraction well is not used to derive the potentiometric surface and resultant capture zone.

NASA-4A is located at the distal end of a channel that likely includes NASA-3A. The deposition appears to be inter-bedded fine- and coarse-grained splay deposits (Figure 23). The extraction well is screened across approximately 5 feet of medium-grained sand, inter-bedded with clays and silts (Figure 26).

Because of the relatively low sustainable pump rate, actual capture and hydraulic control at NASA-4A is limited to the immediate vicinity of the extraction well.

2.4. System Analytical Results

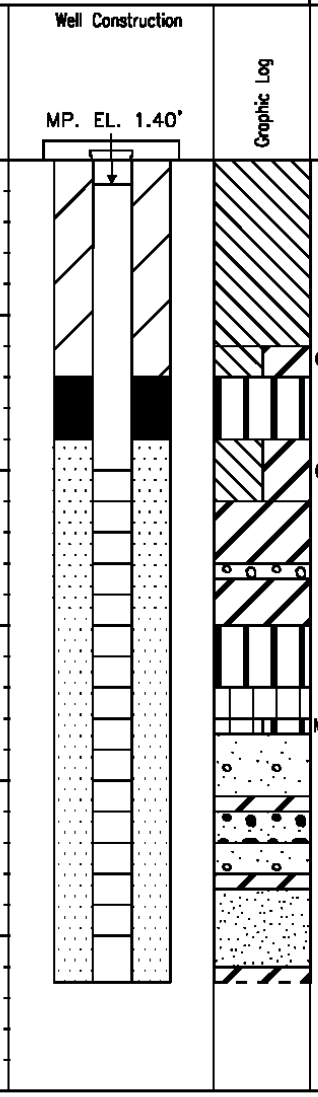
2.4.1. Chemical Data Evaluation and Trend Analysis

The impacts from local and regional groundwater contaminant plumes in NASA's GWTS area have been evaluated to assess conditions during 2009 and changes that have taken place from previous years. Based on the prevalence of TCE, *cis*-1,2-DCE and vinyl chloride in site groundwater, discussion of these three groundwater contaminants are included in this section. Limiting the analysis to these compounds is appropriate based on the following:

- TCE is specified as the indicator compound in the MEW Record of Decision.
- *Cis*-1,2-DCE is a degradation product of TCE and is present in most wells. At most locations, *cis*-1,2-DCE is present at concentrations greater than TCE. Some locations may contain *cis*-1,2-DCE without detectable TCE concentrations.
- TCE and *cis*-1,2-DCE made up approximately 75 percent of the contaminant mass being removed by NASA.
- Vinyl chloride is an indicator of enhanced TCE degradation and is prevalent in areas of VOC and petroleum hydrocarbon co-mingling. Vinyl chloride is often the only remaining VOC in areas of co-mingling.
- Petroleum hydrocarbons are also a common contaminant in NASA's GWTS area. Although not directly addressed in this report, reference is made to their distribution where appropriate.

Analytical data for 2009 is summarized in Appendix E. Concentration-versus-Time graphs for selected wells are presented in Appendix F. Copies of the chains-of-custody, laboratory analytical reports, quality assurance/quality control measures, and validation results are presented in Appendix G.

	Permit No.: 99W00155	Site Id: NASA-4A	Purpose: Extraction Well, Shallow
	Permit Date: 03/02/99	Location: Gate G/West Parallel	
	Consulting Firm: SAIC	X Coordinate: 1548219.60	Y Coordinate: 339984.40
	Logged By: BR/SAIC	Total Depth: 26.50'	Completed Depth: 26.50'
	Certified By: GMT/SAIC	Conductor Casing: type: dia: 0.00in fm: 0.00' to: 0.00'	
Date(s): 04/15/99 - 04/16/99	Measuring Point: 1.40'	Blank Casing: type: Stainless dia: 6.00in fm: 0.8' to: 10.00'	
Contractor: Gregg Drilling	Datum: Mean Sea Level		
Borehole Dia.: 14.00in	Static Water Level:	Screens: type: Slotted size: 0.010in dia: 6.00in fm: 10.00' to: 25.00'	
Drilling Method: Hollow Stem Auger		Annular Fill: type: Grout fm: 0.00' to: 7.00'; type: Betonite fm: 7.00' to: 9.00'; type: #2/12 Sand fm: 9.00' to: 26.50'; type: fm: to:	
Remarks: 11M23A			



Elevation (ft)	Recovery	Sample No.	Blow Count	Depth (ft)	USCS Code	Material Description
						roots extend to 2 feet bgs.
					CL	SILTY CLAY: very dark gray (7.5YR 3/0); 5% rounded to subrounded gravel to 1/2"; roots; low plasticity.
0						gravel increases downward to 10% at 4 feet bgs.
				5	CL/CH	SILTY CLAY: very dark gray; 5% coarse-grained sand; <5% subrounded gravel to 1/4"; roothole; firm to stiff; medium plasticity.
					MH	CLAYEY SILT: very dark gray mottled light brown (7.5YR 6/4); 5% rounded gravel to 1/4"; <5% coarse-grained sand; high plasticity.
				10	CL/CH	SILTY CLAY: light gray (5Y 6/1) mottled light brown; 5-10% angular gravel to 1/4"; <5% coarse-grained sand; medium plasticity.
					CH	SILTY CLAY: light olive brown (2.5Y 5/3); 5% subangular gravel to 1/4"; iron staining; firm to very firm; high plasticity; very moist.
					GW	SANDY GRAVEL: 25-30% poorly graded, coarse-grained sand; well graded, subrounded to subangular gravel to 1-1/4"; 5-10% fines; dense; wet.
-10					CH	SANDY CLAY: black (10YR 2/1); 20% poorly graded, coarse-grained sand; 5-10% subrounded gravel to 3/4"; high plasticity; wet.
				15	MH	SILT: olive; 5% very fine-grained sand; high plasticity; stiff; very moist. sand increases downward.
					ML	SANDY SILT: olive; 20-25% very fine-grained sand; 5% coarse-grained sand; stiff; low plasticity; wet.
					ML/MH	CLAYEY SILT: olive; 10% fine-grained sand; stiff; medium plasticity; wet.
				20	SW	SAND with Gravel: 39% subrounded gravel to 5/8"; 9% coarse-grained sand; 33% medium-grained sand; 17% fine-grained sand; 2% fines.
					CH	SILTY CLAY: light olive brown; high plasticity; lense approx. 3-6" thick.
					GP	GRAVEL with SAND: 58% subrounded gravel to 5/8"; 6% coarse-grained sand; 31% medium-grained sand; 4% fine-grained sand; 1% fines.
					SW	SAND with GRAVEL: 43% subangular to subrounded gravel to 1"; 9% coarse-grained sand; 33% medium-grained sand; 12% fine-grained sand; 3% fines.
					CH	SILTY CLAY: light olive brown; high plasticity; lense approx. 3-6" thick.
-20					SP	SAND with GRAVEL: 38% subrounded gravel; 7% coarse-grained sand; 43% medium-grained sand; 10% fine-grained sand; 2% fines.
				25	CH	SILTY CLAY: light olive brown; <5% fine-grained sand; high plasticity.

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Figure 26
NASA-4A Well Construction Detail and Lithologic Log

2.4.1.1. Evaluation of TCE

This section describes TCE plume boundaries in the A1 aquifer. It also summarizes the range of TCE concentrations. Figure 27 provides concentration contours for TCE, including the highest and lowest concentrations of TCE recorded for each well during 2009. The mapped extent of TCE in groundwater is based on the 5 µg/L maximum contaminant level (MCL) for TCE.

TCE Boundaries

The TCE component of the regional plume in the A1 aquifer extends down-gradient (north) from south of US Highway 101, past monitoring well 11E02A (near northwest corner of airfield), with an axis that generally trends south to north (Figure 27). The northern leading edge is delineated by low concentrations in well 11E02A. The western margin of TCE in the A1 aquifer is delineated by low concentrations in wells 14E14A and 14D13A and non-detectable concentrations in well 11N27A, 10J05A, and 11M02A. The eastern margin of TCE in groundwater is less well defined due to co-mingling with local petroleum hydrocarbons sources. Although TCE is not detected in wells 14C33A, 14C40A, and 14C60A (fuel-impacted areas), historic data from wells WNB-06A1 and WNB-08A1 (runway area) indicates that the eastern TCE boundary extends well onto the runway area.

The “depression” in the eastern margin of the TCE boundary (N211 Aircraft Ramp area) is most likely the result of enhanced degradation of TCE as it co-mingles with petroleum hydrocarbons from Navy Site 9 and NASA AOIs 1 and 3. The absence of TCE, combined with the presence of petroleum hydrocarbons and TCE degradation products *cis*-1,2-DCE and vinyl chloride (discussed in Sections 2.4.1.2 and 2.4.1.3, respectively), indicates that the Regional VOC plume is present in this area, but is masked by the enhanced degradation of TCE. The eastern margin of the TCE plume in the N211 Aircraft Ramp area was delineated using data collected during NASA’s 2004 groundwater investigation in that area (PAI, 2004a).

The overall shape and extent of the TCE concentration contours shown in Figure 27 has not changed significantly since 2004 and is nearly identical to that mapped for 2008.

The highest concentration of TCE in the NASA GWTS area was reported at a concentration of 65 µg/L in well 14D24A. This well is located within ten feet of extraction well NASA-1A.

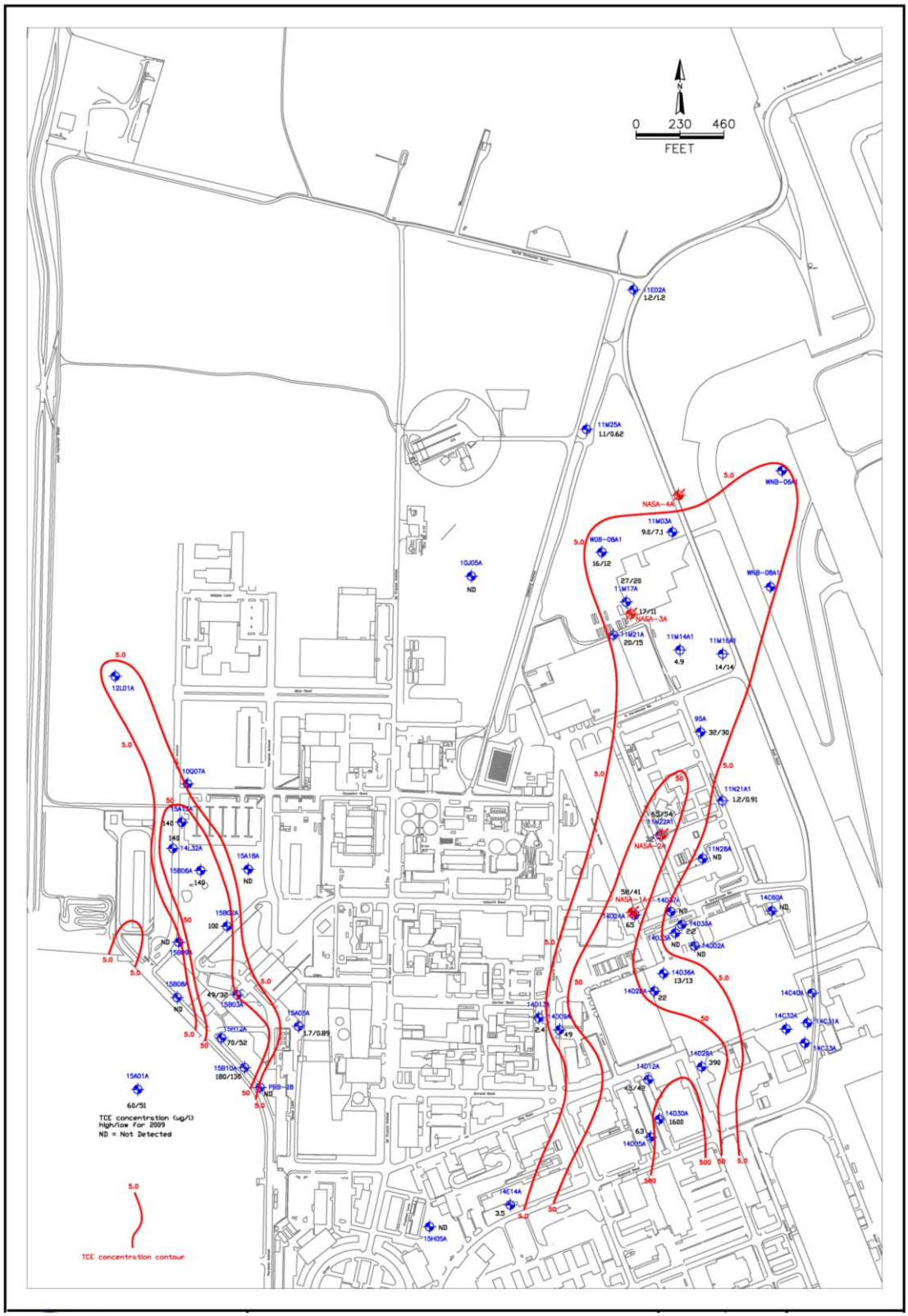

Figure 27
TCE Concentration Contours, A1 Aquifer

TCE Trends

The following section presents an evaluation of historical TCE data. Analysis and interpretation of the TCE data are based on a visual inspection of the historical concentration graphs. If available, data gathered prior to the baseline years are presented and evaluated. Trend discussion is based on the statistical evaluation of data using best-fit linear trend analysis. The locations of wells graphed are included in Figure 4 and in a larger copy as Plate 1. The concentration-versus-time graphs are presented in Appendix F.

Twelve monitoring wells in the vicinity of NASA's extraction wells provided TCE concentration data going back to 1994 and were selected as representative of chemical concentrations in the A1-aquifer. The wells are 11E02A, 11M03A, 11M14A1, 11M16A1, 11M17A, 11M21A, 11N21A1, 11N22A1, 14D24A, 14D26A1, 14D28A, and W08-08A1. Evaluation of concentration data going back to 1994 indicates that prior to the initiation of groundwater extraction (September 2001), TCE concentrations were declining in five of the 12 selected wells (see Table 7). TCE concentrations in five of the wells remained relatively constant. Two of the 12 selected wells, 11M14A1 and 14D28A, exhibited long-term increasing TCE concentrations.

With the installation of NASA's four groundwater extraction, additional monitoring wells were installed to assist with the evaluation of the remedial system. In addition to the 12 monitoring wells discussed above, TCE data for more recently installed wells 11M24A, 11M25A, and 14D36A, was used to evaluate TCE concentration trends since the initiation of pumping at NASA's four extraction wells in September 2001.

- Increasing TCE concentrations continued in wells 11M14A1, 11M17A, 11M25A, and 14D24A.

- Decreasing TCE concentrations continued in wells 11M03A, 11M21A, and 14D26A1.

- Wells 11M16A1, 11M24A, 11N21A1, 14D28A, 14D36A, and W08-08A1 continue to show relatively stable concentrations since the initiation of pumping.

- Previously increasing TCE concentrations in well11E02A appear to be stabilizing.

- Previously stable TCE concentrations in well 11N22A1 appear to have begun downward, decreasing trends.

There does not, however, appear to be any correlation between well location and observed concentration trends in the well. The wells with increasing trends can both be found adjacent to NASA's extraction wells and at the margins of the plume.

Table 7
TCE Concentration Trends at Selected Wells

Well	TCE trend prior to NASA groundwater extraction	TCE trend since NASA groundwater extraction
11E02A	=	=
11M03A	⇩	⇩
11M14A1	⇧	⇧
11M16A1	=	=
11M17A	⇩	⇧
11M21A	=	⇩
11M24A	NA	=
11M25A	NA	⇧
11N21A1	=	=
11N22A1	⇩	⇩
14D24A	⇩	⇧
14D26A1	=	⇩
14D28A	⇧	=
14D36A	NA	=
W08-08A1	⇩	=
NASA-1A	NA	⇩
NASA-2A	NA	⇧
NASA-3A	NA	⇩
NASA-4A	NA	⇧

⇩ Decreasing TCE concentration trend

⇧ Increasing TCE concentration trend

= Stable TCE concentration trend

NA = not applicable (data not available)

Concentrations of TCE have been declining at extraction wells NASA-1A (Figure 28) and NASA -3A (Figure 29).

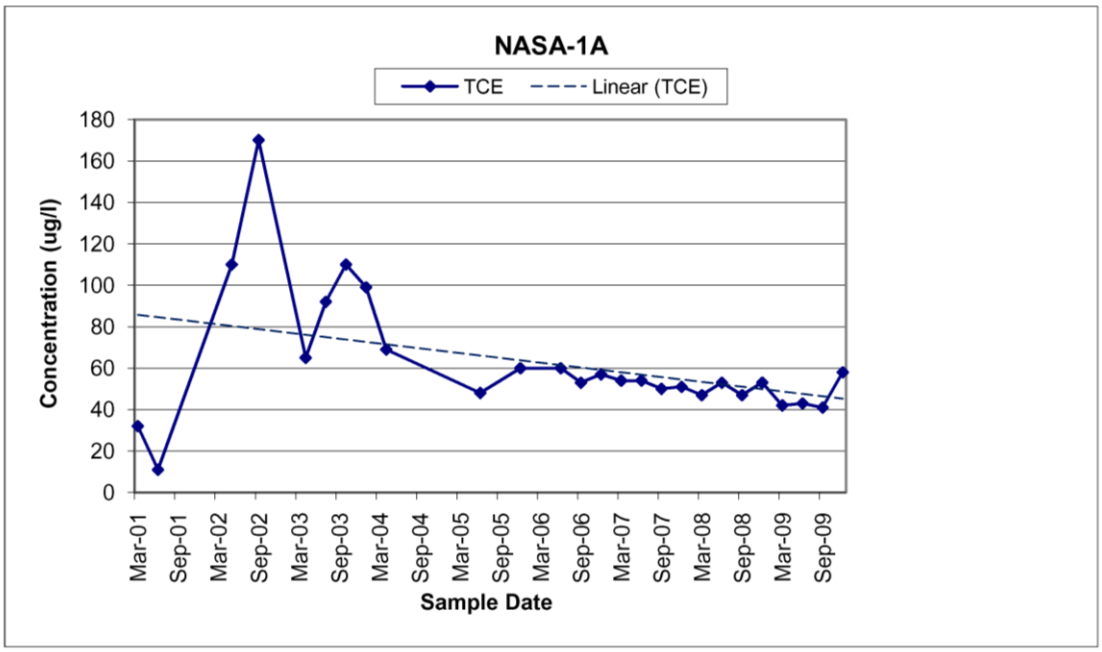

Figure 28
TCE Concentration-versus-Time Graph, Extraction Well NASA-3A

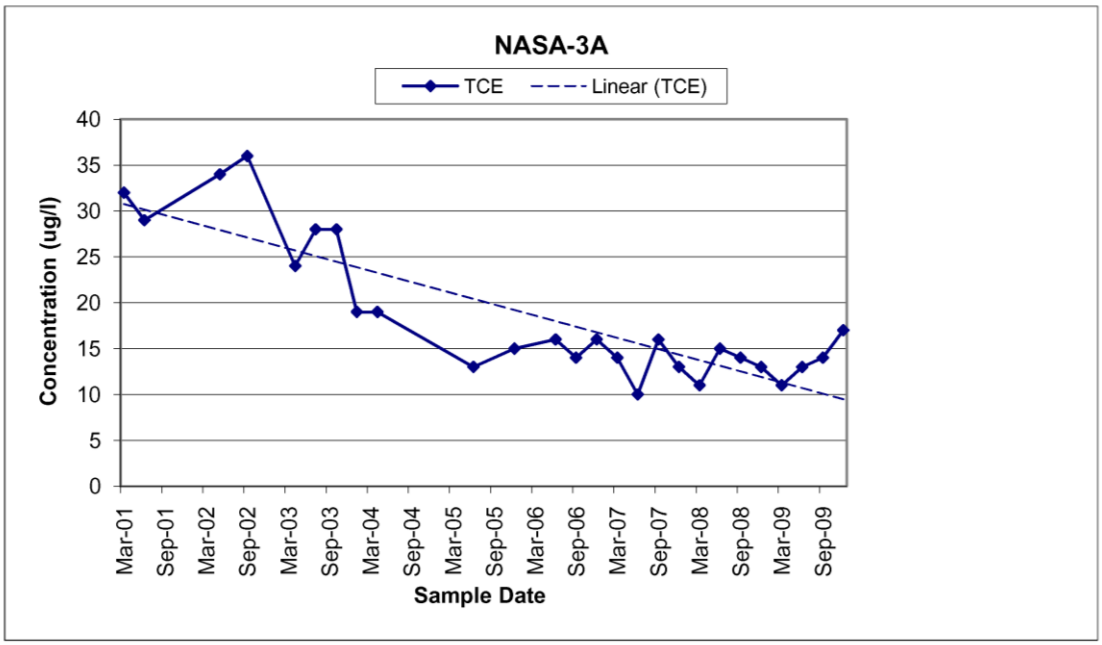

Figure 29
TCE Concentration-versus-Time Graph, Extraction Well NASA-1A

At extraction well NASA-4A, TCE concentrations are increasing, but remain below the cleanup level (Figure 30).

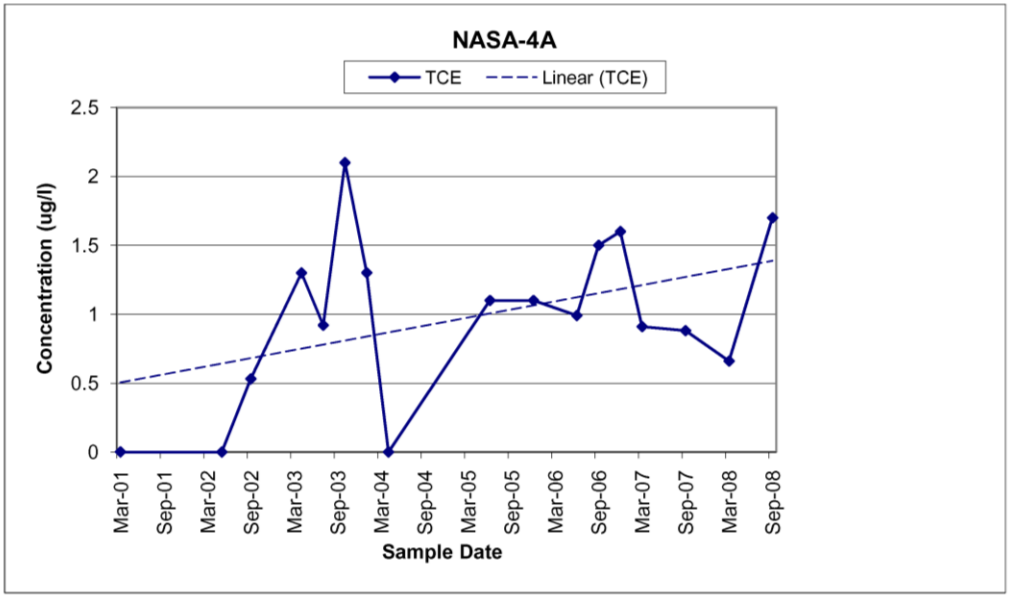

Figure 30
TCE Concentration-versus-Time Graph, Extraction Well NASA-4A

At extraction well NASA-2A, the TCE concentration appears to have began an increasing trend (Figures 31).

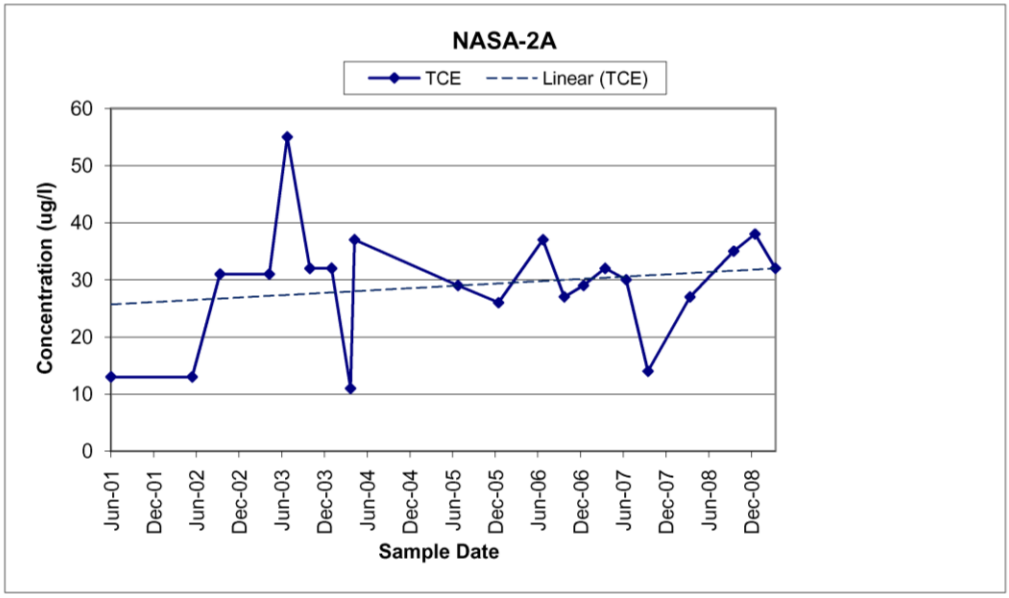

Figure 31
TCE Concentration-versus-Time Graph, Extraction Well NASA-2A

2.4.1.2. Evaluation of *cis*-1,2-DCE

This section describes *cis*-1,2-DCE plume boundaries in the A1 aquifer. It also summarizes the range of *cis*-1,2-DCE concentrations. Figure 32 provides concentration contours for *cis*-1,2-DCE, including the highest and lowest concentrations of *cis*-1,2-DCE recorded for each well during 2009. The mapped extent of *cis*-1,2-DCE in groundwater is based on the 6 µg/L MCL for *cis*-1,2-DCE.

Cis-1,2-DCE Boundaries

The *cis*-1,2-DCE component of the Regional Plume in the A1 aquifer extends down-gradient (north) from south of US Highway 101. The northern leading edge is delineated by trace concentrations in well 11E02A (Figure 32). The western margin of the *cis*-1,2-DCE boundary is delineated by low concentrations in wells 14E14A, 14D13A and 11M17A, and W08-08A1 and non-detectable concentrations in wells 15H05A and 11N27A. As previously discussed for TCE, the eastern *cis*-1,2-DCE margin is less well defined due to co-mingling with local petroleum hydrocarbons sources. C*is*-1,2-DCE was detected in wells 14C60A and 95A at concentrations of 7.3 µg/L and 8.6 µg/L, respectively. Historic data from wells 93A, WNB-06A1, and WNB-08A1 indicates that the eastern *cis*-1,2-DCE boundary has historically extended well onto the runway area.

The depression in the eastern *cis*-1,2-DCE margin (vicinity of AOI 3) is most likely the result of enhanced degradation of *cis*-1,2-DCE as it co-mingles with petroleum hydrocarbons from NASA AOIs 1 and 3. The absence of *cis*-1,2-DCE, combined with the presence of petroleum hydrocarbons and the *cis*-1,2-DCE degradation product vinyl chloride (see Section 2.4.1.3), suggests that the Regional Plume is present in this area, but is masked by the enhanced degradation of *cis*-1,2-DCE. The eastern margin of the *cis*-1,2-DCE plume in the N211 Aircraft Ramp area was delineated using data collected during NASA's 2004 groundwater investigation in that area (PAI, 2004a).

The overall shape and extent of the *cis*-1.2-DCE concentration contours shown in Figure 32 has not changed significantly since 2004. The only notable changes from the 2008 mapped plume boundary is the inclusion of well 14C60A in the 6 µg/L contour north of the N211 Aircraft Ramp and the inclusion of 14E14A in the 6 µg/L contour along the southwestern plume edge.

The highest concentration of *cis*-1,2-DCE in the NASA GWTS area was reported at a concentration of 80 µg/L in well 14D24A. This well is located within ten feet of extraction well NASA-1A.

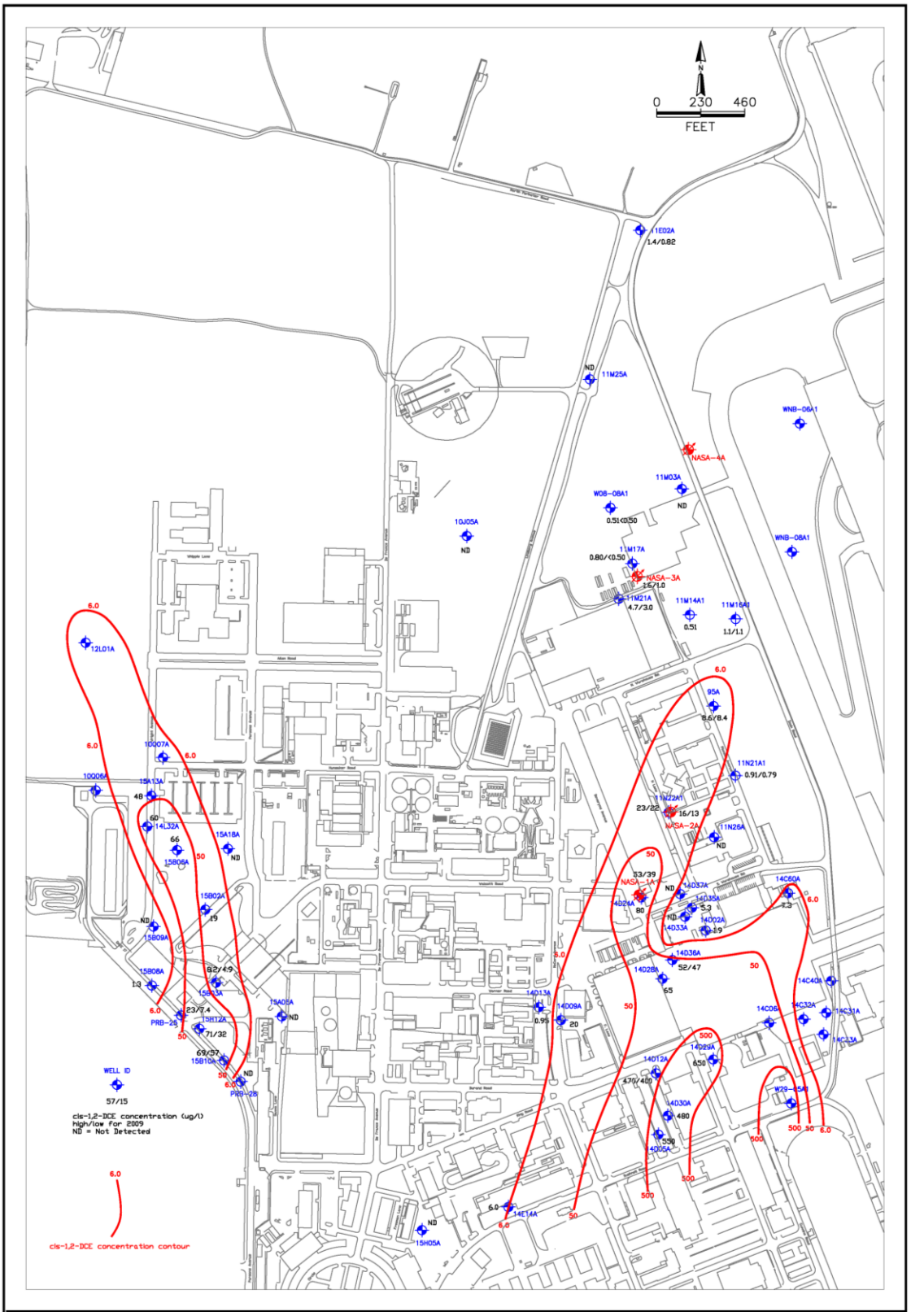

Figure 32
***Cis*-1,2-DCE Concentration Contours, A1 Aquifer**

Cis-1,2-DCE Trends

The following section presents an evaluation of historical *cis*-1,2-DCE data. Analysis and interpretation of the *cis*-1,2-DCE data are based on a visual inspection of the historical concentration graphs. If available, data gathered prior to the baseline years are presented and evaluated. Trend discussion is based on the statistical evaluation of data using best-fit linear trend analysis. The locations of wells graphed are included in Figure 4 and Plate 1. The concentration-versus-time graphs are presented in Appendix F.

Eleven monitoring wells in the vicinity of NASA's extraction wells provided *cis*-1,2-DCE concentration data going back to 1994 and were selected as representative of chemical concentrations in the A1-aquifer zone. The wells are 11E02A, 11M03A, 11M14A1, 11M16A1, 11M17A, 11M21A, 11N21A1, 11N22A1, 14D24A, 14D26A1, and 14D28A. Evaluation of concentration data going back to 1994 indicates that prior to the initiation of groundwater extraction (September 2001), *cis*-1,2-DCE concentrations were declining in three of the eleven selected wells (Table 8). Four of the eleven wells indicated increasing *cis*-1,2-DCE concentrations. *Cis*-1,2-DCE concentrations in four of the wells remained relatively constant.

With the installation of NASA's four groundwater extraction, additional monitoring wells were installed to assist with the evaluation of the remedial system. In addition to the ten monitoring wells discussed above, *cis*-1,2-DCE data for more recently installed wells 14C60A and 14D36A was used to evaluate *cis*-1,2-DCE concentration trends since the initiation of pumping at NASA's four extraction wells in September 2001.

- Increasing *cis*-1,2-DCE concentrations continued in wells 11M14A1 and 14D24A.

- Decreasing *cis*-1,2-DCE concentrations continued in wells 11E02A, 11M21A, 11N21A1, 11N22A1, 14D26A1, 14D28A, and 14D36A.

- Four wells (11M03A, 11M16A1, 11M17A, and 14C60A) show relatively stable concentrations since the initiation of pumping.

There does not appear to be any correlation between well location and observed concentration trends in the well. The wells with increasing trends can both be found adjacent to NASA's extraction wells and at the margins of the plume. .

Table 8
***Cis*-1,2-DCE Concentration Trends at Selected Wells**

Well	*Cis*-1,2-DCE trend prior to NASA groundwater extraction	*Cis*-1,2-DCE trend since NASA groundwater extraction
11E02A	⇩	⇩
11M03A	⇩	=
11M14A1	=	⇧
11M16A1	=	=
11M17A	=	=
11M21A	⇩	⇩
11N21A1	⇧	⇩
11N22A1	⇧	⇩
14C60A	NA	=
14D24A	⇧	⇧
14D26A1	=	⇩
14D28A	⇧	⇩
14D36A	NA	⇩
NASA-1A	NA	⇩
NASA-2A	NA	⇩
NASA-3A	NA	⇩
NASA-4A	NA	=

⇩ Decreasing *cis*-1,2-DCE concentration Trend

⇧ Increasing *cis*-1,2-DCE concentration trend

= Stable *cis*-1,2-DCE concentration trend

NA = not applicable (data not available)

Concentrations of *cis*-1,2-DCE have been declining in extraction wells NASA-1A (Figure 33), NASA-2A (Figure 34) and NASA-3A (Figure 35). At well NASA-4A (Figure 36), it appears that the *cis*-1,2-DCE concentration has become fairly stable.

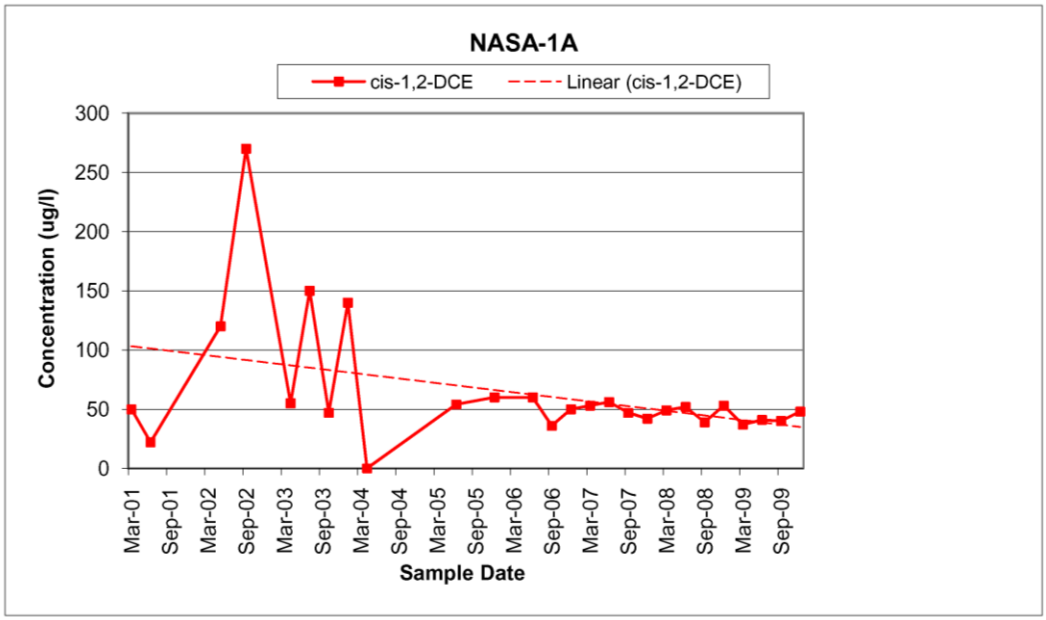

Figure 33
***Cis*-1,2-DCE Concentration-versus-Time Graph, Extraction Well NASA-1A**

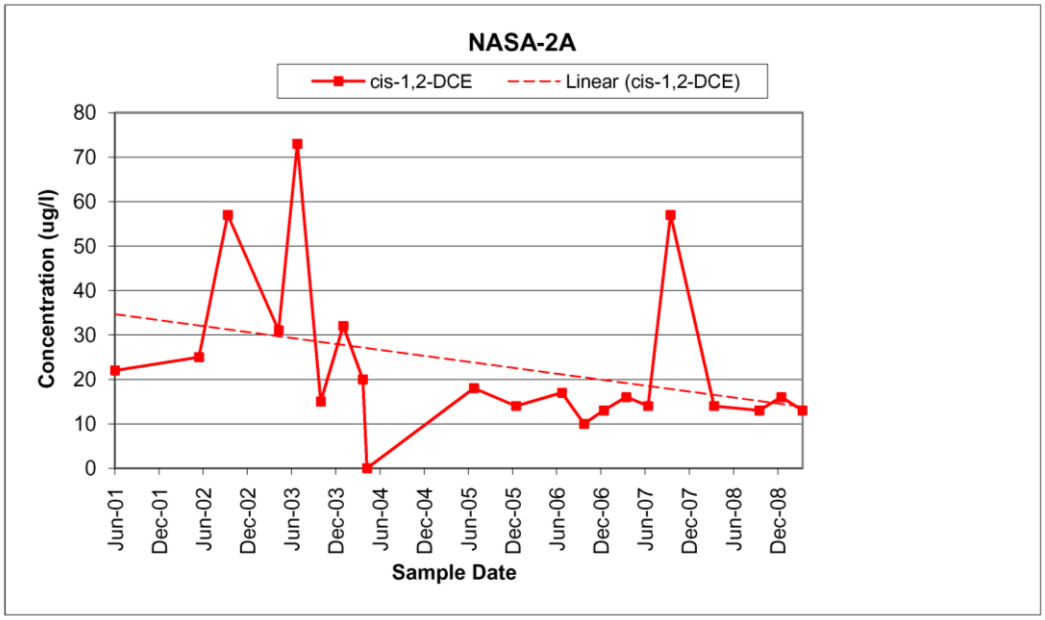

Figure 34
***Cis*-1,2-DCE Concentration-versus-Time Graph, Extraction Well NASA-2A**

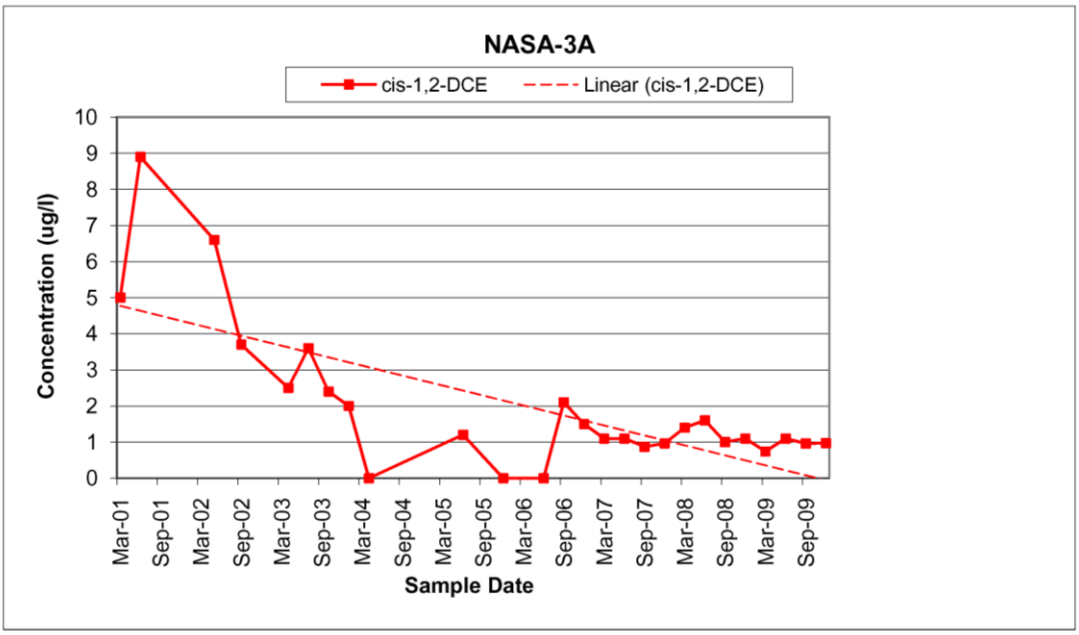

Figure 35
***Cis*-1,2-DCE Concentration-versus-Time Graph, Extraction Well NASA-3A**

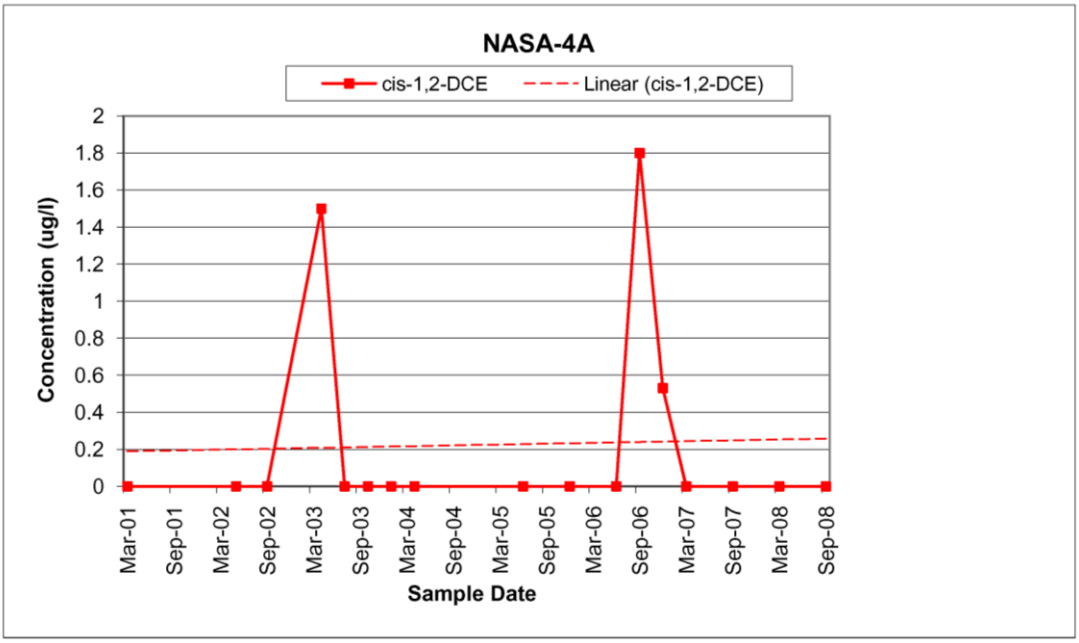

Figure 36
***Cis*-1,2-DCE Concentration-versus-Time Graph, Extraction Well NASA-4A**

2.4.1.3. Evaluation of Vinyl Chloride

This section describes vinyl chloride plume boundaries in the A1 aquifer. It also summarizes the range of vinyl chloride concentrations. Figure 37 provides concentration contours for vinyl chloride, including the highest and lowest concentrations of vinyl chloride recorded for each well during 2009.

Vinyl Chloride Boundaries

The vinyl chloride component in the regional VOC plume in the A1 aquifer extends down-gradient (north) from south of US Highway 101, extending north to well 11N22A1A, with an axis that generally trends south to north (Figure 37). The northern margin is delineated by non-detectable concentrations at wells 11N21A1, 11N26A, and 95A. The western margin of vinyl chloride in groundwater is delineated by non-detectable concentrations at well 14D09A. The eastern margin is defined by low concentrations at well 14C32A and non-detectable concentrations in wells 14C31A, 14C33A, and 14C40A. The eastern margin of vinyl chloride in the N211 Aircraft Ramp area was delineated using data collected during NASA's 2004 groundwater investigation in that area (PAI, 2004a).

The overall shape and extent of the vinyl chloride concentration contours shown in Figure 37 has not changed significantly since 2004. The only notable changes from the plume boundaries mapped for 2007 is the inclusion of well 14C60A in the 0.50 µg/L contour north of the N211 Aircraft Ramp and the exclusion of well 95A from the 0.50 µg/L contour at the leading edge of the vinyl chloride plume.

The highest concentration of vinyl chloride in the NASA GWTS area was reported at a concentration of 3.6 µg/L in well 14C60A. This well is located in the northeast portion of the N211 Aircraft Ramp area.

Vinyl Chloride Trends

The following section presents an evaluation of historical vinyl chloride data. Analysis and interpretation of the vinyl chloride data are based on a visual inspection of the historical concentration graphs. If available, data gathered prior to the baseline years are presented and evaluated. Trend discussion is based on the statistical evaluation of data using best-fit linear trend analysis. The locations of wells graphed are included in Figure 4 and Plate 1. The concentration-versus-time graphs are presented in Appendix F.

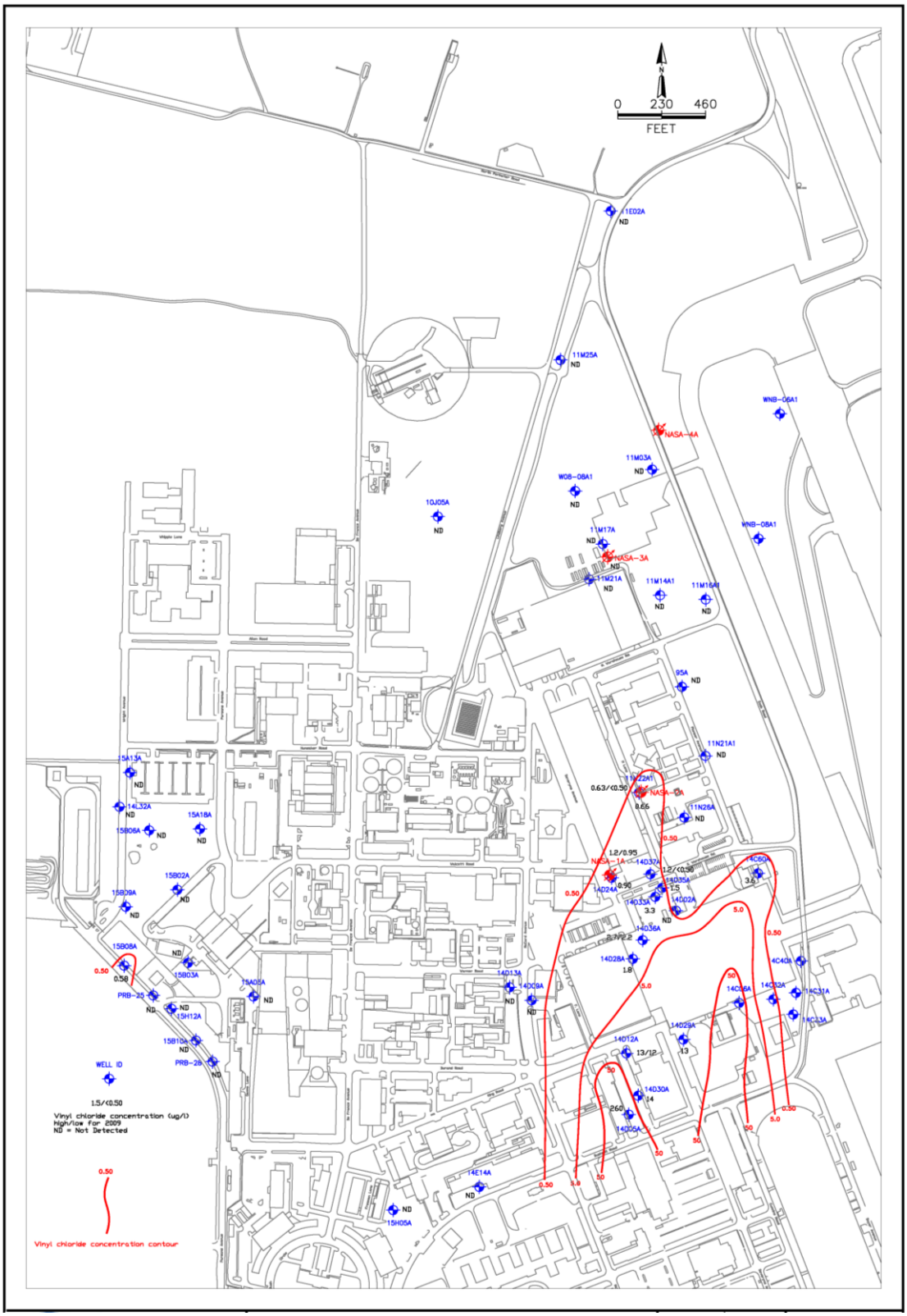

Figure 37
Vinyl Chloride Concentration Contours, A1 Aquifer

Four monitoring wells in the vicinity of NASA's extraction wells provided vinyl chloride concentration data going back to 1994 and were selected as representative of chemical concentrations in the A1 aquifer. The wells are 11N21A1, 14D24A, 14D26A1, and 14D28A. Evaluation of concentration data going back to 1994 indicates that prior to the initiation of groundwater extraction (September 2001), vinyl chloride concentrations were increasing in all four of the selected wells (Table 9).

With the installation of NASA's four groundwater extraction, additional monitoring wells were installed to assist with the evaluation of the remedial system. In addition to the four monitoring wells discussed above, vinyl chloride data for more recently installed wells 14C60A, 14D33A, 14D35A, and 14D36A, was used to evaluate vinyl chloride concentration trends since the initiation of pumping at NASA's four extraction wells in September 2001.

- Vinyl chloride concentrations continued to increase in well 14D36A.
- Decreasing trends continued in wells 11N21A1, 14C60A, 14D26A1, 14D28A, and 14D35A.
- Concentrations of vinyl chloride in wells 14D24A and 14D33A have remained relatively stable.

Table 9
Vinyl Chloride Concentration Trends at Selected Wells

Well	Vinyl chloride trend prior to NASA groundwater extraction	Vinyl chloride trend since NASA groundwater extraction
11N21A1	⇧	⇩
14C60A	NA	⇩
14D24A	⇧	=
14D26A1	⇧	⇩
14D28A	⇧	⇩
14D33A	NA	=
14D35A	NA	⇩
14D36A	NA	⇧
NASA-1A	NA	⇩
NASA-2A	NA	⇩

⇩ Decreasing vinyl chloride concentration trend

⇧ Increasing vinyl chloride concentration trend

= Stable vinyl chloride concentration trend

NA = not applicable (data not available)

Two NASA extraction wells contain vinyl chloride (NASA-1A and NASA-2A). Concentrations of vinyl chloride continue to decrease in NASA-1A (Figure 38) and are NASA-2A (Figure 39).

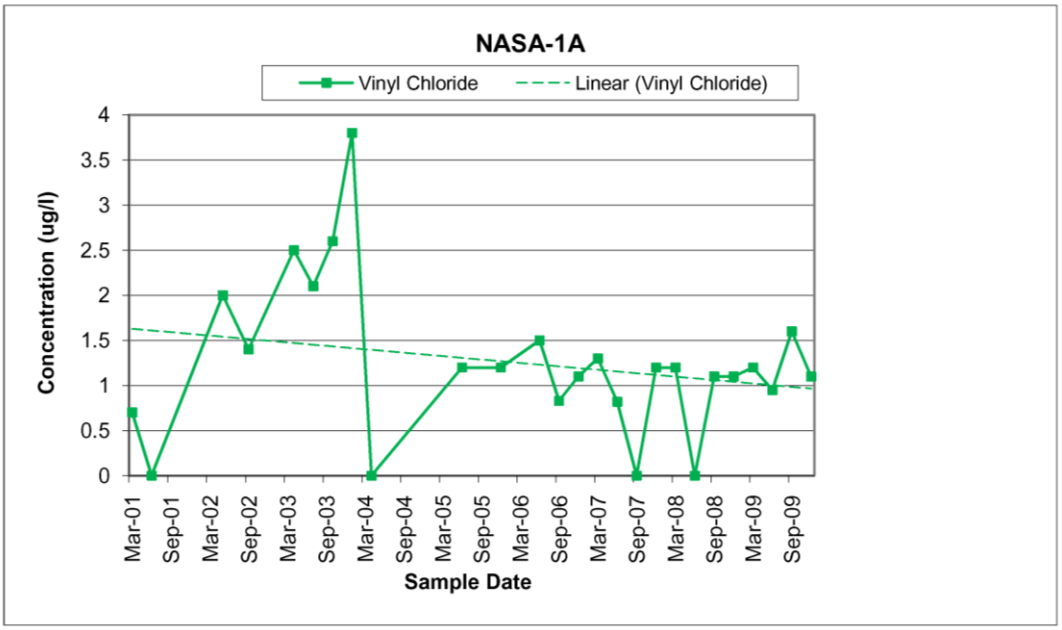

Figure 38
Vinyl Chloride Concentration-versus-Time Graph, Extraction Well NASA-1A

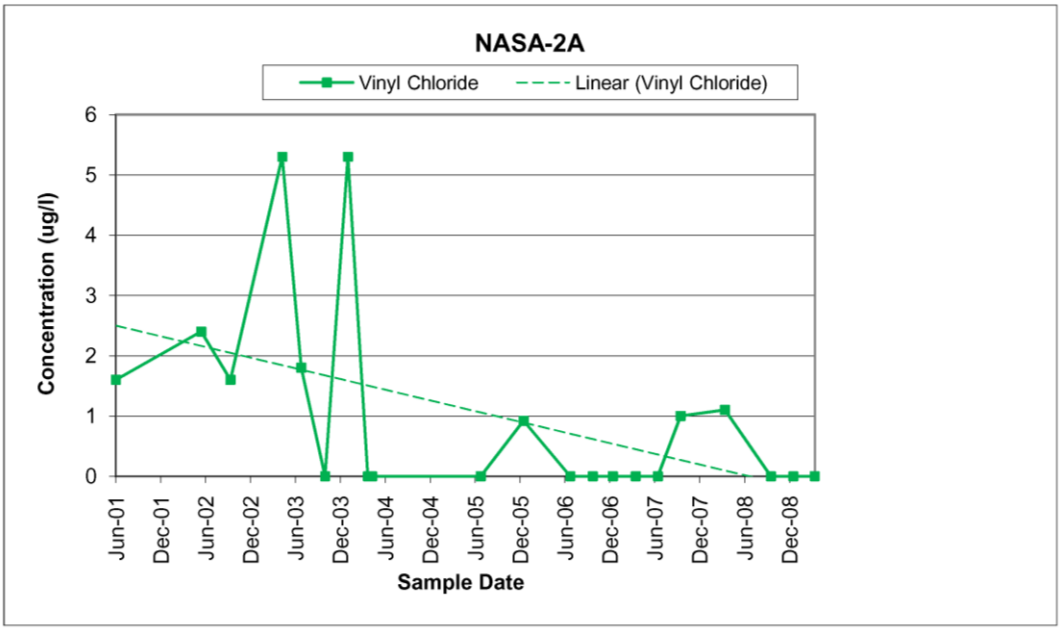

Figure 39
Vinyl Chloride Concentration-versus-Time Graph, Extraction Well NASA-2A

3.0 OPERATIONS AND MAINTENANCE PROBLEMS

Other than the system shutdowns as presented in Section 2.2.3, no significant treatment system problems or exceedances were encountered during the 2009 calendar year.

4.0 TECHNICAL ASSESSMENT

4.1. Remedy Functionality

The NASA GWTS functioned as designed in capturing groundwater contamination from the suspected source up-gradient of extraction well NASA-1A and the former VTOL Pad/Navy Site 8 North documented source area up-gradient of NASA-3A. The NASA GWTS was not designed, however, to capture the Regional Plume.

Due to low hydraulic capacity of the A1 aquifer at the NASA-2A and NASA-4A extraction well locations, capture of the distal portion of the Regional Plume is limited at these well locations. Based on groundwater VOC concentrations below cleanup levels at NASA-4A, pumping at this well was suspended on April 28, 2009. Due to low hydraulic capacity of the A1 aquifer at NASA-2A and the resultant poor performance of this well, pumping was also suspended on April 28, 2009.

Concentrations trends of TCE, *cis*-1,2-DCE, and vinyl chloride present in Section 2.4.1 are predominantly decreasing for the 2009 calendar year. TCE concentrations appear to be evenly distributed between uptrending and downtrending concentration trends (six wells with increasing trends, six wells with decreasing trends, seven wells with stabilizing concentrations). Concentration trends of *cis*-1,2-DCE appear to be trending downward in the majority of wells (ten wells with decreasing trends, two wells with increasing trends, five wells with stabilizing concentrations). Vinyl chloride concentration trends are also trending downward in the majority of wells (seven wells with decreasing trends, one well with increasing trend, two wells with stabilizing concentrations). Overall, more wells are exhibiting decreasing concentrations in 2009 compared to 2008.

The NASA GWTS was based on the installation of four extraction wells to remediate two specific areas discussed in the 1995 EKI report. Below is a discussion of the effectiveness of the remedy at each of the two specific areas.

4.1.1. Suspected Source Area, Area of Investigation 9

NASA-1A

The location of NASA-1A was selected to control a suspected source area (Figure 11) of relatively high TCE groundwater concentrations in the area between buildings N259 and N240.

The estimated capture zone for NASA-1A, as interpreted by flow-net analysis, is shown in Figures 15 and 18. From the March and November water level data, the estimated capture zone of NASA-1A is similar in extent to the capture zone predicted in 1995 EKI report (Figure 40). However, the orientation of the estimated capture zone is also more north-south than the modeled capture zone, which was predicted to achieve a more northeast-southwest configuration.

A comparison to the predicted capture zone in the "*Revised Final Design, Regional Groundwater Remediation Program, North of US Highway 101"* (Smith, 1996) cannot be made because the location of NASA-1A was moved from the original location (southeast corner of Building N144) to the southwest corner.

Based on the flow-net analysis and channel geometry presented by EKI, it appears that NASA-1A is capturing the majority of groundwater flowing through the suspected source area. After an initial spike in COC concentrations during the first year of operation, concentrations appear to have stabilized and began a declining trend.

In NASA-1A, concentrations of TCE, *cis*-1,2-DCE and vinyl chloride show declining linear trends since pumping began. However, concentrations still persist above cleanup levels. Adjacent monitoring well 14D26A1 also shows declining TCE, *cis*-1,2-DCE and vinyl chloride concentrations. However, adjacent well 14D24A, which is screened in only the uppermost sand layer, shows increasing TCE and *cis*-1,2-DCE, with stabilizing vinyl chloride concentrations.

NASA-1A is currently operating at an extraction rate of 7.0 gpm. The proposed extraction rate was 8.0 gpm. It is uncertain if this well can sustain a rate of 8.0 gpm.

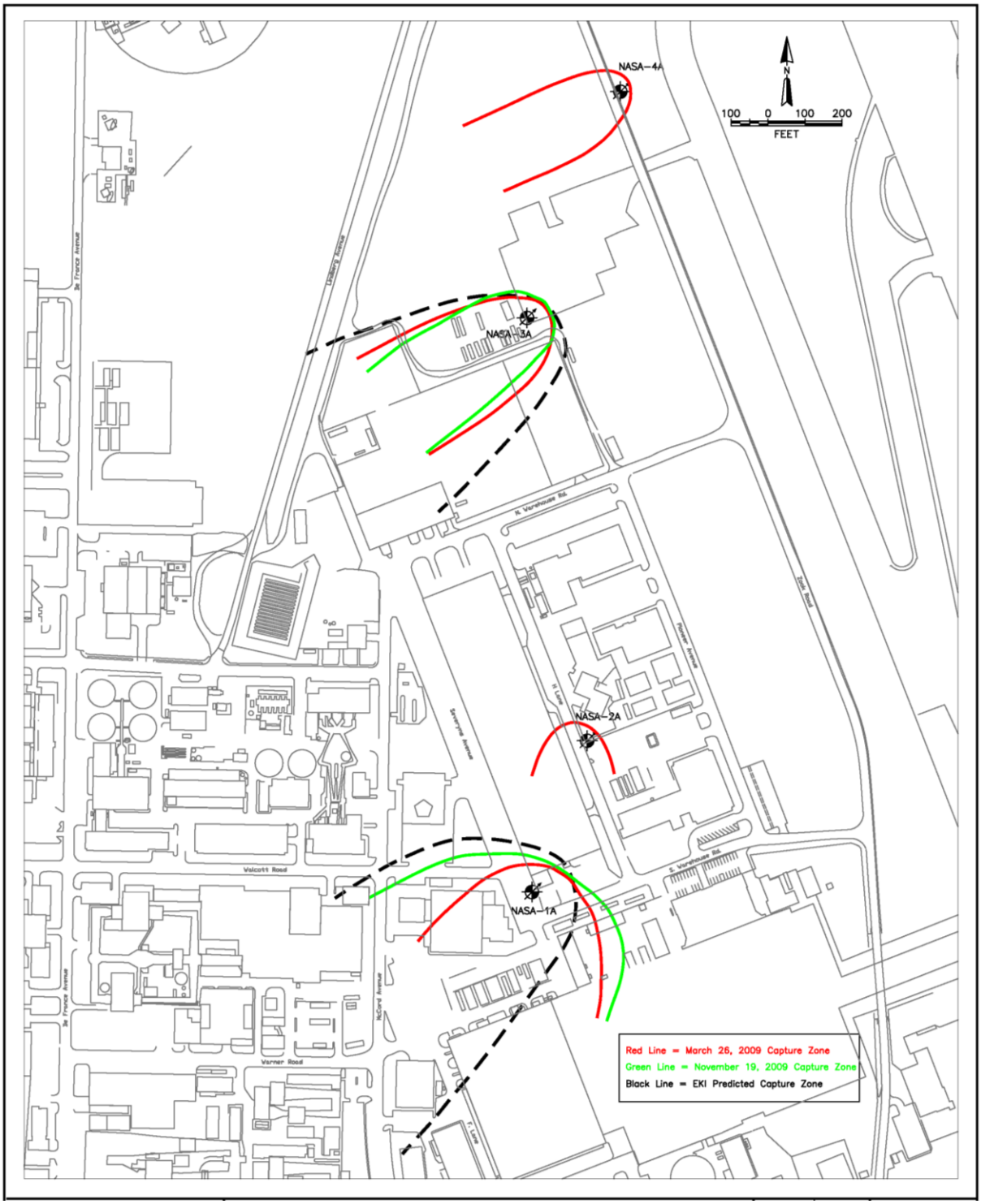

Figure 40
Comparison of Mapped Capture Zones versus Modeled Capture Zone

NASA-2A

NASA-2A was originally intended to be a “contingency” well, dependent on the performance of NASA-1A (EKI, 1995). However, NASA-2A was installed and operations began at the same time as the other NASA extraction wells.

Based on the geologic mapping in the EKI report, NASA-2A is located in the same channel as NASA-1A, approximately 400 feet down-gradient. Prior to installation, additional subsurface investigation was conducted at the proposed location of NASA-2A. Because of a lack of significant coarse-grained material at the original proposed location, the final well location was moved approximately 225 feet “up-channel” (up-gradient).

NASA-2A has historically shown poor performance. Before suspension of pumping on April 28, 2009, this well was cycling at 1.0 gpm (~20 minutes pumping, 60 minutes recovering), compared to the modeled 3 gpm expected extraction rate. Therefore, the capture zone for this well was much smaller than originally anticipated. The relatively poor performance of NASA-2A is most likely because of a combination of the following factors: 1) although sand deposits are abundant at the extraction well location (Figure 22), the majority of the sand is fine-grained; 2) there are numerous, relatively thin clay and silty clay layers present at the extraction well location, suggesting that the lateral continuity of the permeable sand may be limited (i.e., pinching sands, bifurcation, etc.); and 3) the extraction well may be located near the edge of a channel deposit resulting in limited recharge from non-channel deposits (silts and clays).

NASA-2A experienced a spike in COC concentrations after startup. Concentrations of TCE appear to be increasing, while the *cis*-1,2-DCE and vinyl chloride concentration trends are declining. Concentrations of TCE, *cis*-1,2-DCE, vinyl chloride persist above cleanup levels.

However, because this well is down-gradient and down-channel from NASA-1A, which appears to be capturing the majority of groundwater flowing through this “channelized” area, suspension of pumping at NASA-2A is not considered critical. However, NASA is concerned that concentrations of TCE at this location have not shown significant decreases. NASA will evaluate the possibility of relocating NASA-2A to a more productive location in the future.

4.1.2. VTOL Pad/Navy Site 8 North Source Area, Area of Investigation 7

NASA-3A

The location of NASA-3A was selected to control residual TCE contamination from the VTOL Pad/Navy Site 8 North area.

The estimated capture zone for NASA-3A, as interpreted by flow-net analysis on Figures 15 and 18 is somewhat smaller than the capture zone predicted in EKI 1995 report (Figure 40). It is, however, comparable to that predicted in the "*Revised Final Design*" (Smith, 1996). However, limited groundwater elevation data lateral to NASA-3A makes it difficult to accurately define the actual capture zone.

Figure 12 shows the location of NASA-3A and its estimated capture zone in relation to the former excavation boundary of the VTOL Pad/Site 8 North source removal action. NASA-3A is located approximately 110 feet down-gradient from the former spill area, and based on EKI mapping, within the same channel. Based on the proximity of NASA-3A to the spill area, the estimated capture zone, and the channelized flow through the area, it appears that NASA-3A is capturing the majority of contaminated groundwater flowing through this area.

NASA-3A is currently operating at an extraction rate of 7.0 gpm. The proposed extraction rate was 6 gpm. It is likely that this well could sustain pump rates of at least 10 gpm; however, the design installed pump is only capable of a 9.0 gpm maximum rate (60 Hz). Due to pump limitations, the pump will only run at this rate for several hours before it automatically shuts down.

At NASA-3A, concentrations of TCE and *cis*-1,2-DCE have been in steady decline since startup. TCE still persists above cleanup levels. Down-gradient monitoring well 1M03A shows similar trends. Additional COCs 1,1-DCE and 1,1-DCA concentrations are showing slight declining trends at NASA-3A, but remain present at concentrations above cleanup levels.

NASA-4A

NASA-4A was originally intended to be a "contingency" well, dependent on the performance of NASA-3A (EKI, 1995). However, NASA-4A was installed and operations began at the same time as the other NASA extraction wells.

Prior to installation, additional subsurface investigation was conducted at the proposed location of NASA-4A. Because of a lack of significant coarse-grained material, the final location was moved approximately 250 feet north (down-gradient) of the original proposed location.

The estimated capture zone for NASA-4A, as interpreted by flow-net analysis on Figures 15 and 18 is somewhat smaller than the capture zone predicted in the 1995 EKI report, and is much smaller than that predicted by Smith (1996). A direct comparison between the modeled capture zones and the mapped capture zones cannot be made because NASA-4A was not installed in the modeled location. However, because this well is down-gradient and likely down-channel from NASA-3A, which appears to be capturing the majority of groundwater flowing through the VTOL Pad/Navy Site 8 North source area, the suspension of pumping from NASA-4A does not appear critical. However, NASA will evaluate the possibility of relocating NASA-4A to a more productive location in the future.

Concentrations of TCE and *cis*-1, 2-DCE have been below cleanup levels since pumping began.

4.2. Are Capture Zones Adequate?

As previously discussed, the capture zones for NASA-1A and NASA-3A appear to be capturing the majority of groundwater flowing through the two NASA areas of concern. However, based on Figures 41 and 42, a large portion of the plume mass is bypassing the NASA GWTS extraction wells. These wells were not intended to address the larger Regional plume mass.

It appears that WATS and/or RGRP (MEW) extraction wells may not be capturing the western margin of the Regional VOC plume (EPA, 2004). Concentrations of TCE and *cis*-1,2-DCE have been increasing in well 14D09A (west of building N211) since the startup of the WATS and RGRP extraction system. In addition, PCE concentrations have been increasing in well 14D28A (east of N211). NASA extraction wells NASA-1A and NASA-2A were not located nor designed to address this contamination.

Similarly, it appears that *cis*-1,2-DCE and vinyl chloride, as well as up-gradient petroleum hydrocarbons, along the eastern margin of the Regional VOC plume may not be fully captured (EPA, 2004).

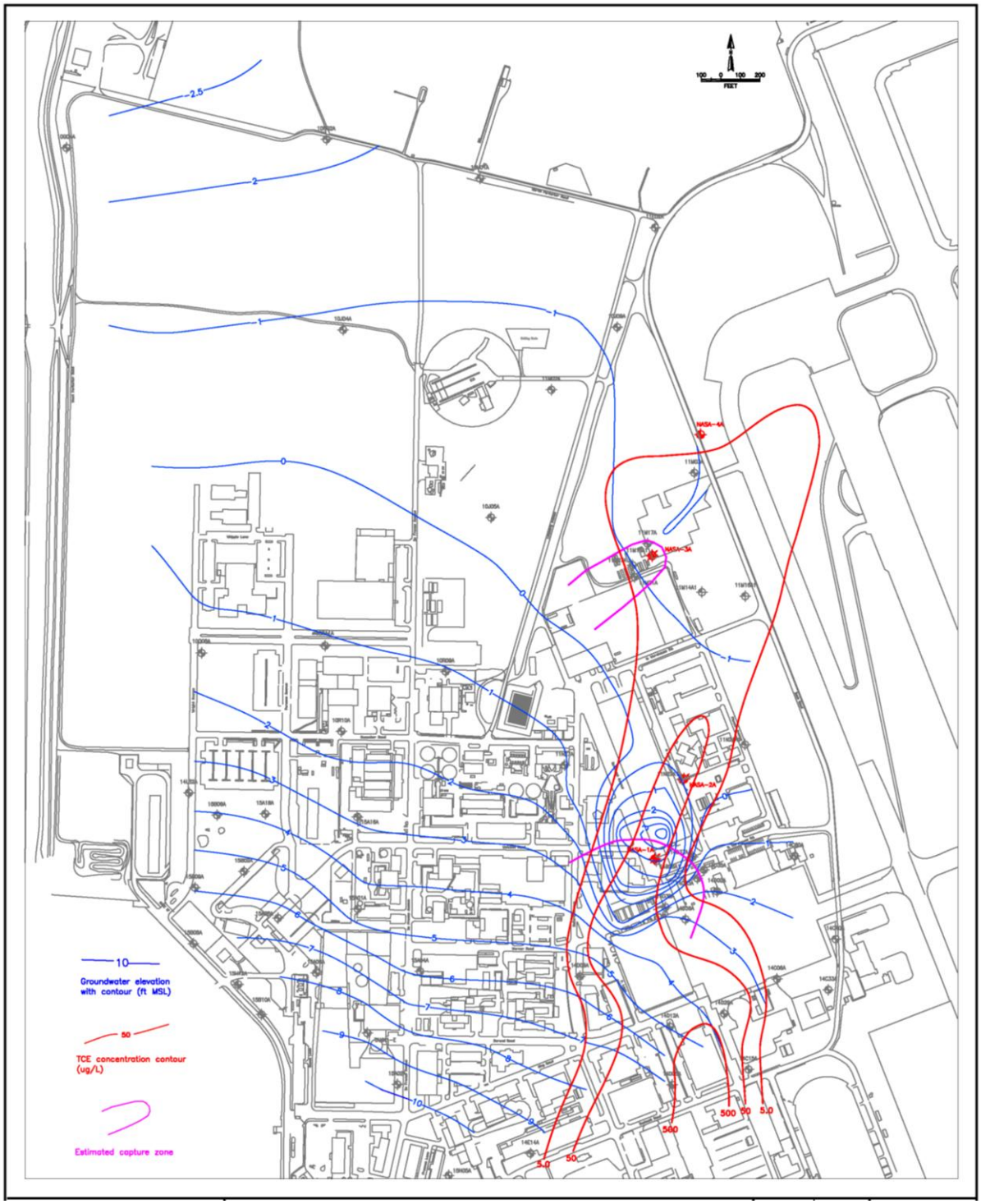

Figure 41
TCE Concentration Contours with Capture Zones

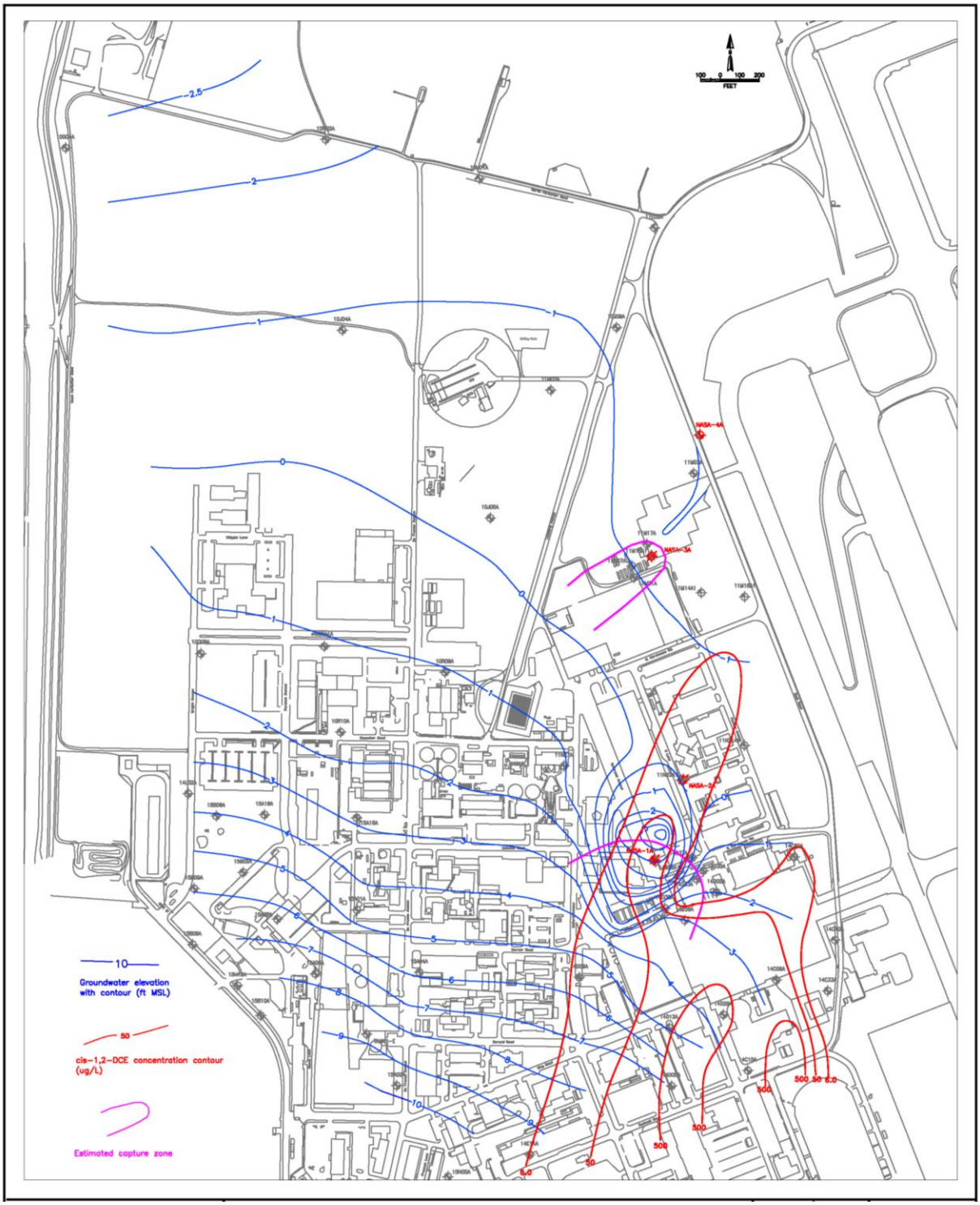

Figure 42
***Cis*-1,2-DCE Concentration Contours with Capture Zones**

4.3. Are Concentrations Decreasing Over Time?

NASA-1A

After an initial spike in concentrations after system start up, TCE and *cis*-1,2-DCE, concentrations in the vicinity of this well have been decreasing (Figure 43). However, the linear trend in concentrations has been relatively flat since mid-2005.

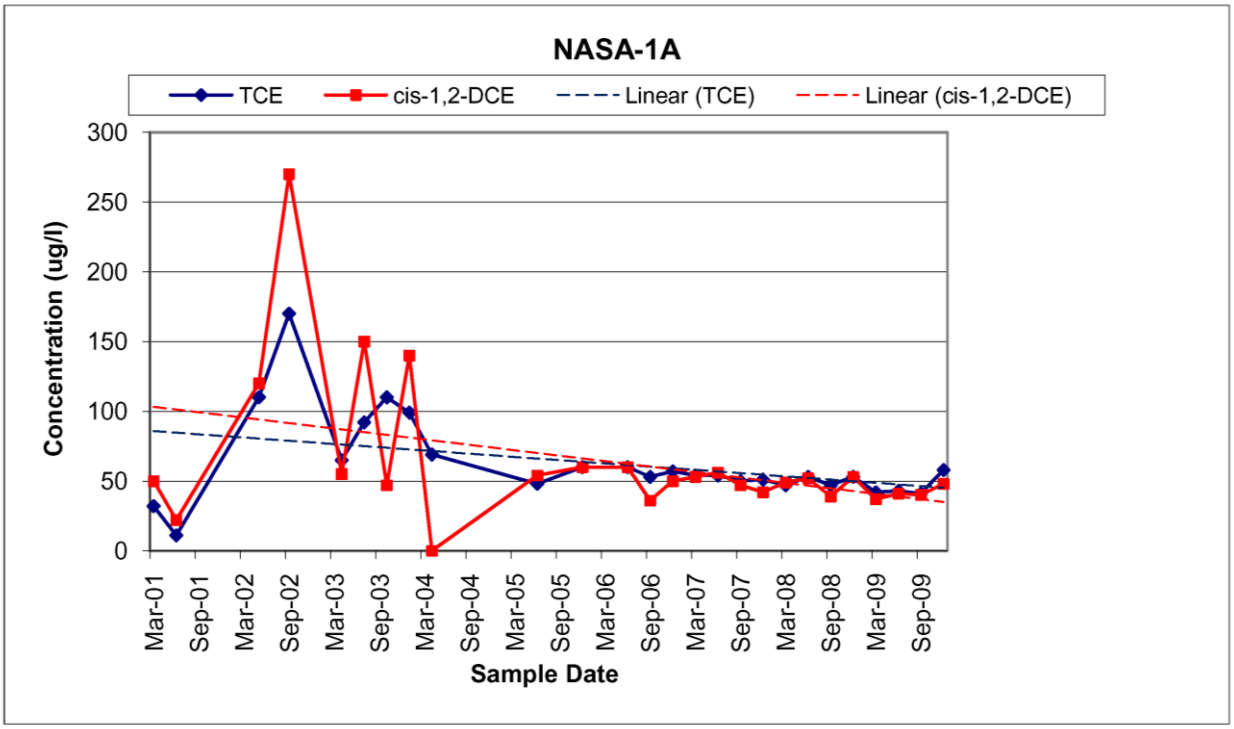

Figure 43
TCE and *cis*-1,2-DCE Concentration-versus-Time Graph
Extraction Well NASA-1A

NASA-2A

After an initial spike in concentrations after system start up, TCE and *cis*-1,2-DCE, concentrations in the vicinity of this well have stabilized. The long-term linear trend of TCE concentrations, as indicated in Figure 44, shows a slight increase. The long-term linear trend of *cis*-1,2-DCE concentrations shows a significant decline. Further monitoring is required to better define trend direction.

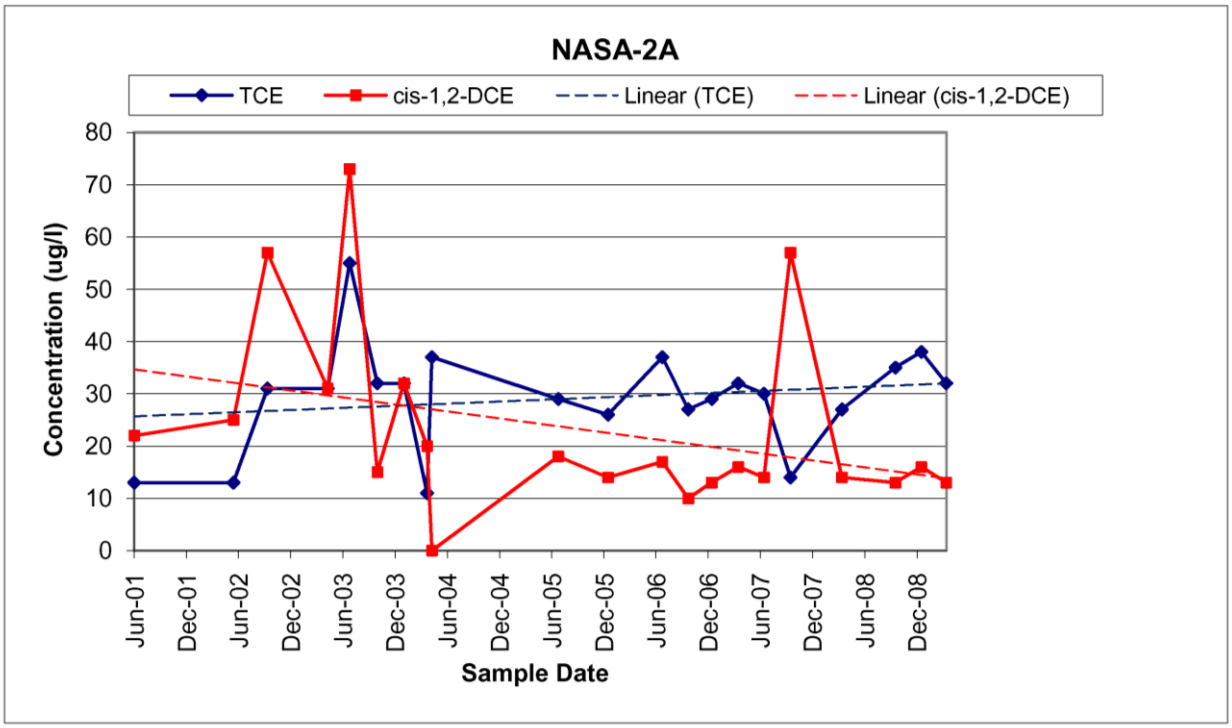

Figure 44
TCE and *cis*-1,2-DCE Concentration-versus-Time Graph
Extraction Well NASA-2A

NASA-3A

Since startup, there has been a significant overall declining trend in TCE and *cis*-1,2-DCE concentrations. Recent sampling events (2006-2009) indicate that the concentration trends may be stabilizing. The trends are illustrated in Figure 45.

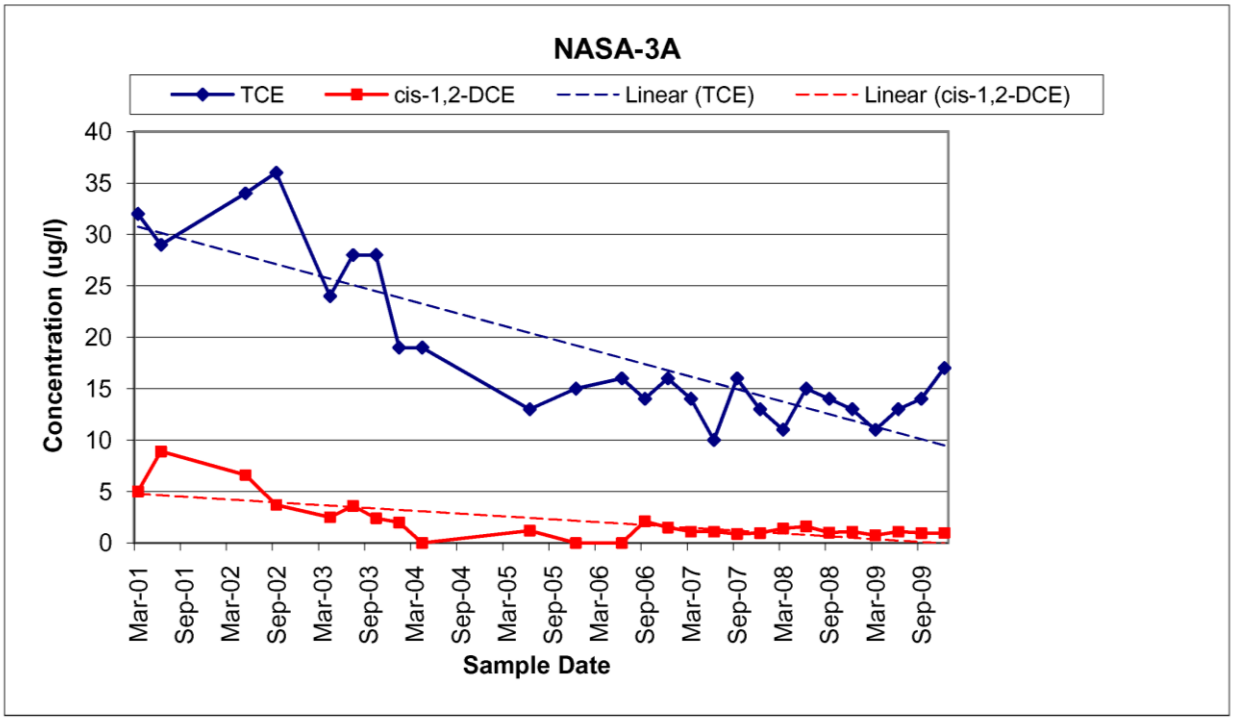

Figure 45
TCE and *cis*-1,2-DCE Concentration-versus-Time Graph
Extraction Well NASA-3A

NASA-4A

TCE and *cis*-1,2-DCE concentrations in the vicinity of this well have fluctuated over time (Figure 46). However, the concentrations of these constituents have been below cleanup levels and fluctuations around the detection limit can be expected.

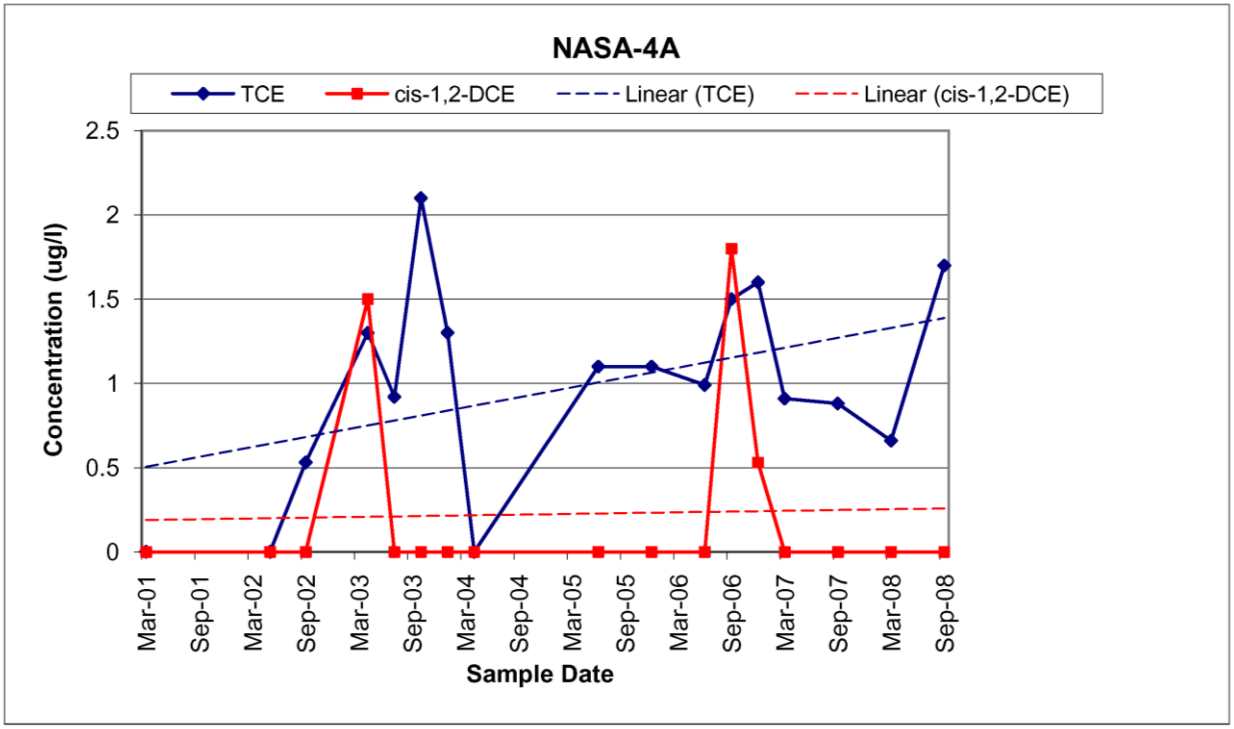

Figure 46
TCE and *cis*-1,2-DCE Concentration-versus-Time Graph
Extraction Well NASA-4A

Concentration Trends at NASA GWTS

The overall trend for total VOC concentrations (EPA 8260 analytes) measured from the influent at NASA's GWTS during monthly NPDES compliance shows a significant decrease since system startup in September, 2001 (Figure 47). A decline of 59 percent has occurred from the highest reported concentration of 197 µg/L (October 2001) to the most recent of 80.64 µg/L (December 2009).

TCE concentrations have declined 43 percent from the high 67 µg/L (October 2001) to the most recent of 38 µg/L (December 2009).

Cis-1,2-DCE concentrations have declined 71 percent from the high 95 µg/L (October 2001) to the most recent of 28 µg/L (December 2009).

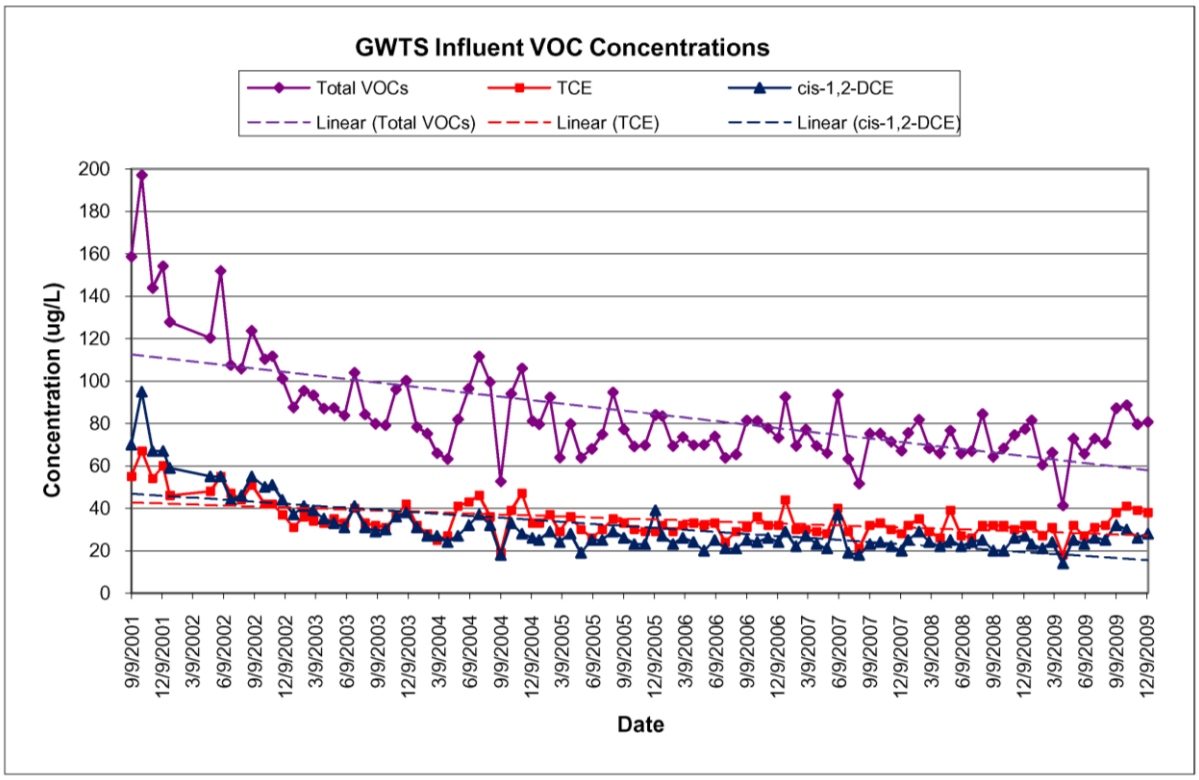

Figure 47
Volatile Organic Compounds Concentration-versus-Time Graph (2001-Present)
NASA Groundwater Treatment System Influent

However, Figure 47 shows that the majority of contaminant reductions occurred from 2001 through 2004. Since the end of 2004, concentrations of total VOCS, TCE, and *cis*-1,2-DCE have become relatively stable (Figure 48).

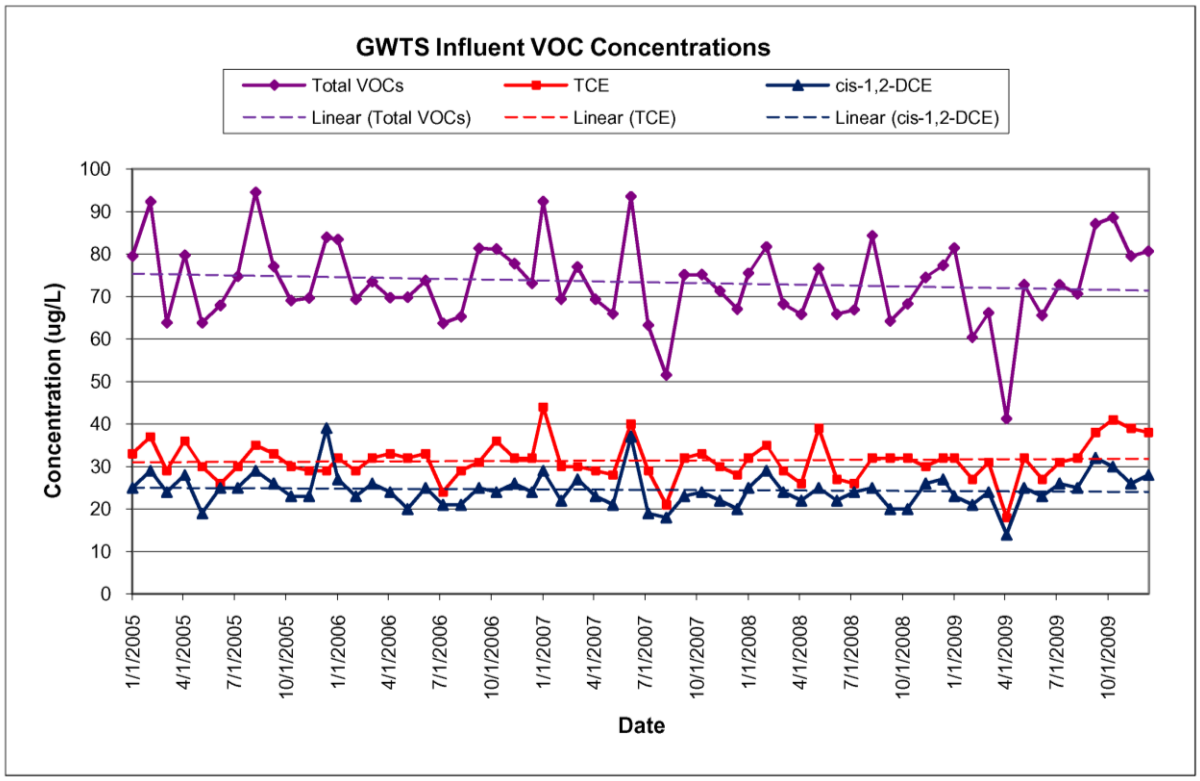

Figure 48
Volatile Organic Compounds Concentration-versus-Time Graph (2005-Present)
NASA Groundwater Treatment System Influent

In-Situ Mass

The following section discusses the procedures and presents the results of calculating the in-situ dissolved mass of TCE, *cis*-1,2-DCE and vinyl chloride in the NASA GWTS area.

The in-situ dissolved mass in the A1 aquifer was estimated for the NASA GWTS area. The estimate is based on the 2008 iso-concentration contours surface area located within the 5 µg/L (TCE), 6 µg/L (*cis*-1,2-DCE) and 0.50 µg/L (vinyl chloride) boundaries (Figures 27, 32, and 37) located within the NASA GWTS area boundary. AUTOCAD was used to measure the surface area between adjacent iso-concentration contours. It was assumed (based on boring log information) that the thickness of the A1 aquifer is 20 feet (generalized thickness from the top of the water table to the bottom of the A1 aquifer). A porosity of 30 percent was used to calculate in-situ water volume. The geometric mean concentration for each iso-concentration contour interval was multiplied by the calculated water volume within that interval to estimate the in-situ mass for the chemicals within an iso-concentration contour interval. Where iso-concentration contours do not increase to the next concentration interval, the interval was taken to be the highest concentration within that interval. The in-situ dissolved mass within each iso-concentration contour interval was then summed to calculate the total analyte dissolved mass within the NASA GWTS area.

The estimated total mass of dissolved TCE in the A1 aquifer of the NASA GWTS area in 2009 was approximately 19.5 pounds, compared to 20.9 pounds estimated for 2008. Although the concentration contours shown in Figure 27 are relatively unchanged from 2008, concentrations of TCE have generally declined across the site, resulting in the drop of in-situ TCE mass. Based on the above in-situ TCE mass estimates, a total of 1.4 pounds of TCE mass was removed from the NASA GWTS area during 2009. Based on monthly flow data and analytical results from the 2009 Annual NPDES report, approximately 2.1 pounds of TCE was removed via groundwater extraction and treatment at the NASA GWTS.

The estimated total mass of dissolved *cis*-1,2-DCE in the A1 aquifer in 2009 was approximately 18.0 pounds, compared to 19.5 pounds estimated for 2008. Although the concentration contours shown in Figure 32 are similar to 2008, concentrations of *cis*-1,2-DCE have generally declined across the site, resulting in the drop of in-situ *cis*-1,2-DCE mass. Based on the above in-situ *cis*-1,2-DCE mass estimates, a total of 1.5 pounds of *cis*-1,2-DCE mass was removed from the NASA GWTS area during 2009. Based on monthly flow data and analytical results from the 2009 Annual NPDES report, approximately 1.6 pounds of *cis*-1,2-DCE was removed via groundwater extraction and treatment at the NASA GWTS

The estimated total mass of dissolved vinyl chloride in the A1 aquifer in 2009 was approximately 1.9 pounds, compared to 2.0 pounds estimated for 2008. Although the concentration contours shown in Figure 37 are similar to 2008, concentrations of vinyl chloride have declined across the site, resulting in the drop of in-situ vinyl chloride mass. Based on the above in-situ vinyl chloride mass estimates, a total of 0.1 pounds of vinyl chloride mass was removed from the NASA GWTS area during 2009. Based on monthly flow data and analytical results from the 2009 Annual NPDES report, approximately 0.04 pounds of vinyl chloride was removed via groundwater extraction and treatment at the NASA GWTS

Based on these calculations, 6.7% of the dissolved in-situ TCE, 7.7% of the dissolved in-situ *cis*-1,2-DCE, and 5.0% of the dissolved in-situ vinyl chloride was removed during 2009. Assuming no contaminant inflow (and other simplifying conditions such as adsorption/desorption, complete capture of the plume, etc.), and using vinyl chloride as the controlling chemical, an additional 20 years of groundwater extraction is required to achieve cleanup (compared to the eight-year estimate in last year's report). However, as previously discussed, VOC inflow onto NASA Ames from existing up-gradient source areas is very likely.

As can be noted from the above discussion, the mass of TCE, *cis*-1,2-DCE, and vinyl chloride removed through groundwater extraction and treatment is not equal to the change in mass determined through the in-situ mass calculation. The in-situ mass calculation is based on a number of assumptions and estimations. Two major assumptions are a uniform aquifer thickness and no in-flow of contaminant mass. Estimations that have a significant impact on the in-situ mass calculation include location of concentration contours (professional judgment applied based on limited data, distance between contoured wells, etc.), the use of geometric means in performing the calculation, and the use of the highest compound concentration in upper range of concentration contours (bias to the high side). Large changes in the calculated in-situ mass can be observed if the concentration of a chemical in just one well changes to above or below a mapped contour interval. In addition, the in-situ mass of TCE concentrations can decrease naturally through chemical degradation. *Cis*-1,2-DCE concentrations can increase through conversion of TCE or decrease through degradation. Vinyl chloride concentrations can increase through degradation of TCE and its daughter products. Therefore, in-situ mass, as calculated using the method described above, provides only a general order of magnitude estimation of the amount of a chemical in the groundwater and can be used as a general indicator for overall conditions and changes in conditions.

5.0 IMPACT OF UP-GRADIENT SOURCES

5.1. Northern WATS Area – MEW and Navy Capture Zones

Based on observed soil and groundwater conditions in the N211 Aircraft Ramp area, NASA reviewed existing data to evaluate the effectiveness of the up-gradient WATS and MEW extraction systems. Based on discrepancies between mapped estimations of MEW and Navy capture zones, discrepancies between estimated groundwater capture efficiencies and observed field conditions, and upon reviewing lithologic logs and concentration-versus-time graphs of nearby wells, NASA believes that contaminated groundwater containing both VOCs and fuels is continuing to by-pass these up-gradient extraction systems. This is also supported by statements contained in the EPA's 5-Year Review (EPA, 2004)

Potential continuing sources into the NASA GWTS area to be considered include:

- Regional VOC Plume – Portions of the Regional Plume by-passing capture in the Northern WATS area (EPA, 2004).
- Building 88 – PCE concentrations in groundwater are increasing in wells 14D28A and 14D36A, which are down-gradient from the Northern WATS area. Building 88 is a potential source of this contamination (EPA, 2004).
- Site 9 – Petroleum hydrocarbons, especially gasoline, appear to be migrating from this area and by-passing capture in the Northern WATS area.

6.0 OTHER 2009 ACTIVITIES

6.1. Center-Wide Groundwater Sampling Program

As part of the ongoing site-wide groundwater monitoring program, additional information is included in this section that discusses areas of contaminated groundwater at the site not associated with the Regional Plume. These areas include the Orion Park plume, the N211 Aircraft Ramp, AOI 4, and AOI 6 contaminated groundwater areas.

6.1.1. Orion Park Plume

The "Orion Park Plume" is located along NASA'S western property boundary and is named after the Navy's Orion Park Housing area, from where it is migrating onto NASA property (see Figure 49). The source of this VOC plume has not been identified.

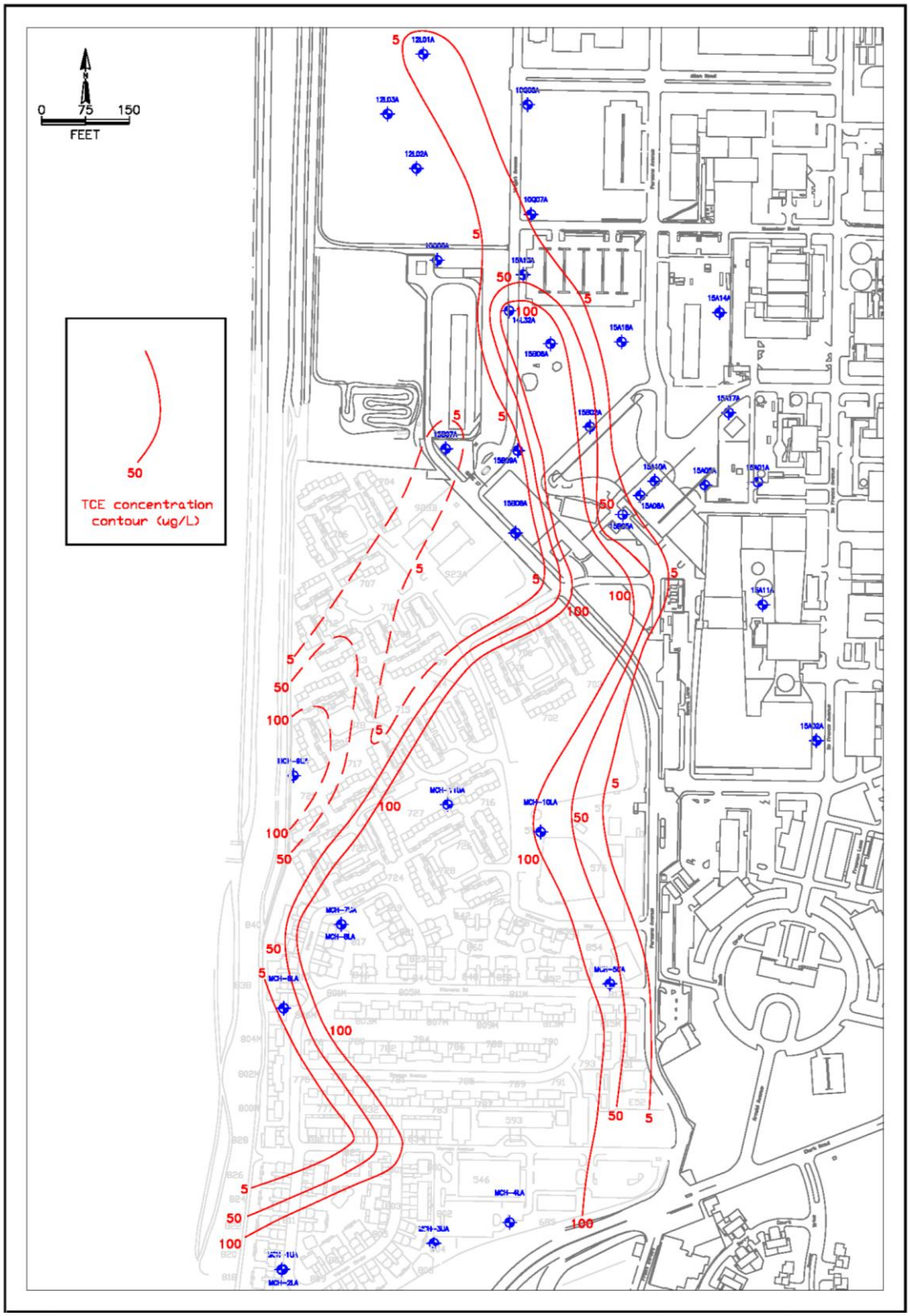

Figure 49
AOI 17 TCE Plume

NASA has requested the Navy, EPA, and the RWQCB to take action to stop the flow of these contaminants onto NASA property. The Navy installed eight new monitoring wells of varying depths to better determine the source of the Orion Park Housing area groundwater plume (TTECI, 2006). Analytical results appear to indicate both an offsite source and an onsite source for the solvent-contaminated groundwater underlying the Housing area.

NASA installed an air sparge barrier along the NASA property boundary (Figure 50) between May and August, 2008. Continuous operation began on September 12, 2008. Details of the air sparge system can be found in "*Draft Boundary Treatment Zone, Air Sparge Barrier, Operation and Maintenance Plan*" (TTEMI, 2008).

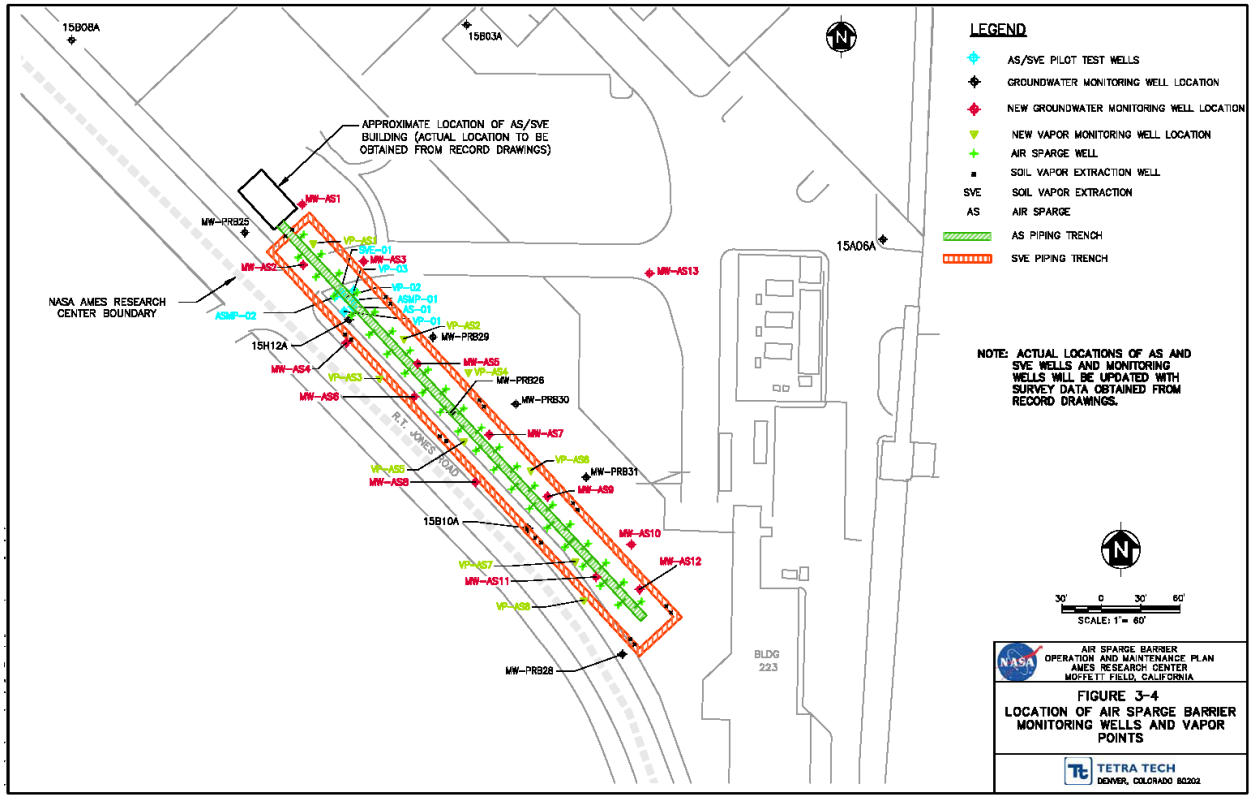

Figure 50
Location of AOI 17 Air Sparge Barrier

The majority of wells in this area were sampled prior to the initiation of sparging. In addition, selected wells are being sampled quarterly and semi-annually to evaluate the effectiveness of the sparging operations. The pre-sparge distribution of TCE in the A1 aquifer is shown in Figure 49. The plume boundary for *cis*-1,2-DCE is similar to that shown for TCE. For a preliminary evaluation of the effectiveness of the air-sparge barrier, a comparison between the pre-sparge and post-sparge analytical results from 2009 are summarized in Table 10.

Table 10
AOI 17 Groundwater VOC Concentrations

Well	Pre-Sparge TCE (µg/L)	Post-Sparge TCE (µg/L)	Pre-Sparge *cis*-1,2-DCE (µg/L)	Post Sparge *cis*-1,2-DCE (µg/L)
15A06A	1.8	0.89	<0.50	<0.50
15B03A	35	32	5.9	4.9
15B10A	180	130	71	57
15H12A	240	52	120	27
MW-AS1	220	34	91	8.6
MW-AS2	78	21	60	15
MW-AS3	200	38	100	9.7
MW-AS4	150	34	82	23
MW-AS5	220	68	89	23
MW-AS6	240	10	99	10
MW-AS7	180	88	100	42
MW-AS8	210	170	84	75
MW-AS9	130	28	43	10
MW-AS10	34	11	5.0	1.5
MW-AS11	42	40	5.6	5.8
MW-AS12	0.54	<0.50	<0.50	<0.50
MW-AS13	73	48	13	8.3
PRB-25	14	6.7	25	7.6
PRB-26	200	<0.50	87	4.1
PRB-28	<0.50	<0.50	<0.50	<0.50
PRB-29	200	60	82	18
PRB-30	150	87	56	33
PRB-31	100	83	22	20

6.1.2. N211 Aircraft Ramp

The N211 Aircraft Ramp is located in the east central portion of NASA Ames (Figure 51). The initial part of the N211 Aircraft Ramp, closest to Building 211, was completed in the late 1940's or early 1950's. The aircraft ramp was extended to its current configuration between early 1974 and mid-1975. The N211 Aircraft Ramp is bound to the north by AOIs 3 and 3 East. The southeast portion of the Aircraft Ramp is bound by AOI 1. In the past, two groups of USTs were located within AOI 3: two tanks near Building 248A and four tanks under Building N259. Both groups of tanks were known to have leaked aviation gas and/or jet fuel. AOI 1 historically contained four underground storage tanks used to store jet fuel. In 1994, this area was designated an "Area of Investigation" in response to an accidental jet fuel release in May 1992.

Although no additional work has been conducted within the N211 Aircraft Ramp area since 2006, this summary is provided to support the discussion made in Section 2.4.1.1 regarding the absence of TCE in this area. Additional details of the previous investigations can be found in the *"Area of Investigation 3 East, Up-Gradient Source Investigation, Soil and Groundwater Sampling & Analysis Report of Findings"* (ISSi, 2005a), "*2006 Regional Groundwater Remediation Program Progress Report*" (ISSi, 2007b), and the "*Draft Report of Findings, N211 Aircraft Ramp/Northern West-Side Aquifer Treatment System Area, Soil and Groundwater Investigation"* (ISSI, 2006a).

The results of these investigations indicate that a significant source area on the N211 Aircraft Ramp was highly unlikely. It appears that the source of jet fuel in groundwater originates from combined sources, including NASA's AOI 1 and up-gradient Navy sources. Since AOI 1 USTs stored only jet fuel, the gasoline contamination in groundwater appears to originate from up-gradient Navy sources. Based on the results of this investigation, the following conclusions were made:

- Groundwater containing both jet fuel, gasoline and VOCs at concentrations above cleanup levels are migrating past the WATS capture zone in the vicinity of Navy extraction well EA1-6.

- Groundwater containing gasoline, VOCs, and probably jet fuel, at concentrations above cleanup levels are migrating past the WATS capture zone in the vicinity of Navy extraction well EA1-4.

- Groundwater containing concentrations of 1,1-DCA, 1,1-DCE, *cis*-1,2-DCE, TCE, and vinyl chloride in excess of cleanup levels appears to be escaping capture at REG-6A (especially to the west).

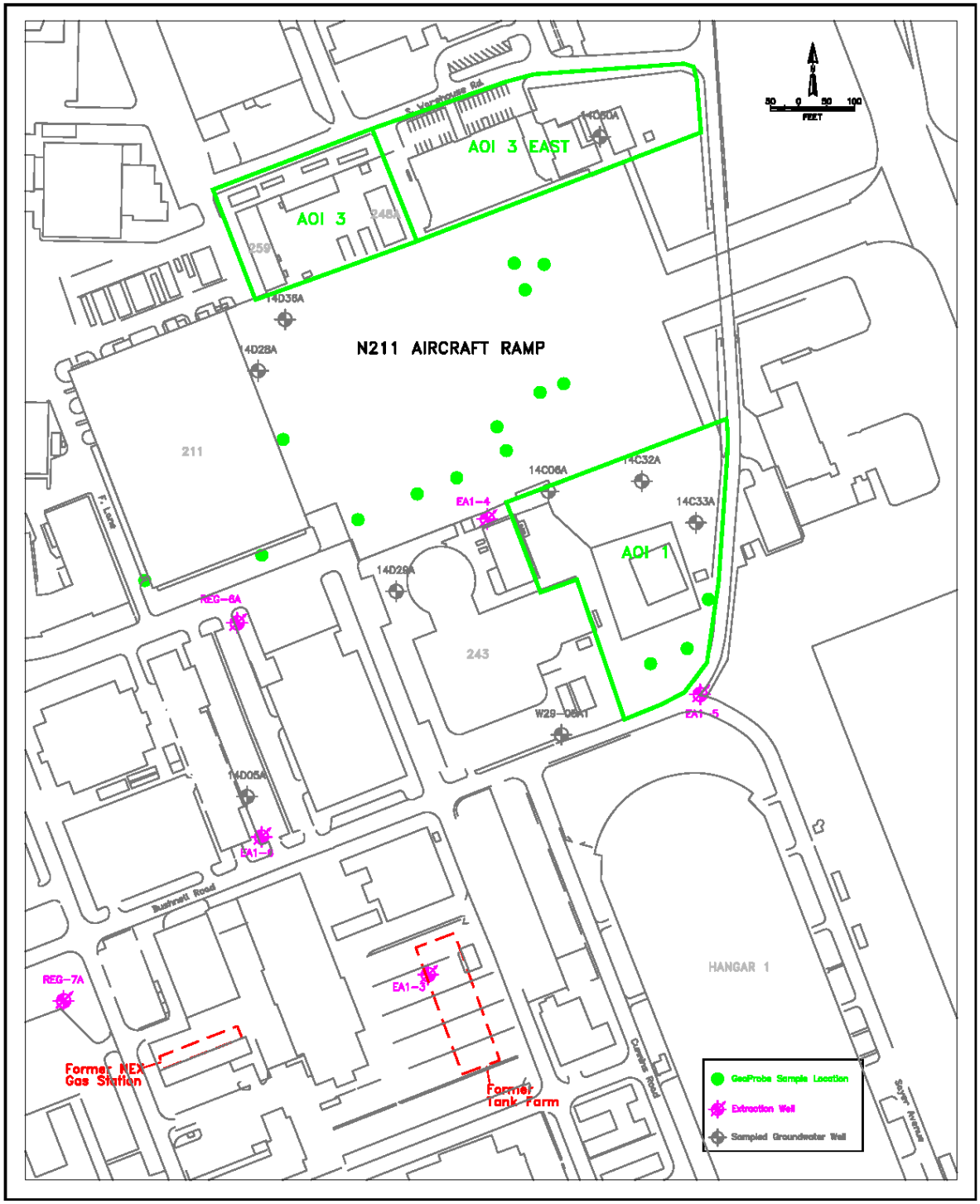

Figure 51
N211 Aircraft Ramp Site Detail

To provide a more comprehensive view of the distribution of VOCs and petroleum hydrocarbons in groundwater at the site, Figure 52 is provided. In this figure, the chemical data gathered during the N211 Aircraft Ramp investigation was combined with the most recent groundwater data from monitoring wells. Figure 52 illustrates the distributions of TCE, *cis*-1,2-DCE, vinyl chloride, jet fuel, and gasoline where they are present at concentrations exceeding cleanup levels. This figure shows only data related to the "Regional Plume." The "Orion Park Plume," which lies to the west, is not addressed in this section.

Figure 52 illustrates that large portions of the plume, both along the western and eastern margins, as well as within the interior of the plume, are escaping capture. Concentrations of TCE and *cis*-1,2-DCE exceeding cleanup levels in well 14D09A (west of building N211) indicate non-capture along the western margin of the plume. Concentrations of *cis*-1,2-DCE and vinyl chloride, as well as co-mingled gasoline and jet fuel in the eastern portion of the plume, reside outside projected capture zones. Furthermore, based on the results of the 2004 and 2006 N211 Aircraft Ramp investigations, VOCs and/or petroleum hydrocarbons are escaping capture in the vicinity of MEW extraction well REG-6A and Navy extraction wells EA1-4 and EA1-5.

Figure 52
Regional VOC and Fuel Co-Mingled Plumes

6.1.3. Area of Investigation 4

Area of Investigation 4 is located in the southwest portion of the facility and includes the National Full-Scale Aerodynamics Complex (NFAC) wind tunnel testing (Figure 53). Much of AOI 4 is occupied by the NFAC. Surface areas within AOI 4 consist mostly of paved areas for roads and parking lots (asphalt and concrete), gravel- and grass-covered fields, and some light landscaping.

In the "*Final AOI 4 2004 O&M Summary Report*" (ISSi, 2005b), NASA recommended discontinuing the sampling of selected monitoring wells because they had met the monitoring requirements as outlined in the Final O&M Plan. The sampling frequency of the selected wells was reduced to semi-annual, pending approval by the Department of Toxic Substances Control (DTSC). On November 3, 2005, NASA submitted a formal request to discontinue the sampling of wells 15A01A, 15A05A, 15A06A, 15A10A, and 15B02A. The DTSC responded with a November 17, 2005-dated letter that approved the request to discontinue monitoring these wells. The DTSC letter requires that wells 15A11A and Tank1-E continue to be sampled on a quarterly basis until the monitoring requirements of four consecutive quarters of concentrations of chemicals of concern (COCs) below cleanup goals are achieved. The COCs for AOI 4 were identified as BTEX, TPH-G, TPH-D, TPH-JP5/JP8 and TPH-MO. Well 15A04A was also reduced to annual sampling (Quarter 4). On March 14, 2007, DTSC reviewed the "*Area of Investigation 4, 2006 Draft Operation and Maintenance Report*" (ISSi, 2007c) and provided comments (DTSC, 2007). The DTSC stated that the collection on natural attenuation parameters proposed in the 2006 O&M Report was not appropriate at that time. However, the DTSC did approve the termination of groundwater monitoring at well 15A04A.

During 2009, groundwater monitoring wells 15A11A and TANK1-E were sampled quarterly. The analytical results for groundwater samples collected during 2009 are summarized in Table 11. TPH-MO, benzene, ethylbenzene, toluene, and xylenes were not detected in any of the samples and have been omitted from the table. NASA will continue to monitor AOI 4 O&M wells 15A11A and TANK1-E as required by the O&M Agreement.

Table 11
Petroleum Hydrocarbons in Groundwater, AOI 4 Area

Well ID	Date	TPH-JP5/JP8 (µg/l)	TPH-D (µg/l)	TPH-G (µg/l)
15A11A	3/24/2009	170	<50	**59**
15A11A	6/9/2009	280	<50	**51**
15A11A	9/22/2009	200	<50	**110**
15A11A	12/14/2009	<50	240	**110**
TANK1-E	3/24/2009	<50	<50	<50
TANK1-E	6/9/2009	<50	<50	<50
TANK1-E	9/22/2009	<50	<50	<50
TANK1-E	12/14/2009	<50	<50	<50
Cleanup Level		**700**	**700**	**50**

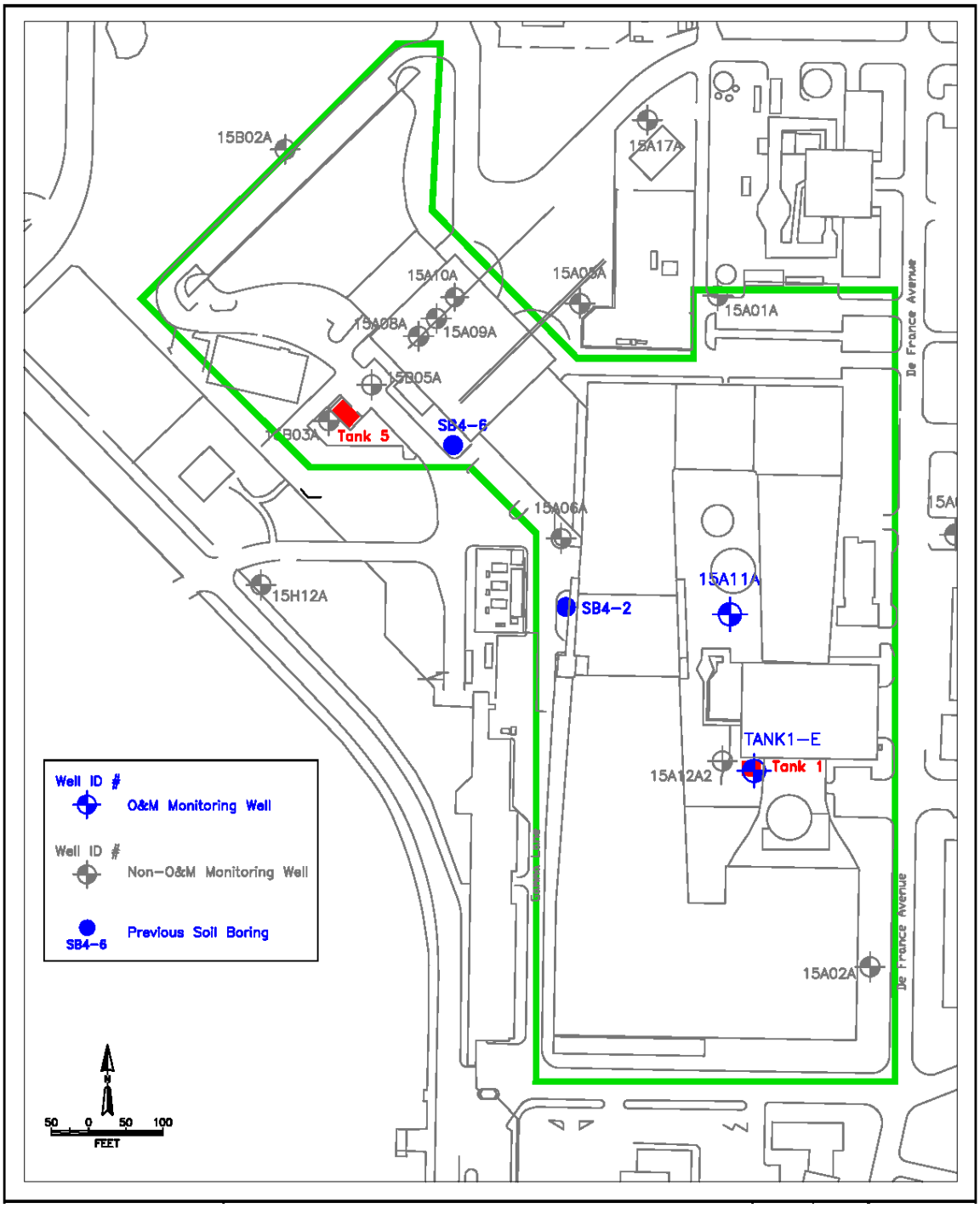

Figure 53
AOI 4 Site Detail

6.1.4. Area of Investigation 6

Area of Investigation 6 encompasses a former drainage ditch that parallels Lindbergh Avenue, beginning north of building N250 and terminating south of North Perimeter Road (Figure 54). AOI 6 includes the section of the former open storm drain channel and the adjacent exposed soils that began near Building N250B (southern end of AOI 6), paralleled Lindbergh Avenue for approximately 2,000 feet, and terminated at a diversion box.

Previous soil sampling efforts indicated that the majority of the storm drain channel contained PCBs and lead at concentrations exceeding cleanup levels. The area north of the OARF road is considered an "ecologically sensitive area." Therefore the NASA site-specific PCB soil remediation level of 0.47 mg/kg was used for this area. In the area south of the OARF road, NASA applied the DTSC site-specific, residential PCB soil remediation level of 2.0 mg/kg (with an average of 1.0 mg/kg).

Based on the initial analytical results, the entire length of the channel was over-excavated an additional 1 foot in depth (approximately 3.5 feet total depth) (NASA, 1995). Additional excavation and sampling was conducted at a number of locations where elevated concentrations of PCBs persisted (SAIC, 1997). Groundwater monitoring wells 10J08A and 10J09A were also installed down-gradient from the locations of the two highest residual PCB concentrations ("*Groundwater Monitoring Well Installations, AOI 6, Lindbergh Avenue Storm Drain Channel,*" [SAIC, 1996] and "*Installation of Monitoring Wells, Soil & Groundwater Sampling at AOIs 3, 6 & the OARF (AOI 11),"* [DMJM, 1997]).

Additional soil excavation was conducted in 2001. The 2001 excavation effort and results of the post-excavation soil sampling are summarized in the "*Draft Implementation Report, Area of Investigation AOI 6, Surface Soils"* (PAI 2005). The soil removal actions conducted in 1994 and 2001 appear to have successfully remediated the channel soils.

To determine if groundwater had been impacted, periodic sampling of groundwater in the vicinity of AOI 6 was performed. Prior to 2005, wells 11E02A, 10J09A, and 10J08A (replaced by 11M25A in January 2002) have sporadically contained PCBs at concentrations as high as 1.8 µg/L. Lead has been routinely detected in wells 10J09A and 11M25A and has been detected at concentrations as high as 42 µg/L.

During 2009, wells 11E02A and 11M25A were sampled twice. Lead was not detected in either well above the laboratory reporting limit of 5.0 µg/L. PCBs were not detected in either well above the laboratory reporting limit of 0.50 µg/L.

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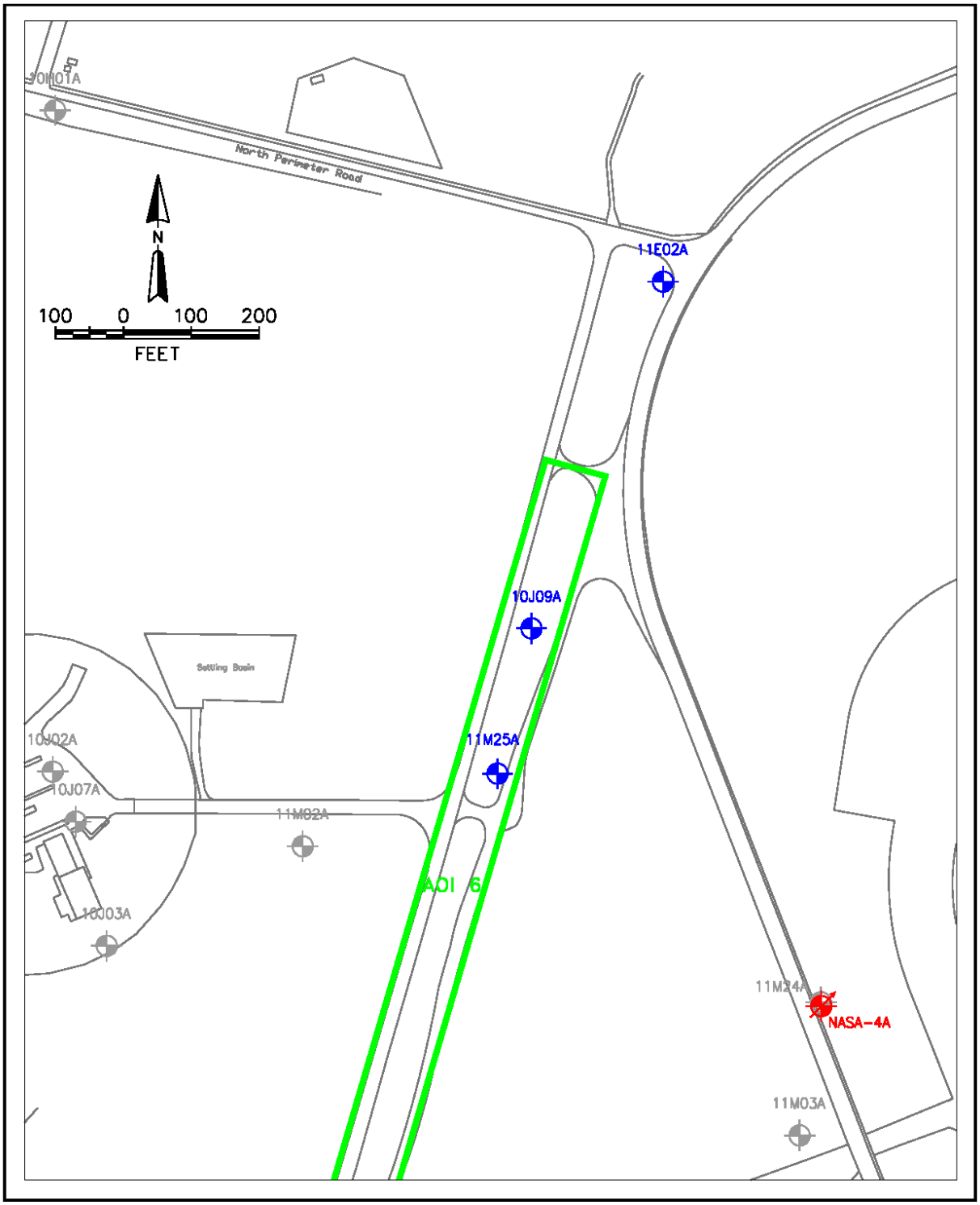

Figure 54
AOI 6 Site Detail

The detection of PCBs in groundwater is uncommon (four detections in 65 samples). Furthermore, PCBs have not been detected in groundwater samples collected during the last 12 sampling events.

Although lead has been detected with greater frequency, it is also naturally occurring in the soil and groundwater at NASA Ames. In fact, the average background concentration (17 µg/L) exceeds the Action Level for lead (15 µg/L). The highest reported concentration of lead in AOI 6 groundwater 42 µg/L is within the concentration range of background levels of lead at NASA Ames (0.08 µg/L to 50 µg/L). Furthermore, lead has been below the Action Level during the last nine sampling events.

Based on the fact that majority of both PCBs and lead were most likely adsorbed to surface and near surface soils that have been subsequently removed from the AOI 6 area, and that both PCBs and lead have not been detected in AOI 6 groundwater above site action levels in the last nine to 12 sampling events, NASA recommends the cessation of groundwater monitoring for PCBs and lead.

6.2. Treated Effluent Reuse

Currently, treated water from the MEW and NASA groundwater treatment systems is utilized in NASA's Arc Jet Wind Tunnel cooling towers and boiler or discharged to Stevens Creek. A pipeline was constructed in 1998 for diversion of treated groundwater through the onsite Industrial Waste Water Treatment Plant at N271 for treatment prior to reuse by the Arc Jet facility. NASA reused 2,738,100 gallons of the treated NASA and MEW groundwater in 2009.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the current capture zone analysis and the effectiveness of the current NASA GWTS system configuration, further assessment of the existing hydrogeologic conditions within the NASA GWTS area is appropriate.

Based on the information contained within this report, the following conclusions and recommendations are made:

7.1. Suspected Source Area, Area of Investigation 9

NASA-1A appears to be functioning as intended. Based on capture zone analysis, the majority of contaminated groundwater from the suspected source area is being captured. However, increasing TCE concentrations near down-gradient well NASA-2A suggests that there may be minor bypassing of this well.

Since down-gradient contingency well NASA-2A is not functioning as intended, NASA has replaced the pump at NASA-1A with a slightly higher capacity pump and has increased the pumping rate of NASA-1A from 6.9 gpm to 7.1 gpm.

NASA intends to identify a more effective location for well NASA-2A using CPT and GeoProbe testing. NASA also intends to install piezometers near NASA-1A to provide additional groundwater level data for better capture zone analysis.

As previously discussed, NASA extraction wells NASA-1A and NASA-2A were not intended to address the larger Regional Plume mass migrating through this area.

7.2. VTOL Pad/Navy Site 8 North Source Area, Area of Investigation 7

NASA-3A is pumping at a rate exceeding its design parameters of 7.1 gpm versus 6.0 gpm. However, because of the high hydraulic conductivity of the channel deposits in this area and limited extraction rate of the existing pump, draw-down, and therefore the propagation of a capture zone, is limited.

NASA intends to identify a more effective location for well NASA-4A using CPT and GeoProbe testing. NASA also intends to install piezometers near NASA-3A to provide additional groundwater level data for better capture zone analysis.

As previously discussed, NASA extraction wells NASA-3A and NASA-4A were also not intended to address the larger Regional Plume mass migrating through this area.

7.3. Northern WATS Area

It appears that WATS and/or RGRP extraction wells may not be capturing the western margin of the Regional Plume (EPA, 2004). Concentrations of *cis*-1,2-DCE have been increasing in well 14D09A (west of building N211) since the startup of the WATS and RGRP extraction systems (Figures 55). In addition, PCE concentrations have been increasing in well 14D28A (Figure 56). A review of Navy and MEW capture zone analyses indicate that capture of the Regional Plume may not be complete. NASA extraction wells NASA-1A and NASA-2A were not located nor designed to address this contamination.

Similarly, it appears that *cis*-1,2-DCE and vinyl chloride, as well as up-gradient petroleum hydrocarbons, along the eastern margin of the Regional Plume may not be fully captured (EPA, 2004).

The results of NASA's 2006 N211 Aircraft Ramp investigations also suggest that VOCs and/or petroleum hydrocarbons are escaping capture near Navy extraction wells EA1-4 and EA1-5 and MEW extraction well REG-6A.

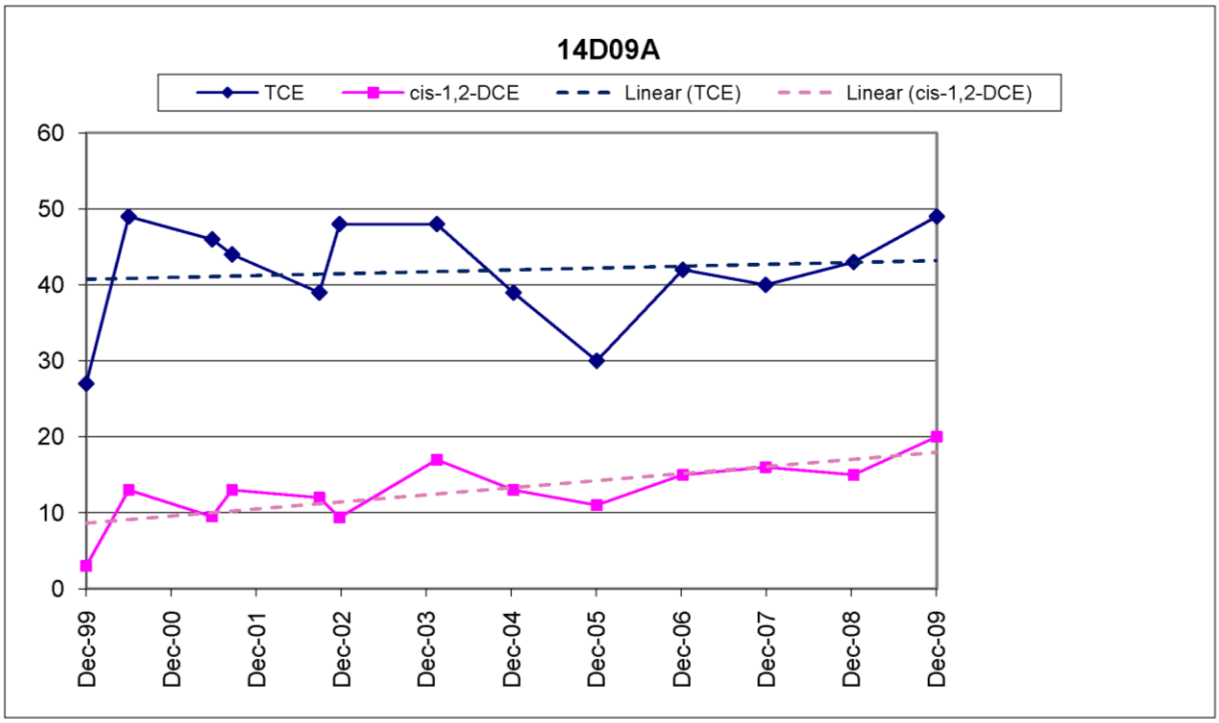

Figure 55
TCE and *cis*-1,2-DCE Concentration-versus-Time Graph, Well 14D09A

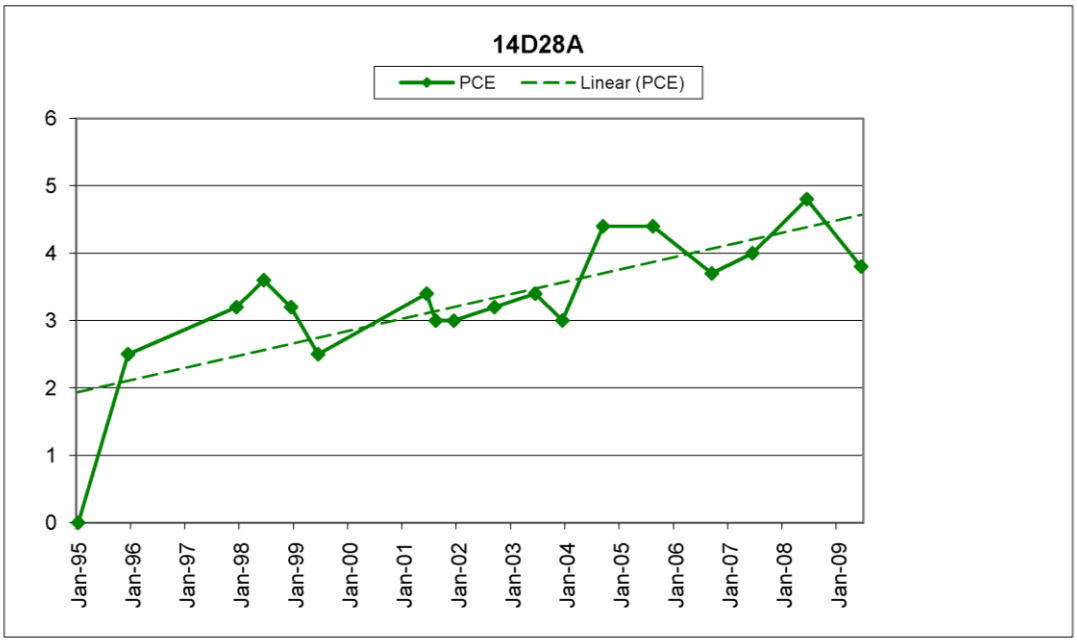

Figure 56
PCE Concentration-versus-Time Graph, Well 14D28A

8.0 FOLLOW-UP ACTIONS

As stated in Section 7, NASA has optimized the performance of extraction wells NASA-1A and NASA-3A to within design limitations, and is proposing the installation of piezometers near these wells to further evaluate the effectiveness of the NASA GWTS and to evaluate potential alternative locations for extraction wells NASA-2A and NASA-4A. NASA anticipates that the investigation will be conducted during 2011.

9.0 UPCOMING 2010 WORK AND PLANNED FUTURE ACTIVITIES

NASA has scheduled the following tasks for completion during 2010/2011:

- Monthly GWTS NPDES influent and effluent sampling in 2010.
- Quarterly GWTS NPDES reporting in April, July, October 2010 and January 2011.
- Annual GWTS NPDES reporting in January 2010 and January 2011.
- Quarterly groundwater sampling in March, June, September, and December 2010.
- Semi-annual site-wide groundwater level measurements in March and November 2010.
- Develop “Sand and Gravel Distribution and Thickness Maps” and geologic cross sections for AOIs 7 and 9 using existing lithologic data in preparation of future piezometers installations and potential extraction well relocation investigations.
- Future installation of piezometers in the vicinity of NASA extraction wells NASA-1A and NASA-3A.
- Future installation of exploratory CPT and GeoProbe borings in the vicinity of existing NASA extraction wells to determine appropriate locations for the replacement of wells NASA-2A and NASA-4A.

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APPENDIX A

2009 NASA GWTS NPDES REPORT

National Aeronautics and
Space Administration

Ames Research Center
Moffett Field, CA 94035-1000

Reply to Attn of: JQ:237-14

JAN 28 2010

Ms. Lourdes Gonzales
Regional Water Quality Control Board
NPDES Division
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Dear Ms. Gonzales:

Enclosed is the *Draft Annual 2009 Self-Monitoring Report* for NPDES Permit CAG912003. This permit is for the discharge of treated groundwater from the groundwater treatment system located at the National Aeronautics and Space Administration Ames Research Center.

I certify under penalty of law that this document and attachments are prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing the violations.

If you have any questions, you can contact me at 650-604-0237 or by e-mail at Donald.M.Chuck@nasa.gov.

Cordially,

Donald M. Chuck
Restoration Project Manager
Environmental Management Division

Enclosure

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National Aeronautics and Space Administration

DRAFT
SELF MONITORING REPORT
ANNUAL 2009

REGIONAL GROUNDWATER
REMEDIATION PROGRAM

NPDES PERMIT NUMBER CAG912003

NASA Ames Research Center
Moffett Field, CA

January 2010

SELF MONITORING REPORT
ANNUAL 2009

REGIONAL GROUNDWATER REMEDIATION PROGRAM

NPDES PERMIT NUMBER CAG912003

NASA Ames Research Center
Moffett Field, California

Prepared by:

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Prepared for:

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January 2010

1.0 INTRODUCTION

The Environmental Management Division at the National Aeronautics and Space Administration (NASA) Ames Research Center (NASA Ames) has requested Integrated Science Solutions, Inc. (ISSi) to prepare this Annual Report for the NASA Ames Groundwater Treatment System (GWTS) located at the corner of North Warehouse Road and H Lane at Moffett Field, California. This Annual Report was prepared in accordance with the Self-Monitoring Program reporting requirements contained in the National Pollutant Discharge Elimination System (NPDES) Permit Number CAG912003, Order 99-051-75 (File Numbers 2189.8009, 1210.48 FA), WDID: 2438009003, issued by the California Regional Water Quality Control Board (RWQCB) to NASA on 09 September 2004. This Annual Report details the results of water quality analyses and operational data obtained from the NASA Ames GWTS during calendar year 2009.

2.0 BACKGROUND

Groundwater extracted from extraction wells NASA-1A and NASA-3A is pre-filtered by two 25-micron bag filters operating in parallel, prior to passing through two 5,000-pound granulated activated carbon (GAC) vessels operating in series. Treated groundwater is then discharged to Stevens Creek in accordance with the NPDES permit. Figure 1 shows the locations of the treatment system outfall and discharge route to Stevens Creek. Figure 2 details the treatment process and influent and effluent sample points. The construction of the NASA Ames GWTS was completed in August 2001 and started operations on September 10, 2001. Groundwater extraction from wells NASA-2A and NASA-4A was suspended on April 18, 2009.

3.0 SYSTEM OPERATIONAL STATUS, CALENDAR YEAR 2009

The NASA Ames GWTS was fully operational for 95% of calendar year 2009.

3.1 System-Wide Shutdowns

During 2009, the NASA Ames GWTS experienced several automatic system-wide shutdowns. These automatic system-wide shutdowns resulted from problems with electrical systems and/or power disruptions. Dates and durations of these shutdowns are detailed below in Table 1.

Table 1

2009 NASA Ames GWTS
System Shutdown Data

Date(s)	Duration (hours)	Cause
1/1/09 – 1/6/09	120	System-Wide Electrical Malfunction
1/17/09 – 1/20/09	79	System-Wide Electrical Malfunction
1/22/09	10	System Shut-down for Electrical Repairs
2/2/09	7	Electrical Problem (NASA-1A only)
2/11/09	10	Electrical Problem (NASA-1A only)
2/26/09	2	Electrical Problem (squirrels damaged electrical wires)
4/22/09	3	Electrical Problem (NASA-1A only)
4/29/09 – 5/1/09	30	Electrical Problem (NASA-1A only)
5/5/09	1	Electrical Problem
5/22/09	7	Electrical Problem (NASA-1A only)
6/18/09	3	Electrical Problem (NASA-1A only)
7/29/09 – 7/30/09	8	Electrical Problem (NASA-1A only)
8/6/09	2	Electrical Problem
8/11/09	3	Electrical Problem (NASA-1A only)
10/7/09	9	Electrical Power Disruption
10/12/09 – 10/14/09	22	Electrical Short-Circuit in LDV-14 Vault
10/14/09 – 10/17/09	81	Electrical Short-Circuit in LDV-14 Vault (NASA-3A only)
10/17/09 – 10/20/09	48	System Shut-down to troubleshoot and repair electrical short-circuit
12/18/2009	2	System Shut-down to repair electrical system

3.2 Suspension of Pumping at NASA-2A and NASA-4A

On April 28, 2009, after discussions with the US EPA and California Regional Water Quality Control Board, NASA suspended operation of extraction wells NASA-2A and NASA-4A. As discussed in NASA's "*2008 Draft Regional Groundwater Remediation Program Progress Report,*" the performance of these wells had been less than designed and anticipated. In addition, groundwater extracted from NASA-4A had been below cleanup levels.

The extraction rates from wells NASA-1A and NASA-3A were adjusted to maintain NASA's 15 gallons per minute (gpm) discharge limit. NASA-1A is currently operating at 8 gpm and NASA-3A is operating at 7 gpm. Wells NASA-2A and NASA-4A are turned on for approximately two hours per week to maintain operability.

3.3 Carbon Replacement

Quarter 3, 2009 Carbon Replacement

On August 6, 2009, the granulated activated carbon (GAC) within vessel GAC-552 was replaced (see Figure 2). Vessel GAC-552 served as the secondary GAC vessel from September 19, 2007 to September 30, 2008 (12 months of service) and the primary GAC vessel from September 30, 2008 to August 6, 2009 (11 months of service). No system shutdown was required during the carbon replacement.

3.4 VOC Mass Removal

During calendar year 2009, the NASA Ames GWTS removed a total of 4.72 pounds of Volatile Organic Compounds (VOCs) from 7,830,490 gallons of groundwater. Table 2 summarizes the volume of groundwater and VOC mass removal for the NASA Ames GWTS. Laboratory-certified analytical reports can be found with the previously submitted Quarterly Reports.

Table 2

2009 NASA Ames GWTS Flow and Mass Removal Data

Month	Total System Influent (gallons)	Average Flow (gpd)	Average Flow (gpm)	Influent VOC Concentration (µg/L)	Total VOC Mass Removed (pounds)
January	502,404	16,207	11.25	81.38	0.34
February	625,074	22,324	15.50	60.36	0.32
March	671,860	21,673	15.05	66.12	0.37
April	633,047	21,102	14.65	41.21	0.22
May	668,478	21,564	14.97	72.76	0.41
June	682,160	22,739	15.79	65.54	0.37
July	700,963	22,612	15.70	72.75	0.43
August	696,435	22,466	15.60	70.58	0.41
September	681,586	22,720	15.78	87.07	0.50
October	599,897	19,352	13.44	88.57	0.44
November	681,747	22,725	15.78	79.46	0.45
December	686,839	22,156	15.39	80.64	0.46
Yearly Average	**652,541**	**21,470**	**14.91**	**72.24**	**0.39**
Yearly Sum	**7,830,490**	**---**	**---**	**---**	**4.72**

gpd = gallons per day
gpm = gallons per minute
µg/L = micrograms per liter or parts per billion (ppb)

4.0 WATER QUALITY ANALYSES

Table 3 summarizes the results of water quality analyses of influent and effluent water samples collected from the NASA Ames GWTS during calendar year 2009. Laboratory-certified analytical reports can be found with the previously submitted Quarterly Reports. The influent and effluent sample points are shown in Figure 2.

Table 4 details the results of temperature, pH, and other water quality analyses conducted during calendar year 2009. Table 5 provides the standard observations for calendar year 2009.

Table 3

2009 NASA Ames GWTS Analytical Results
First Quarter 2009

Sample Location	Sample Date	1,1-DCA (µg/L)	1,1-DCE (µg/L)	*cis*-1,2-DCE (µg/L)	TCE (µg/L)	Other VOCs (µg/L)
NASA-I	1/28/09	3.7	6.5	23	32	Chloroform = 0.31[J] 1,4-DCB = 10 *trans*-1,2-DCE = 0.63[J] 1,1,1-TCA = 0.78[J] 1,1,2,2-TCA = 2.0 Vinyl Chloride = 0.46[J] Freon 113 = 2.0[J]
NASA-E	1/28/09	ND	ND	ND	ND	ND
NASA-I	2/17/09	2.7	6.1	21	27	*trans*-1,2-DCE = 0.47[J] Vinyl Chloride = 0.44[J] Freon 11 = 0.55[J] Freon 113 = 2.1[J]
NASA-E	2/17/09	ND	ND	ND	ND	ND
NASA-I	3/19/09	3.3	5.8	24	31	Chloroform = 0.25[J] Chloromethane = 0.24[J] 1,1,1-TCA = 0.52[J] Vinyl Chloride = 0.35[J] Freon 11 = 0.66[J]
NASA-E	3/19/09	ND	ND	ND	ND	Chloromethane = 0.39[J]

NASA-I = Influent
NASA-E = Effluent
ND = Not Detected
µg/l = micrograms per liter
1,1-DCA = 1,1-Dichloroethane
1,1-DCE= 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichloroethene
VOC = Volatile Organic Compound

1,4-DCB – 1,4-Dichlorobenzene
trans-1,2-DCE = *trans*-1,2- Dichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
1,1,2,2-TCA = 1,1,2,2-Tetrachloroethane
Freon 11 = Trichlorofluoromethane
Freon 113 = 1,1,2-Trichloro-1,2,2-trifluoroethane
[J] = detected, but below the Report Limit; therefore, result is an estimated concentration

Table 3 (continued)

2009 NASA Ames GWTS Analytical Results
Second Quarter 2009

Sample Location	Sample Date	1,1-DCA (µg/L)	1,1-DCE (µg/L)	*cis*-1,2-DCE (µg/L)	TCE (µg/L)	Other VOCs (µg/L)
NASA-I	4/27/09	2.0	3.6	14	18	Chloroform = 0.14[J] *trans*-1,2-DCE = 0.43[J] 1,1,1-TCA = 0.34[J] Vinyl Chloride = 0.52 Freon 11 = 0.58[J] Freon 113 = 1.6[J]
NASA-E	4/27/09	ND	ND	ND	ND	ND
NASA-I	5/20/09	3.6	6.7	25	32	*trans*-1,2-DCE = 0.82[J] 1,1,1-TCA = 0.43[J] Vinyl Chloride = 0.65 Freon 11 = 0.96[J] Freon 113 = 2.6[J]
NASA-E	5/20/09	ND	ND	ND	ND	PCE = 0.31[J]
NASA-I	6/23/09	3.1	6.1	23	27	*trans*-1,2-DCE = 0.77[J] Vinyl Chloride = 0.76 Freon 11 = 0.81[J] Freon 113 = 1.8[J]
NASA-E	6/23/09	ND	ND	ND	ND	Chloromethane = 0.36[J]

NASA-I = Influent
NASA-E = Effluent
ND = Not Detected
µg/l = micrograms per liter
1,1-DCA = 1,1-Dichloroethane
1,1-DCE= 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichlororethene

VOC = Volatile Organic Compound
trans-1,2-DCE = *trans*-1,2- Dichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
Freon 113 = 1,1,2-trichloro-1,2,2-trifluoroethane
Freon 11 = Trichlorofluoromethane
[J] = detected, but below the Report Limit; therefore, result is an estimated concentration

Table 3 (continued)

2009 NASA Ames GWTS Analytical Results
Third Quarter 2009

Sample Location	Sample Date	1,1-DCA (µg/L)	1,1-DCE (µg/L)	cis-1,2-DCE (µg/L)	TCE (µg/L)	Other VOCs (µg/L)
NASA-I	7/20/09	3.7	7.0	26	31	*trans*-1,2-DCE = 0.75[J] 1,1,1-TCA = 0.71[J] Vinyl Chloride = 0.65 Freon 11 = 0.74[J] Freon 113 = 2.2[J]
NASA-E	7/20/09	ND	ND	ND	ND	ND
NASA-I	8/27/09	3.2	5.6	25	32	*trans*-1,2-DCE = 1.4 1,1,1-TCA = 0.53[J] Vinyl Chloride = 0.42[J] Freon 11 = 0.53[J] Freon 113 = 1.9[J]
NASA-E	8/27/09	ND	ND	ND	ND	ND
NASA-I	9/21/09	4.3	6.8	32	38	*trans*-1,2-DCE = 1.7 1,1,1-TCA = 0.67[J] Vinyl Chloride = 1.2 Freon 113 = 2.4[J]
NASA-E	9/21/09	ND	ND	ND	ND	ND

NASA-I = Influent
NASA-E = Effluent
ND = Not Detected
µg/l = micrograms per liter
1,1-DCA = 1,1-Dichloroethane
1,1-DCE= 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichlororethene

VOC = Volatile Organic Compound
trans-1,2-DCE = *trans*-1,2- Dichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
Freon 113 = 1,1,2-trichloro-1,2,2-trifluoroethane
Freon 11 = Trichlorofluoromethane
[J] = detected, but below the Report Limit; therefore, result is an estimated concentration

Table 3 (continued)

2009 NASA Ames GWTS Analytical Results
Fourth Quarter 2009

Sample Location	Sample Date	1,1-DCA (µg/L)	1,1-DCE (µg/L)	cis-1,2-DCE (µg/L)	TCE (µg/L)	Other VOCs (µg/L)
NASA-I	10/27/09	4.2	6.9	30	41	*trans*-1,2-DCE = 0.73[J] 1,1,1-TCA = 0.68[J] Vinyl Chloride = 0.86 Freon 11 = 1.1[J] Freon 113 = 3.1[J]
NASA-E	10/27/09	ND	ND	ND	ND	ND
NASA-I	11/24/09	6.1	8.8	26	39	*trans*-1,2-DCE = 0.75[J] 1,1,1-TCA = 0.57[J] Vinyl Chloride = 0.66 Freon 11 = 0.68[J] Freon 113 = 2.1[J]
NASA-E	11/24/09	ND	ND	ND	ND	ND
NASA-I	12/15/09	3.8	6.5	28	38	*trans*-1,2-DCE = 0.76[J] Freon 11 = 0.63[J] Freon 113 = 2.2[J]
NASA-E	12/15/09	ND	ND	ND	ND	ND

NASA-I = Influent
NASA-E = Effluent
ND = Not Detected
µg/l = micrograms per liter
1,1-DCA = 1,1-Dichloroethane
1,1-DCE= 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
TCE = Trichlororethene

VOC = Volatile Organic Compound
trans-1,2-DCE = *trans*-1,2- Dichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
Freon 113 = 1,1,2-trichloro-1,2,2-trifluoroethane
Freon 11 = Trichlorofluoromethane
[J] = detected, but below the Report Limit; therefore, result is an estimated concentration

Table 3 (continued)

2009 NASA Ames GWTS Monitoring Data
Other Analyses

Sample Location	Sample Date	Total Petroleum Hydrocarbons (µg/L)	BTEX (µg/L)	MTBE (µg/L)	Fuel Oxygenates (µg/L)
NASA-I	1/28/09	51 (TPH-G)	ND	ND	---
NASA-E	1/28/09	NS	NS	NS	---
NASA-I	2/17/09	51 (TPH-G)	ND	ND	---
NASA-E	2/17/09	ND	ND	ND	---
NASA-I	3/19/09	ND	ND	ND	---
NASA-E	3/19/09	ND	ND	ND	---
NASA-I	4/27/09	ND	ND	ND	---
NASA-E	4/27/09	ND	ND	ND	---
NASA-I	5/20/09	ND	ND	ND	---
NASA-E	5/20/09	ND	ND	ND	---
NASA-I	6/23/09	ND	ND	ND	DIPE = 1.1
NASA-E	6/23/09	ND	ND	ND	ND
NASA-I	7/20/09	ND	ND	ND	---
NASA-E	7/20/09	ND	ND	ND	---
NASA-I	8/27/09	ND	ND	ND	---
NASA-E	8/27/09	ND	ND	ND	---
NASA-I	9/21/09	ND	ND	ND	---
NASA-E	9/21/09	ND	ND	ND	---
NASA-I	10/27/09	120 (TPH-MO)	ND	ND	---
NASA-E	10/27/09	98 (TPH-MO)	ND	ND	---
NASA-I	11/24/09	ND	ND	ND	---
NASA-E	11/24/09	ND	ND	ND	---
NASA-I	12/15/09	ND	ND	ND	DIPE = 0.75
NASA-E	12/15/09	ND	ND	ND	ND

NASA-I = Influent
NASA-E = Effluent
ND = Not Detected
NS = Not Sampled
-- = Analysis/analyses not required
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes
MTBE = Methyl Tertiary Butyl Ether
Fuel Oxygenates = TAME, DIPE, ETBE, TBA, Ethanol, and Methanol
TPH-G = Total Petroleum Hydrocarbons as Gasoline
DIPE = Diisopropyl Ether

Table 3 (continued)

2009 NASA Ames GWTS Monitoring Data
Other Analyses

Sample Location	Sample Date	SVOCs (µg/L)	1,4-Dioxane (µg/L)
NASA-I	6/23/09	--	1.1
NASA-E	6/23/09	ND	1.2
NASA-I	12/15/09	ND	1.1
NASA-E	12/15/09	ND	ND

NASA-I = Influent
NASA-E = Effluent
SVOCs = Semi-Volatile Organic Compounds
ND = Not Detected above
µg/l = micrograms per liter

Table 3 (continued)

2009 NASA Ames GWTS Monitoring Data
Other Analyses

Static % Survival Aquatic Toxicity Screening (Rainbow Trout)	
NASA-E-121509 (12/15/2009)	
Parameter	**Result**
96-Hour % Survival	95%
Dissolved Oxygen	7.20 mg/L
pH	7.70 standard units
Conductivity	1284 µS/cm
Salinity	0.60 ppt
Temperature	6.50° C
Total Chlorine	<0.03 mg/L
Ammonia	<0.03 mg/L
Alkalinity	476 mg/l as $CaCO_3$
Hardness	590 mg/l as $CaCO_3$

NASA-E = Effluent
mg/l = milligrams per litter
µS/cm = micro Siemens per centimeter
ppt parts per trillion
°C = degrees Celsius

Table 4

2009 NASA Ames GWTS Monitoring Data
Field Parameters

Sample Location	Sample Date	Temperature (^oC)	pH (Standard Units)	Turbidity (NTU)
NASA-I	1/28/2009	17.2	7.34	--
NASA-E	1/28/2009	14.7	7.34	--
NASA-I	2/17/2009	16.7	7.42	--
NASA-E	2/17/2009	14.7	7.40	--
NASA-I	3/19/2009	17.3	7.41	--
NASA-E	3/19/2009	16.8	7.37	--
NASA-I	4/27/09	17.4	7.42	--
NASA-E	4/27/09	16.2	7.40	--
NASA-I	5/20/09	18.4	7.44	--
NASA-E	5/20/09	17.9	7.40	--
NASA-I	6/23/09	19.5	7.47	--
NASA-E	6/23/09	19.8	7.43	--
NASA-I	7/20/09	18.9	7.49	--
NASA-E	7/20/09	18.5	7.47	--
NASA-I	8/27/09	19.5	7.46	--
NASA-E	8/27/09	18.9	7.46	--
NASA-I	9/21/09	21.0	7.47	--
NASA-E	9/21/09	22.2	7.47	--
NASA-I	10/27/09	18.1	7.54	--
NASA-E	10/27/09	18.0	7.52	--
NASA-I	11/24/09	19.4	7.47	--
NASA-E	11/24/09	20.1	7.40	--
NASA-I	12/15/09	17.7	7.52	--
NASA-E	12/15/09	15.6	7.53	0.61

NASA-I = Influent
NASA-E = Effluent
^oC = degrees Celsius
NTU = nephelometric turbidity units
-- = Analysis/analyses not required
ND = Not Detected
NS = Not Sampled

Table 5

2009 NASA Ames GWTS Monitoring Data
Standard Observations

Sample Location	Sample Date	Floating/ Suspended Material	Deposits, Discoloration and/or Plugging	Prevention of Overflow or Bypass	Odor
NASA-I	1/28/2009	--	--	--	No
NASA-E	1/28/2009	No	No	OK	No
NASA-I	2/17/2009	--	--	--	No
NASA-E	2/17/2009	No	No	OK	No
NASA-I	3/19/2009	--	--	--	No
NASA-E	3/19/2009	No	No	OK	No
NASA-I	4/27/09	--	--	--	No
NASA-E	4/27/09	No	No	OK	No
NASA-I	5/20/09	--	--	--	No
NASA-E	5/20/09	No	No	OK	No
NASA-I	6/23/09	--	--	--	No
NASA-E	6/23/09	No	No	OK	No
NASA-I	7/20/09	--	--	--	No
NASA-E	7/20/09	No	No	OK	No
NASA-I	8/27/09	--	--	--	No
NASA-E	8/27/09	No	No	OK	No
NASA-I	9/21/09	--	--	--	No
NASA-E	9/21/09	No	No	OK	No
NASA-I	10/27/09	--	--	--	No
NASA-E	10/27/09	No	No	OK	No
NASA-I	11/24/09	--	--	--	No
NASA-E	11/24/09	No	No	OK	No
NASA-I	12/15/09	--	--	--	No
NASA-E	12/15/09	No	No	OK	No

NASA-I = Influent
NASA-E = Effluent
-- = Analysis/analyses not required

5.0 DISCUSSION

5.1 Effluent Sample Detections

5.1.1 Chloromethane Detection in March Effluent Sample

On March 19, 2009, chloromethane was detected in the effluent sample at an estimated concentration ("J" value) of 0.39 µg/L. Chloromethane was detected in the influent sample at an estimated concentration ("J" value) of 0.24 µg/L. The "trigger" value for chloromethane, as provided in Table E.6 of the September 9, 2004 NPDES permit, is 5.0 ug/L ("other VOCs"). No further action was required.

5.1.2 Tetrachloroethene (PCE) Detection in May Effluent Sample

On May 20, 2009, tetrachloroethene (PCE) was detected in the effluent sample at an estimated concentration ("J" value) of 0.31 µg/L. PCE was not detected in the influent sample. The Maximum Daily Effluent Limitation for discharge to "Other Surface Water Areas" for PCE, as provided in Table B.1 of the September 9, 2004 NPDES permit, is 5.0 µg/L. No further action was required.

5.1.3 Chloromethane Detection in June Effluent Sample

On June 23, 2009 chloromethane was detected in the effluent sample at an estimated concentration ("J" value) of 0.36 µg/L. Chloromethane was not detected in the influent sample. The "trigger" value for chloromethane, as provided in Table E.6 of the September 9, 2004 NPDES permit, is 5.0 µg/L ("other VOCs"). No further action was required.

5.1.4 1,4-Dioxane Detection in June Effluent Sample

On June 23, 2009 sampling event, 1,4-Dioxane was detected in the effluent sample at a concentration 1.2 µg/L. 1,4-Dioxane was detected in the influent sample at a concentration of 1.1 µg/L. The "trigger" value for 1,4-Dioxane, as provided in Table E.6 of the September 9, 2004 NPDES permit, is 3.0 µg/L. No further action was required.

5.1.5 Motor Oil Detection in September Effluent Sample

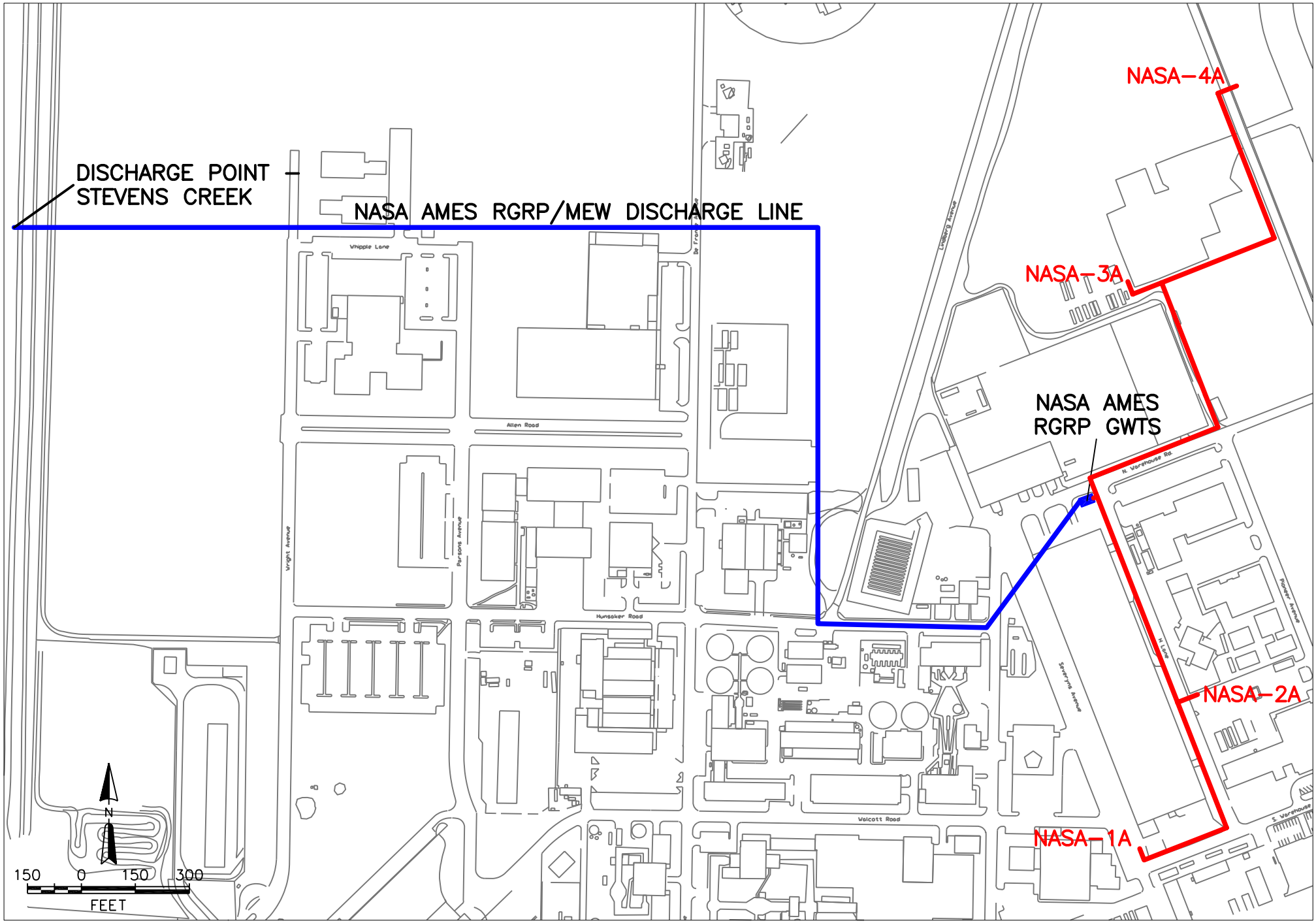
On September 27, 2009, TPH-MO was detected in the effluent sample at a concentration of 98 µg/L. TPH-MO was also detected in the influent sample at a concentration of 120 µg/L. Although no NPDES permit discharge limit has been established for TPH-MO, NASA was concerned about the detection since motor oil had only been detected during one previous sampling event (120 µg/L in the effluent sample collected on December 8, 2003).

On November 6, 2009, NASA collected confirmation samples of the influent and effluent samples for TPH-MO analyses. In addition, NASA prepared a sample blank using distilled water and a sample bottle from the same lot of sample bottles used for the September sampling event. The sample blank contained TPH-MO at a concentration of 110 µg/L, while the influent sample contained TPH-MO at a concentration of 94 µg/L. Motor oil was not detected in the effluent sample. It appears that the detection of motor oil during the September 27 sampling event was most likely caused by contaminated sample bottles.

Motor oil was not detected in any of the samples collected during the standard November and December sampling events.

6.0 CONCLUSIONS

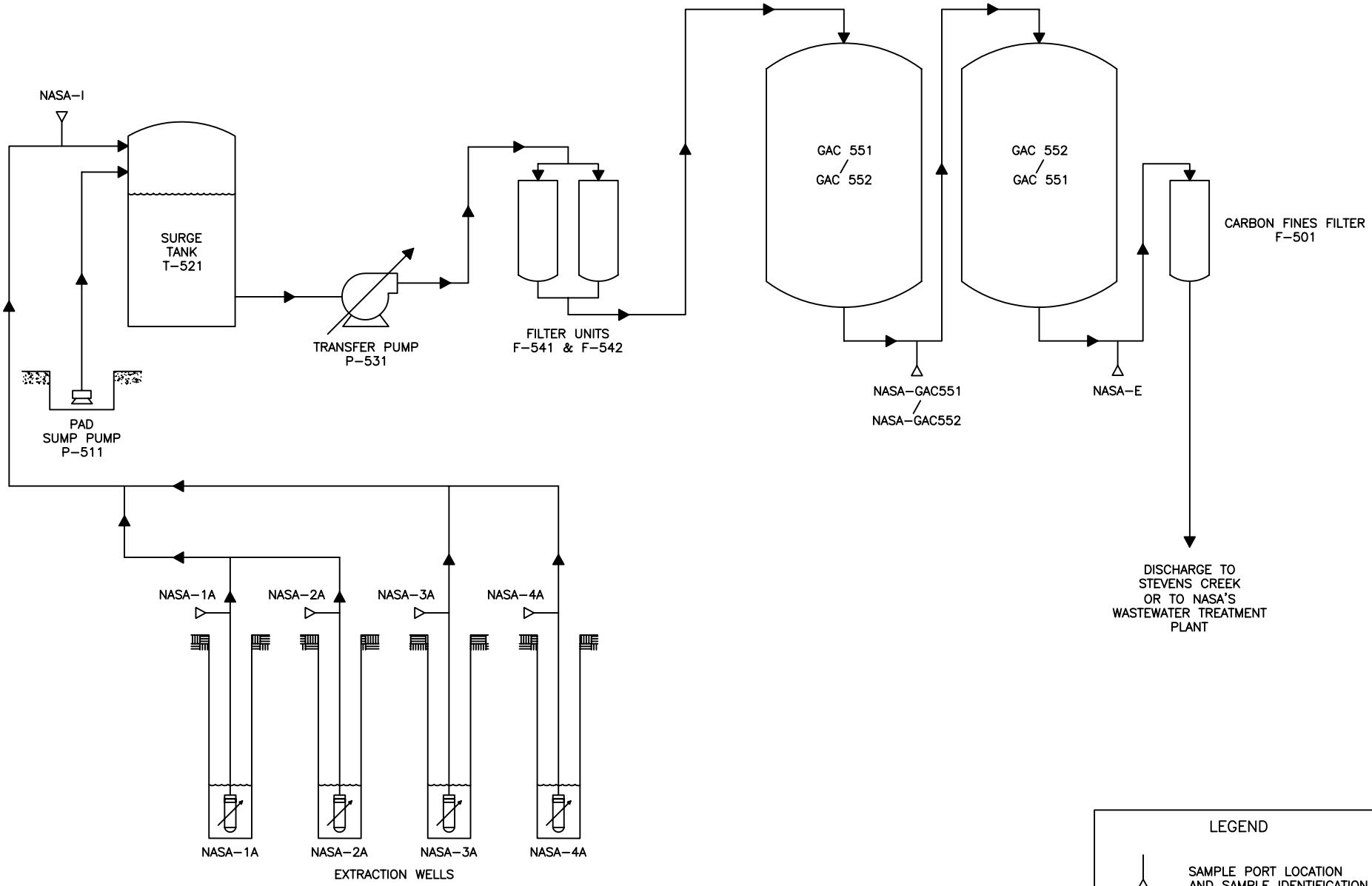
Data presented in Tables 3 4, and 5 indicate that the NASA Ames GWTS was in compliance with the effluent discharge limitations set forth in the September 9, 2004 NPDES permit during calendar year 2009.



Ames Research Center
Moffett Field, California 94035

TITLE:
NASA AMES RGRP GWTS
SYSTEM, DISCHARGE LINE, AND DISCHARGE POINT LOCATIONS

DWN: CNF	DES.: CNF	PROJECT NO.: RGRP GWTS
CHKD: DHV	APPD: JRL	FIGURE NO.: 1
DATE: 12/2003	REV.: 04	



Ames Research Center
Moffett Field, California 94035

TITLE:
NASA AMES RGRP GWTS
GWTS FLOW DIAGRAM AND SAMPLE PORT LOCATIONS

DWN: CNF	DES.: CNF	PROJECT NO.: RGRP GWTS
CHKD: DHV	APPD: JRL	
DATE: 03/2003	REV.: 02	FIGURE NO.: 2

APPENDIX B

2009 NASA DEPTH-TO-WATER MEASUREMENTS

2009 Depth-to-Water Measurements

Well	Date	Measuring Point Elevation (ft MSL)	Depth to Water (ft)	Water Elevation (ft MSL)
095A	03/26/09	6.57	6.49	0.08
095A	11/19/09	6.65	7.47	-0.82
10B01A	03/26/09	5.85	6.96	-1.11
10B01A	11/19/09	5.85	8.68	-2.83
10B04A	03/26/09	1.76	3.30	-1.54
10B04A	11/19/09	1.76	4.78	-3.02
10G04A	03/26/09	3.59	4.50	-0.91
10G04A	11/19/09	3.59	6.02	-2.43
10H01A	03/26/09	5.16	6.49	-1.33
10H01A	11/19/09	5.16	6.74	-1.58
10H02A	03/26/09	2.26	3.57	-1.31
10H02A	11/19/09	2.26	4.48	-2.22
10J04A	03/26/09	3.89	3.65	0.24
10J04A	11/19/09	3.89	4.75	-0.86
10J05A	03/26/09	6.34	5.32	1.02
10J05A	11/19/09	6.34	6.59	-0.25
10J09A	03/26/09	3.70	4.27	-0.57
10J09A	11/19/09	3.70	4.72	-1.02
10Q06A	03/26/09	12.12	7.66	4.46
10Q08A	03/26/09	6.54	3.71	2.83
10Q08A	11/19/09	6.54	5.22	1.32
10R07A2	03/26/09	10.70	7.80	2.90
10R07A2	11/19/09	10.70	8.24	2.46
10R09A	03/26/09	8.78	6.77	2.01
10R09A	11/19/09	8.78	7.73	1.05
10R10A	03/26/09	9.15	6.25	2.90
10R10A	11/19/09	9.15	7.84	1.31
10R11A	03/26/09	9.25	7.08	2.17
10R11A	11/19/09	9.25	8.16	1.09
11E02A	03/26/09	4.76	6.15	-1.39
11E02A	11/19/09	4.76	6.55	-1.79
11M02A	03/26/09	4.27	3.84	0.43
11M02A	11/19/09	4.27	4.86	-0.59
11M03A	03/26/09	6.51	7.24	-0.73
11M03A	11/19/09	6.51	8.02	-1.51
11M07A	03/26/09	5.86	5.68	0.18
11M07A	11/19/09	5.86	6.90	-1.04
11M14A1	03/26/09	8.26	8.50	-0.24
11M14A1	11/19/09	8.26	9.46	-1.20
11M16A1	03/26/09	8.79	9.40	-0.61
11M16A1	11/19/09	8.79	10.19	-1.40
11M17A	11/19/09	4.16	5.39	-1.23
11M18A1	11/19/09	3.72	5.25	-1.53
11M21A	03/26/09	7.10	6.87	0.23
11M21A	11/19/09	7.10	8.03	-0.93
11M25A	03/26/09	3.73	4.06	-0.33

2009 Depth-to-Water Measurements

Well	Date	Measuring Point Elevation (ft MSL)	Depth to Water (ft)	Water Elevation (ft MSL)
11N21A1	03/26/09	6.14	5.86	0.28
11N21A1	11/19/09	6.14	6.96	-0.82
11N22A1	03/26/09	10.75	10.02	0.73
11N22A1	11/19/09	10.75	11.26	-0.51
11N26A	03/26/09	9.13	8.40	0.73
11N27A	11/19/09	12.25	10.96	1.29
12L03A	03/26/09	10.62	12.20	-1.58
14C06A	03/26/09	15.02	10.37	4.65
14C06A	11/19/09	15.02	12.15	2.87
14C15A	03/26/09	13.39	9.76	3.63
14C15A	11/19/09	13.39	11.79	1.60
14C33A	03/26/09	13.55	8.57	4.98
14C33A	11/19/09	13.55	10.38	3.17
14C40A	03/26/09	11.49	7.49	4.00
14C40A	11/19/09	11.49	8.99	2.50
14C60A	03/26/09	10.27	7.75	2.52
14C60A	11/19/09	10.27	9.21	1.06
14D02A	03/26/09	10.15	6.31	3.84
14D02A	11/19/09	10.15	7.99	2.16
14D05A	03/26/09	14.68	6.35	8.33
14D05A	06/25/09	14.68	7.20	7.48
14D05A	11/19/09	14.68	7.22	7.46
14D09A	03/26/09	15.81	8.83	6.98
14D09A	11/19/09	15.81	10.20	5.61
14D12A	03/26/09	14.78	8.88	5.90
14D12A	06/25/09	14.78	9.94	4.84
14D12A	11/19/09	14.78	10.50	4.28
14D24A	03/26/09	8.29	9.66	-1.37
14D24A	11/19/09	8.29	12.31	-4.02
14D25A2	03/26/09	8.30	5.21	3.09
14D25A2	11/19/09	8.30	6.83	1.47
14D26A1	03/26/09	8.35	11.13	-2.78
14D26A1	11/19/09	8.35	13.99	-5.64
14D29A	03/26/09	13.93	8.54	5.39
14D29A	06/25/09	13.93	9.97	3.96
14D29A	11/19/09	13.93	10.13	3.80
14D30A	06/25/09	13.45	7.06	6.39
14D31A2	03/26/09	8.02	5.55	2.47
14D31A2	11/19/09	8.02	7.20	0.82
14D33A	03/26/09	10.00	6.43	3.57
14D33A	11/19/09	10.00	8.06	1.94
14D35A	03/26/09	9.29	5.97	3.32
14D35A	11/19/09	9.29	7.61	1.68
14D36A	03/26/09	12.05	7.26	4.79
14D36A	11/19/09	12.05	8.84	3.21

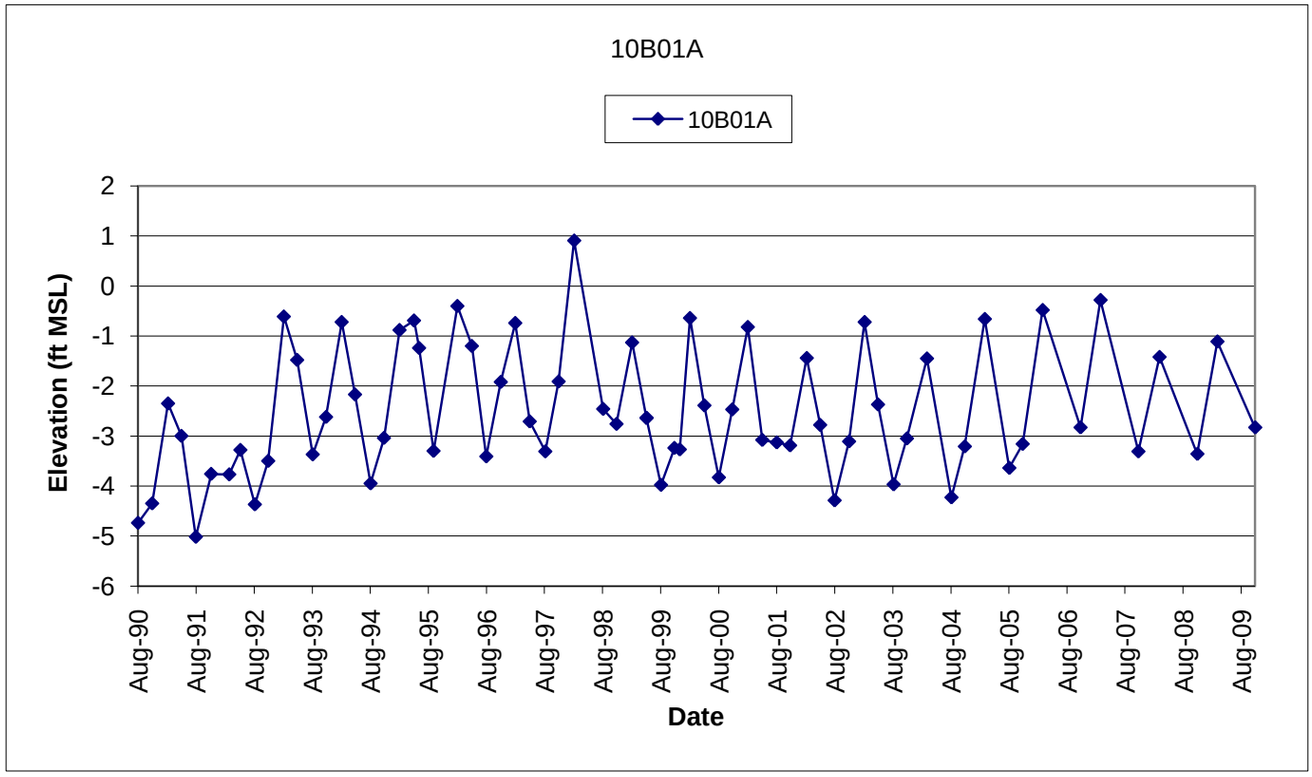
2009 Depth-to-Water Measurements

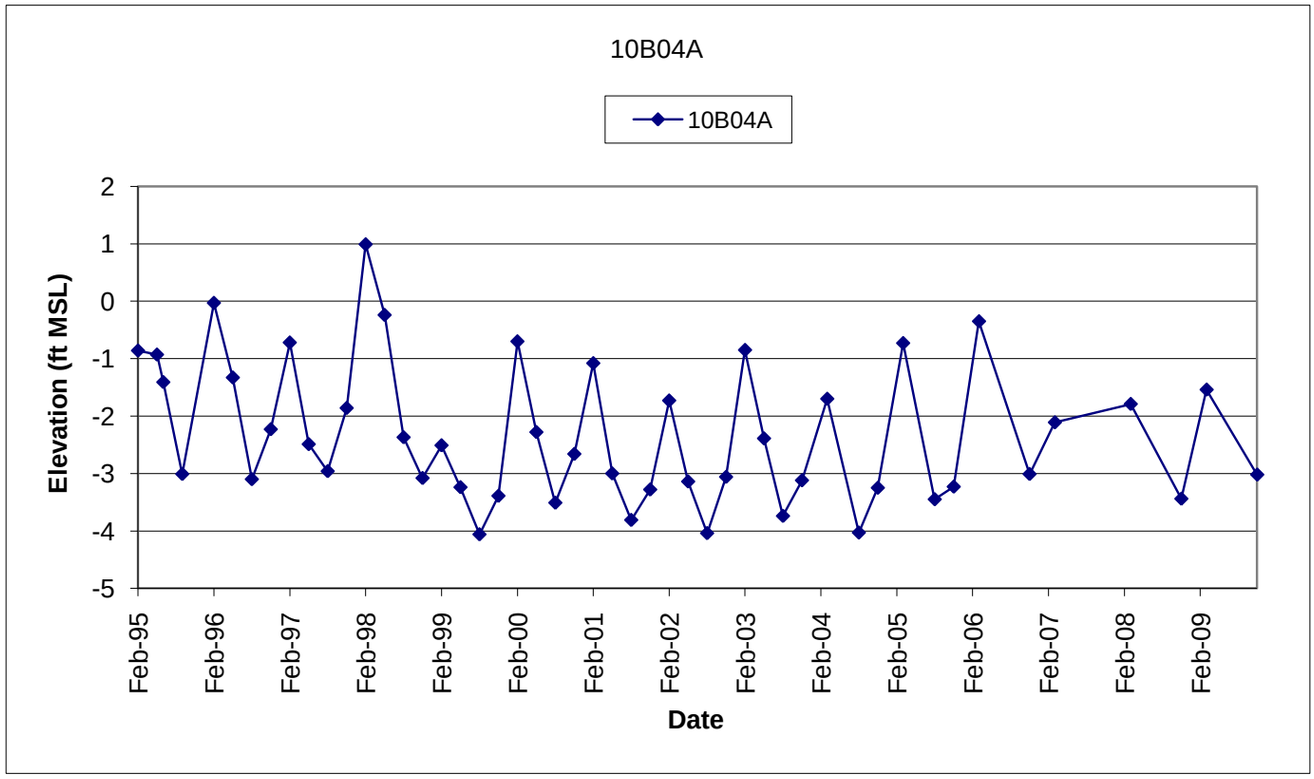
Well	Date	Measuring Point Elevation (ft MSL)	Depth to Water (ft)	Water Elevation (ft MSL)
14D37A	03/26/09	8.19	5.24	2.95
14D37A	11/19/09	8.19	6.88	1.31
14D39A	03/26/09	12.51	8.12	4.39
14D39A	11/19/09	12.51	9.69	2.82
14E14A	03/26/09	21.64	10.98	10.66
14E14A	11/19/09	21.64	11.99	9.65
14L32A	11/19/09	11.29	7.80	3.49
15A01A	03/26/09	15.36	9.71	5.65
15A01A	11/19/09	15.36	11.01	4.35
15A02A	03/26/09	17.14	6.46	10.68
15A02A	11/19/09	17.14	7.45	9.69
15A04A	03/26/09	14.24	7.18	7.06
15A04A	11/19/09	14.24	8.56	5.68
15A06A	03/26/09	15.24	5.86	9.38
15A06A	11/19/09	15.24	7.18	8.06
15A08A	03/26/09	14.31	6.64	7.67
15A08A	11/19/09	14.31	7.80	6.51
15A11A	03/26/09	15.08	5.69	9.39
15A12A2	03/26/09	16.94	7.67	9.27
15A12A2	11/19/09	16.94	7.67	9.27
15A15A2	03/26/09	12.35	8.10	4.25
15A15A2	11/19/09	12.35	9.44	2.91
15A16A	03/26/09	12.21	7.96	4.25
15A16A	11/19/09	12.21	9.45	2.76
15A18A	03/26/09	12.67	7.40	5.27
15A18A	11/19/09	12.67	8.91	3.76
15B02A	11/19/09	13.18	7.80	5.38
15B06A	11/19/09	11.49	7.26	4.23
15B08A	03/26/09	14.74	6.38	8.36
15B08A	11/19/09	14.74	7.60	7.14
15B09A	03/26/09	13.19	6.00	7.19
15B09A	11/19/09	13.19	7.22	5.97
15B10A	03/26/09	15.37	5.04	10.33
15B10A	11/19/09	15.37	6.52	8.85
15B17A2	03/26/09	14.82	5.17	9.65
15B17A2	11/19/09	14.82	6.45	8.37
15B18A2	03/26/09	15.20	5.18	10.02
15B18A2	11/19/09	15.20	6.45	8.75
15H05A	03/26/09	18.69	5.63	13.06
15H05A	11/19/09	18.69	6.58	12.11
15H12A	03/26/09	14.77	5.28	9.49
15H12A	11/19/09	14.77	6.69	8.08
TANK1-E	03/26/09	16.45	6.49	9.96
TANK1-E	11/19/09	16.45	7.45	9.00
W08-08A1	03/26/09	5.10	9.22	-4.12
W08-08A1	11/19/09	5.10	6.06	-0.96

APPENDIX C

NASA 2009 HYDROGRAPHS

APPENDIX C
2009 Hydrographs





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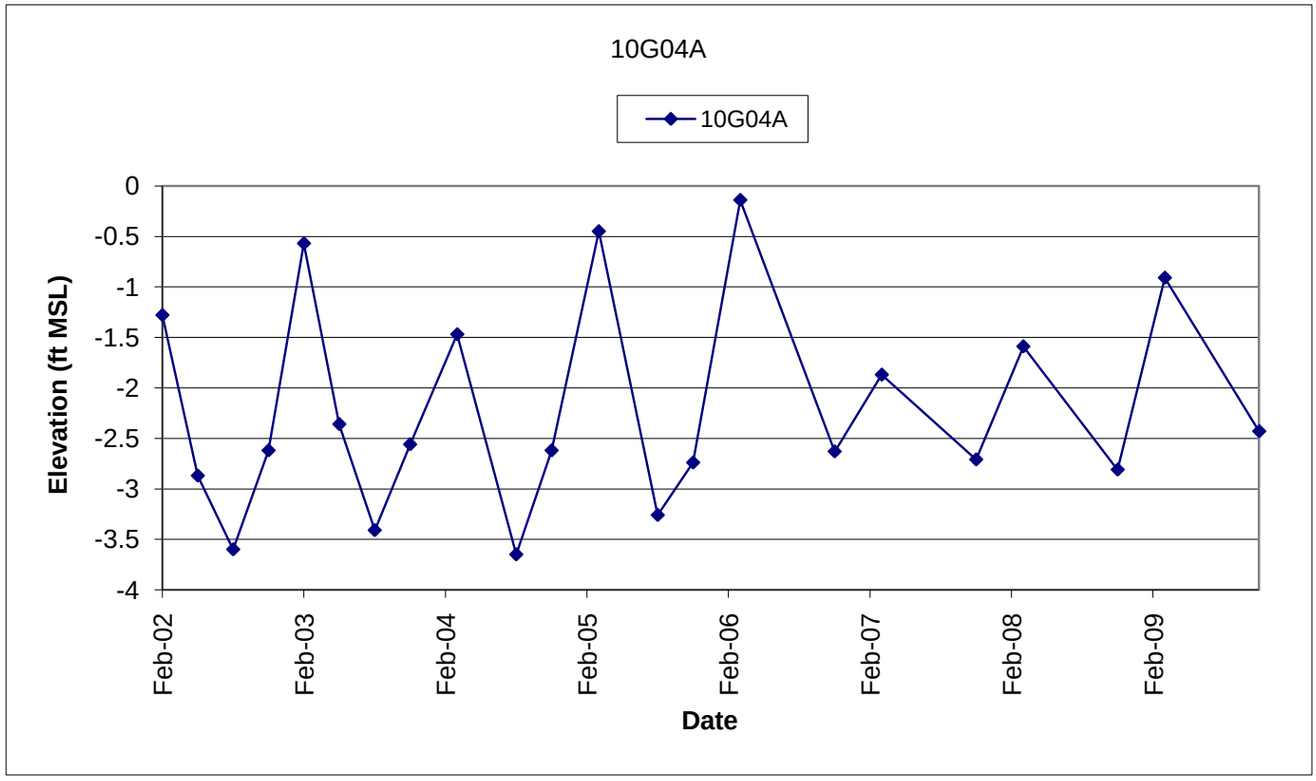
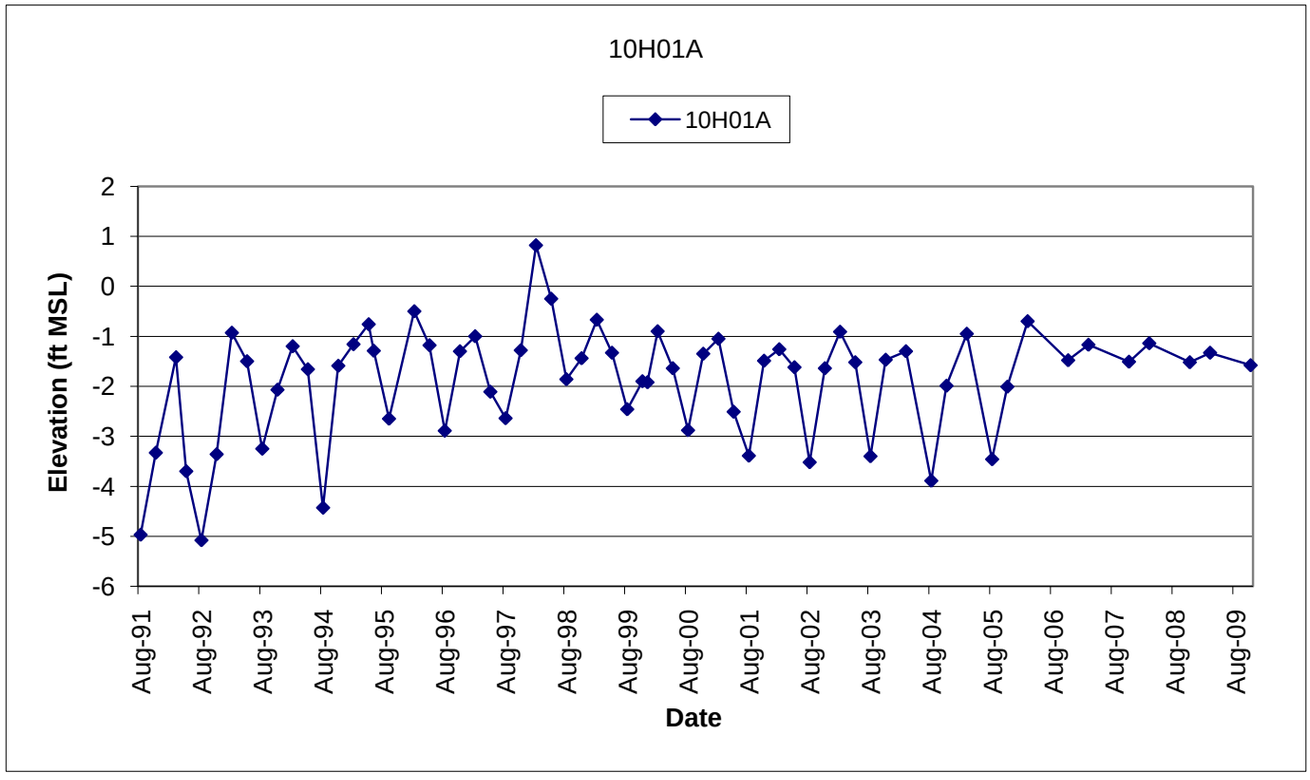
2009 Hydrographs





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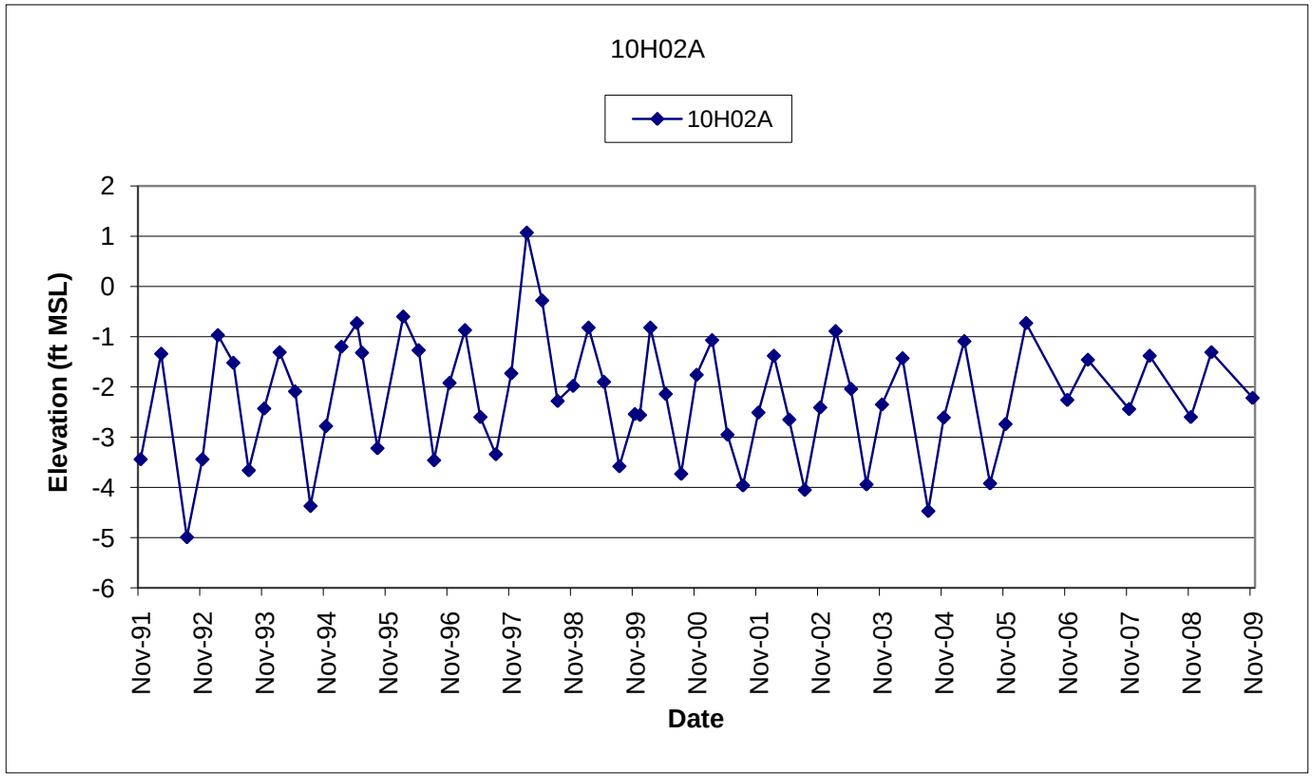
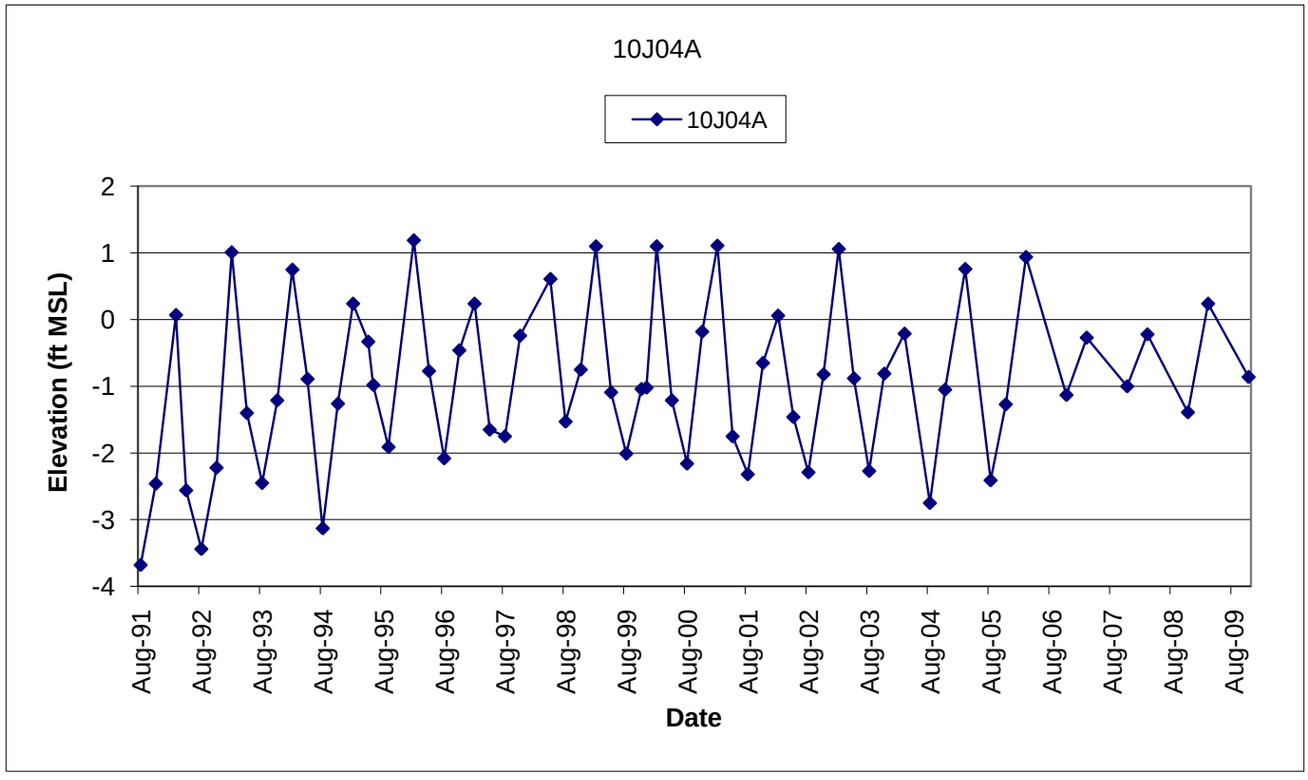
2009 Hydrographs





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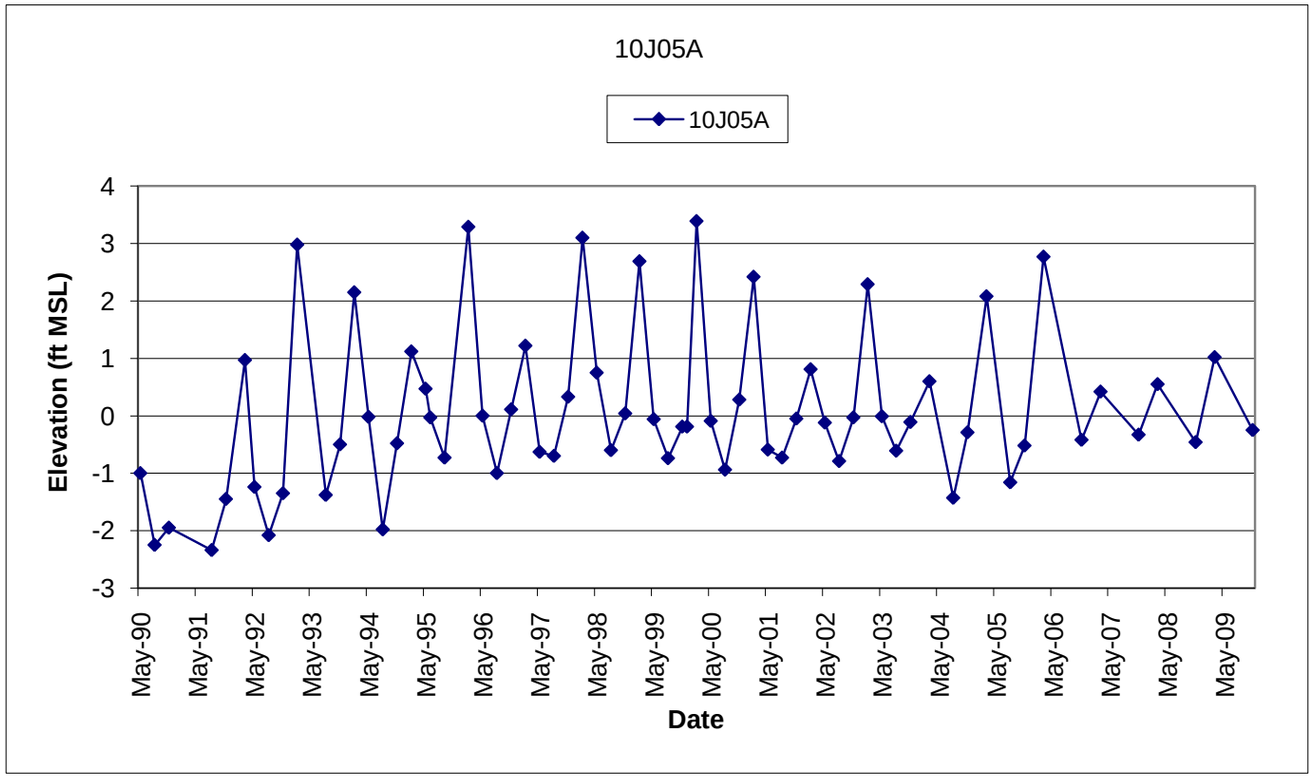
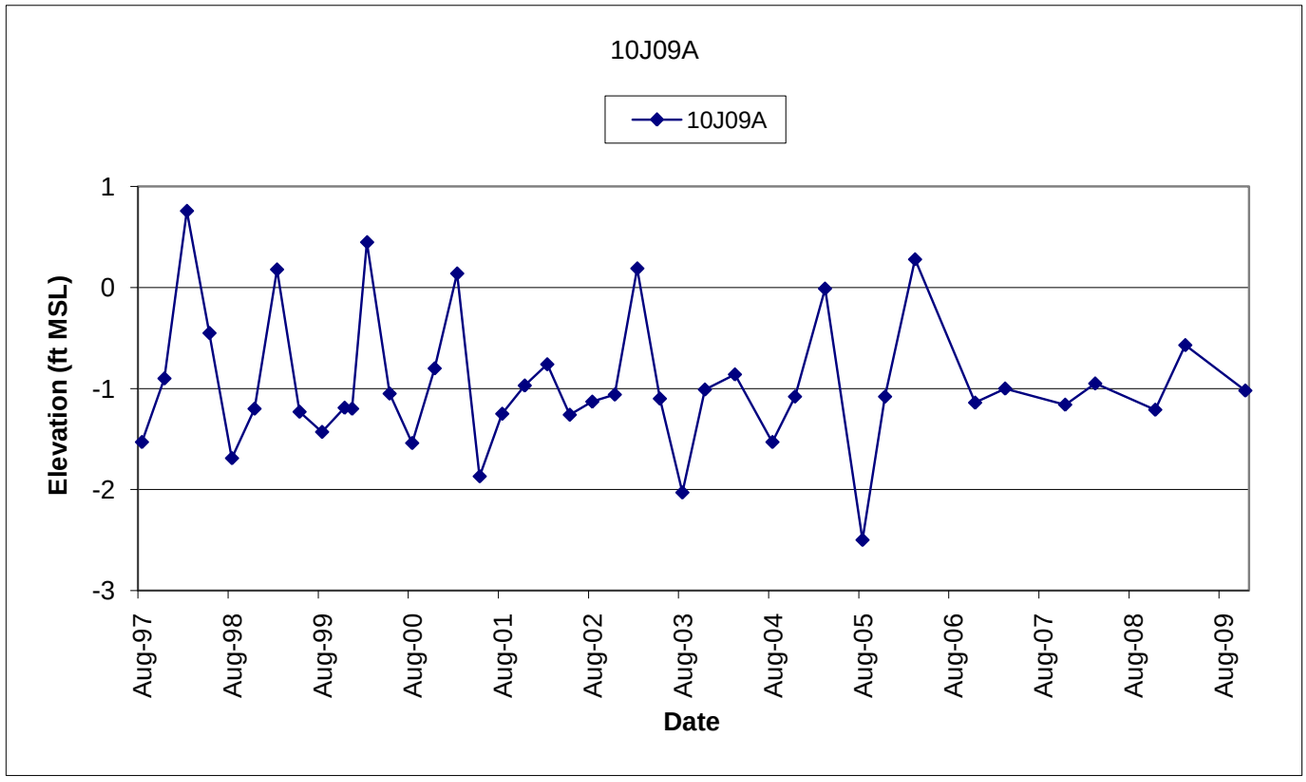
2009 Hydrographs





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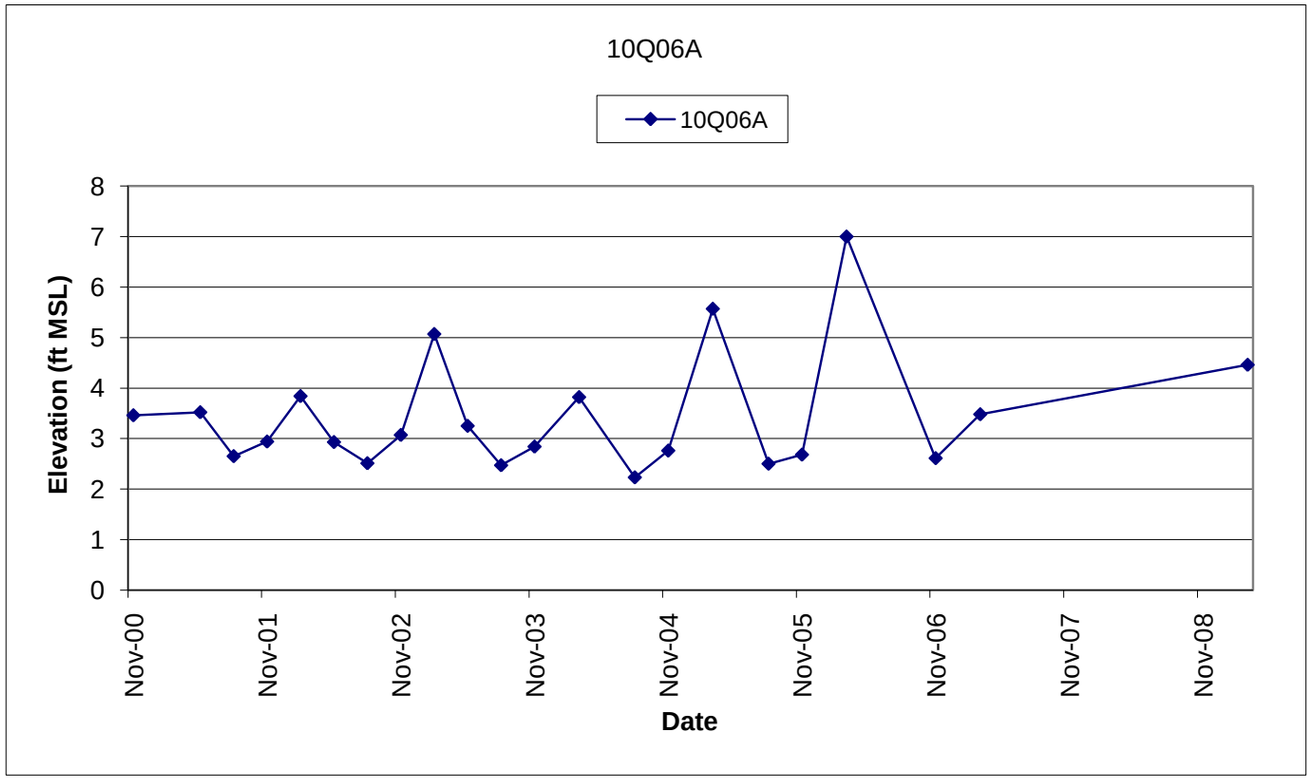
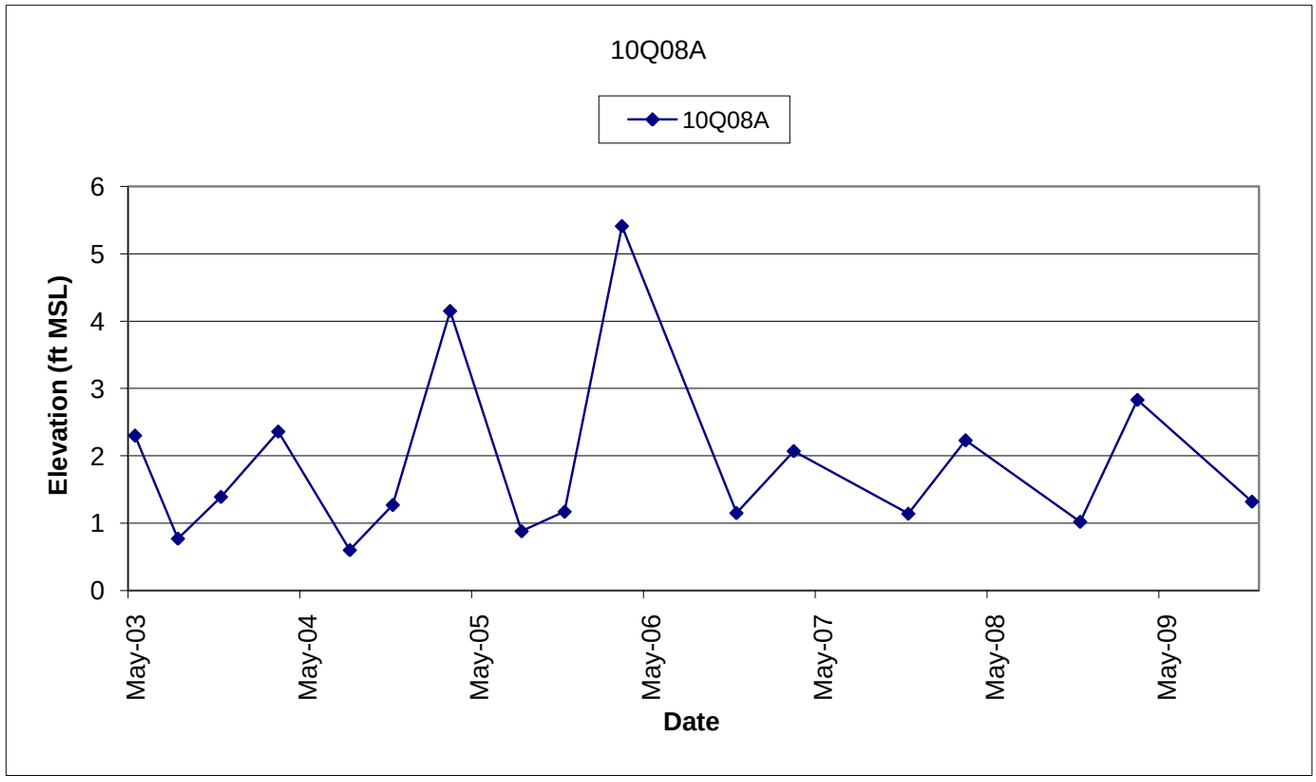
2009 Hydrographs





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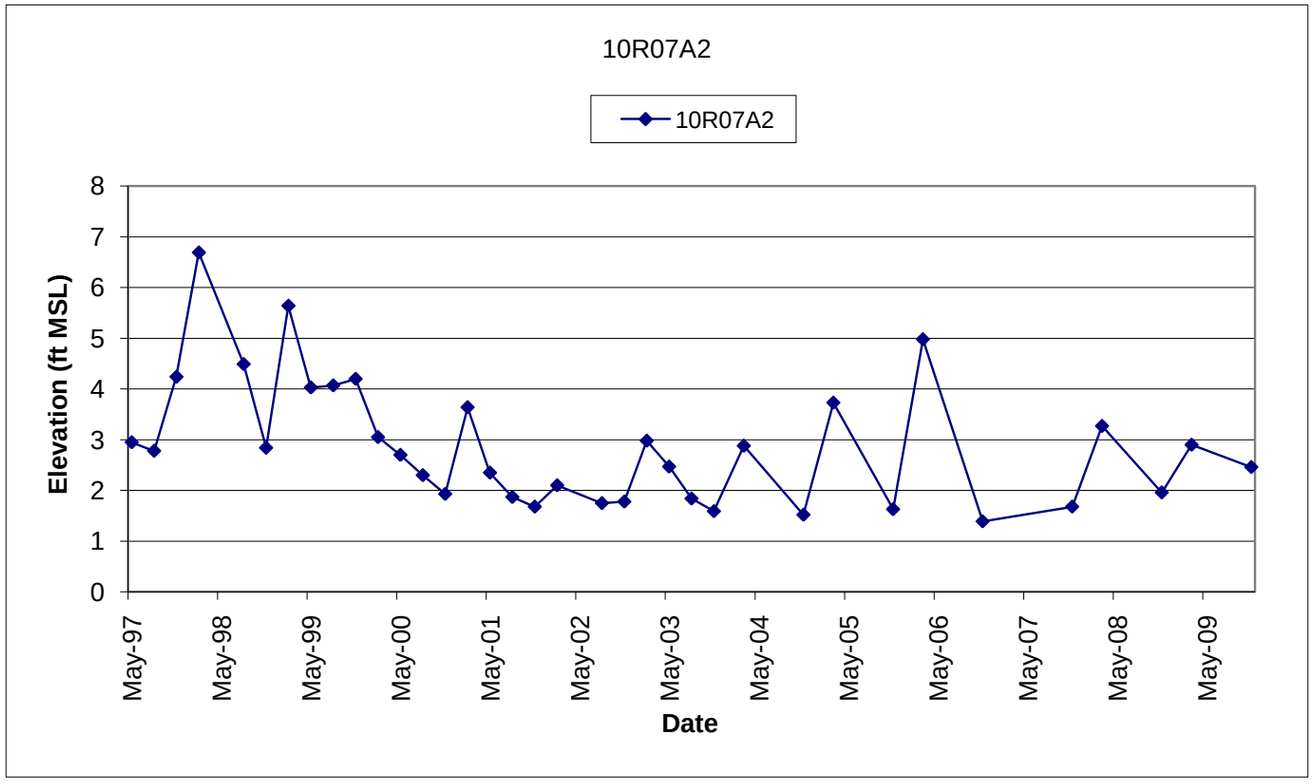
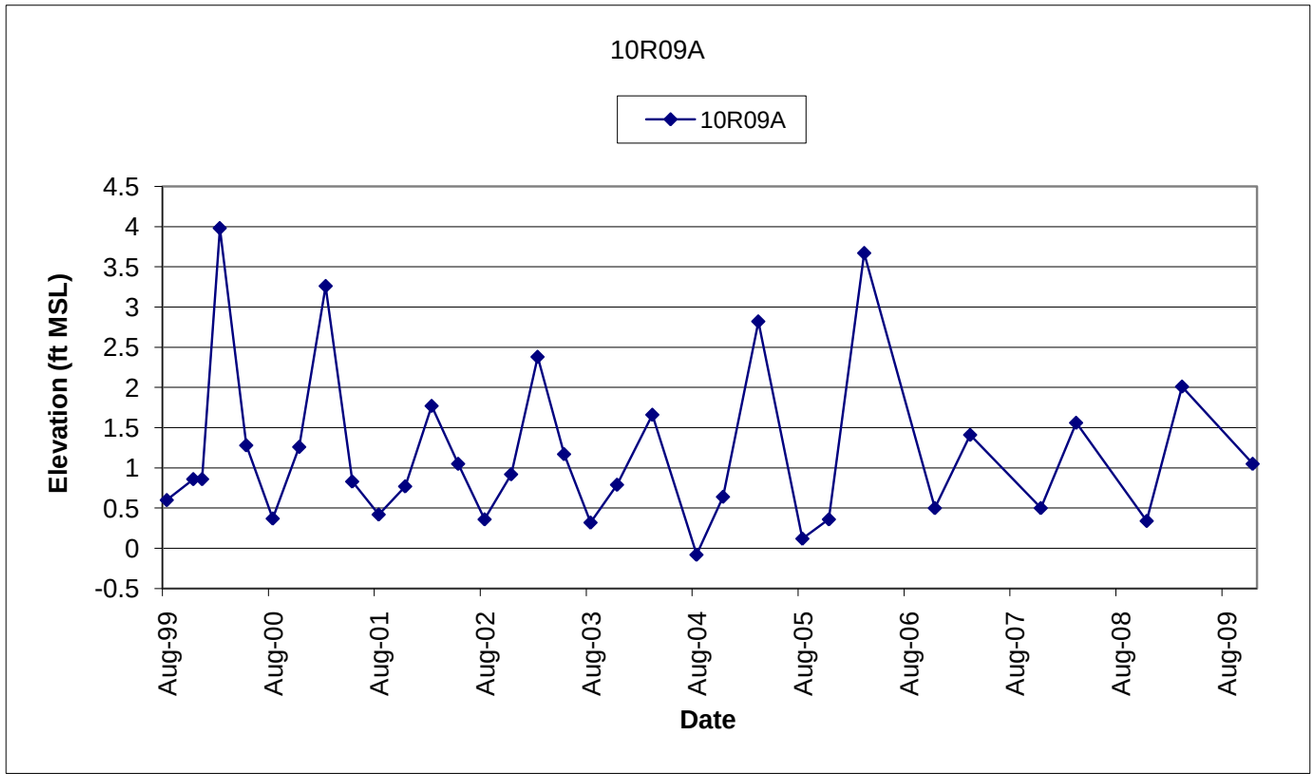
2009 Hydrographs





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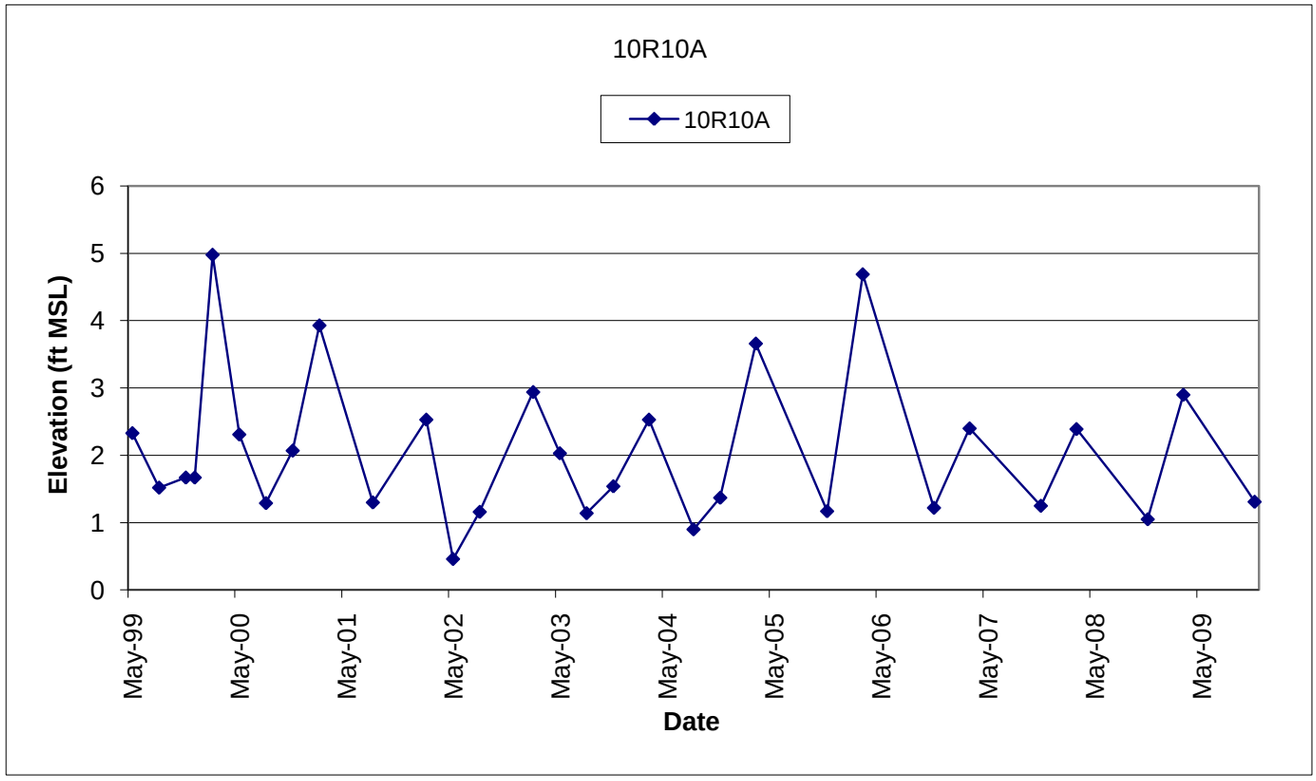
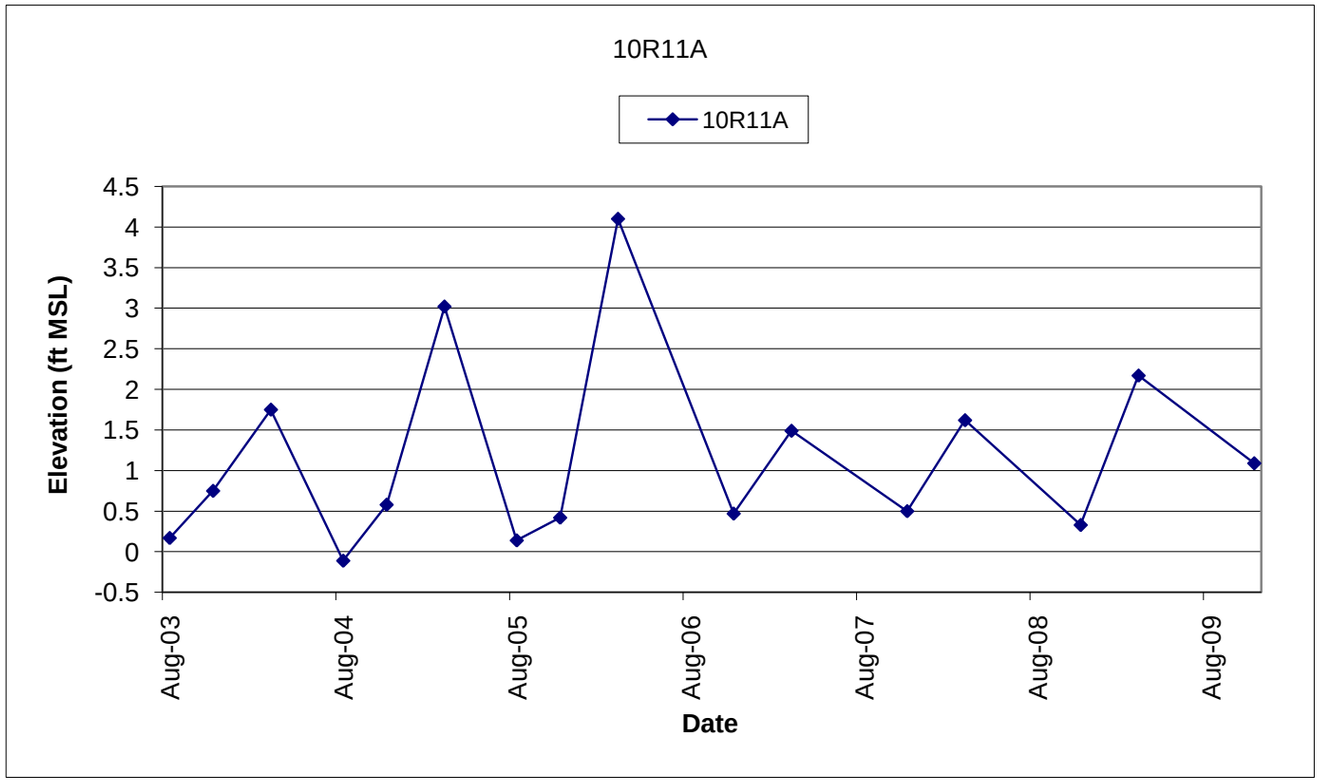
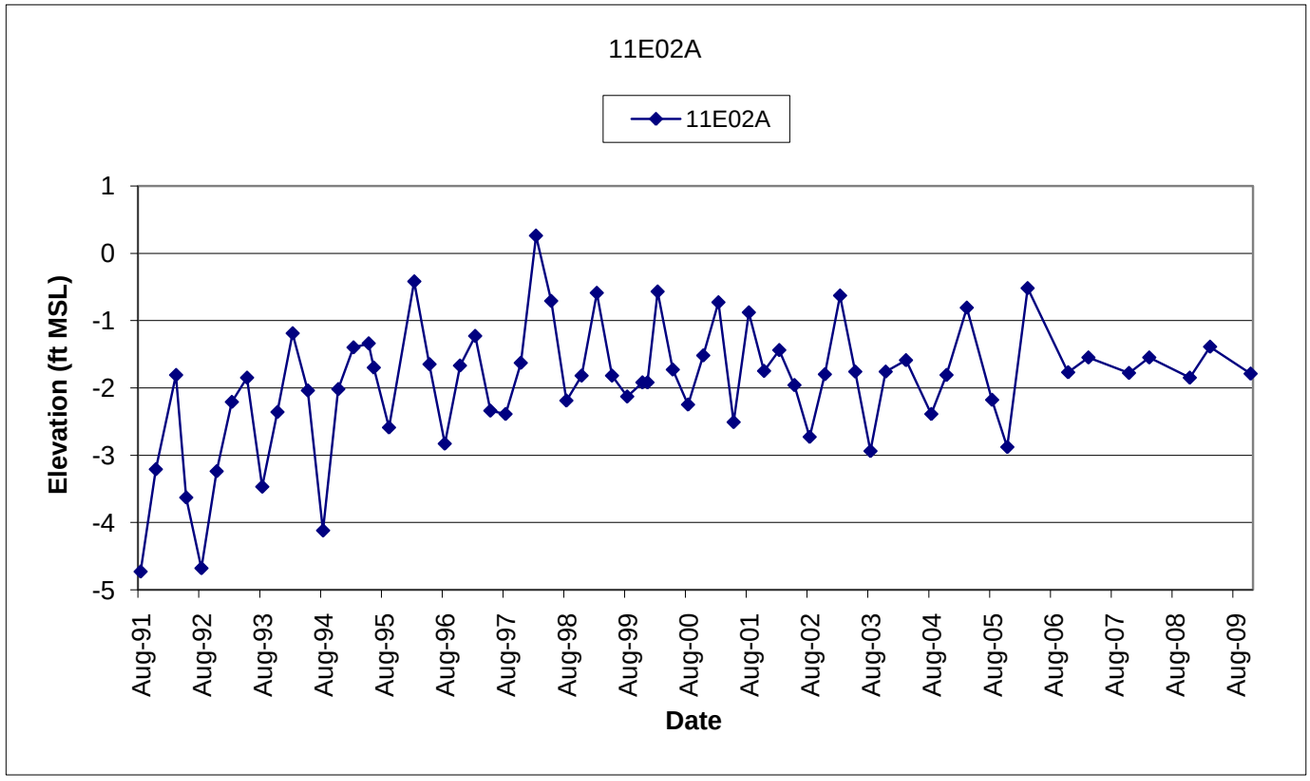
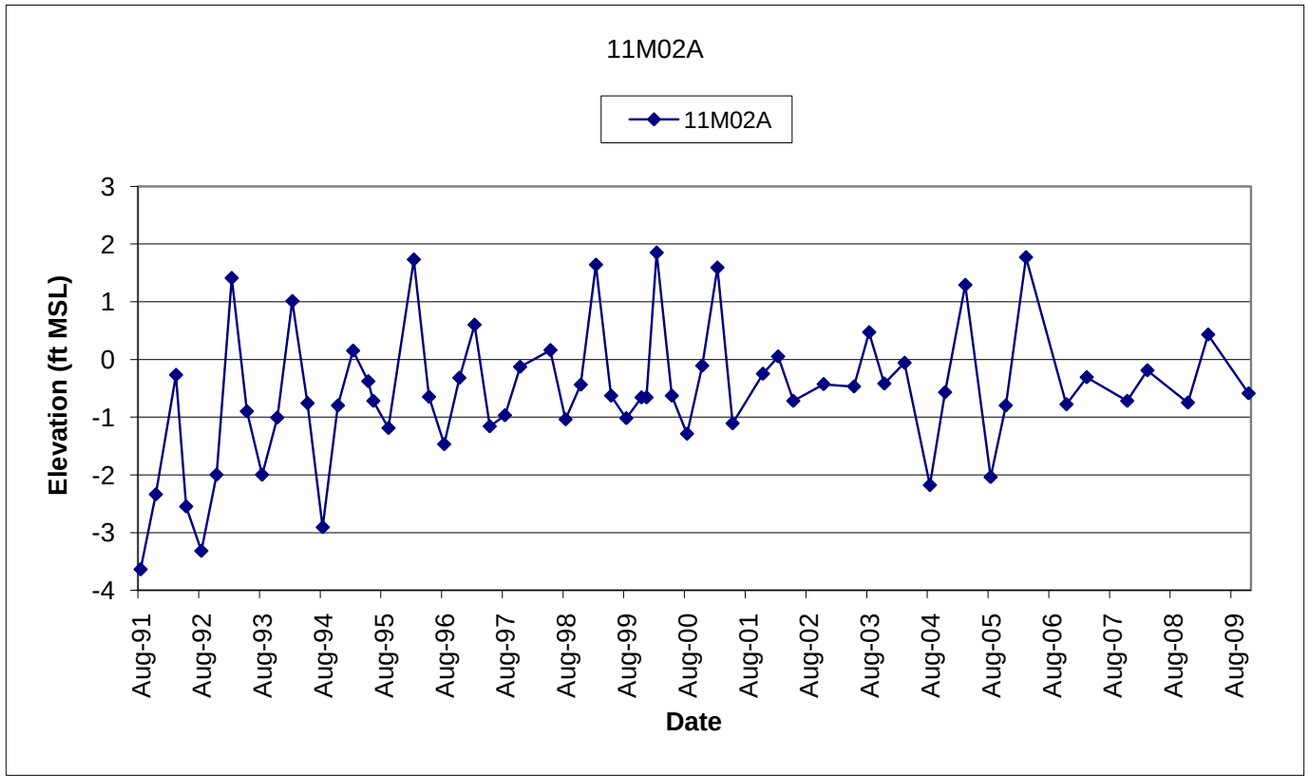
2009 Hydrographs



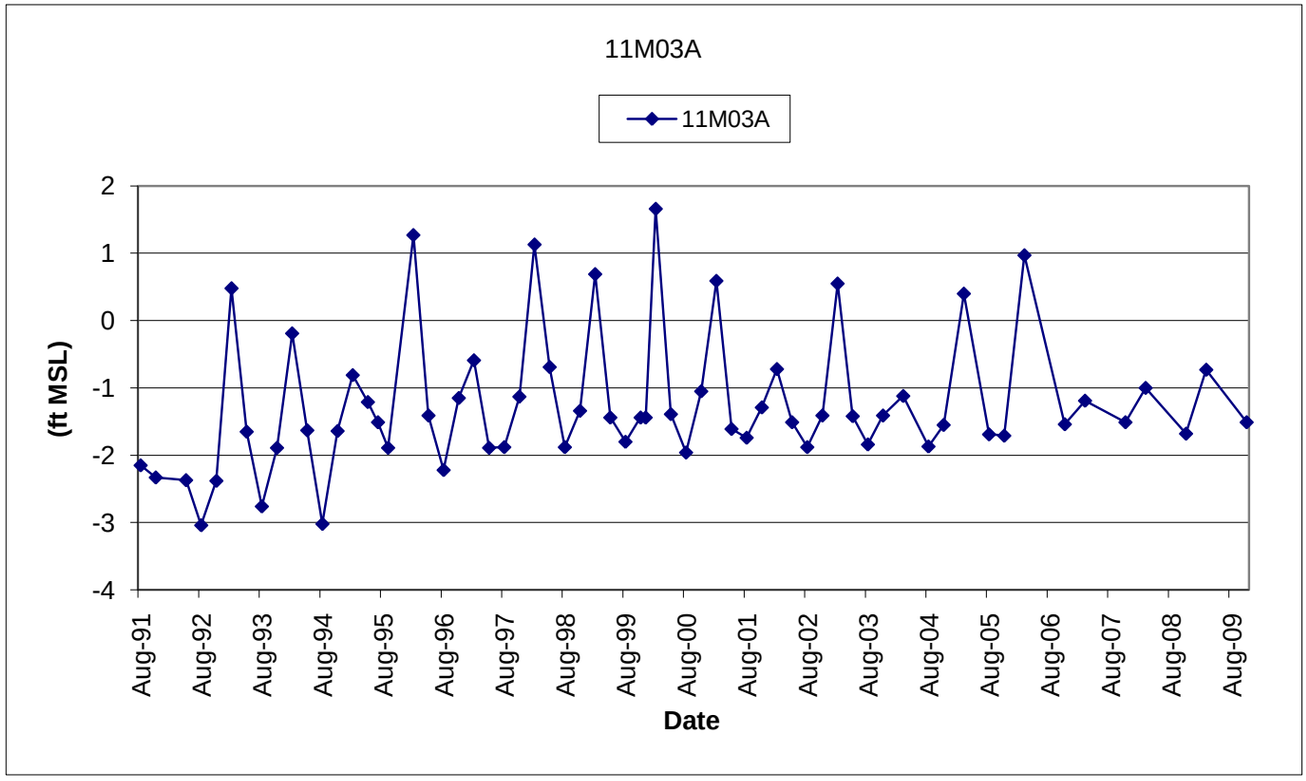


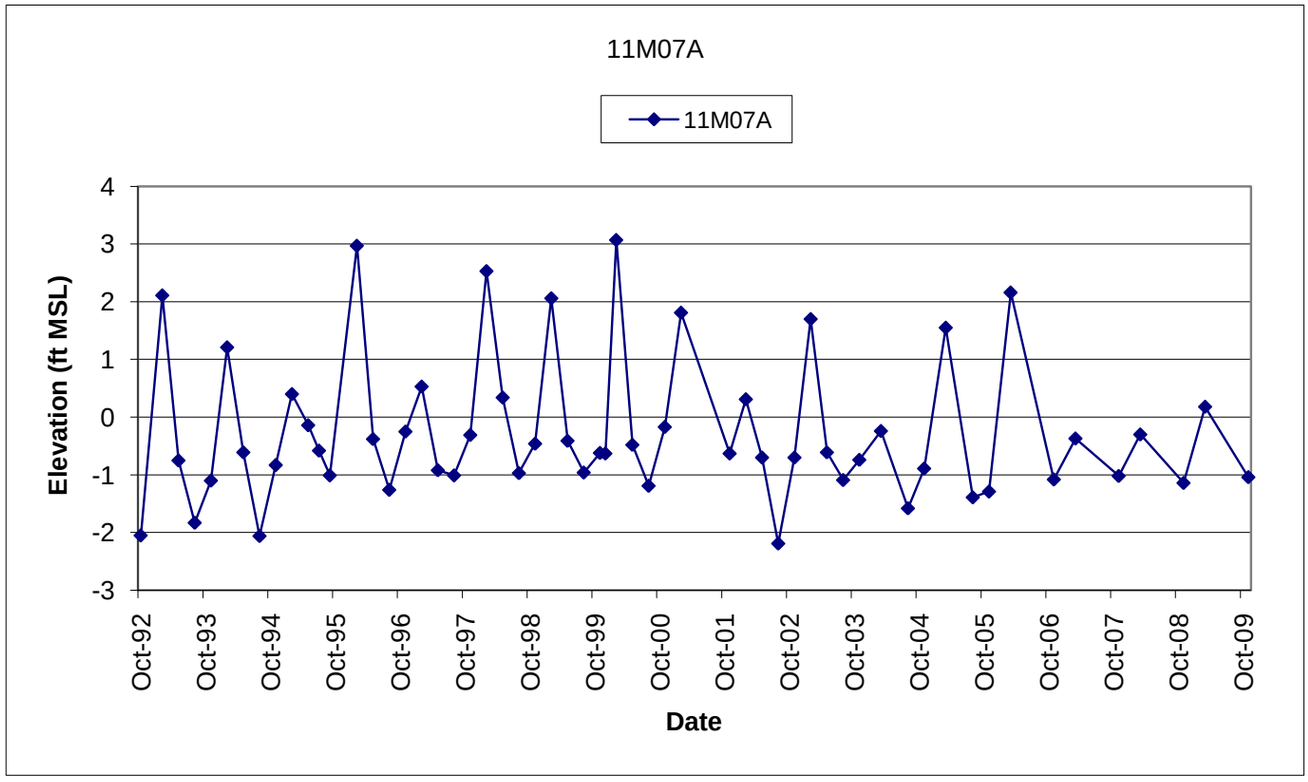
APPENDIX C
2009 Hydrographs



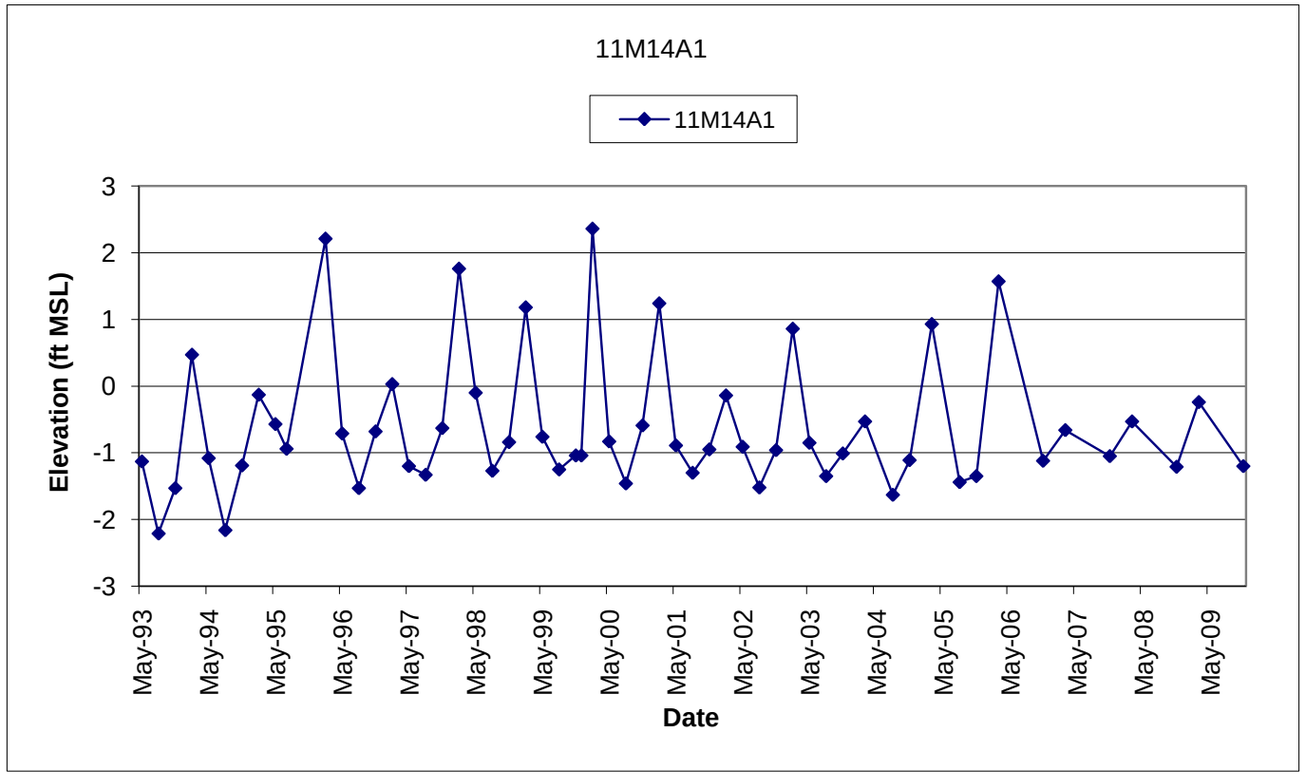


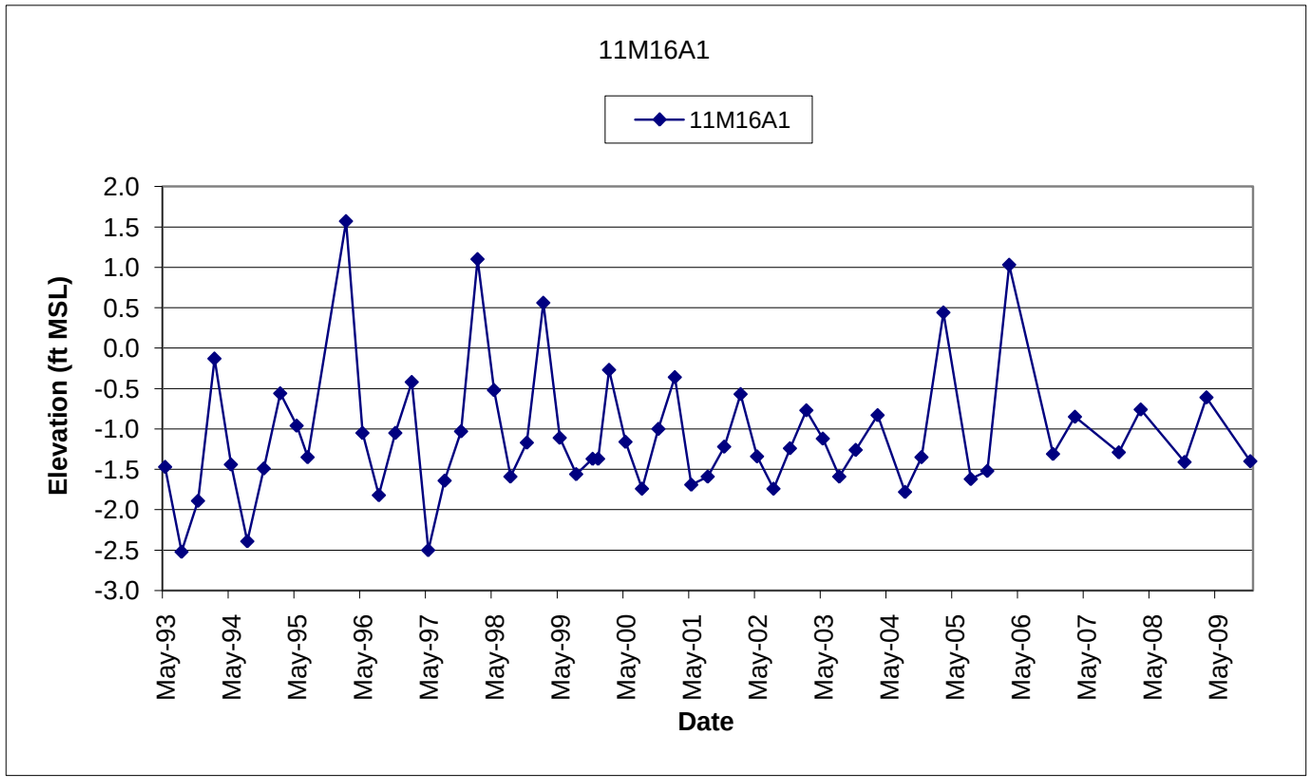
APPENDIX C
2009 Hydrographs



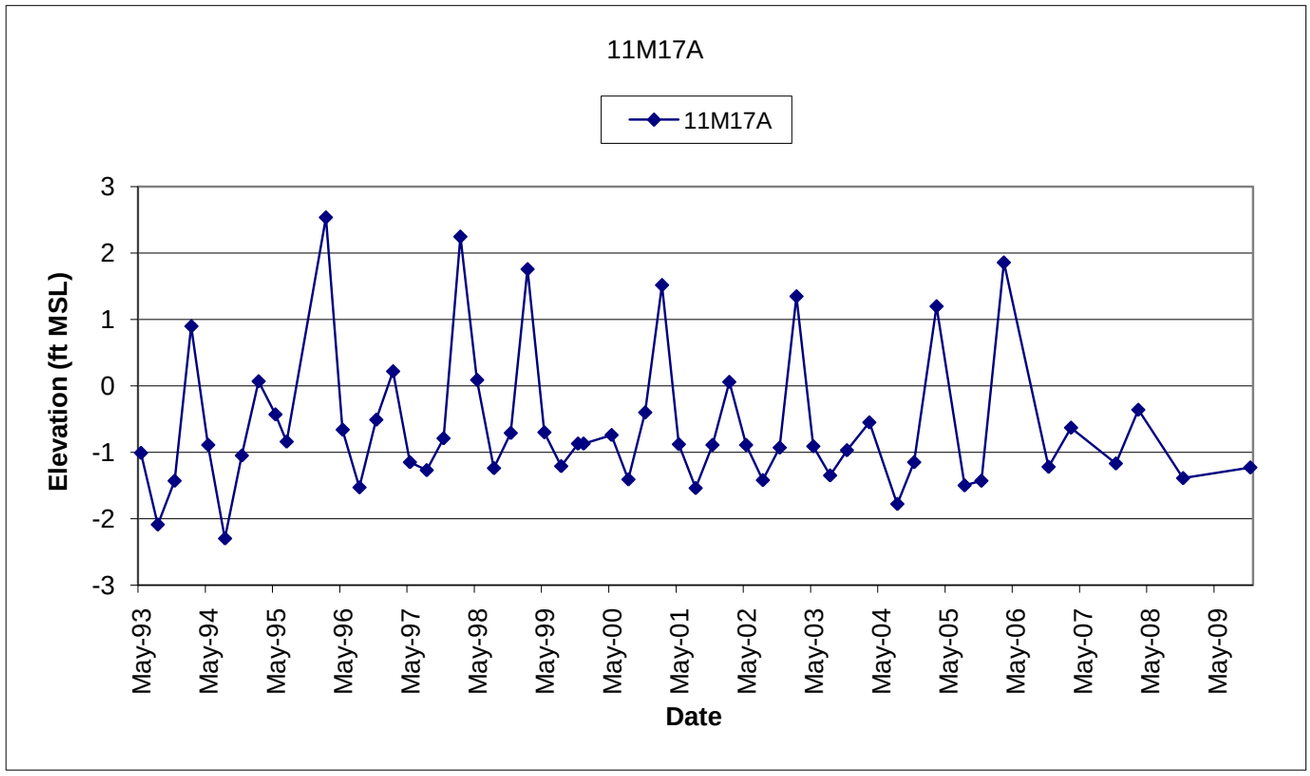


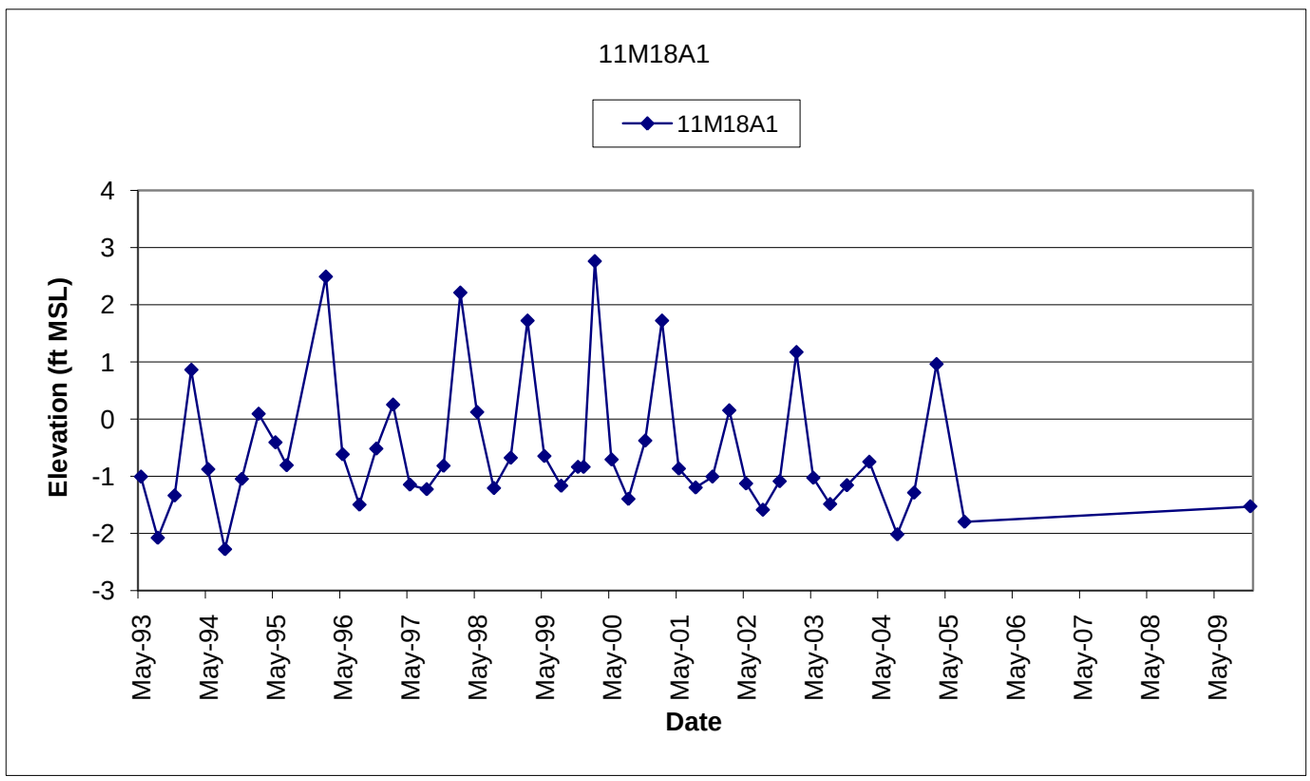
APPENDIX C
2009 Hydrographs





APPENDIX C
2009 Hydrographs





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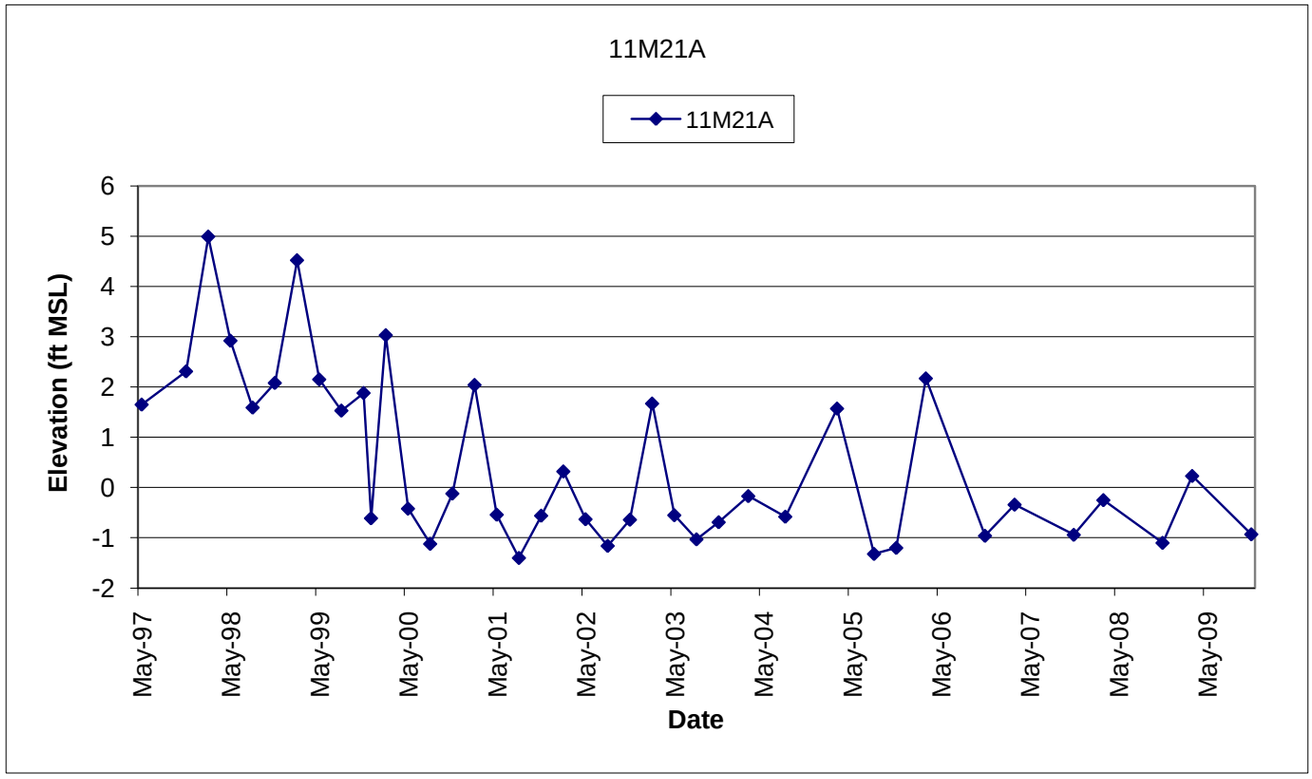
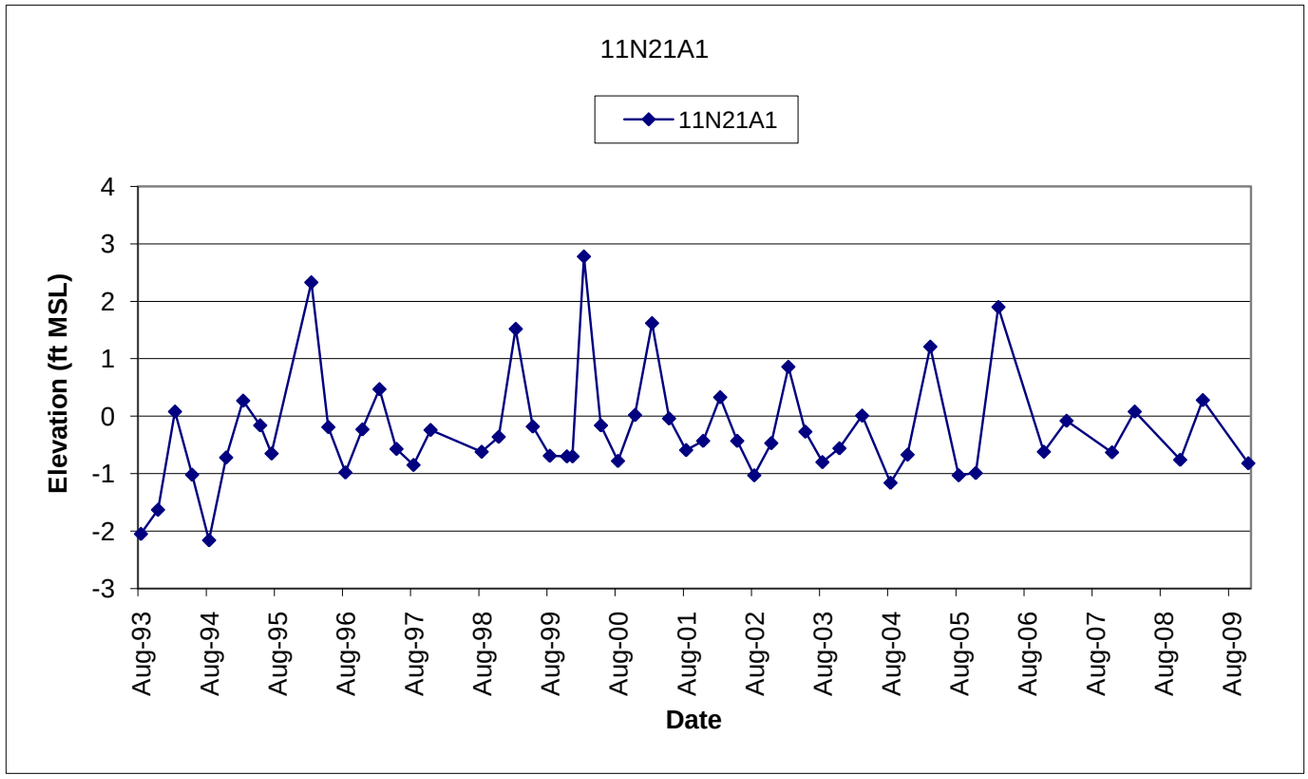
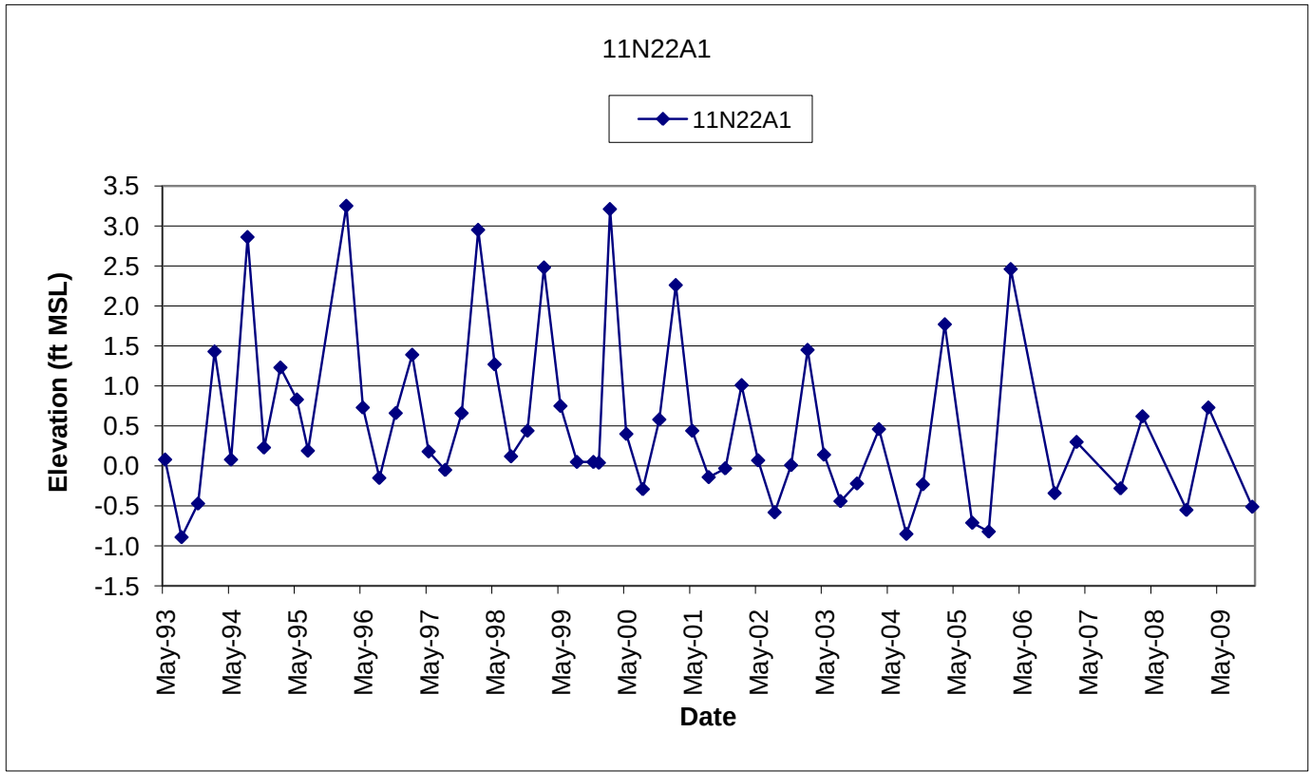
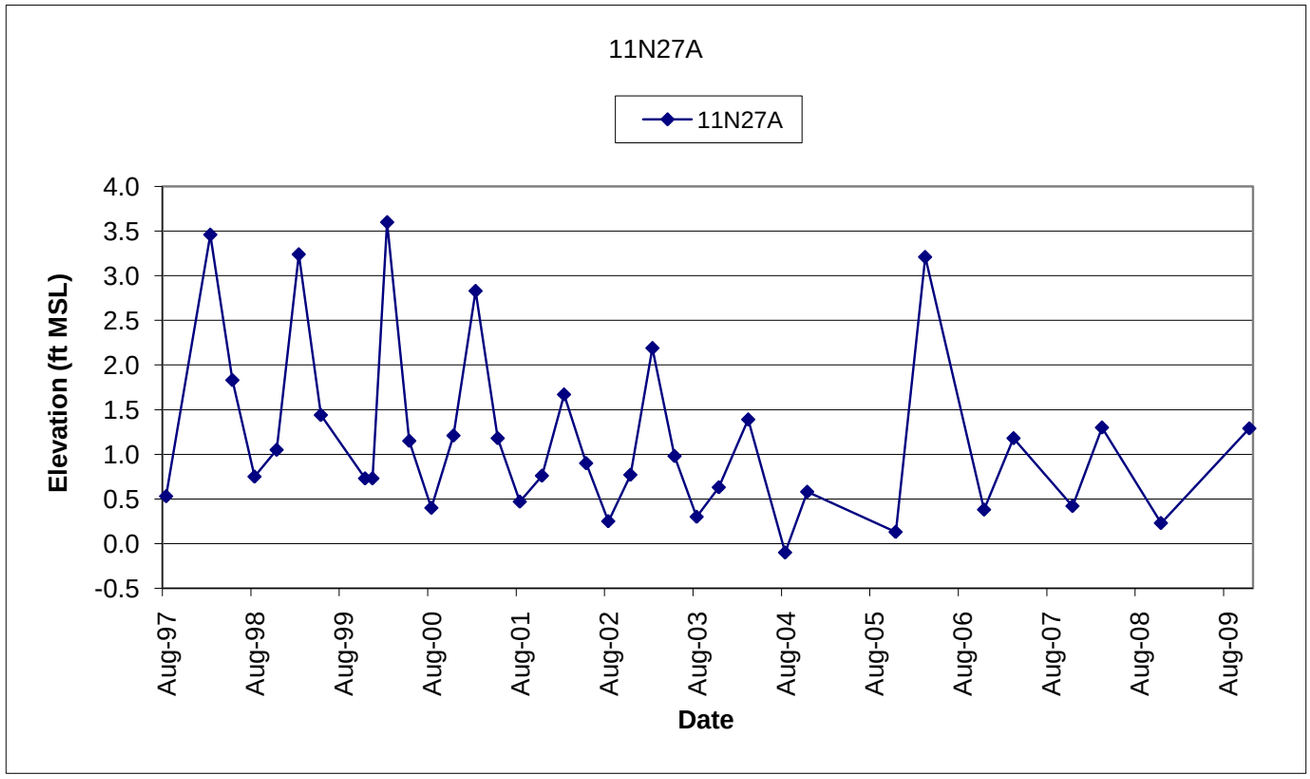
2009 Hydrographs





APPENDIX C
2009 Hydrographs





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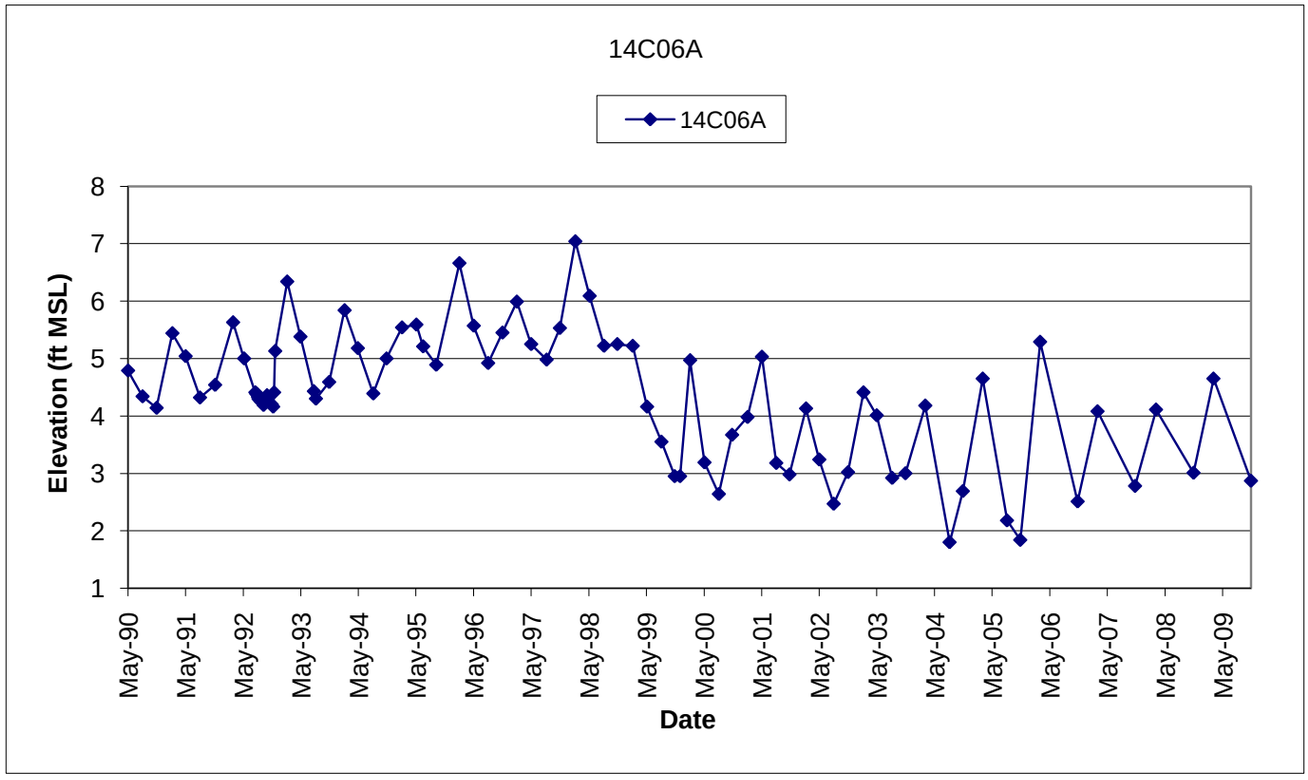
2009 Hydrographs



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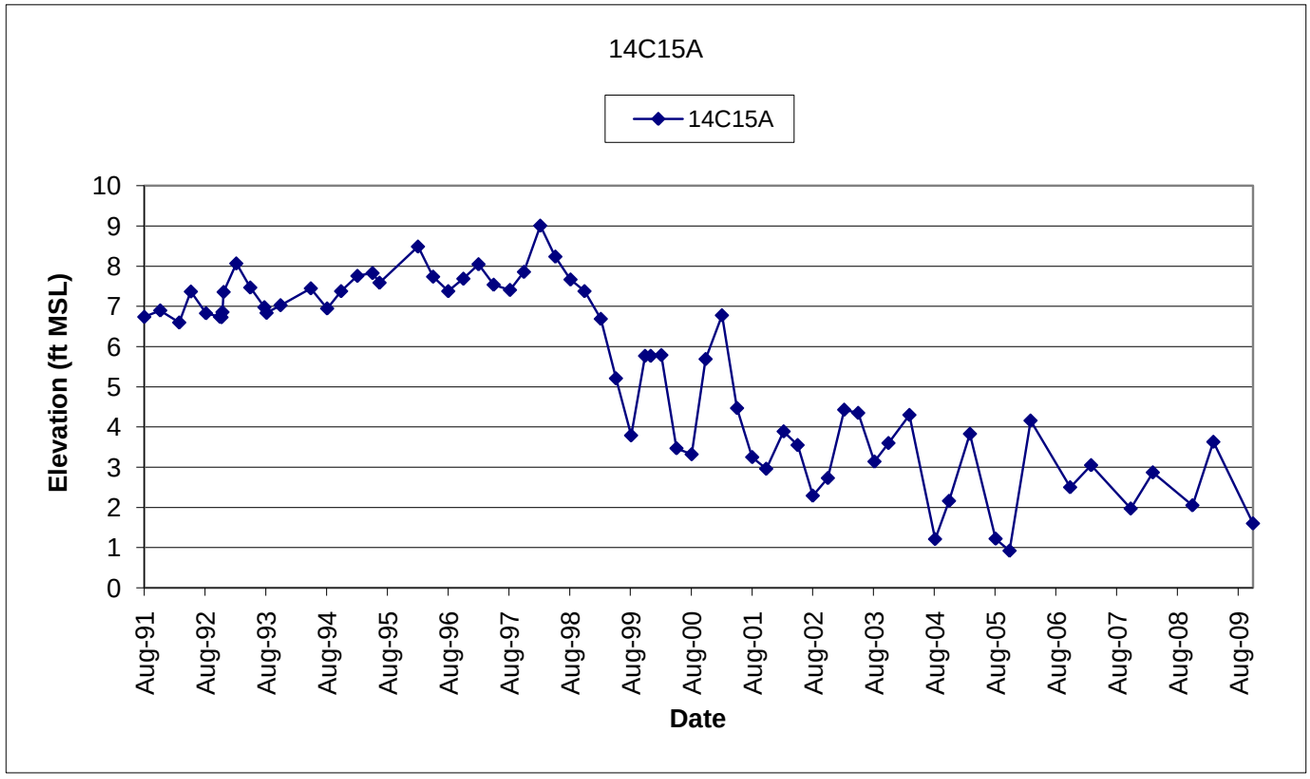

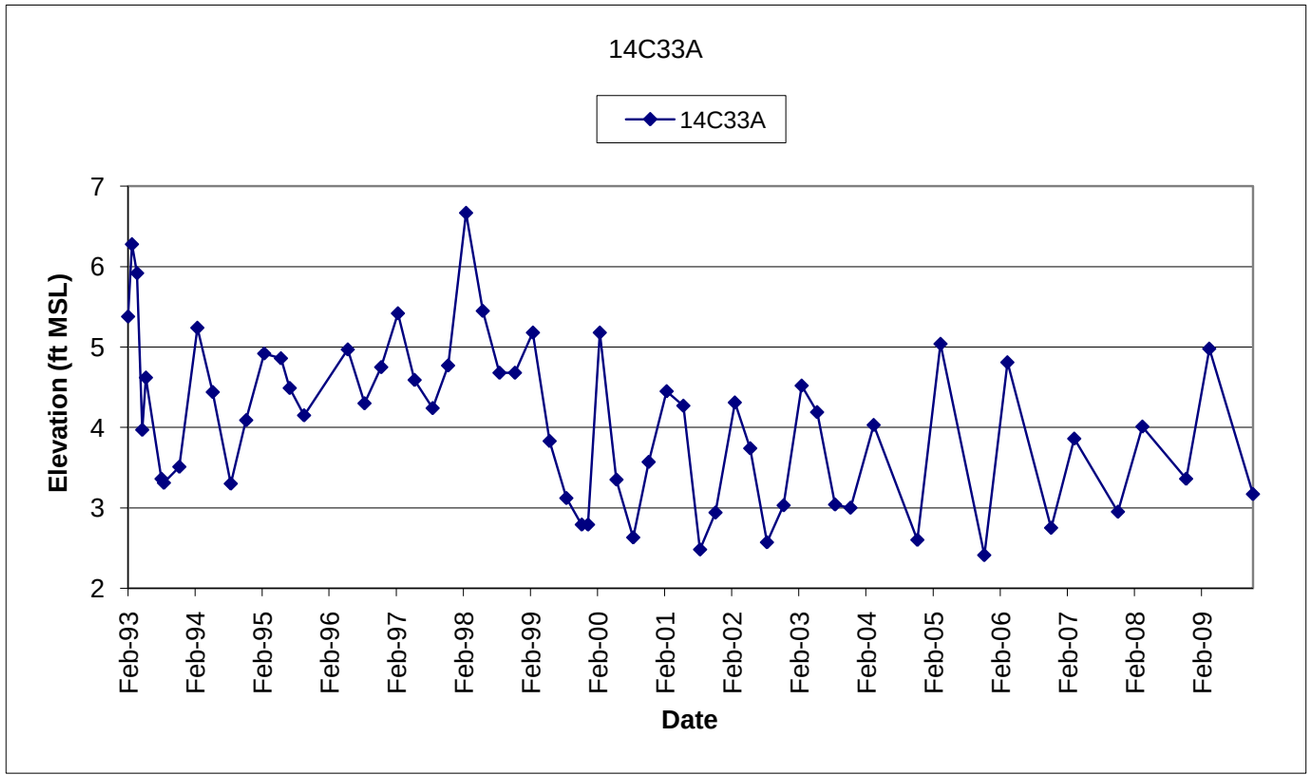

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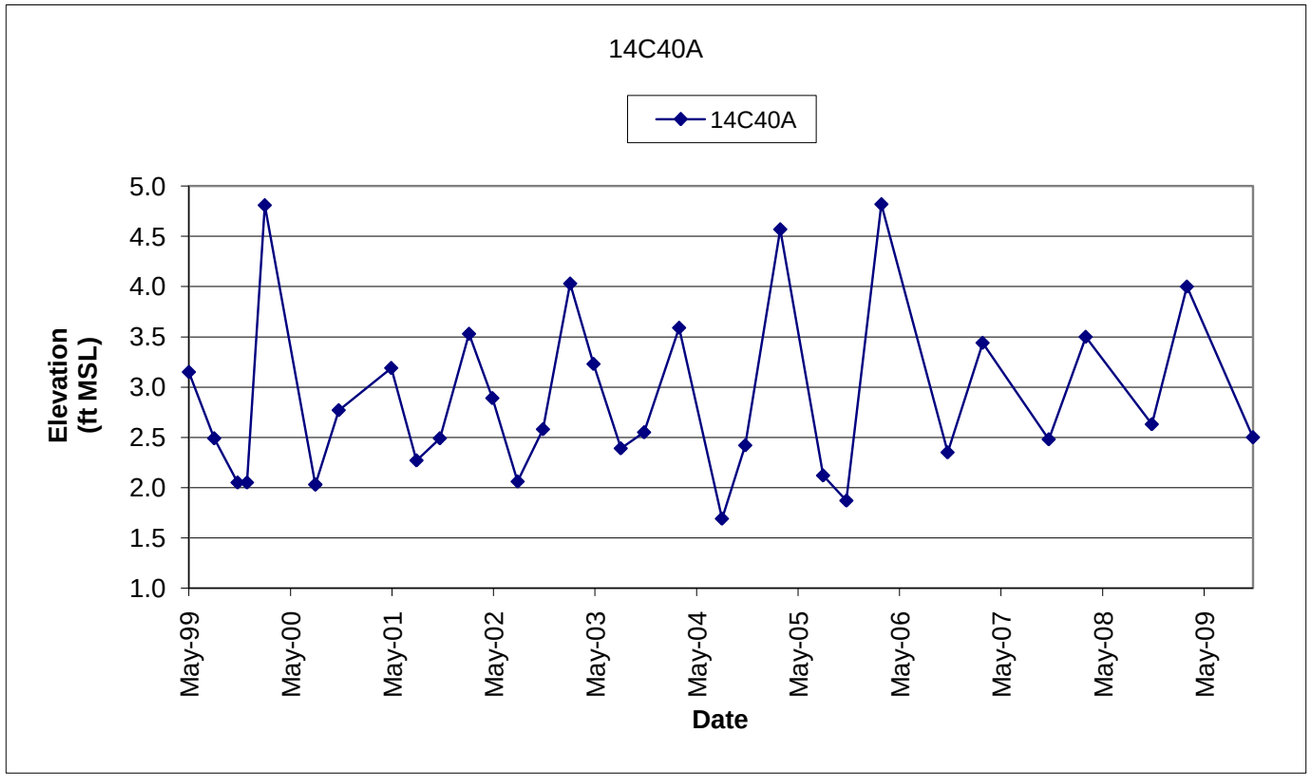

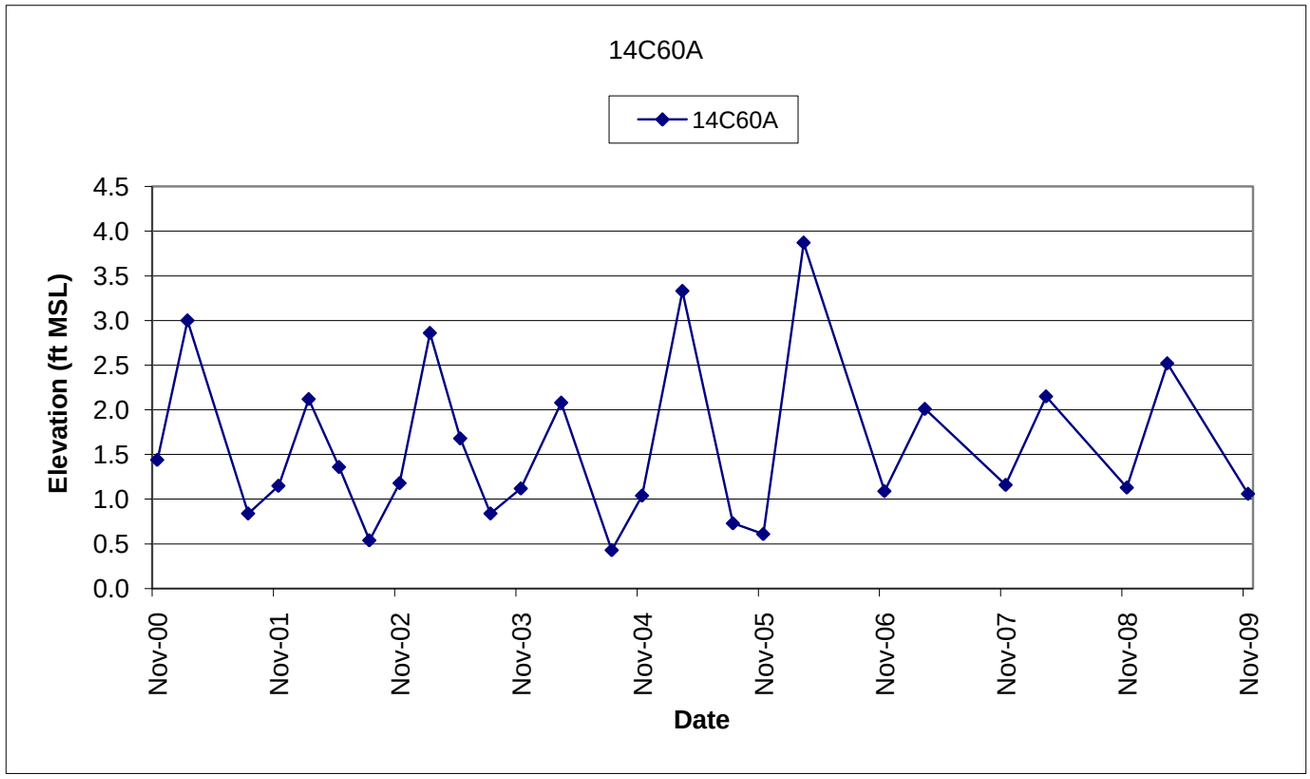

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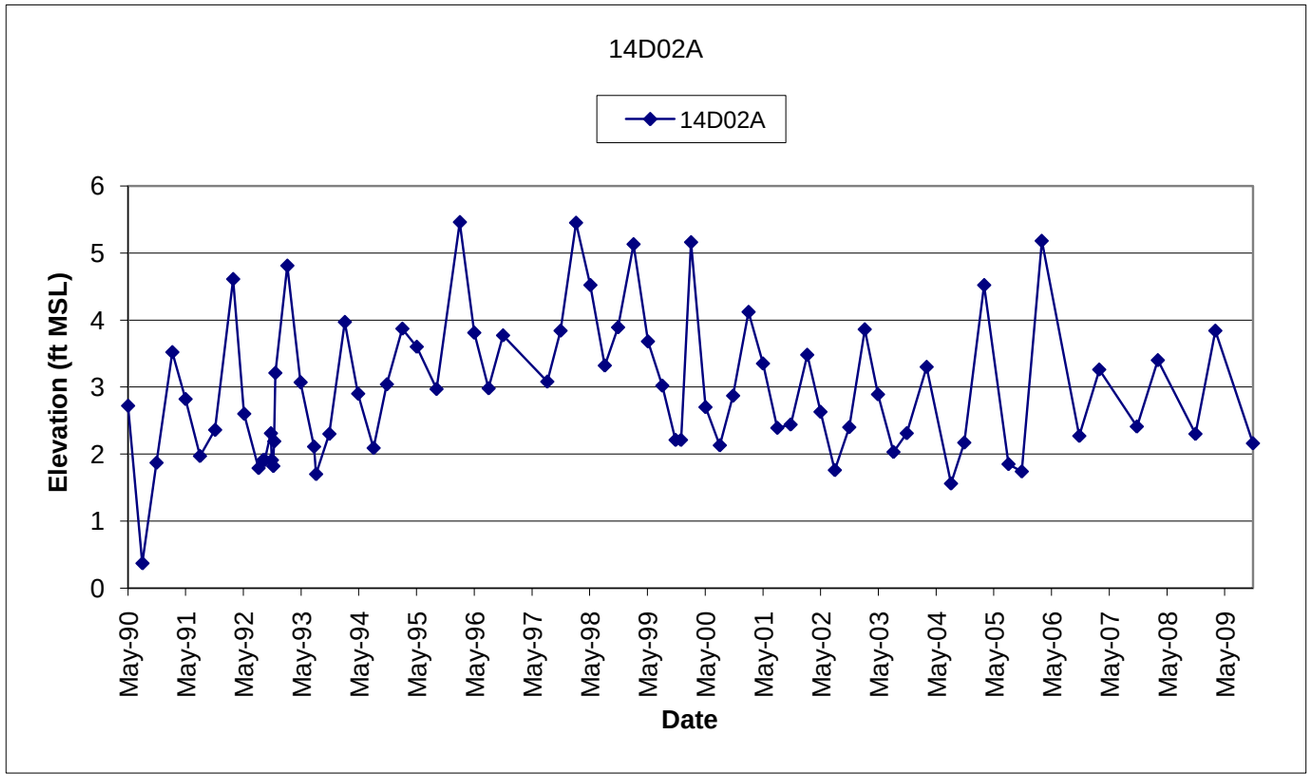
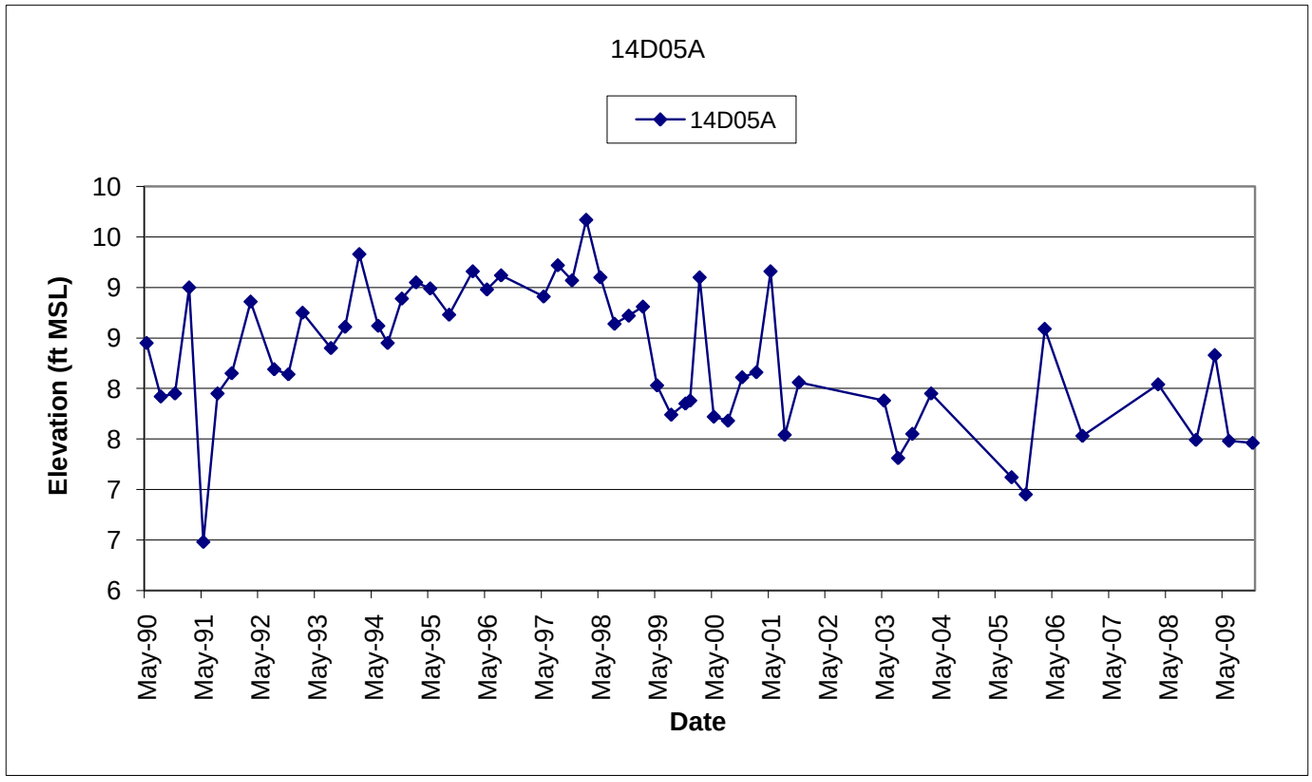
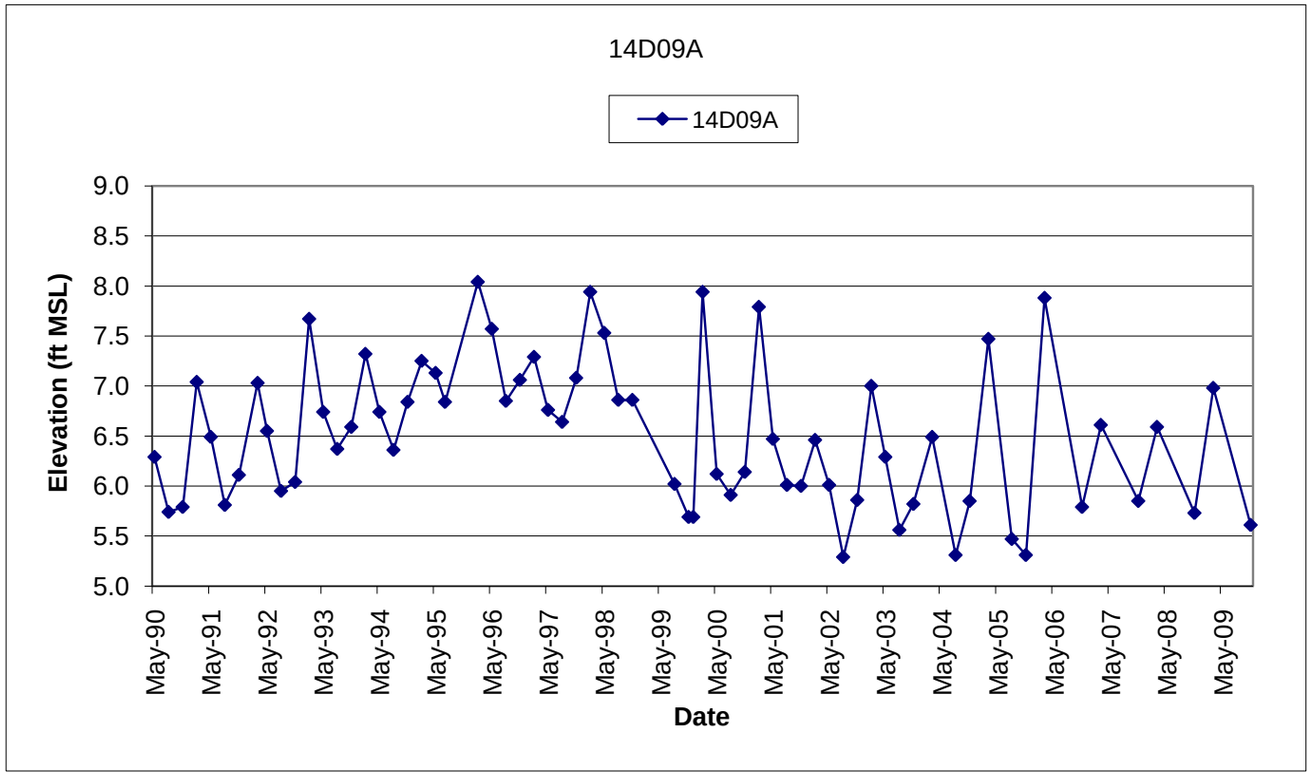
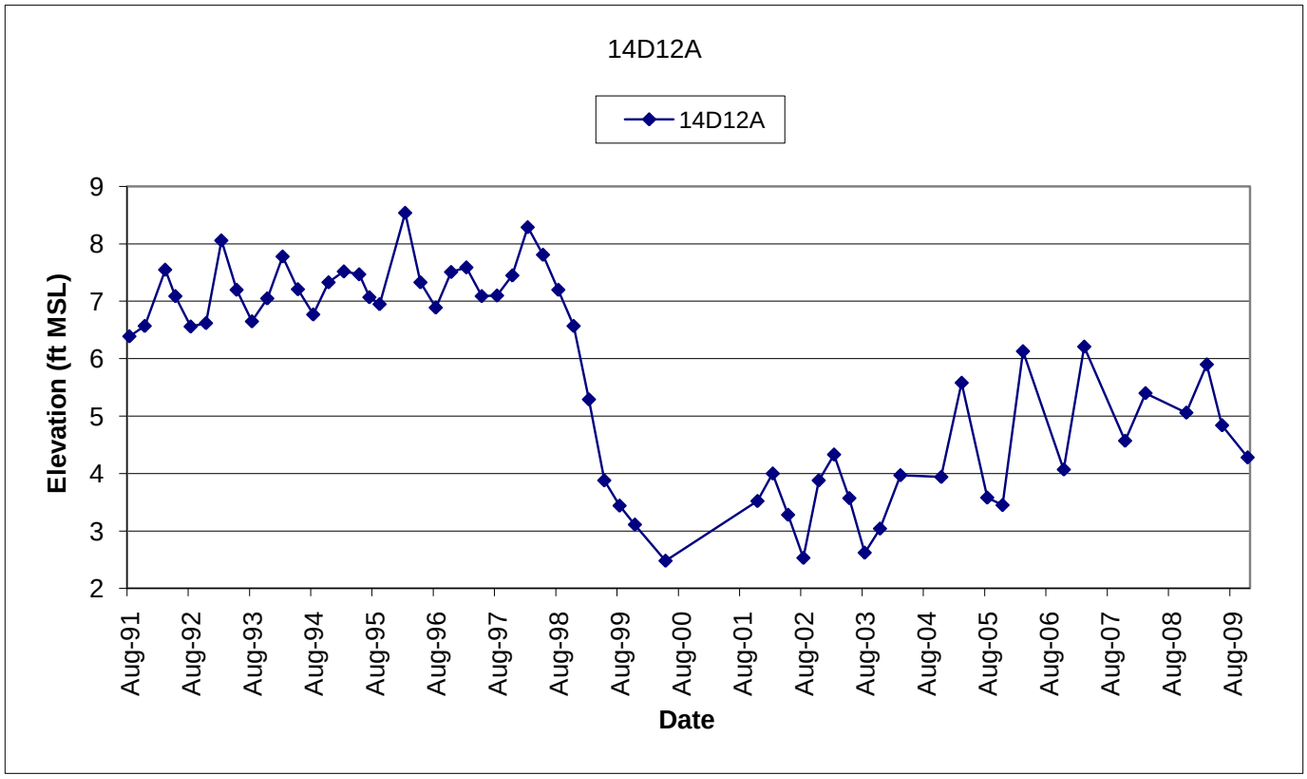
2009 Hydrographs



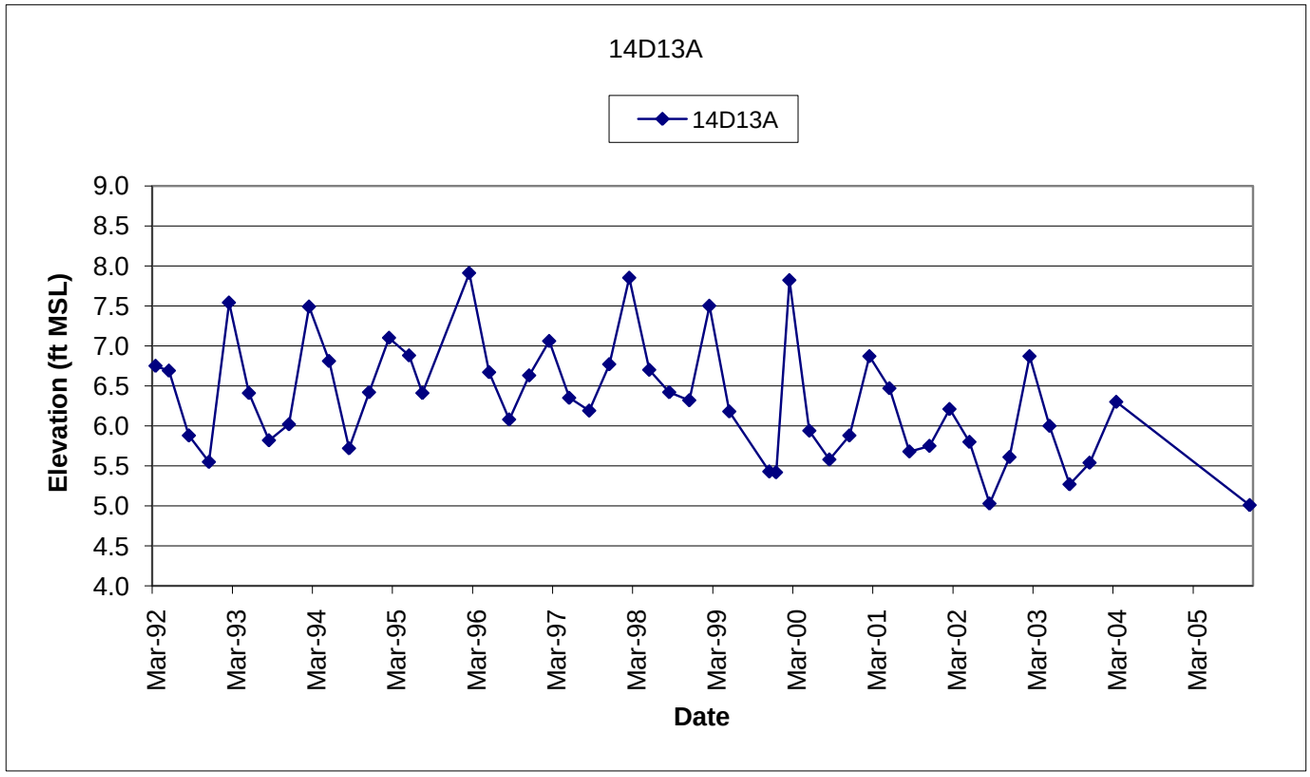


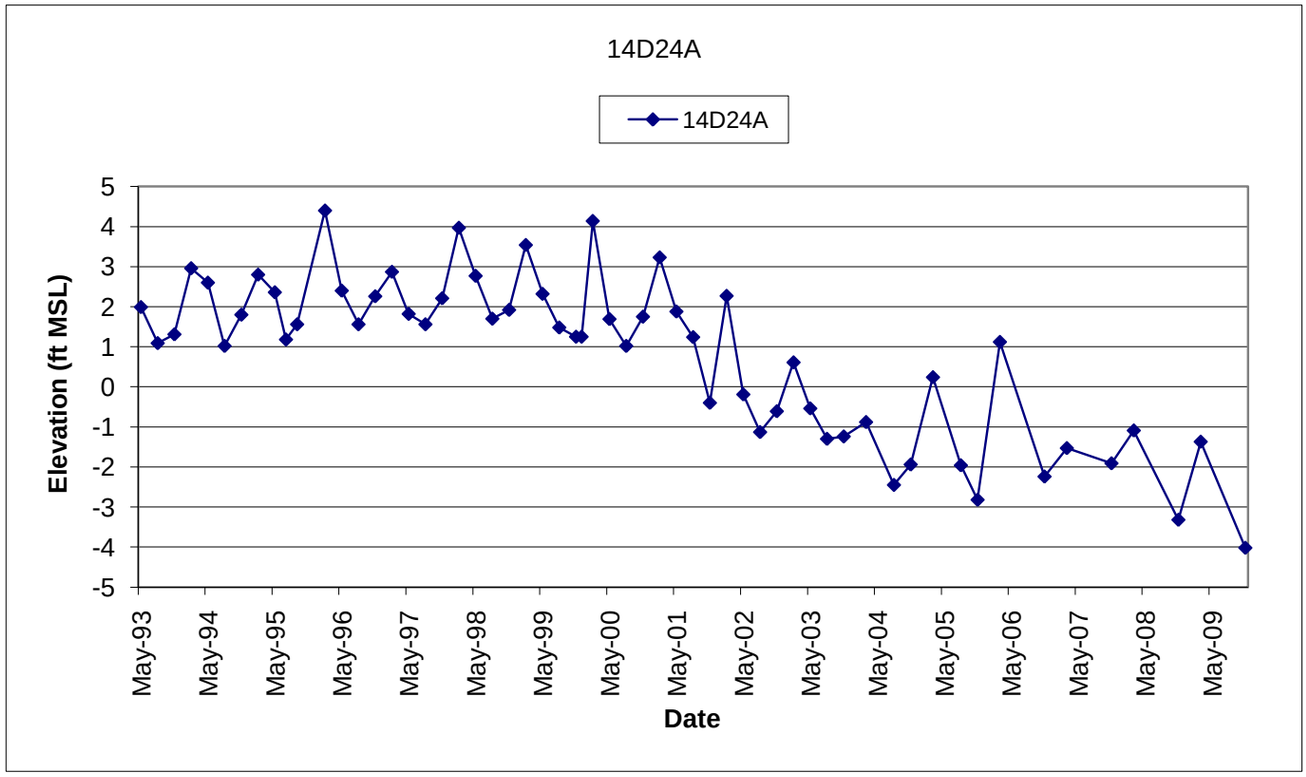
APPENDIX C
2009 Hydrographs



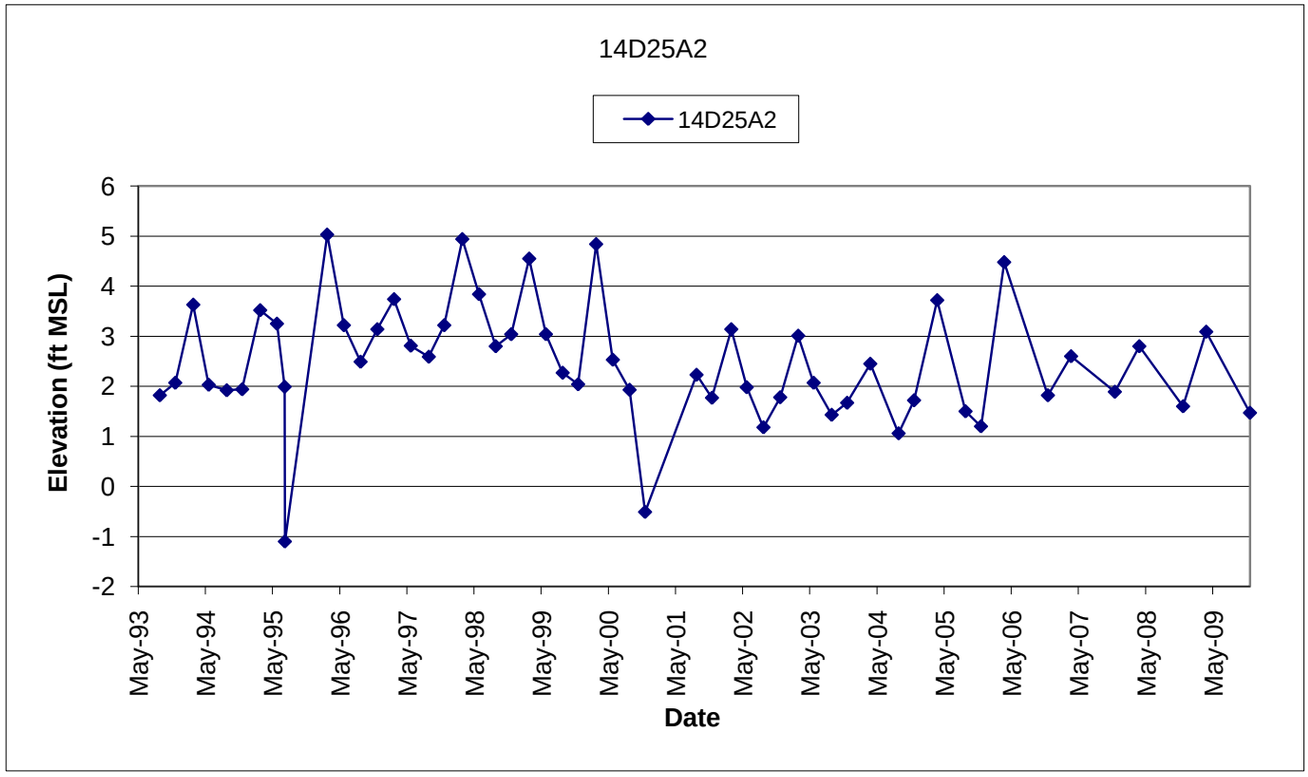


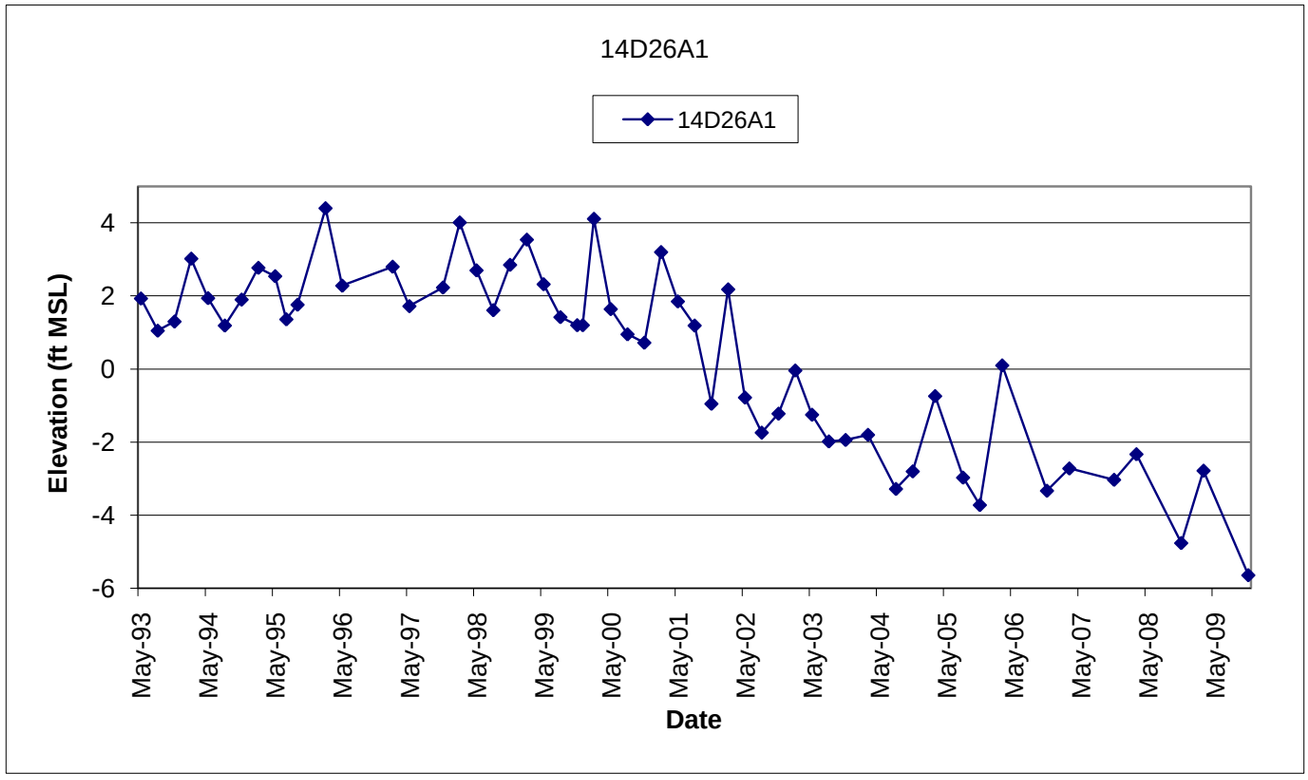
APPENDIX C
2009 Hydrographs





APPENDIX C
2009 Hydrographs





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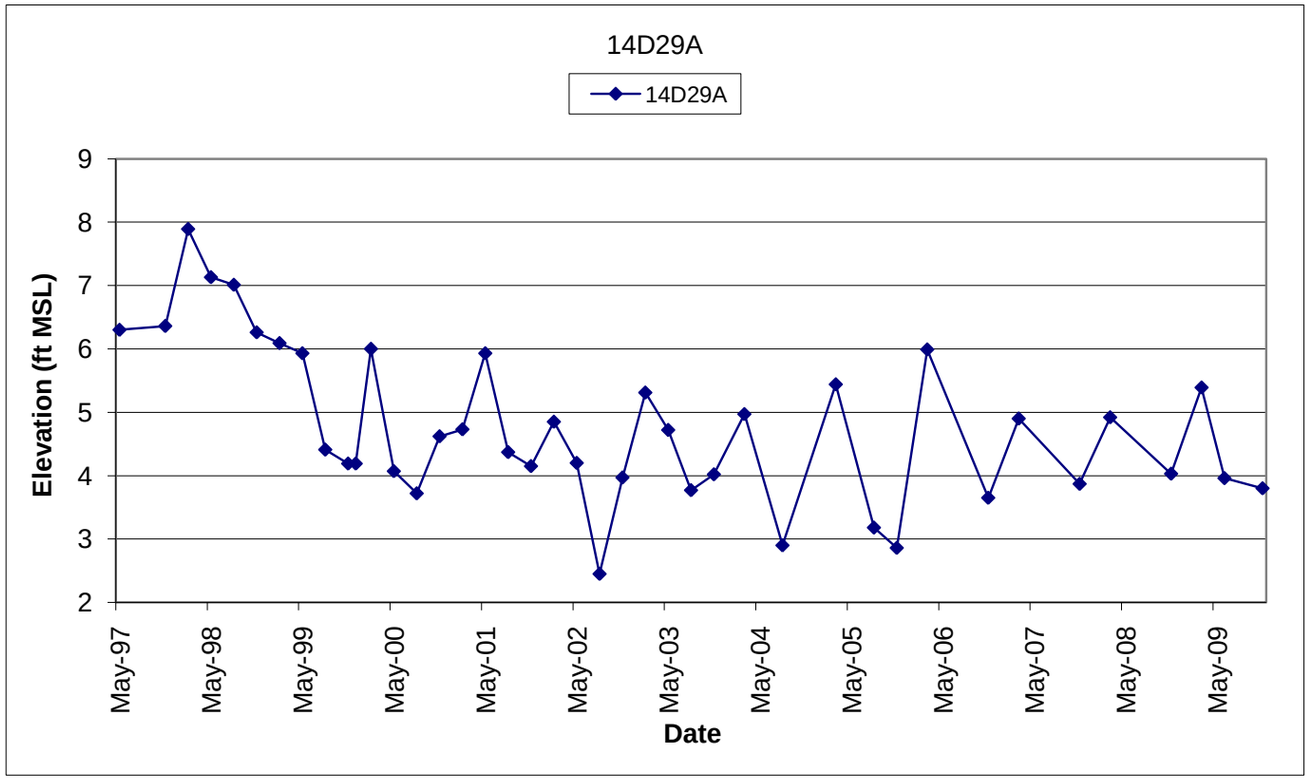

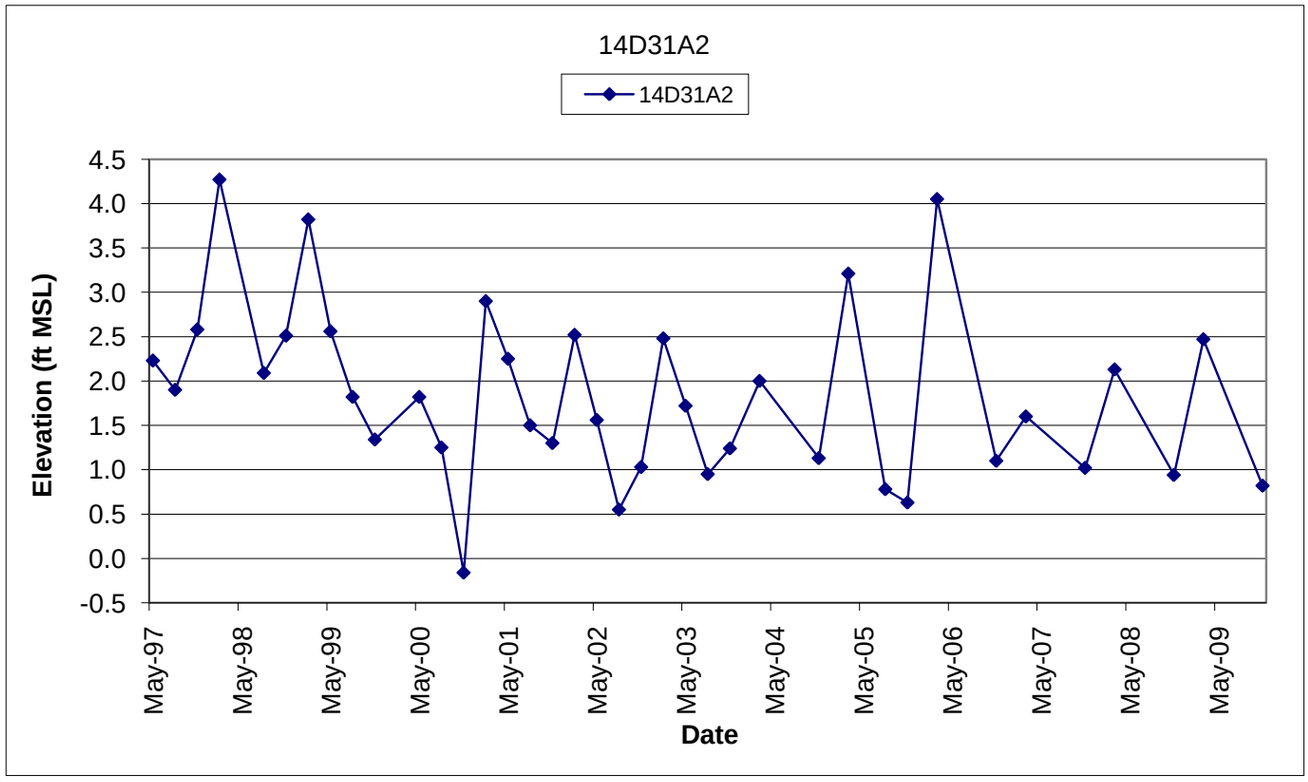

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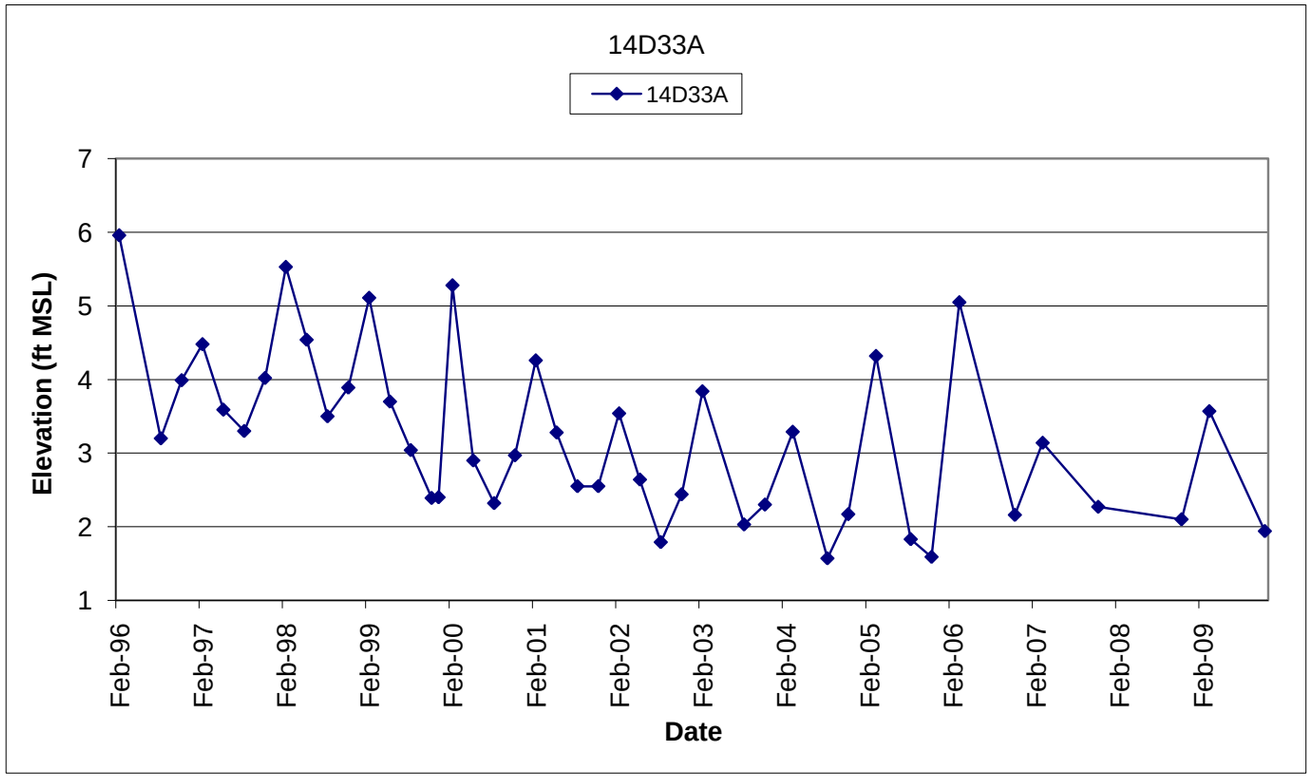
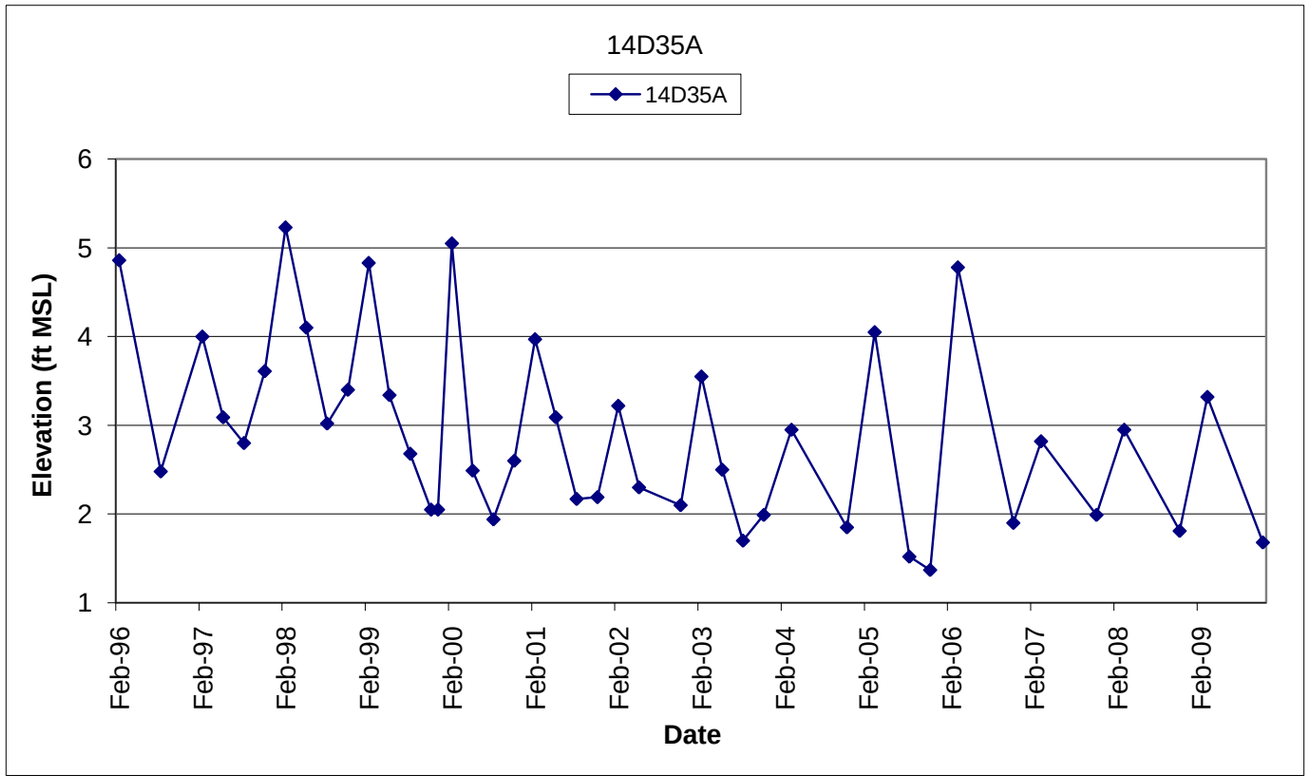
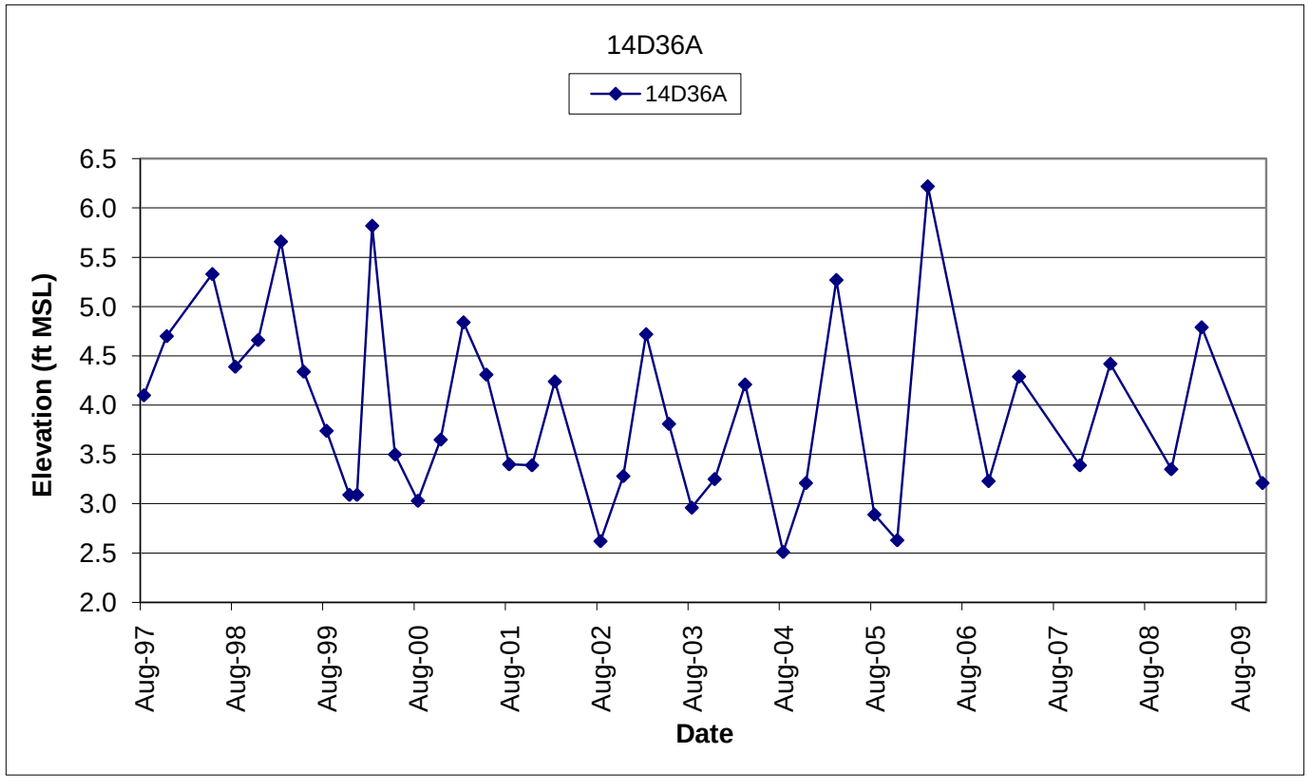
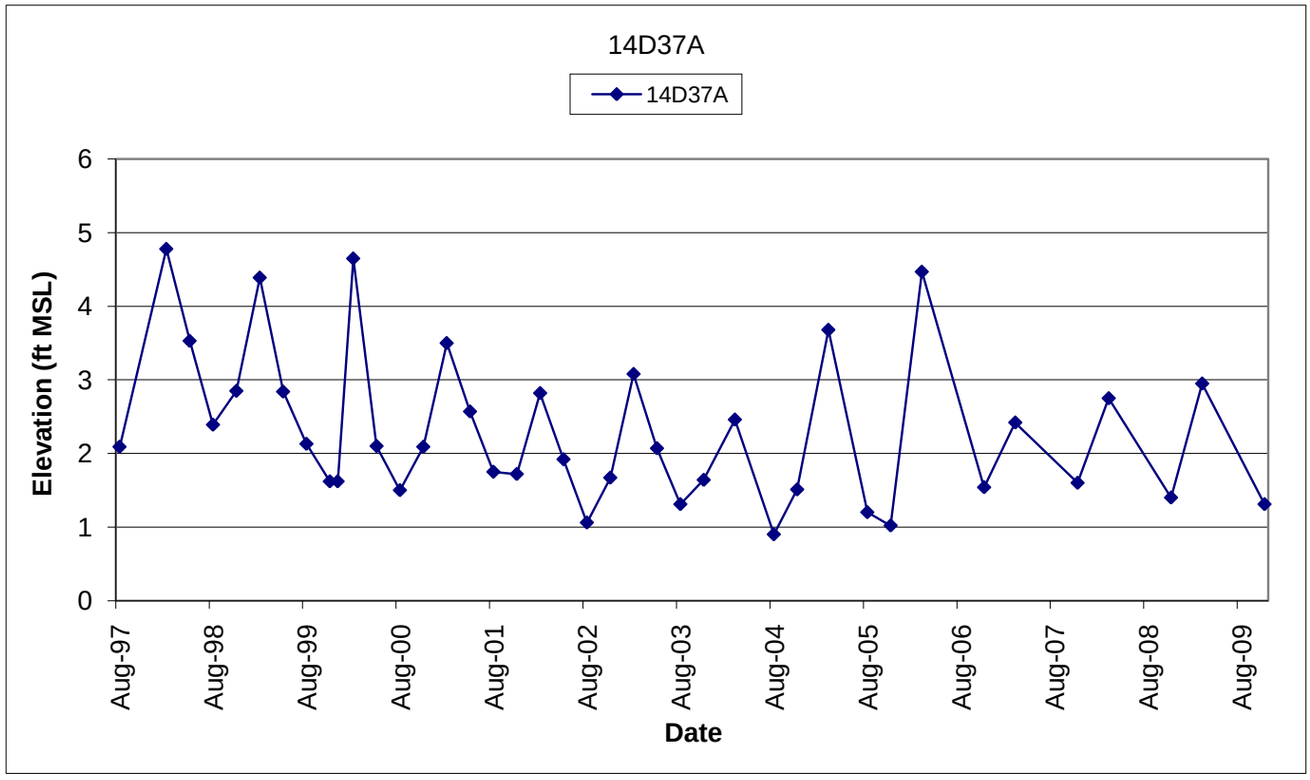


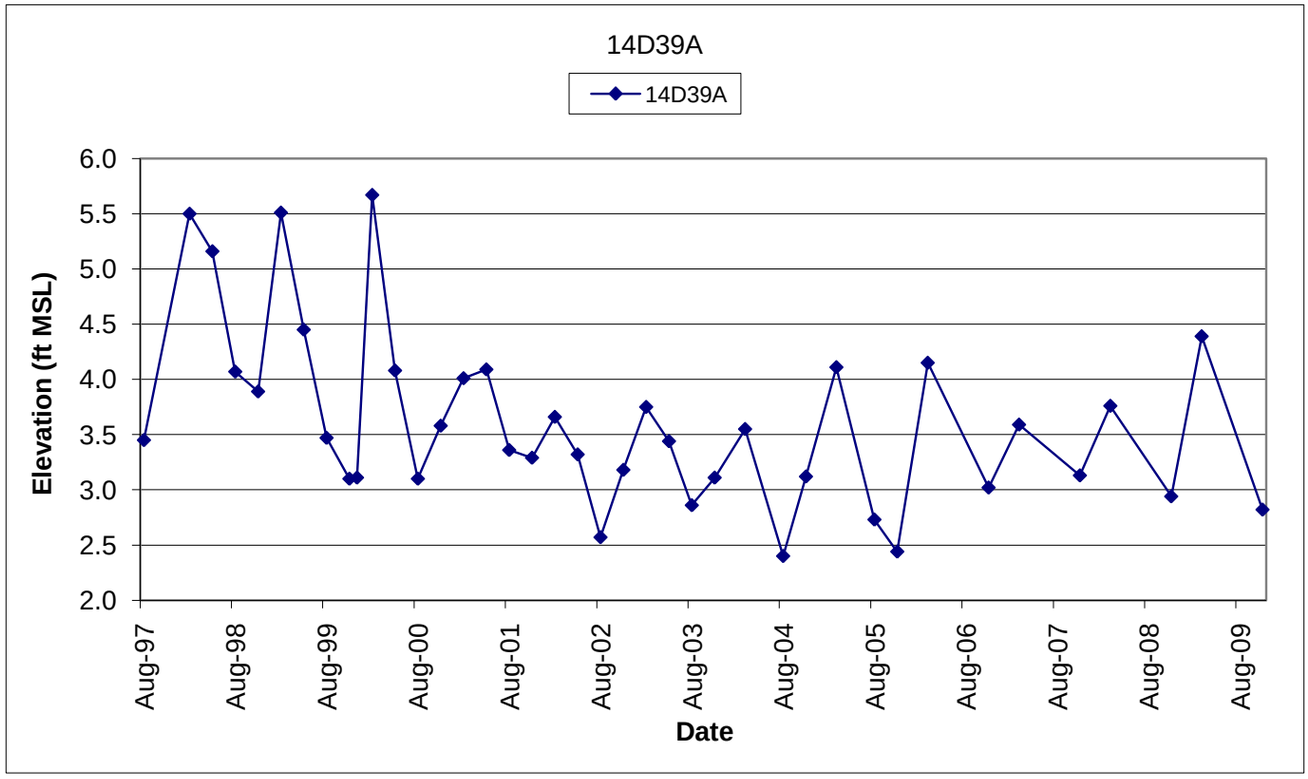


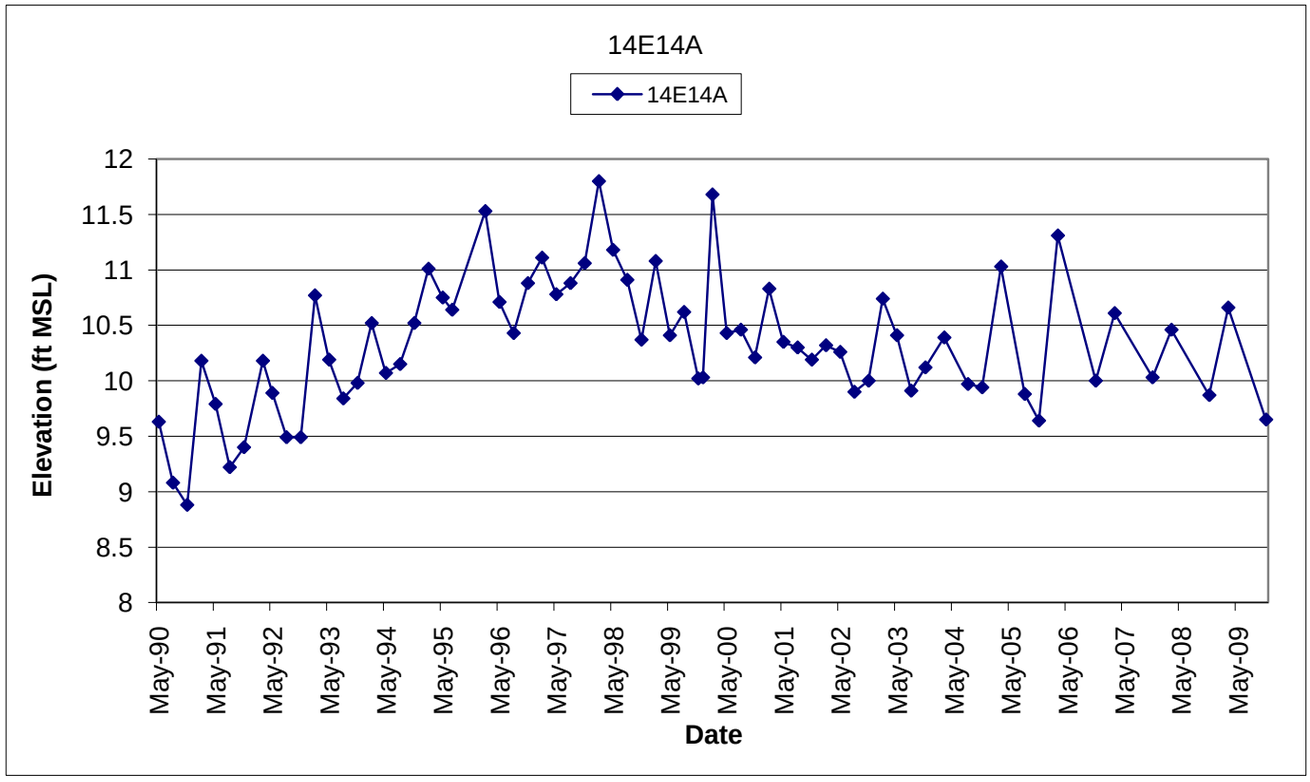
APPENDIX C
2009 Hydrographs



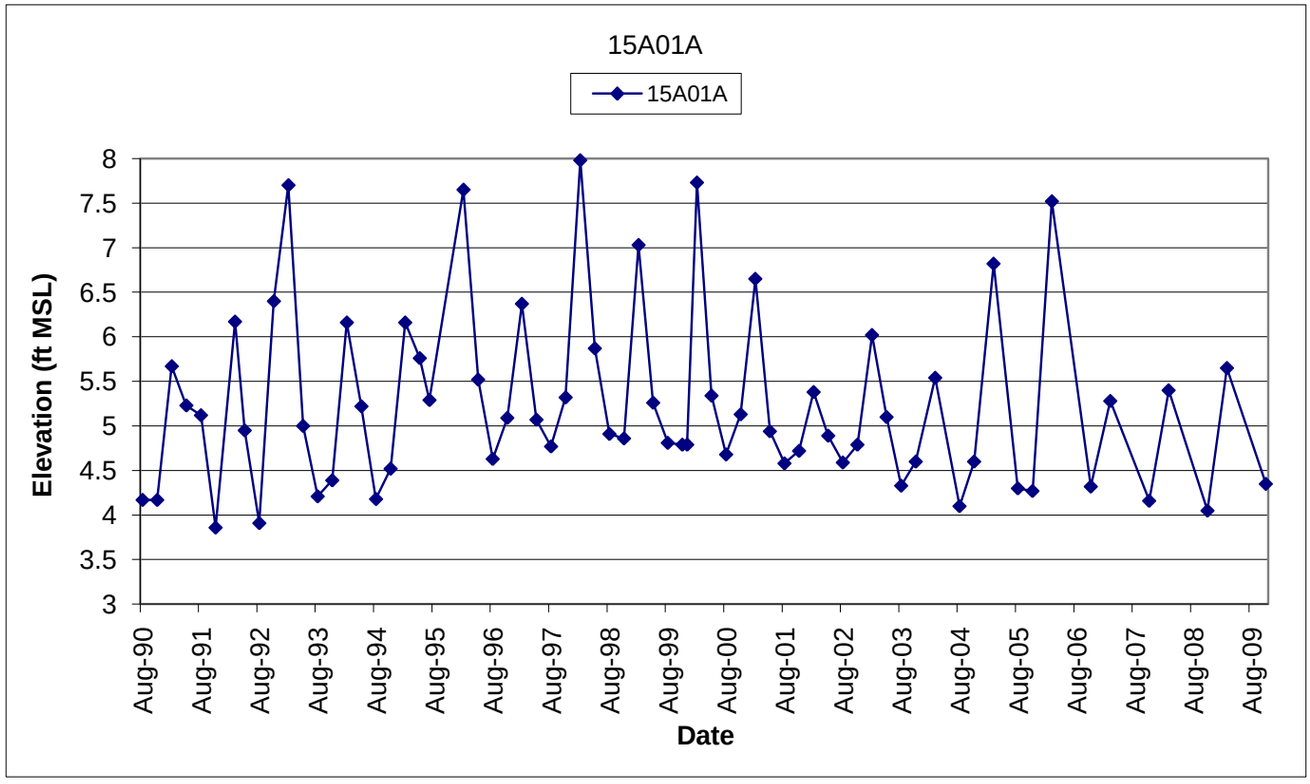


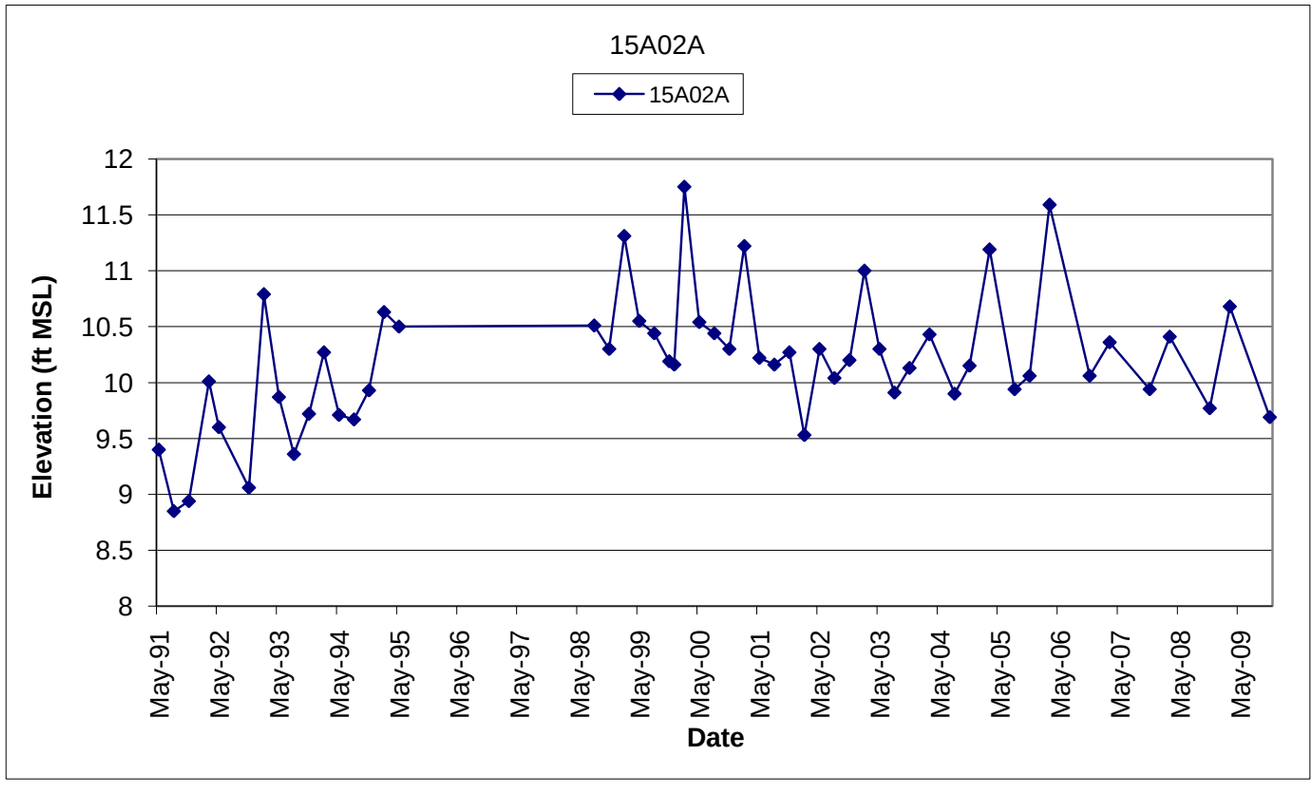
APPENDIX C
2009 Hydrographs



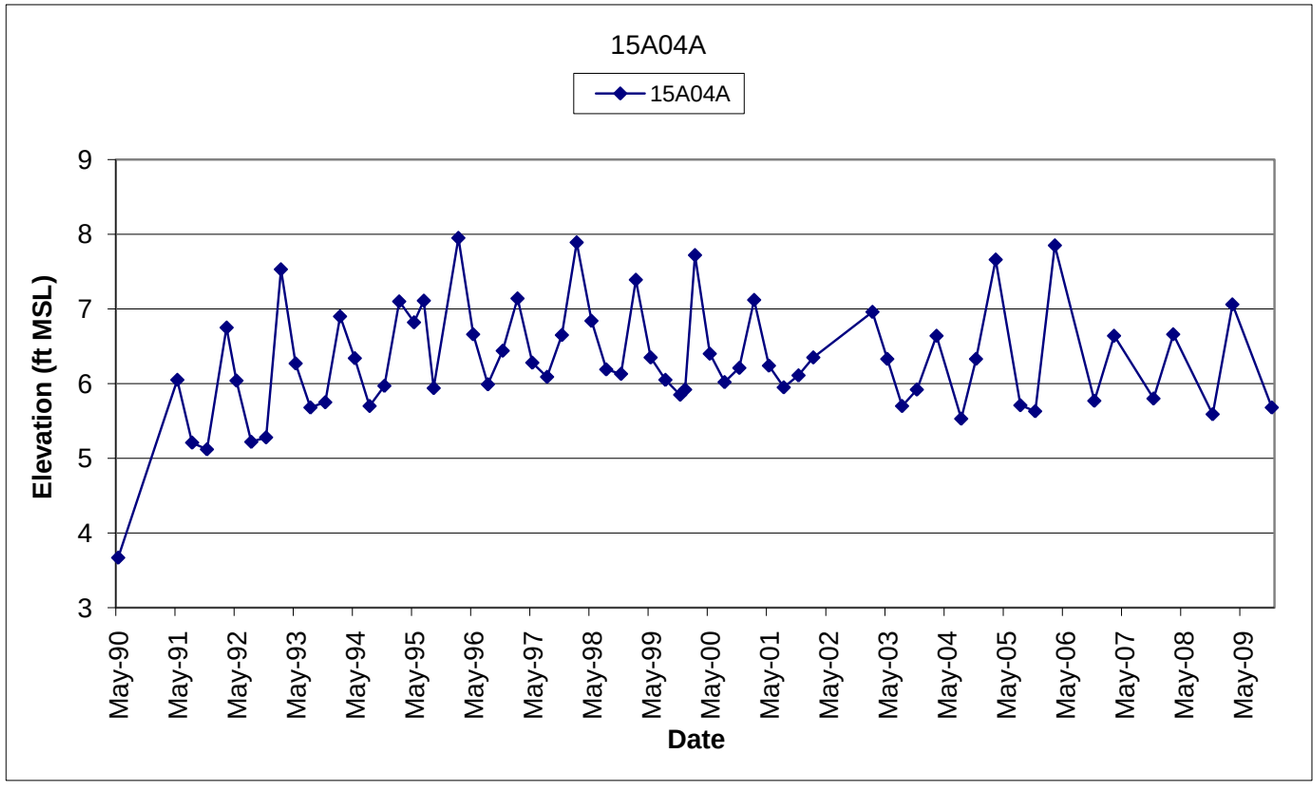


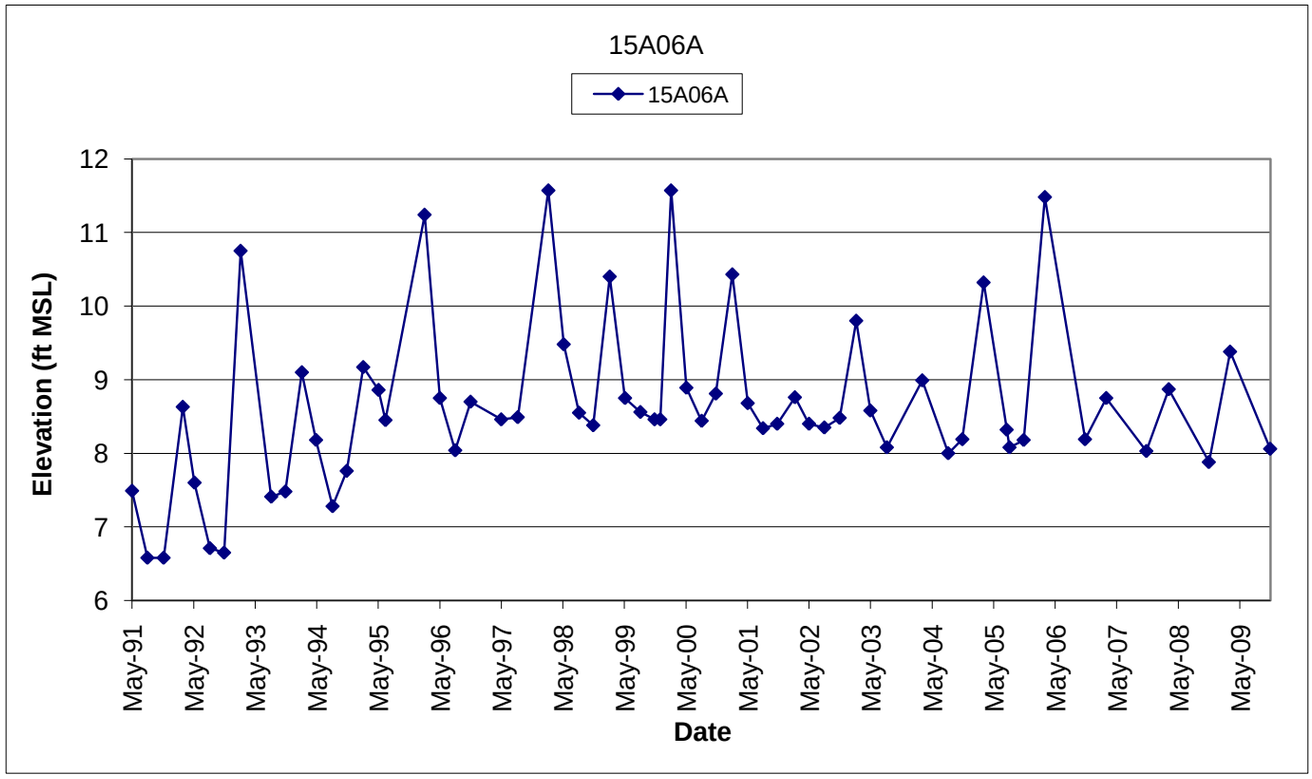
APPENDIX C
2009 Hydrographs



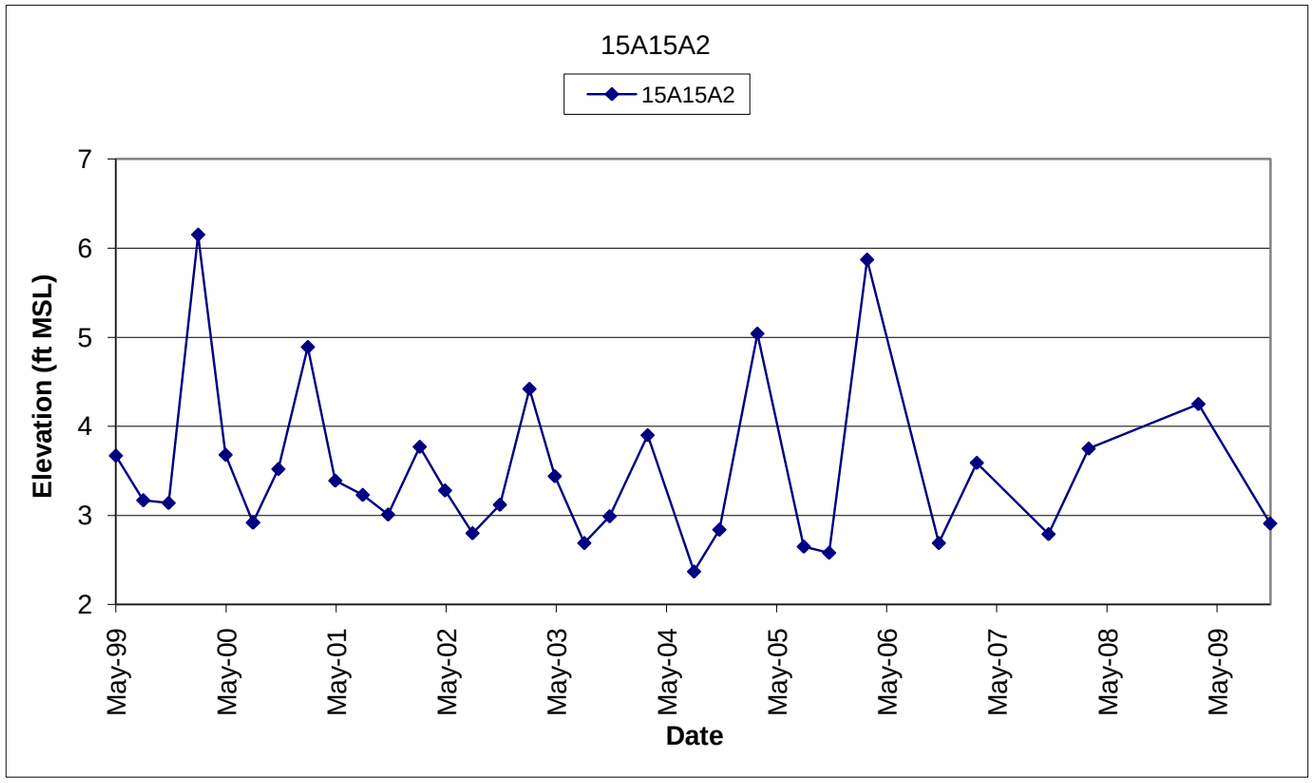


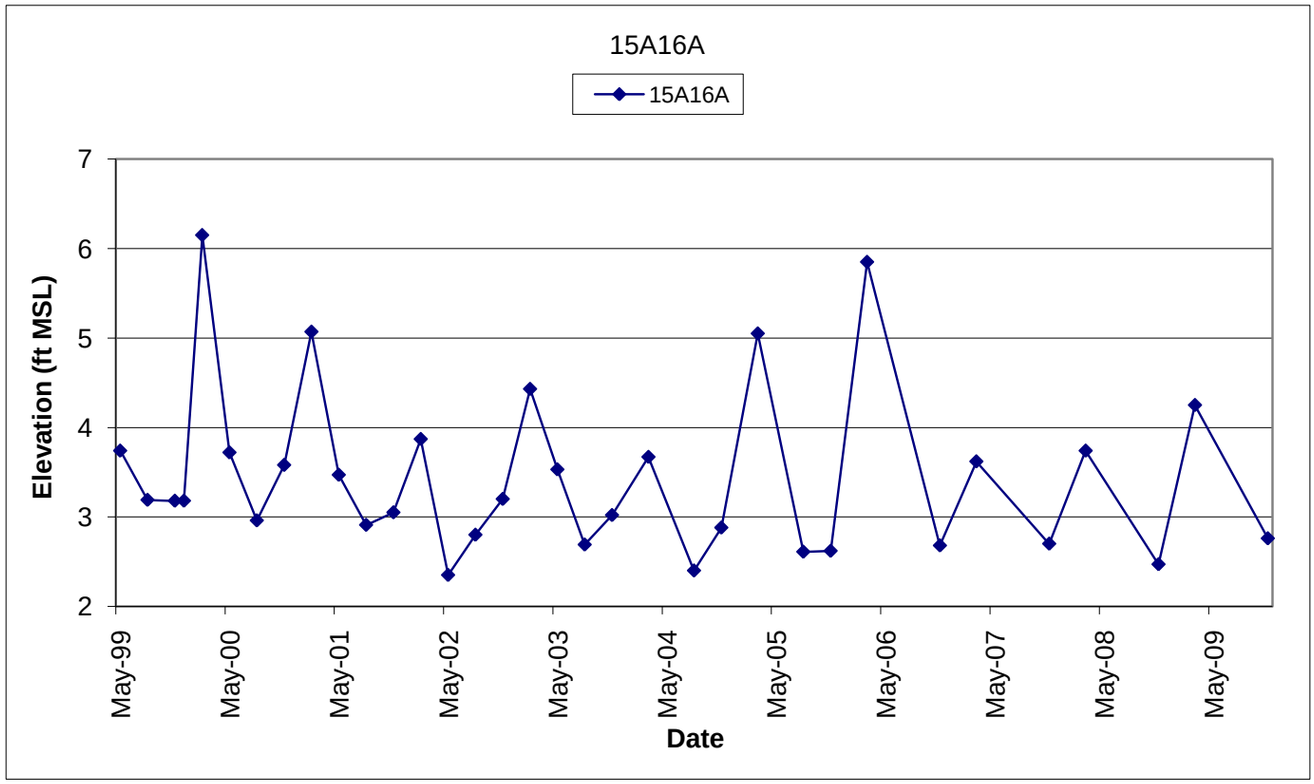
APPENDIX C
2009 Hydrographs



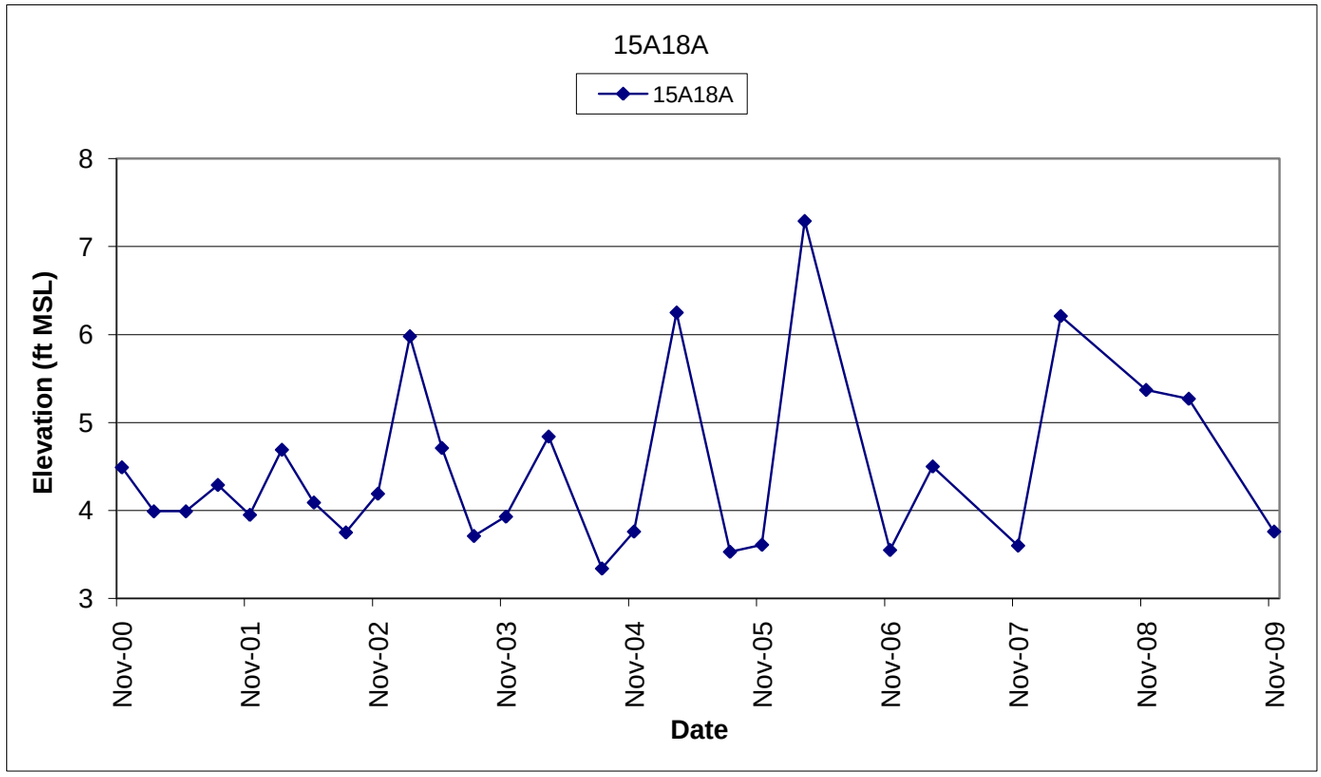


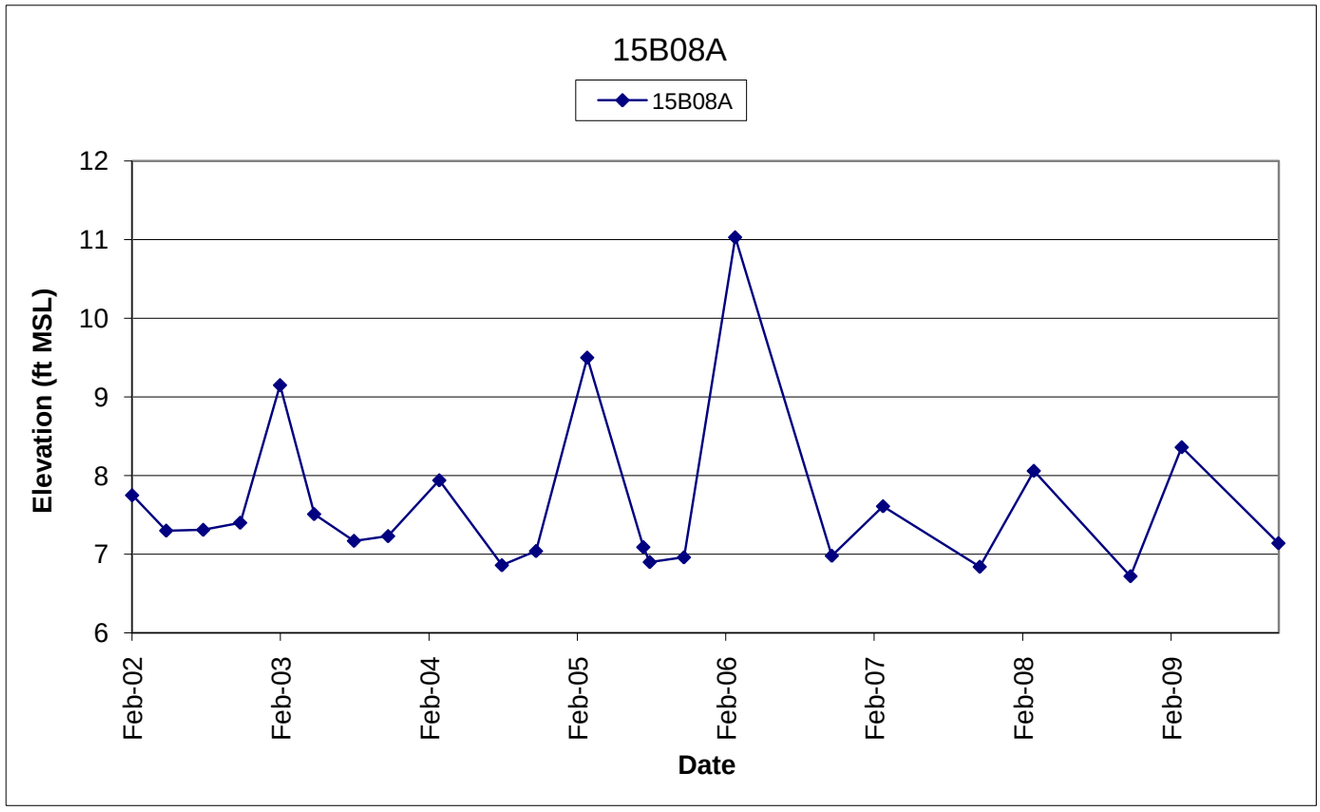
APPENDIX C
2009 Hydrographs





APPENDIX C
2009 Hydrographs





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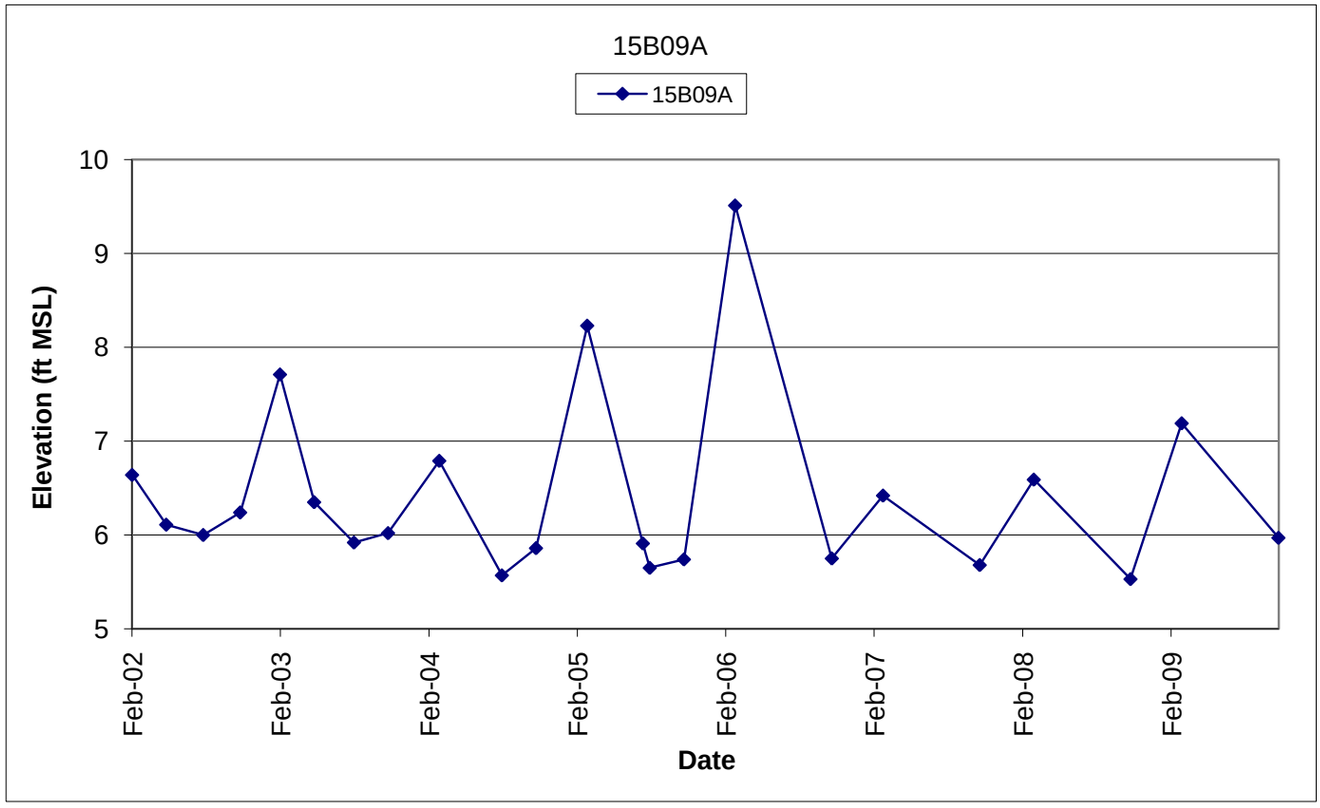
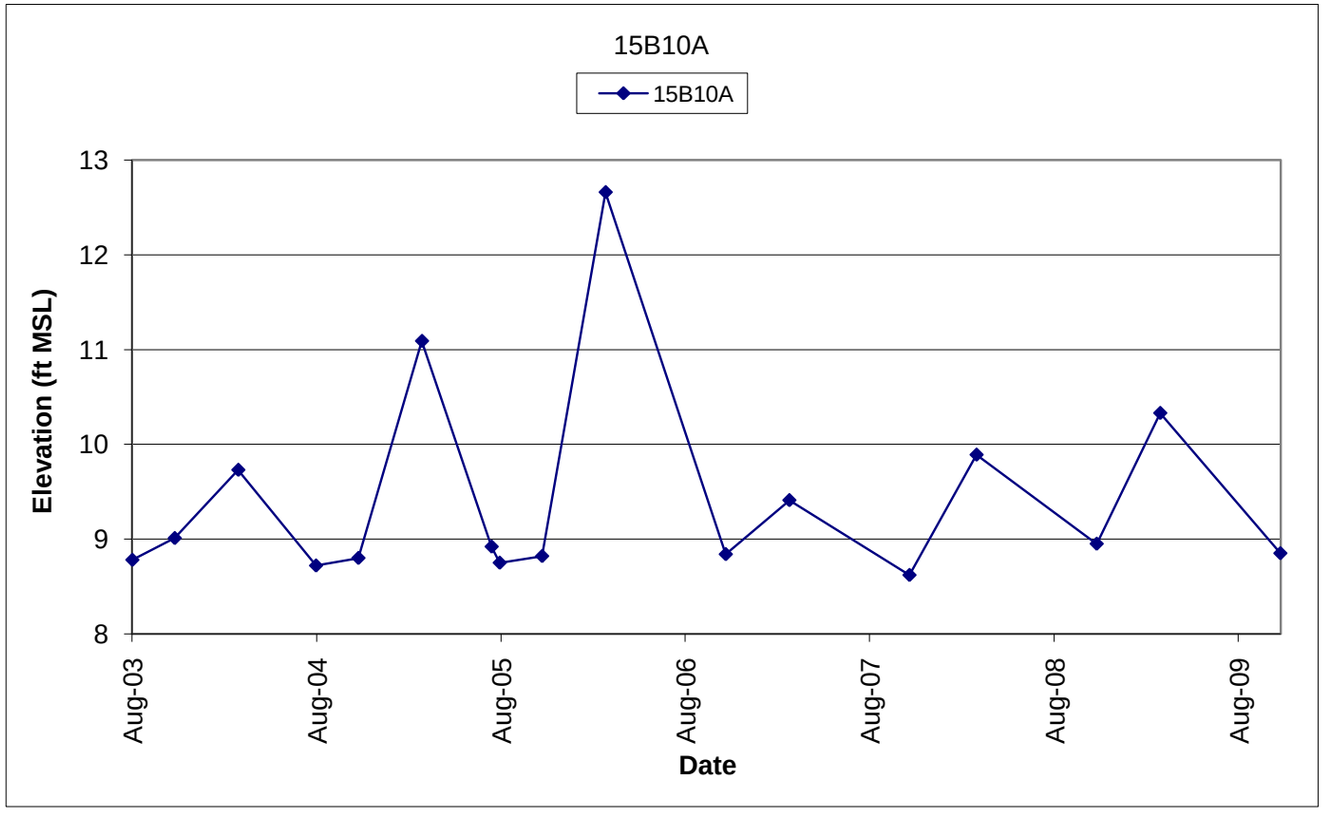
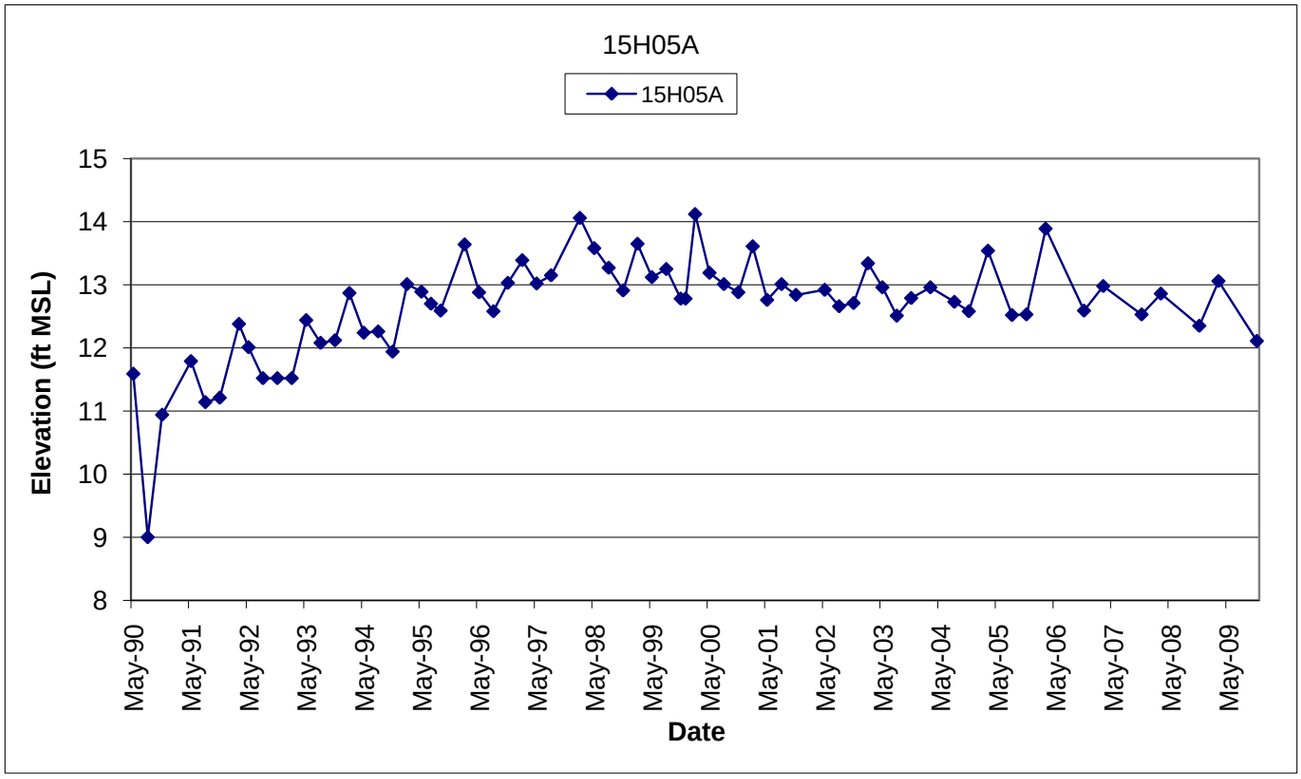
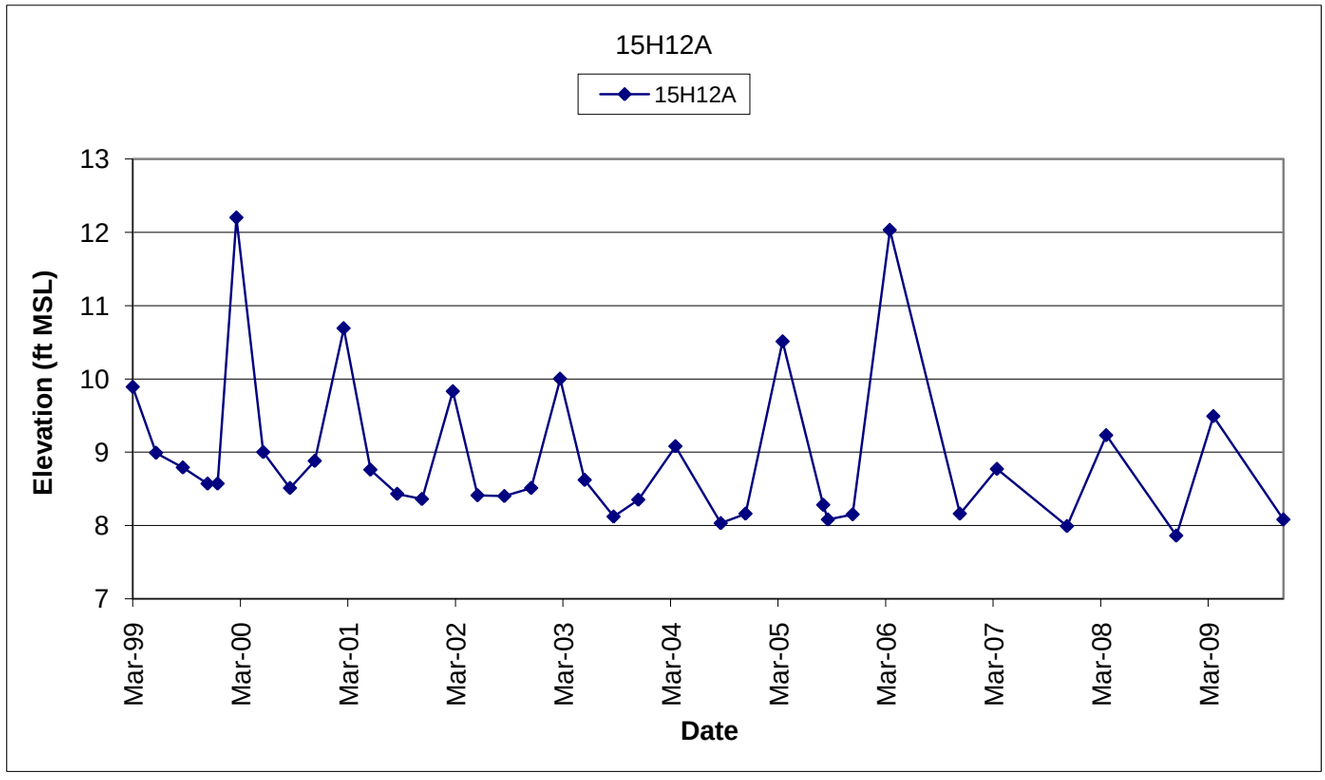
2009 Hydrographs





APPENDIX C
2009 Hydrographs





APPENDIX D

NASA FLOW BUDGET CALCULATIONS

2009 FLOW BUDGET CALCULATIONS
NASA GWTS

Horizontal capture zone analyses method used is based on the following formula.
Q = (**K**) x (**b** x **w**) x ***i*** x **factor (f) where:**
Q = well extraction rate; **K** = aquifer hydraulic conductivity; **b** = aquifer saturated thickness at well;
w = plume width at well; **i** = regional hydraulic gradient near well;
and factor (**f**) **=** "rule of thumb" is 1.5 to 2.0, intended to account for other contributions to the pumping well, such as induced vertical flow from another unit.
Assume minor contribution from units below; then **f** = 1.5 for all calculations.
Used conversion factor of 7.481 gallons per cubic ft to convert from cubic ft/day to gallons/day

NASA-1A "Designed"

(Data values from EKI 1995 system design model except where noted)

K = 300 ft/day
b = 10 ft (feet of hydraulically conductive aquifer material at well = taken from well log)
w = 120 ft (width in feet of hydraulically conductive aquifer material at extraction well)
i = 2 ft verticle drop over 1,000 ft horizontal drop = 2 ft/1,000 ft = 1 ft/500 ft = 0.002 ft/ft
f = 1.5 (unitless)

Q = (300 ft/day) x (10 ft x 120 ft) x (0.002 ft/ft) x (1.5) = **1,080 cubic ft/day**
Q = (1,080 cubic ft/day) x (7.481 gal/cubic ft) x (1 hr/60 mins) x (1 day/24 hrs) = **5.61 gal/min**
NASA-1A 2009 pump rate ~ **7.0 gal/min**

NASA-3A "Designed"

(Data values from EKI 1995 system design model except where noted)

K = 250 ft/day (lower "K" than NASA-1A area due to reduced hydraulic gradient in NASA-3A area)
b = 11 ft (feet of hydraulically conductive aquifer material at well = taken from well log)
w = 175 ft (width in feet of hydraulically conductive aquifer material at extraction well)
i = 1 ft/700 ft = 0.0014 ft/ft
f = 1.5

Q = (250 ft/day) x (11 ft x 175 ft) x (0.0014 ft/ft) x (1.5) = **1,010.625 cubic ft/day**
Q = 1,011 cubic ft/day) x (7.481 gal/cubic ft) x (1 hr/60 mins) x (1 day/24 hrs) = **5.25 gal/min**
NASA-3A 2009 pump rate ~ **7.0 gal/min**

NASA-1A "Regional"

(Data values from NASA 2009 groundwater data except where noted)

K = 150 ft/day (hydraulic conductivity from NASA for "warehouse area" = see EKI 1995 design report)
b = 18 ft (feet of water within well screen interval = TD to top of water column)
w = 407 ft (plume width in feet based on 5 ug/l TCE contour = 2009 TCE Plume Map)
i = 0.0045 (calculated 2008 hydraulic gradient in well area)
f = 1.5

Q = (150 ft/day) x (18 ft x 407) x (0.0045 ft/ft) x (1.5) = **7,417.575 cubic ft/day**
Q = (7418 cubic ft/day) x (7.481 gal/cubic ft) x (1 hr/60 mins) x (1 day/24 hrs) = **38.54 gal/min**
NASA-1A 2009 pump rate ~ **7.00 gal/min**

NASA-3A "Regional"

(Data values from NASA 2009 groundwater data except where noted)

K = 130 ft/day (hydraulic conductivity from Navy for Navy Site 8 area = see EKI 1995 design report)
(Note: lower hydraulic conductivity value based on "distal" location of NASA-3A well and reduced hydraulic gradient in area)
b = 20 ft (feet of water within well screen interval = TD to top of water column)
w = 1,006 ft (plume width in feet based on 5 ug/l TCE contour = 2009 TCE Plume Map)
i = 0.0016 ft/ft (calculated 2008 hydralic gradient in well area)
f = 1.5

Q = (130 ft/day) x (20 ft x 1,006 ft) x (0.006 ft/ft) x (1.5) = **15,693.6 cubic feet/day**
Q = 15,694 cubic ft/day) x (7.481 gal/cubic ft) x (1 hr/60 mins) x (1 day/24 hrs) = **81.53 gal/min**
NASA-3A 2009 pump rate ~ **7.00 gal/min**

APPENDIX E

NASA 2009 GROUNDWATER ANALYTICAL RESULTS

Volatile Organic Compounds

APPENDIX E
2009 Groundwater Analytical Results
Volatile Organic Compounds

Well ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl chloride (µg/L)	1,1,1-TCA (µg/L)	1,2-DCA (µg/L)	1,1-DCA (µg/L)	Chloroform (µg/L)	Freon 11 (µg/L)	Freon 113 (µg/L)
095A	3/24/2009	2.5	**32**	**8.4**	1.2	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50
095A	9/22/2009	2.2	**30**	**8.6**	1.3	<0.50	<0.50	<0.50	<0.50	1.2	<0.50	<0.50	<0.50
11E02A	3/23/2009	<0.50	1.2	0.82	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11E02A	9/21/2009	<0.50	1.2	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
10J05A	8/12/2009	<0.50	<0.50	<0.50	<0.50	5.2	<0.50	0.90	<0.50	0.75	<0.50	<0.50	<0.50
11M03A	3/23/2009	<0.50	**9.0**	<0.50	<0.50	**8.6**	<0.50	0.76	<0.50	2.3	<0.50	1.8	3.1
11M03A	9/21/2009	<0.50	**7.1**	<0.50	<0.50	**7.3**	<0.50	0.99	<0.50	2.3	<0.50	1.1	1.6
11M14A1	6/9/2009	<0.50	4.9	0.51	<0.50	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.63	<0.50
11M16A1	3/24/2009	<0.50	**14**	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.79	<0.50	<0.50	<0.50
11M16A1	9/22/2009	<0.50	**14**	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	0.97	<0.50	<0.50	<0.50
11M17A	3/23/2009	<0.50	**20**	<0.50	<0.50	2.2	<0.50	0.68	<0.50	1.4	0.58	1.8	0.82
11M17A	9/23/2009	<0.50	**27**	0.80	<0.50	**6.9**	<0.50	1.2	<0.50	1.7	0.92	1.8	1.2
11M21A	3/25/2009	<0.50	**15**	3.0	<0.50	**16**	<0.50	1.2	<0.50	4.0	0.60	1.7	2.1
11M21A	9/23/2009	<0.50	**20**	4.7	<0.50	**21**	<0.50	1.6	<0.50	4.7	0.60	1.9	1.1
11M25A	3/23/2009	0.53	0.62	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11M25A	9/21/2009	0.82	1.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11N21A1	3/24/2009	<0.50	1.2	0.91	<0.50	<0.50	<0.50	<0.50	<0.50	0.63	<0.50	<0.50	<0.50
11N21A1	9/22/2009	<0.50	0.91	0.79	<0.50	<0.50	<0.50	<0.50	<0.50	0.68	<0.50	<0.50	<0.50
11N22A1	3/25/2009	<0.50	**65**	**22**	1.2	0.99	**0.63**	<0.50	<0.50	2.2	<0.50	<0.50	1.8
11N22A1	9/23/2009	<0.50	**54**	**23**	1.3	1.1	<0.50	<0.50	<0.50	2.2	<0.50	<0.50	1.7
11N26A	3/23/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11N26A	9/24/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
14C60A	6/10/2009	<0.50	<0.50	**7.3**	<0.50	<0.50	**3.6**	<0.50	<0.50	0.56	<0.50	<0.50	<0.50
14D02A	12/14/2009	<0.50	<0.50	1.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
14D05A	6/25/2009	<0.50	**63**	**550**	7.0	**9.8**	**260**	<0.50	<0.50	**9.5**	<0.50	<0.50	2.7
14D09A	12/15/2009	<0.50	**49**	**20**	<0.50	2.8	<0.50	<0.50	<0.50	2.1	<0.50	<0.50	0.90
14D12A	6/24/2009	3.2	**42**	**400**	4.9	**6.3**	**12**	<0.50	**0.55**	**7.2**	<0.50	<0.50	1.4
14D12A	12/14/2009	4.2	**45**	**470**	4.8	**7.9**	**13**	<0.50	<0.50	**8.0**	<0.50	<0.50	1.8
14D13A	12/15/2009	<0.50	2.4	0.95	<0.50	<0.50	<0.50	<0.50	<0.50	1.1	<0.50	<0.50	<0.50
14D24A	6/10/2009	<0.50	**65**	**80**	2.3	0.77	0.90	<0.50	<0.50	1.5	<0.50	<0.50	<0.50
14D26A1	6/10/2009	<0.50	**8.9**	**11**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cleanup Level		**5.0**	**5.0**	**6.0**	**10**	**6.0**	**0.50**	**200**	**0.50**	**5.0**	**80***	**150**	**1,200**

APPENDIX E
2009 Groundwater Analytical Results
Volatile Organic Compounds

Well ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl chloride (µg/L)	1,1,1-TCA (µg/L)	1,2-DCA (µg/L)	1,1-DCA (µg/L)	Chloroform (µg/L)	Freon 11 (µg/L)	Freon 113 (µg/L)
14D28A	6/10/2009	3.8	**22**	**65**	<0.50	2.9	**1.8**	<0.50	<0.50	3.6	<0.50	<0.50	0.62
14D29A	6/25/2009	**46**	**390**	**650**	7.5	**14**	**13**	<.050	<0.50	**13**	<0.50	<0.50	7.2
14D30A	6/24/2009	0.75	**1600**	**480**	**11**	**26**	**14**	<0.50	<0.50	**12**	<0.50	<0.50	18
14D33A	6/10/2009	<0.50	<0.50	<0.50	<0.50	<0.50	**3.3**	<0.50	<0.50	2.0	<0.50	<0.50	<0.50
14D35A	6/10/2009	<0.50	2.2	5.3	<0.50	<0.50	**1.5**	<0.50	<0.50	2.1	<0.50	<0.50	<0.50
14D36A	3/25/2009	0.79	**13**	**47**	0.64	3.2	**2.2**	<0.50	<0.50	4.8	<0.50	<0.50	0.82
14D36A	9/24/2009	0.88	**13**	**52**	1.1	3.4	**2.7**	<0.50	<0.50	4.4	<0.50	<0.50	0.60
14D37A	3/25/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
14D37A	9/24/2009	<0.50	<0.50	<0.50	<0.50	<0.50	**1.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
14E14A	12/15/2009	<0.50	3.5	**6.0**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
14L32A	11/19/2009	<0.50	**140**	**60**	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15A06A	2/18/2009	<0.50	0.89	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.60
15A06A	11/18/2009	<0.50	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	2.6
15A13A	11/16/2009	<0.50	**140**	**48**	2.1	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15A18A	11/18/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B02A	11/19/2009	<0.50	**100**	**19**	0.70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B03A	2/18/2009	<0.50	**32**	4.9	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B03A	11/16/2009	<0.50	**49**	**8.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B06A	11/19/2009	<0.50	**140**	**66**	2.0	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B08A	11/18/2009	<0.50	<0.50	1.3	<0.50	<0.50	**0.58**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B09A	11/18/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B10A	2/28/2009	<0.50	**130**	**57**	1.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15B10A	11/18/2009	<0.50	**180**	**69**	2.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15H05A	12/16/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15H12A	2/24/2009	<0.50	**52**	**27**	0.67	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15H12A	7/27/2009	<0.50	**60**	**32**	0.71	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
15H12A	11/18/2009	<0.50	**70**	**71**	1.2	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS1	2/25/2009	<0.50	**34**	**8.6**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS1	7/28/2009	<0.50	**52**	**22**	0.64	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS1	11/16/2009	<0.50	**50**	**14**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cleanup Level		**5.0**	**5.0**	**6.0**	**10**	**6.0**	**0.50**	**200**	**0.50**	**5.0**	**80***	**150**	**1,200**

APPENDIX E
2009 Groundwater Analytical Results
Volatile Organic Compounds

Well ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl chloride (µg/L)	1,1,1-TCA (µg/L)	1,2-DCA (µg/L)	1,1-DCA (µg/L)	Chloroform (µg/L)	Freon 11 (µg/L)	Freon 113 (µg/L)
MW-AS2	2/24/2009	<0.50	**21**	**15**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS2	11/13/2009	<0.50	**41**	**28**	0.78	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS3	2/25/2009	<0.50	**38**	**9.7**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS3	7/28/2009	<0.50	**46**	**19**	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS3	11/16/2009	<0.50	**53**	**12**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS4	2/18/2009	<0.50	**34**	**23**	0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS4	11/17/2009	<0.50	**92**	**62**	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS5	2/25/2009	<0.50	**70**	**32**	0.92	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS5	11/16/2009	<0.50	**75**	**34**	0.79	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS6	2/24/2009	<0.50	**33**	**22**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS6	7/27/2009	<0.50	**39**	**22**	0.54	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS6	11/13/2009	<0.50	**44**	**27**	0.51	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS7	2/24/2009	<0.50	**110**	**46**	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS7	11/13/2009	<0.50	**88**	**42**	0.86	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS8	2/18/2009	<0.50	**170**	**75**	2.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS8	11/17/2009	<0.50	**270**	**110**	3.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS9	2/24/2009	<0.50	**73**	**22**	0.59	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS9	7/27/2009	<0.50	**28**	**10**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS9	11/13/2009	<0.50	**63**	**22**	0.53	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS10	2/24/2009	<0.50	**11**	1.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS10	7/27/2009	<0.50	**19**	2.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS10	11/13/2009	<0.50	**22**	3.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS11	2/24/2009	<0.50	**41**	5.8	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS11	7/27/2009	<0.50	**44**	**6.0**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS11	11/13/2009	<0.50	**56**	**7.5**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS12	2/24/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS12	7/27/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS12	11/13/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS13	2/18/2009	<0.50	**52**	**8.3**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS13	7/28/2009	<0.50	**60**	**9.8**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
MW-AS13	11/13/2009	<0.50	**48**	**10**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Cleanup Level		**5.0**	**5.0**	**6.0**	**10**	**6.0**	**0.50**	**200**	**0.50**	**5.0**	**80***	**150**	**1,200**

APPENDIX E
2009 Groundwater Analytical Results
Volatile Organic Compounds

Well ID	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl chloride (µg/L)	1,1,1-TCA (µg/L)	1,2-DCA (µg/L)	1,1-DCA (µg/L)	Chloroform (µg/L)	Freon 11 (µg/L)	Freon 113 (µg/L)
NASA-1A	3/19/2009	<0.50	**42**	**37**	0.92	2.5	**1.2**	<0.50	<0.50	2.6	<0.50	<0.50	1.9
NASA-1A	6/10/2009	<0.50	**43**	**41**	<0.50	2.2	**0.95**	<0.50	<0.50	2.8	<0.50	<0.50	1.6
NASA-1A	9/23/2009	<0.50	**41**	**40**	1.4	3.5	**1.6**	<0.50	<0.50	3.6	<0.50	<0.50	1.5
NASA-1A	12/16/2009	<0.50	**58**	**48**	1.2	3.0	**1.1**	<0.50	**0.61**	3.7	<0.50	<0.50	2.1
NASA-2A	3/19/2009	<0.50	**32**	**13**	<0.50	0.62	**0.66**	<0.50	<0.50	1.5	<0.50	<0.50	0.63
NASA-3A	3/19/2009	<0.50	**11**	0.74	<0.50	**14**	<0.50	1.2	<0.50	3.8	<0.50	2.8	2.7
NASA-3A	6/10/2009	<0.50	**13**	1.1	<0.50	**14**	<0.50	1.4	<0.50	4.5	0.62	2.6	2.7
NASA-3A	9/23/2009	<0.50	**14**	1.0	<0.50	**18**	<0.50	2.0	<0.50	4.7	0.67	2.5	1.7
NASA-3A	12/16/2009	<0.50	**17**	0.97	<0.50	**19**	<0.50	2.0	<0.50	**6.0**	0.77	2.7	3.3
PRB-25	2/18/2009	<0.50	**7.4**	**7.6**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-25	11/17/2009	<0.50	**23**	**37**	0.78	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-26	2/24/2009	<0.50	**10**	**7.6**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-26	11/13/2009	<0.50	**6.3**	4.7	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-28	2/18/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-28	11/17/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-29	2/25/2009	<0.50	**63**	**23**	0.80	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-29	11/16/2009	<0.50	**60**	**18**	0.60	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-30	2/25/2009	<0.50	**87**	**33**	0.91	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-30	11/16/2009	<0.50	**140**	**51**	1.3	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-31	2/24/2009	<0.50	**86**	**20**	0.61	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-31	7/27/2009	<0.50	**83**	**27**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
PRB-31	11/13/2009	<0.50	**130**	**36**	0.92	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W08-01A1	2/18/2009	<0.50	**5.1**	0.55	<0.50	0.91	<0.50	<0.50	<0.50	<0.50	<0.50	0.74	1.2
W08-04A1	2/18/2009	<0.50	**1.2**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
W08-08A1	3/25/2009	<0.50	**16**	<0.50	<0.50	1.7	<0.50	0.66	<0.50	1.2	<0.50	<0.50	2.1
W08-08A1	9/21/2009	<0.50	**12**	<0.50	<0.50	0.73	<0.50	0.73	<0.50	1.4	<0.50	<0.50	1.4
Cleanup Level		**5.0**	**5.0**	**6.0**	**10**	**6.0**	**0.50**	**200**	**0.50**	**5.0**	**80***	**150**	**1,200**

*** = Total Trihalomethane MCL**

Petroleum Hydrocarbons

APPENDIX E
2009 Groundwater Analytical Results
Petroleum Hydrocarbons

Well ID	Date	TPH-MO (mg/L)	TPH-D (mg/L)	TPH-JP5/8 (mg/L)	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
11N26A	3/23/2009	<0.050	<0.050	**0.990**	<50	<0.30	<0.30	<0.30	<0.50
11N26A	9/24/2009	<0.050	<0.050	**0.74**	**430**	<0.30	1.6	0.57	4.4
14C60A	6/10/2009	<0.050	<0.050	0.14	**380**	<0.30	<0.30	<0.30	<0.50
14D02A	12/14/2009	<0.050	<0.050	<0.050	**140**	<0.30	<0.30	<0.30	<0.50
14D05A	6/25/2009	<0.050	<0.050	<0.050	**630**	**7.6**	<0.30	0.83	2.7
14D12A	6/24/2009	<0.050	<0.050	<0.050	**60**	0.49	<0.30	<0.30	<0.50
14D12A	12/14/2009	NA	NA	NA	NA	0.66	<0.30	<0.30	<0.50
14D24A	6/10/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
14D26A1	6/10/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
14D28A	6/10/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
14D29A	6/25/2009	<0.050	<0.050	<0.050	<50	0.33	<0.30	<0.30	<0.50
14D30A	6/24/2009	<0.050	<0.050	<0.050	<50	0.80	<0.30	<0.30	<0.50
14D33A	6/10/2009	<0.050	<0.050	0.12	<50	<0.30	<0.30	<0.30	<0.50
14D35A	6/10/2009	<0.050	<0.050	<0.050	**59**	<0.30	<0.30	<0.30	<0.50
14D36A	3/25/2009	<0.050	<0.050	0.098	<50	0.50	<0.30	<0.30	<0.50
14D36A	9/24/2009	<0.050	<0.050	**2.1**	<50	0.43	<0.30	<0.30	<0.50
14D37A	3/25/2009	<0.050	<0.050	**1.2**	**290**	0.51	<0.30	3.1	1.8
14D37A	9/24/2009	<0.050	<0.050	0.58	**200**	<0.30	<0.30	1.6	1.2
15A11A	3/24/2009	<0.050	<0.050	0.17	**59**	<0.50	<0.50	<0.50	<1.0
15A11A	6/9/2009	<0.050	<0.050	0.28	**51**	<0.50	<0.50	<0.50	<1.0
15A11A	9/22/2009	<0.050	<0.050	0.20	**110**	<0.50	<0.50	<0.50	<1.0
15A11A	12/14/2009	<0.050	0.24	<0.050	**110**	<0.50	<0.50	<0.50	<1.0
MW-AS1	11/16/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
Cleanup Level		**0.640**	**0.700**	**0.700**	**50**	**1.0**	**150**	**300**	**1,750**

APPENDIX E
2009 Groundwater Analytical Results
Petroleum Hydrocarbons

Well ID	Date	TPH-MO (mg/L)	TPH-D (mg/L)	TPH-JP5/8 (mg/L)	TPH-G (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
MW-AS3	2/25/2009	<0.050	<0.050	<0.050	**53**	<0.30	<0.30	<0.30	<0.50
MW-AS4	2/18/2009	0.14	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
MW-AS5	11/16/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
MW-AS6	2/24/2009	0.30	<0.050	<0.050	**58**	<0.30	<0.30	<0.30	<0.50
MW-AS7	11/13/2009	0.12	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
MW-AS9	11/13/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
MW-AS10	11/13/2009	<0.050	<0.050	<0.050	**170**	<0.30	<0.30	<0.30	<0.50
MW-AS11	2/24/2009	0.075	<0.050	<0.050	**51**	<0.30	<0.30	<0.30	<0.50
MW-AS13	11/16/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	0.56
NASA-1A	3/19/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
NASA-1A	6/10/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
NASA-1A	9/23/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
NASA-1A	12/16/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
NASA-2A	3/19/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
PRB-28	2/18/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
PRB-29	11/16/2009	<0.050	<0.050	<0.050	<50	<0.30	<0.30	<0.30	<0.50
PRB-30	11/16/2009	<0.050	<0.050	<0.050	**56**	<0.30	<0.30	<0.30	<0.50
TANK1-E	3/24/2009	<0.050	<0.050	<0.050	<50	<0.50	<0.50	<0.50	<1.0
TANK1-E	6/9/2009	<0.050	<0.050	<0.050	<50	<0.50	<0.50	<0.50	<1.0
TANK1-E	9/22/2009	<0.050	<0.050	<0.050	<50	<0.50	<0.50	<0.50	<1.0
TANK1-E	12/14/2009	<0.050	<0.050	<0.050	<50	<0.50	<0.50	<0.50	<1.0
Cleanup Level		**0.640**	**0.700**	**0.700**	**50**	**1.0**	**150**	**300**	**1,750**

NA = Not Analyzed

Polychlorinated Biphenyls

APPENDIX E
2009 Groundwater Analytical Results
Polychorinated Biphenyls

Well ID	Date	Aroclor 1016 (µg/L)	Aroclor 1221 (µg/L)	Aroclor 1232 (µg/L)	Aroclor 1242 (µg/L)	Aroclor 1248 (µg/L)	Aroclor 1254 (µg/L)	Aroclor 1260 (µg/L)	Aroclor 1268 (µg/L)
11E02A	3/23/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11E02A	9/21/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11M25A	3/23/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
11M25A	9/21/2009	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

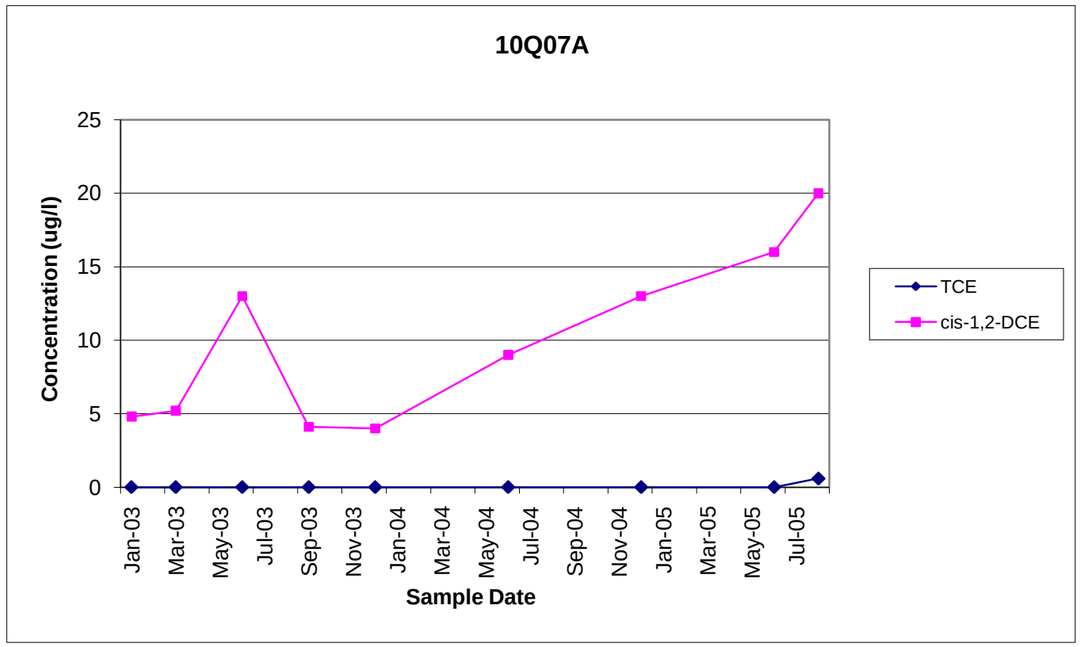
Lead

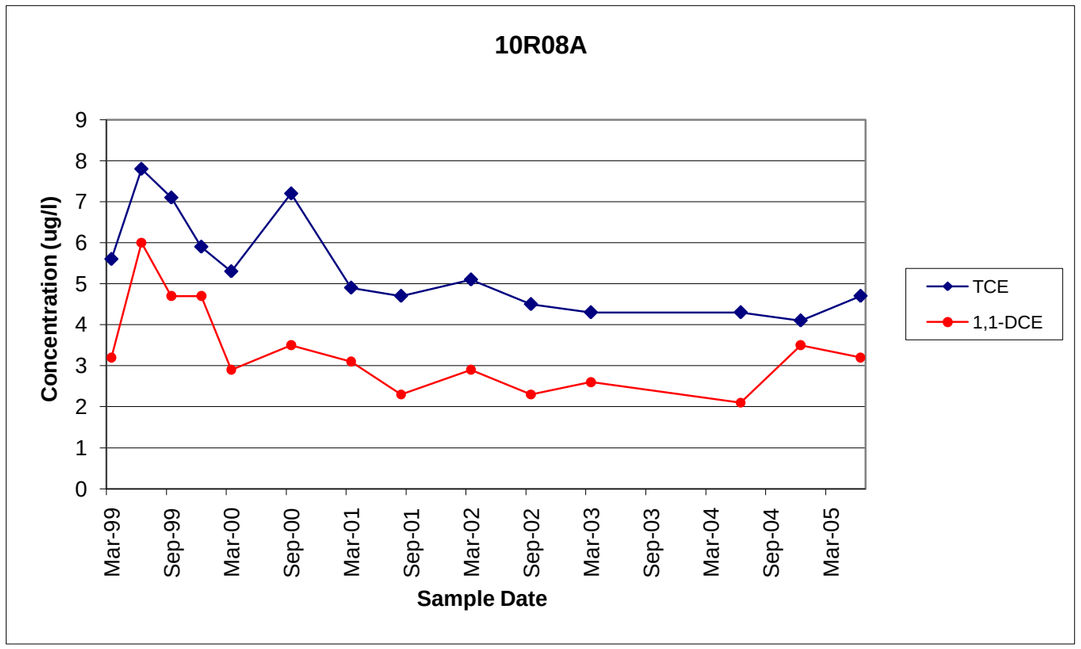
APPENDIX E
2009 Groundwater Analytical Results
Lead

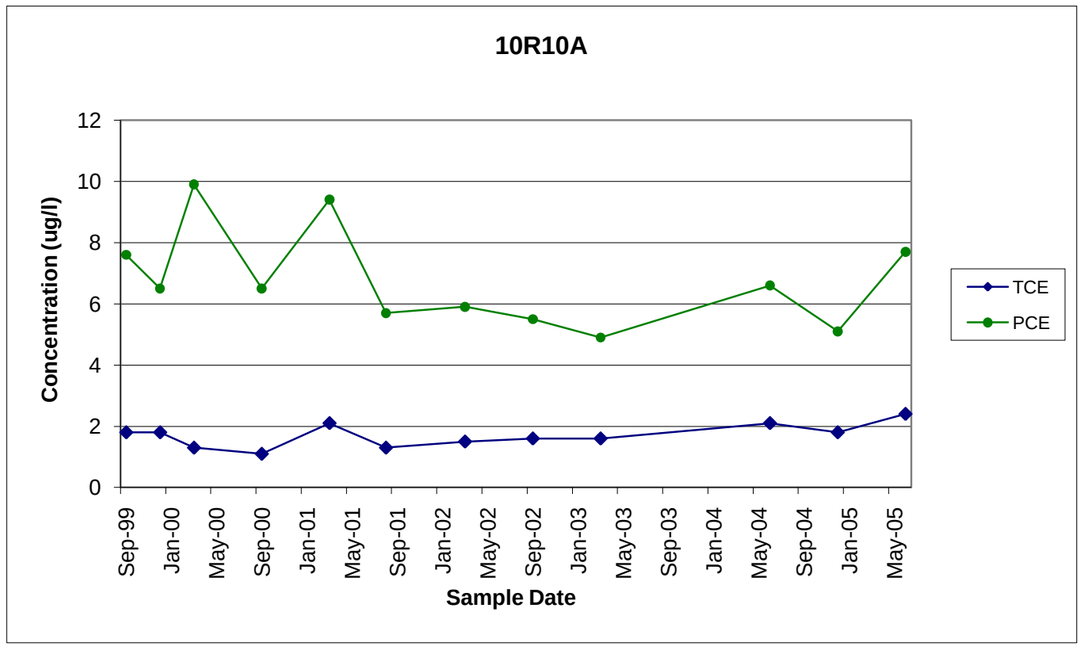
Well ID	Date	Lead (µg/L)
11E02A	3/23/2009	<5.0
11E02A	9/21/2009	<5.0
11M25A	3/23/2009	<5.0
11M25A	9/21/2009	<5.0

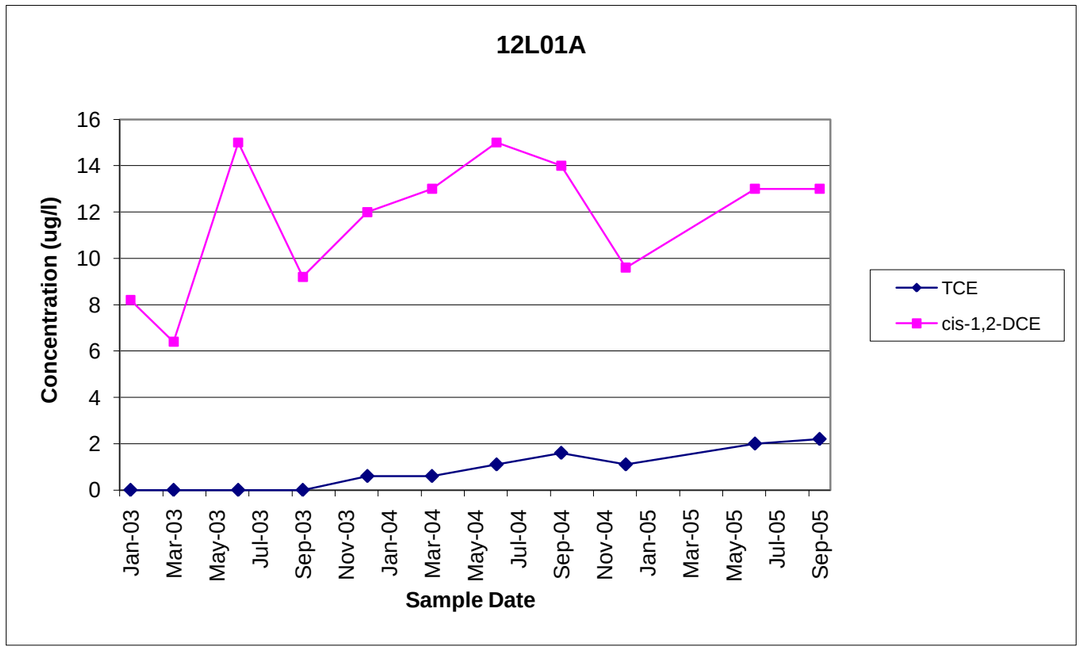
APPENDIX F

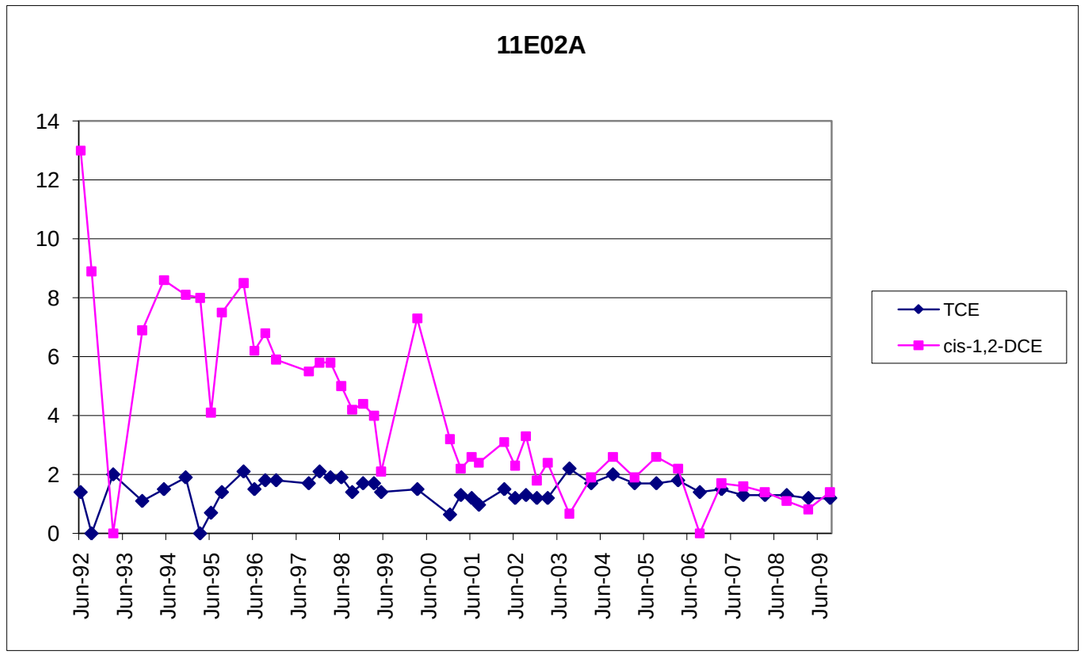
NASA 2009 CONCENTRATION-VERSUS-TIME GRAPHS

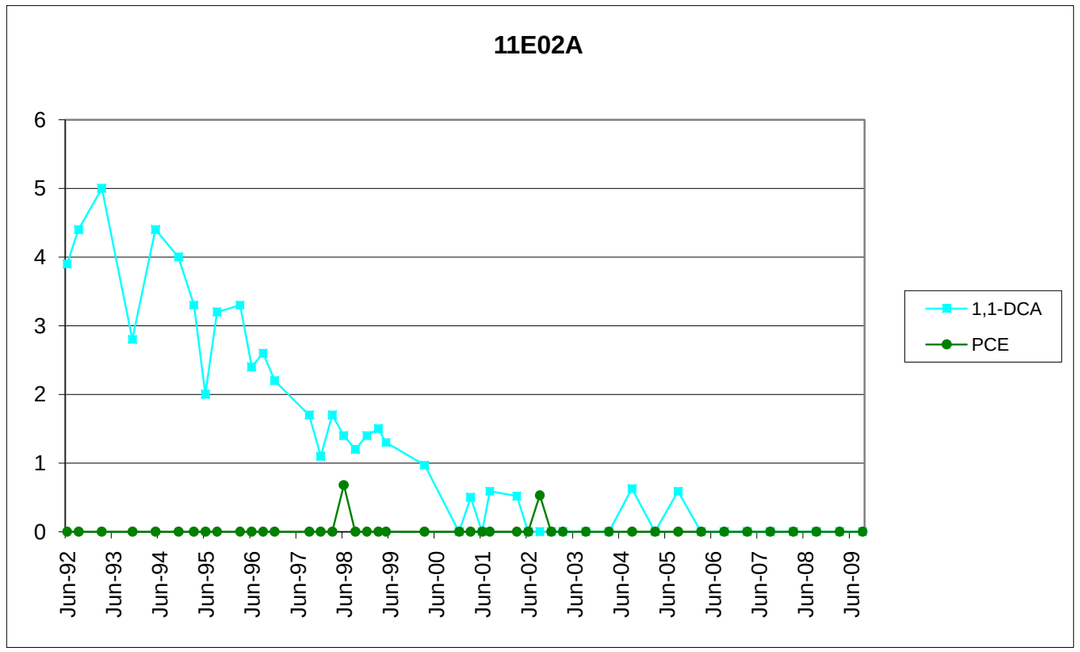

10Q07A
Concentration (ug/l)
25
20
15
10
5
0
Jan-03
Mar-03
May-03
Jul-03
Sep-03
Nov-03
Jan-04
Mar-04
May-04
Jul-04
Sep-04
Nov-04
Jan-05
Mar-05
May-05
Jul-05
Sample Date
TCE
cis-1,2-DCE


10R08A
Concentration (ug/l)
9
8
7
6
5
4
3
2
1
0
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sample Date
TCE
1,1-DCE


10R10A
Concentration (ug/l)
12
10
8
6
4
2
0
Sep-99
Jan-00
May-00
Sep-00
Jan-01
May-01
Sep-01
Jan-02
May-02
Sep-02
Jan-03
May-03
Sep-03
Jan-04
May-04
Sep-04
Jan-05
May-05
Sample Date
TCE
PCE


12L01A
Concentration (ug/l)
16
14
12
10
8
6
4
2
0
Jan-03
Mar-03
May-03
Jul-03
Sep-03
Nov-03
Jan-04
Mar-04
May-04
Jul-04
Sep-04
Nov-04
Jan-05
Mar-05
May-05
Jul-05
Sep-05
Sample Date
TCE
cis-1,2-DCE


11E02A
14
12
10
8
6
4
2
0
Jun-92
Jun-93
Jun-94
Jun-95
Jun-96
Jun-97
Jun-98
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
TCE
cis-1,2-DCE


11E02A
6
5
4
3
2
1
0
Jun-92
Jun-93
Jun-94
Jun-95
Jun-96
Jun-97
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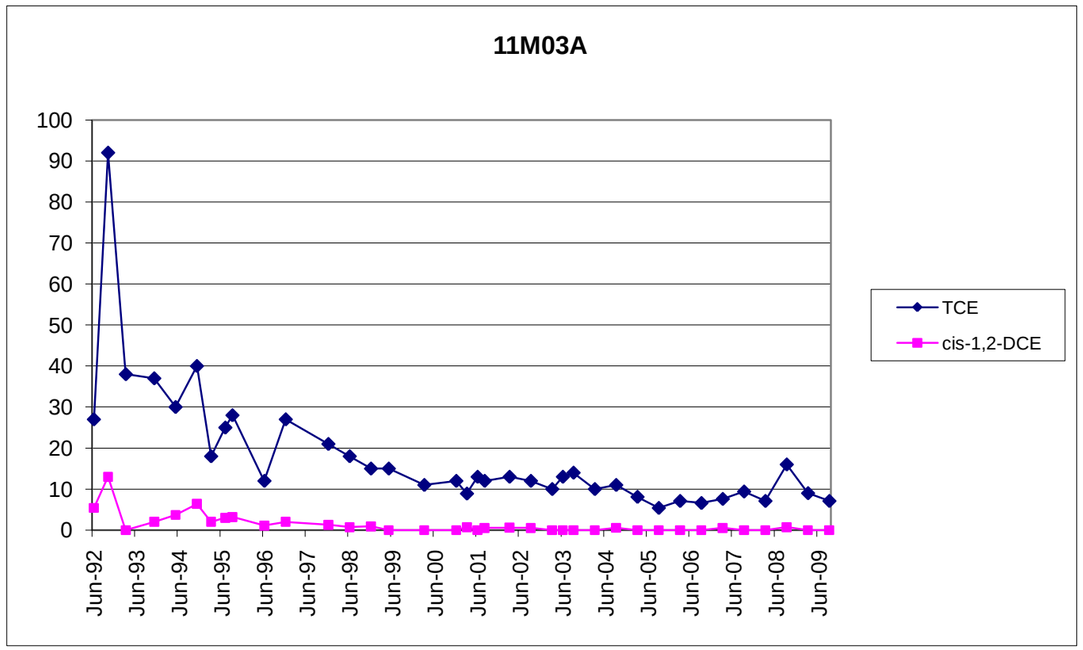
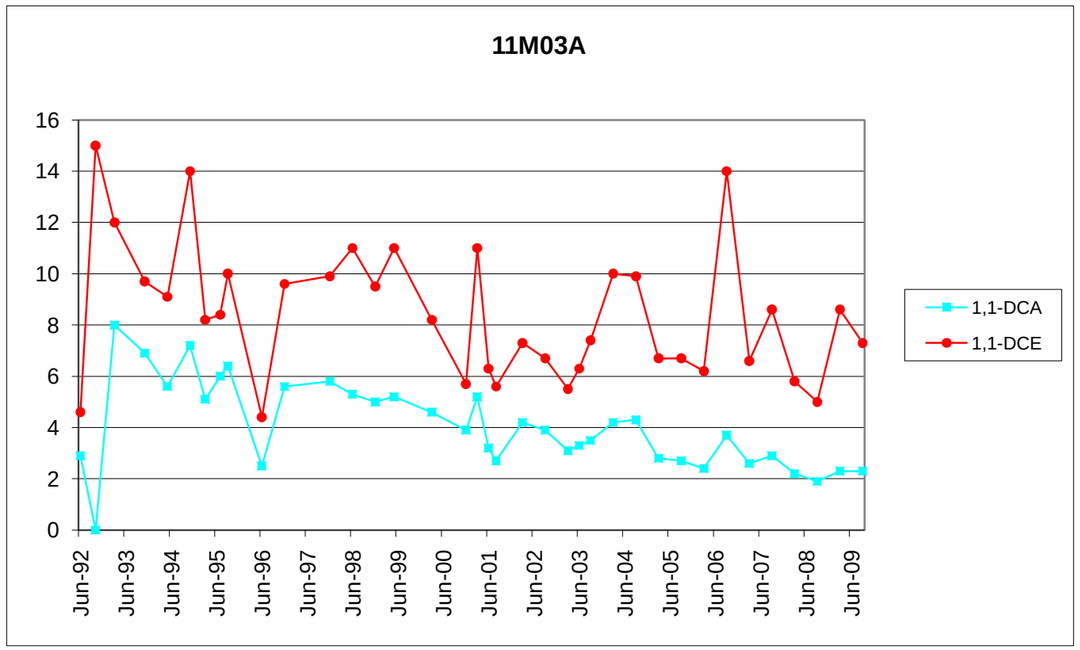
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
1,1-DCA
PCE


11M03A
100
90
80
70
60
50
40
30
20
10
0
Jun-92
Jun-93
Jun-94
Jun-95
Jun-96
Jun-97
Jun-98
Jun-99
Jun-00
Jun-01
Jun-02
Jun-03
Jun-04
Jun-05
Jun-06
Jun-07
Jun-08
Jun-09
TCE
cis-1,2-DCE


11M03A
16
14
12
10
8
6
4
2
0
Jun-92
Jun-93
Jun-94
Jun-95
Jun-96
Jun-97
Jun-98
Jun-99
Jun-00
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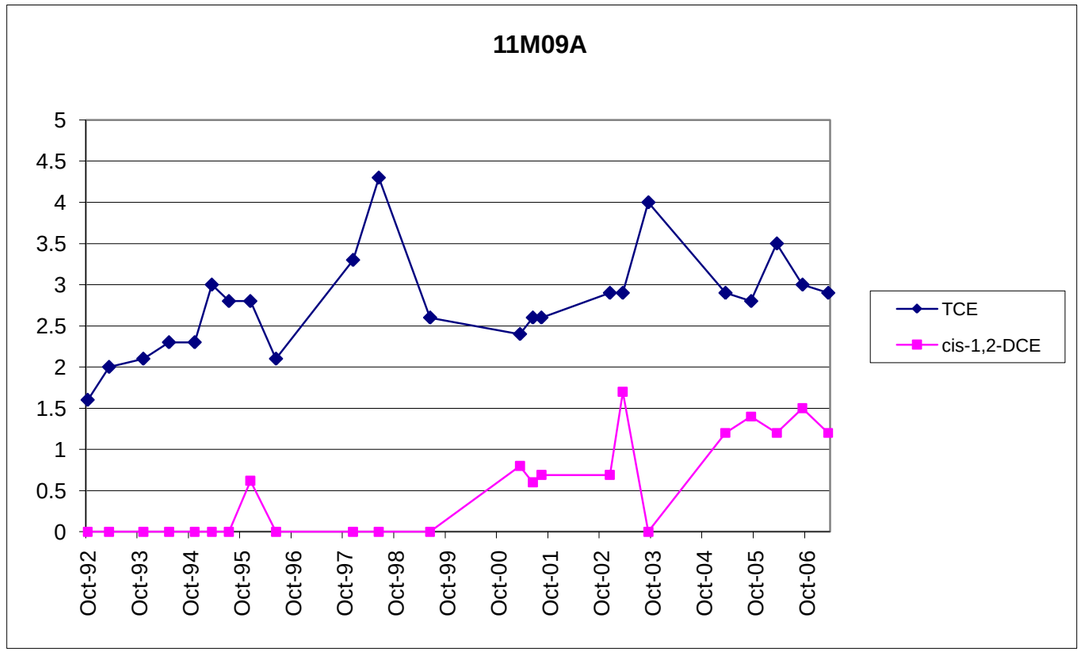
1,1-DCA
1,1-DCE


11M09A
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Oct-92
Oct-93
Oct-94
Oct-95
Oct-96
Oct-97
Oct-98
Oct-99
Oct-00
Oct-01
Oct-02
Oct-03
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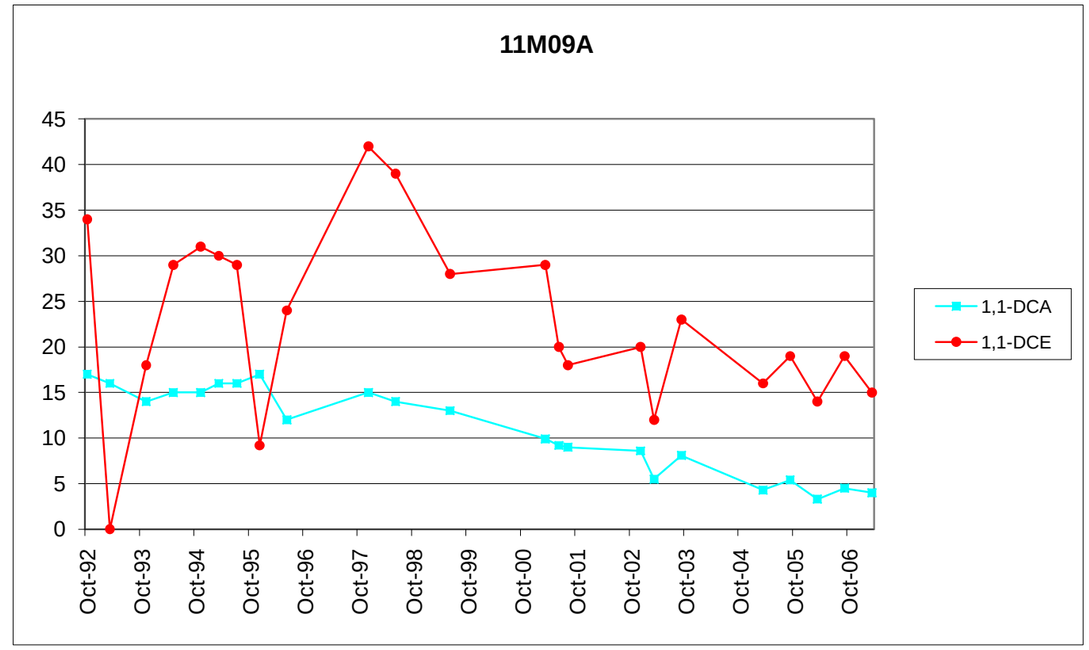
Oct-05
Oct-06
TCE
cis-1,2-DCE


11M09A
45
40
35
30
25
20
15
10
5
0
Oct-92
Oct-93
Oct-94
Oct-95
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Oct-97
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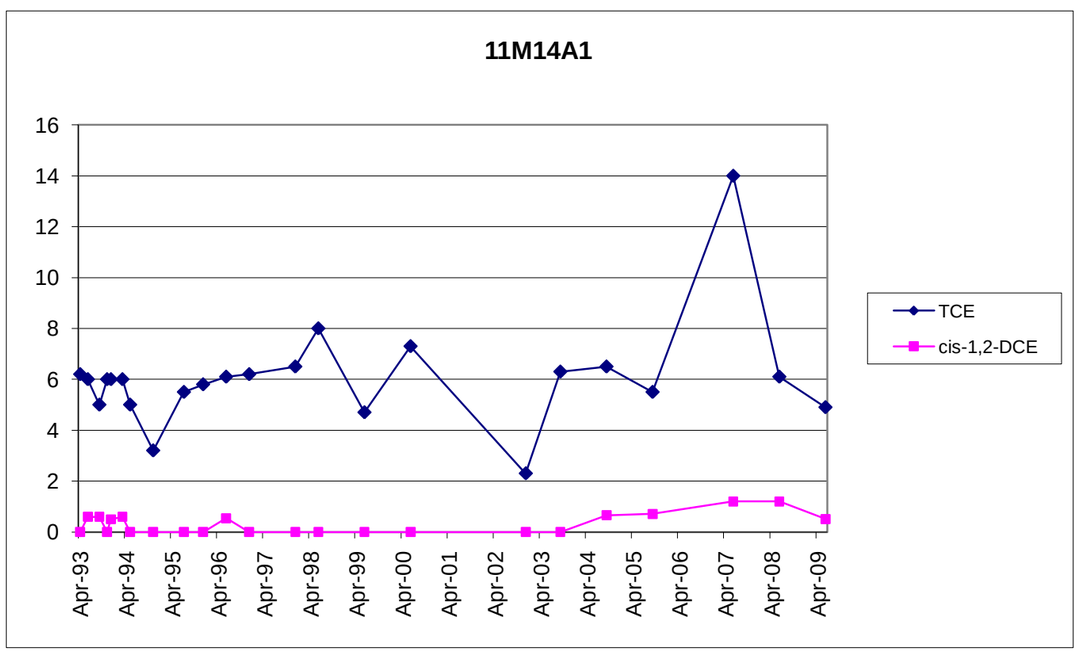
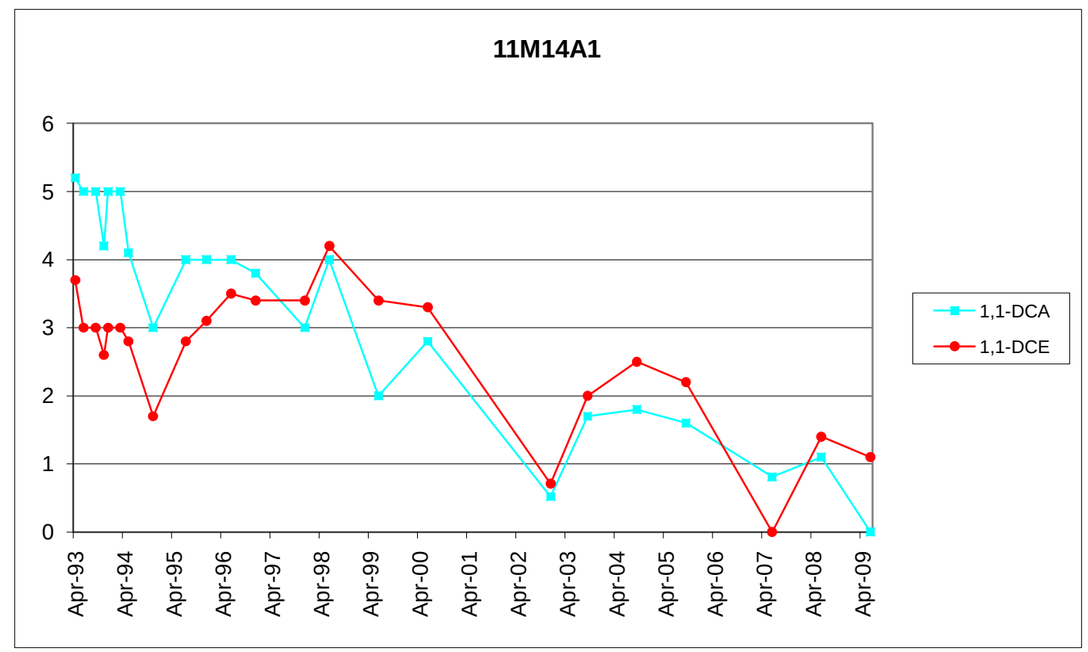
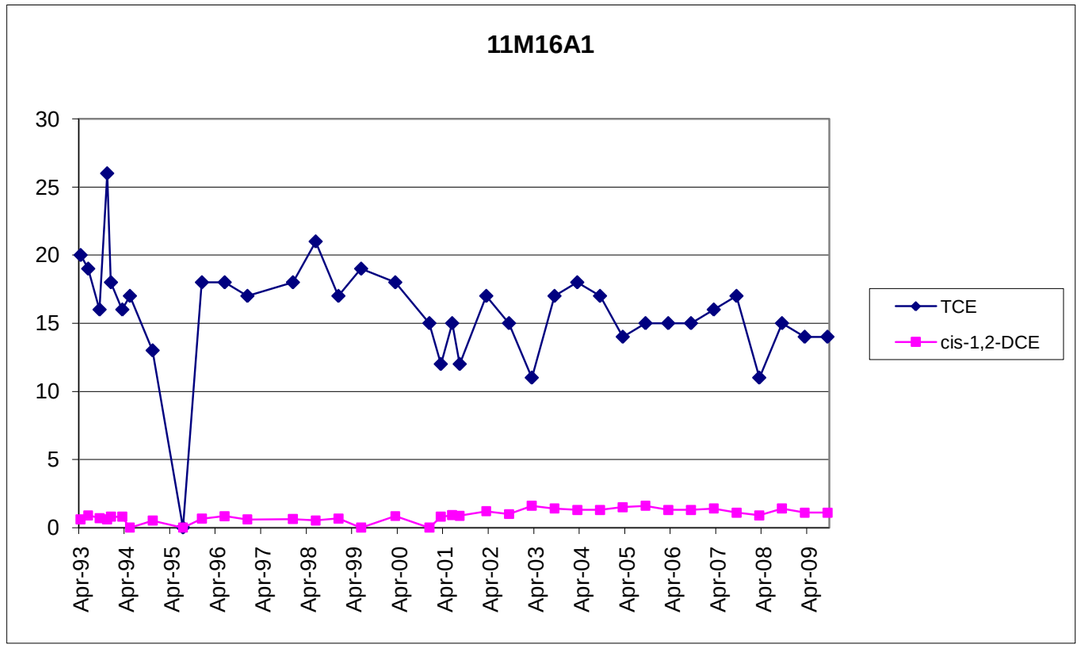
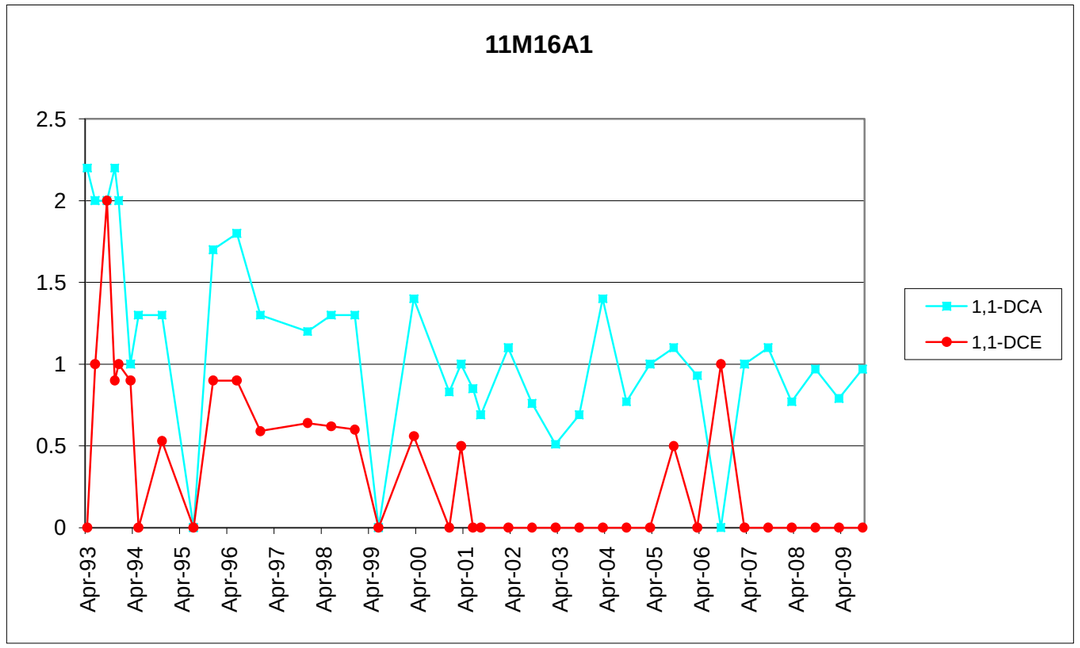
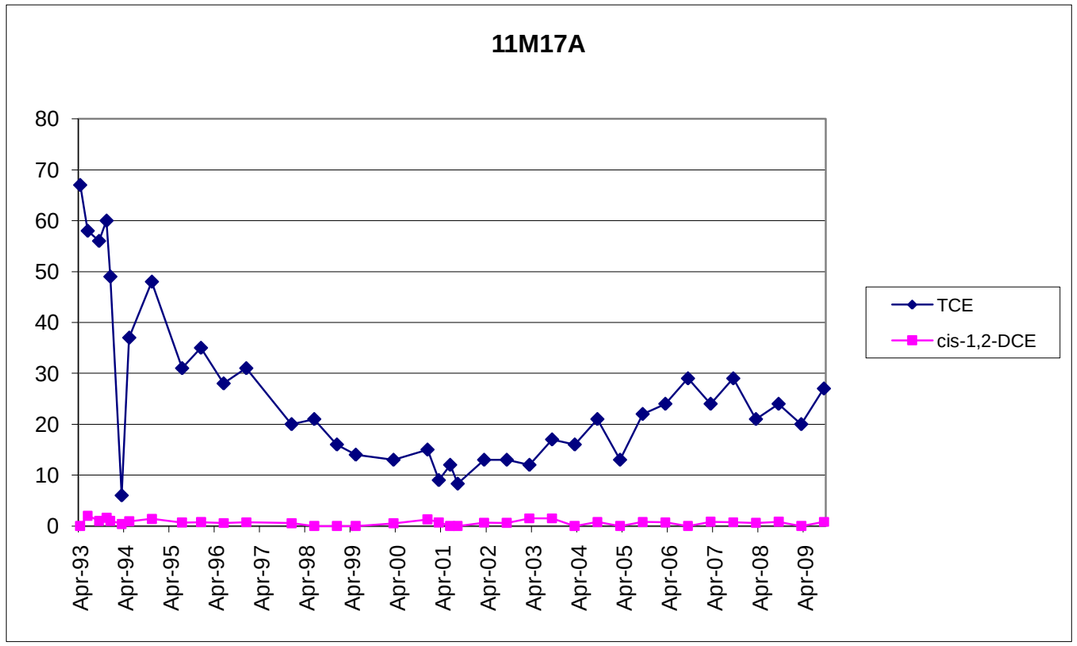
Oct-05
Oct-06
1,1-DCA
1,1-DCE

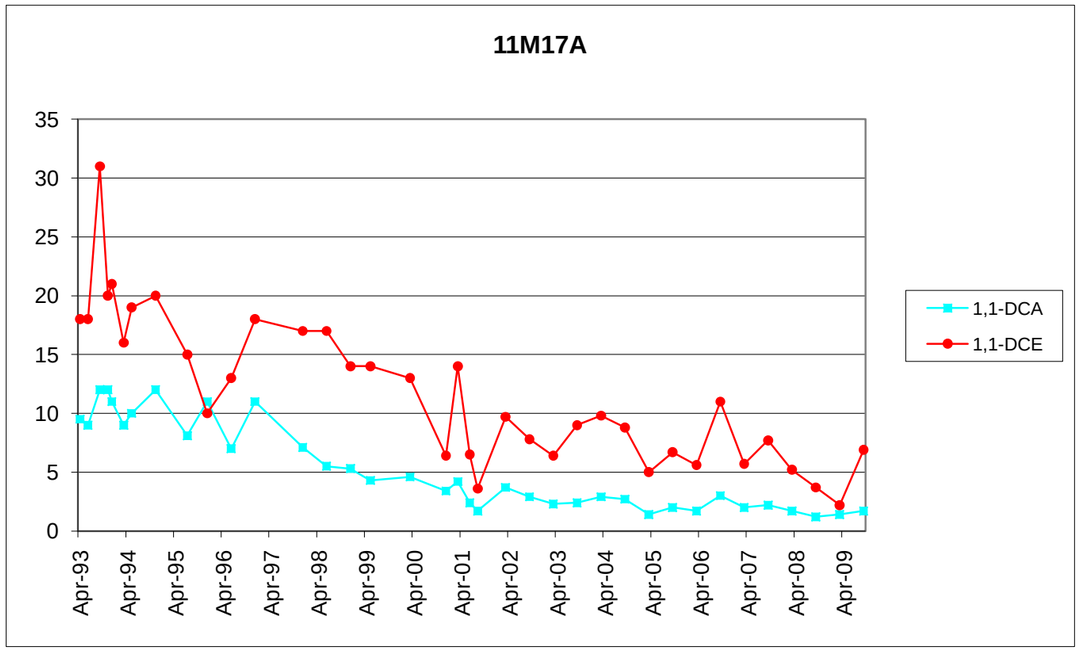

11M14A1
16
14
12
10
8
6
4
2
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
TCE
cis-1,2-DCE

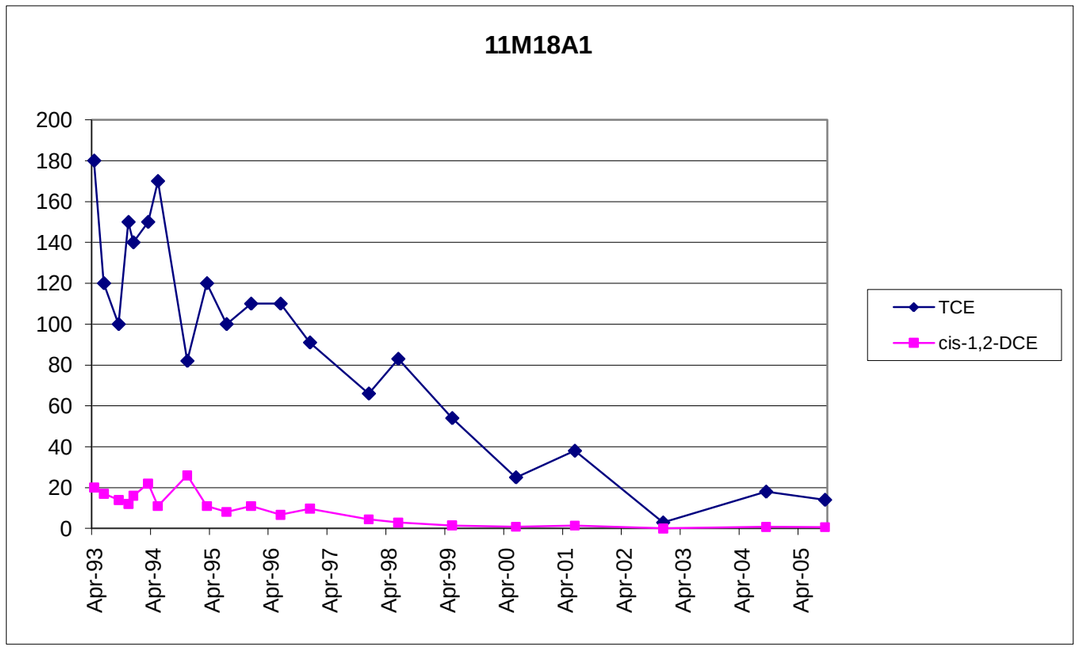

11M14A1
6
5
4
3
2
1
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
1,1-DCA
1,1-DCE

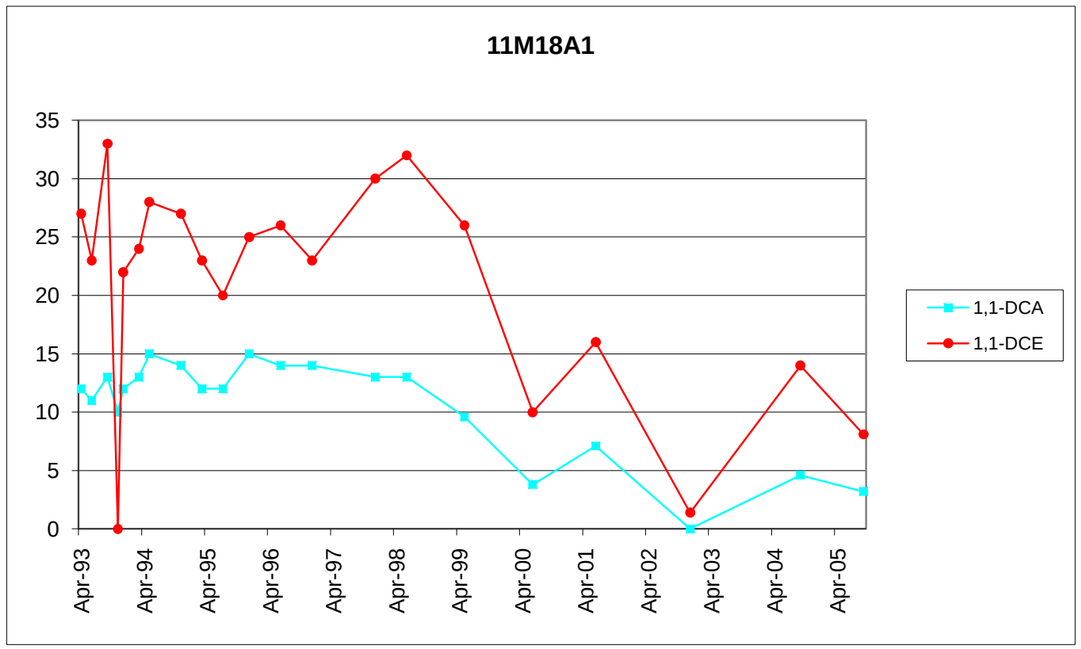

11M16A1
30
25
20
15
10
5
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
TCE
cis-1,2-DCE


11M16A1
2.5
2
1.5
1
0.5
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
1,1-DCA
1,1-DCE


11M17A
80
70
60
50
40
30
20
10
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
TCE
cis-1,2-DCE


11M17A
35
30
25
20
15
10
5
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
Apr-06
Apr-07
Apr-08
Apr-09
1,1-DCA
1,1-DCE


11M18A1
200
180
160
140
120
100
80
60
40
20
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
Apr-98
Apr-99
Apr-00
Apr-01
Apr-02
Apr-03
Apr-04
Apr-05
TCE
cis-1,2-DCE


11M18A1
35
30
25
20
15
10
5
0
Apr-93
Apr-94
Apr-95
Apr-96
Apr-97
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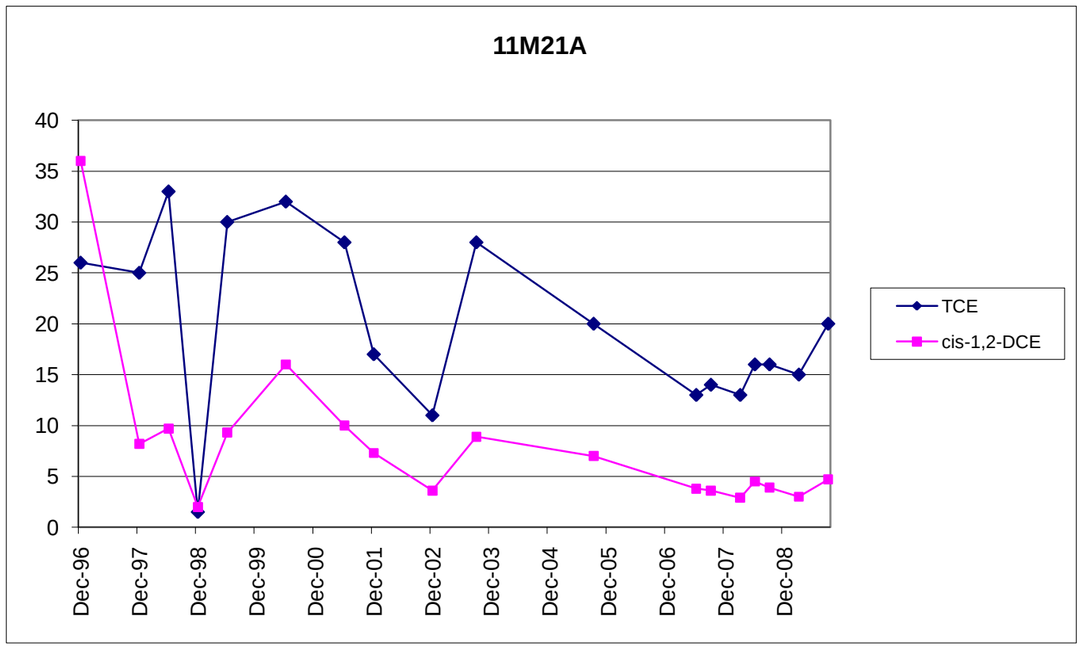
Apr-05
1,1-DCA
1,1-DCE


11M21A
40
35
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25
20
15
10
5
0
Dec-96
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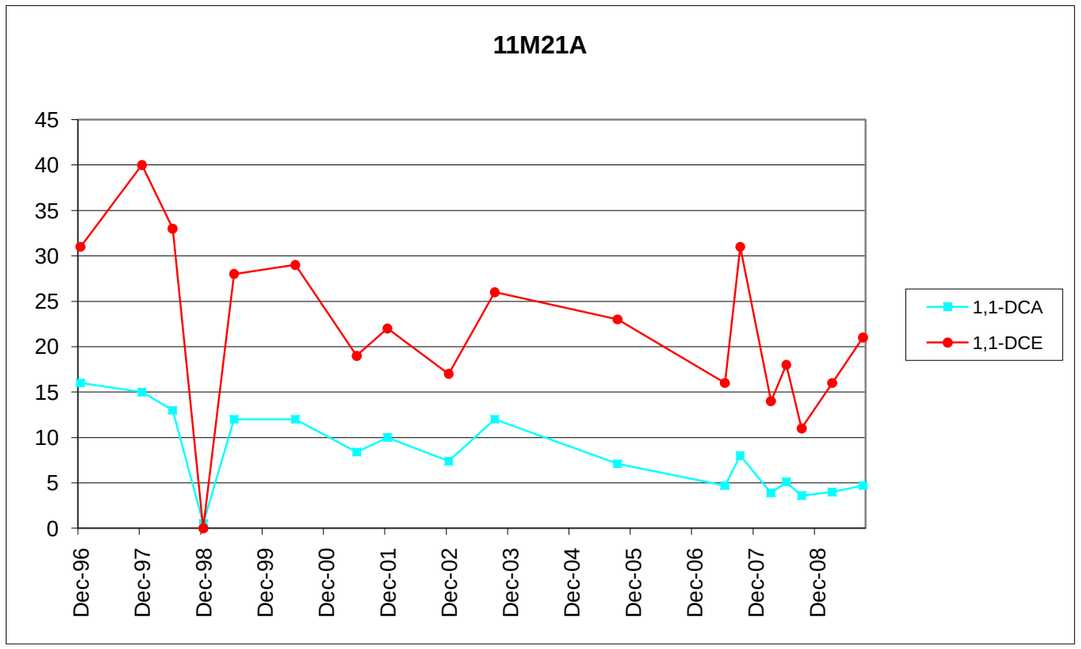
Dec-08
TCE
cis-1,2-DCE


11M21A
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40
35
30
25
20
15
10
5
0
Dec-96
Dec-97
Dec-98
Dec-99
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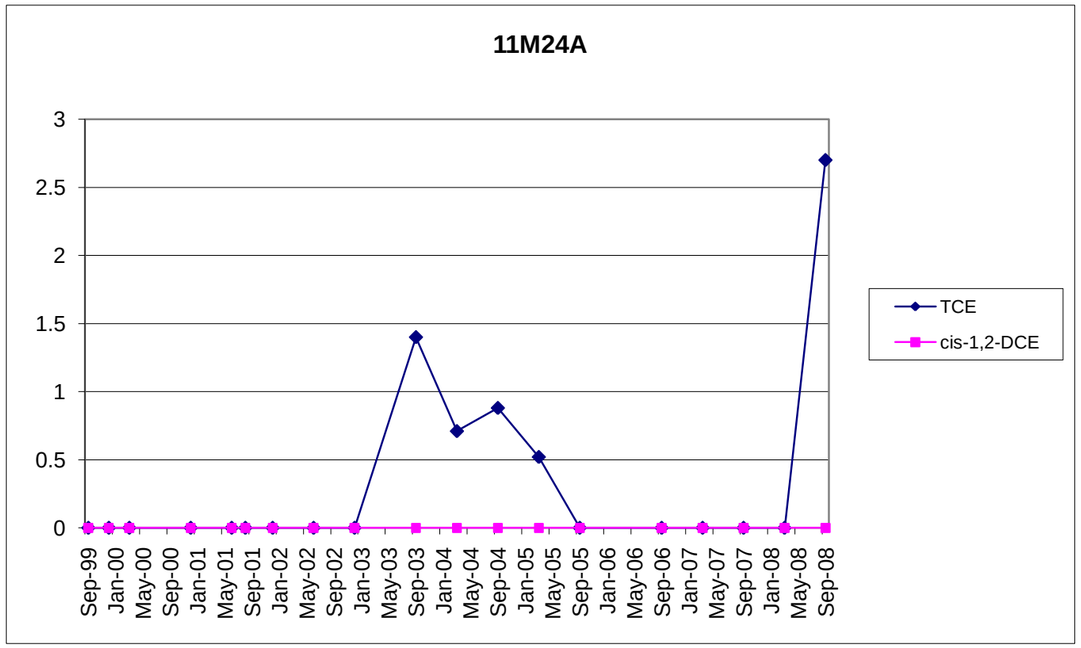
1,1-DCA
1,1-DCE


11M24A
3
2.5
2
1.5
1
0.5
0
Sep-99
Jan-00
May-00
Sep-00
Jan-01
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Sep-01
Jan-02
May-02
Sep-02
Jan-03
May-03
Sep-03
Jan-04
May-04
Sep-04
Jan-05
May-05
Sep-05
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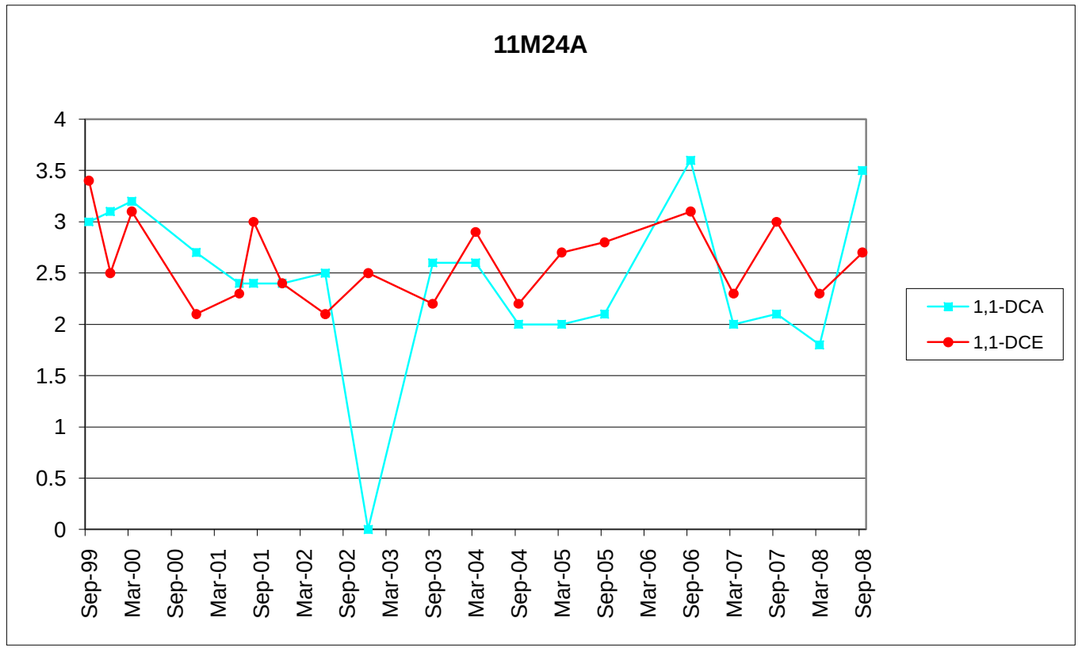
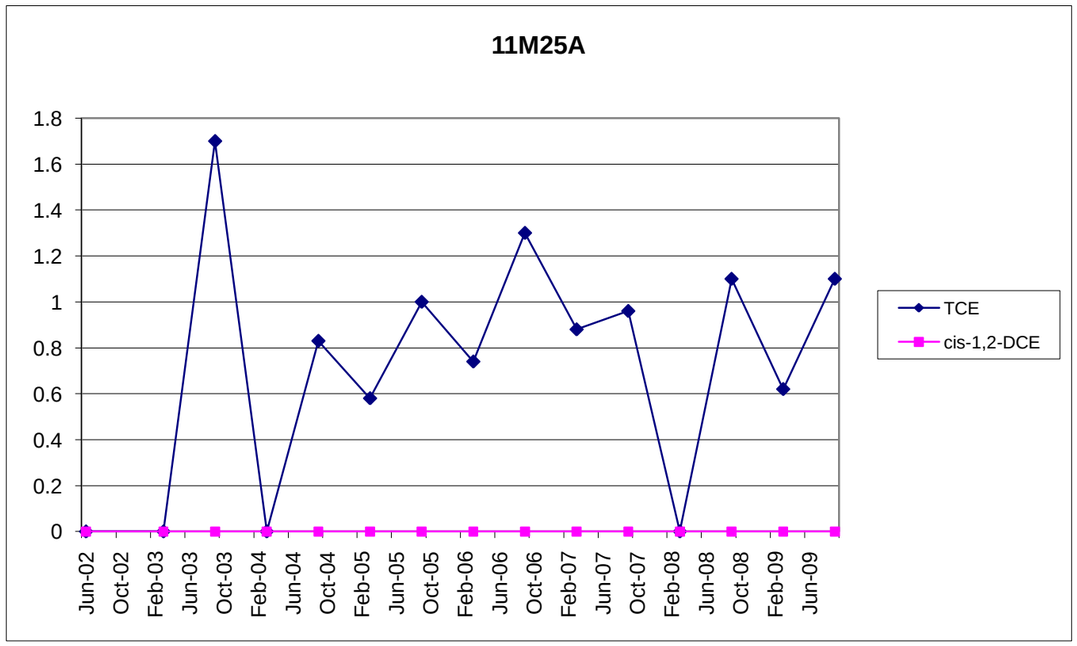
Sep-08
TCE
cis-1,2-DCE


11M24A
4
3.5
3
2.5
2
1.5
1
0.5
0
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
1,1-DCA
1,1-DCE


11M25A
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Jun-02
Oct-02
Feb-03
Jun-03
Oct-03
Feb-04
Jun-04
Oct-04
Feb-05
Jun-05
Oct-05
Feb-06
Jun-06
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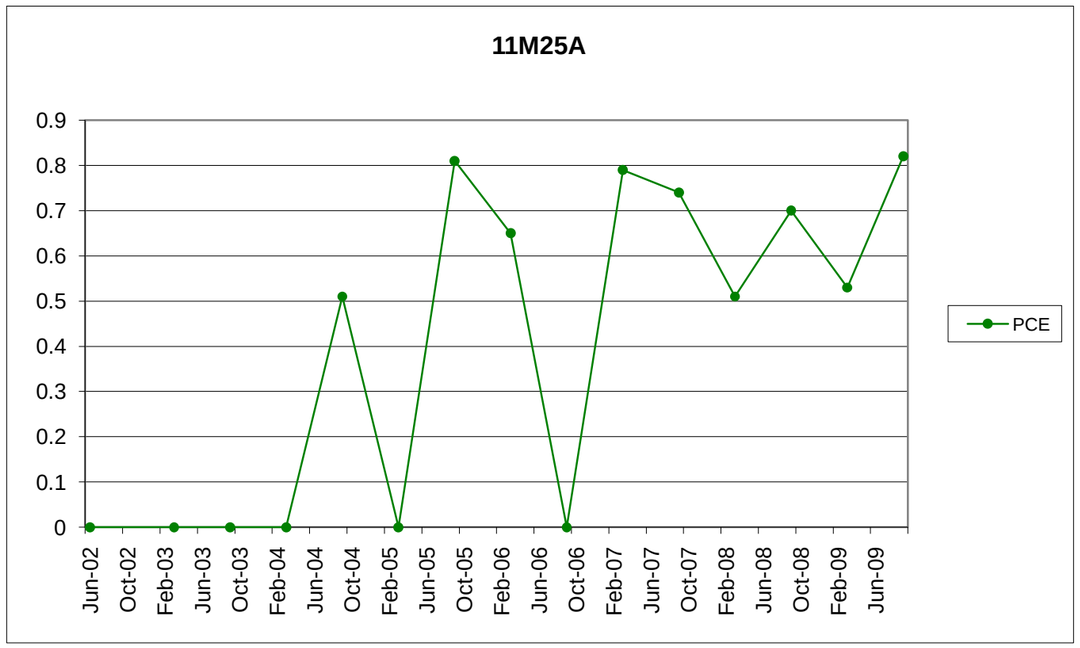
Oct-07
Feb-08
Jun-08
Oct-08
Feb-09
Jun-09
TCE
cis-1,2-DCE


11M25A
0.9
0.8
0.7
0.6
0.5
0.4
0.3
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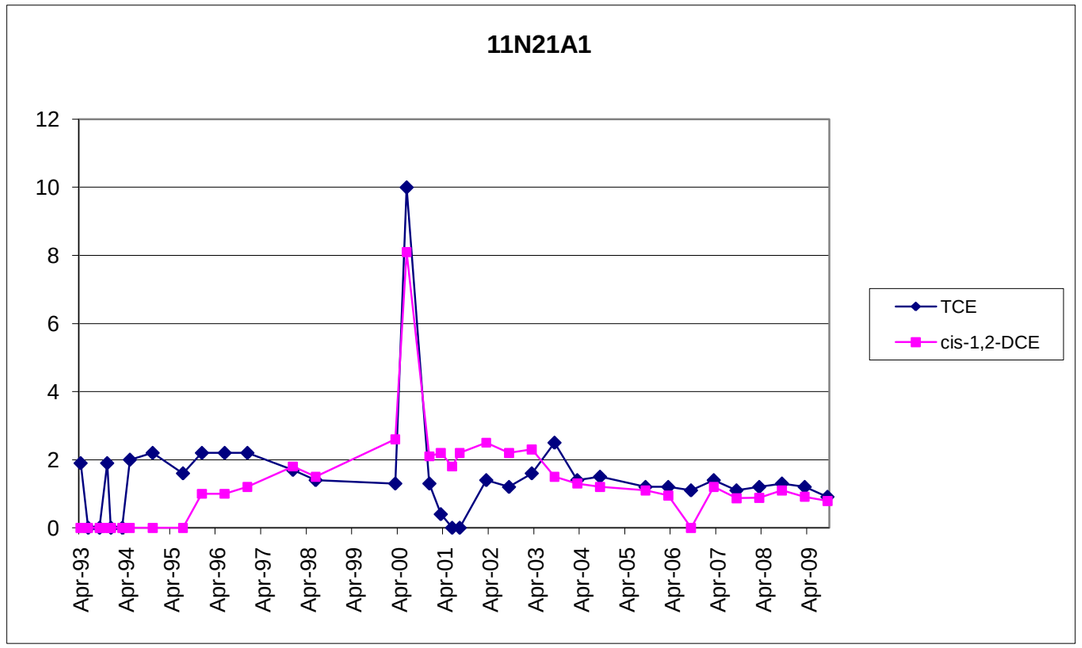
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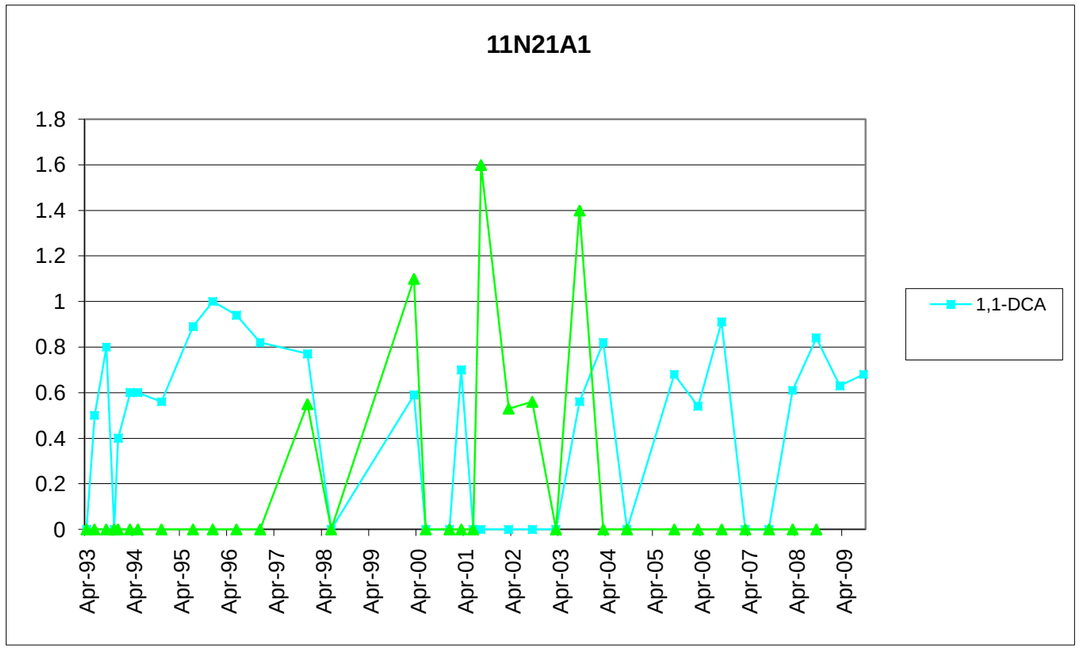
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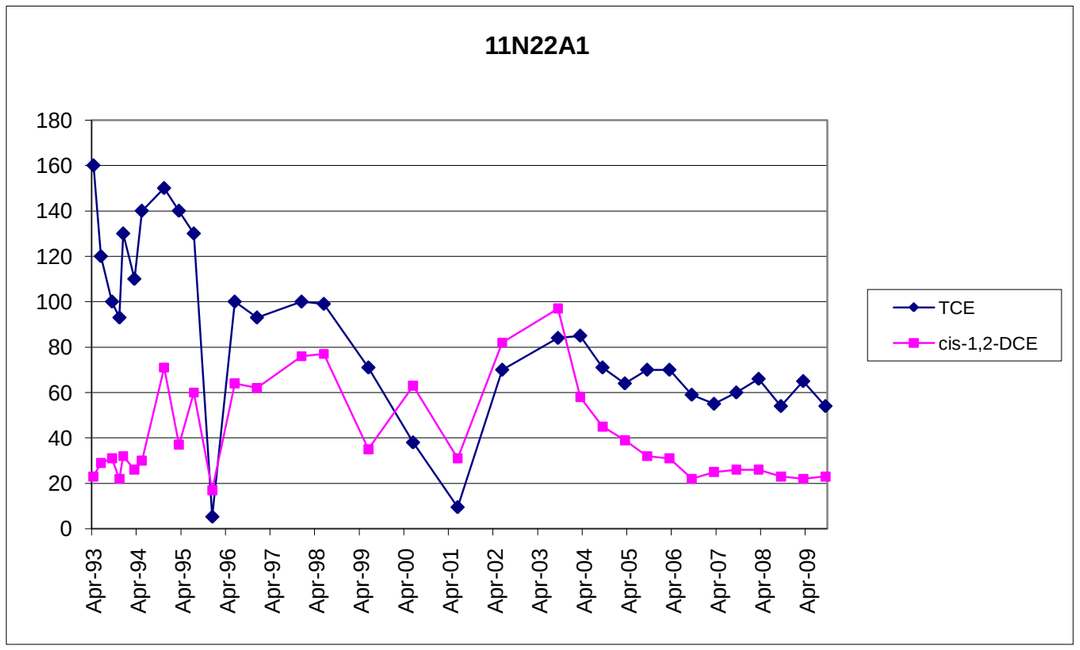
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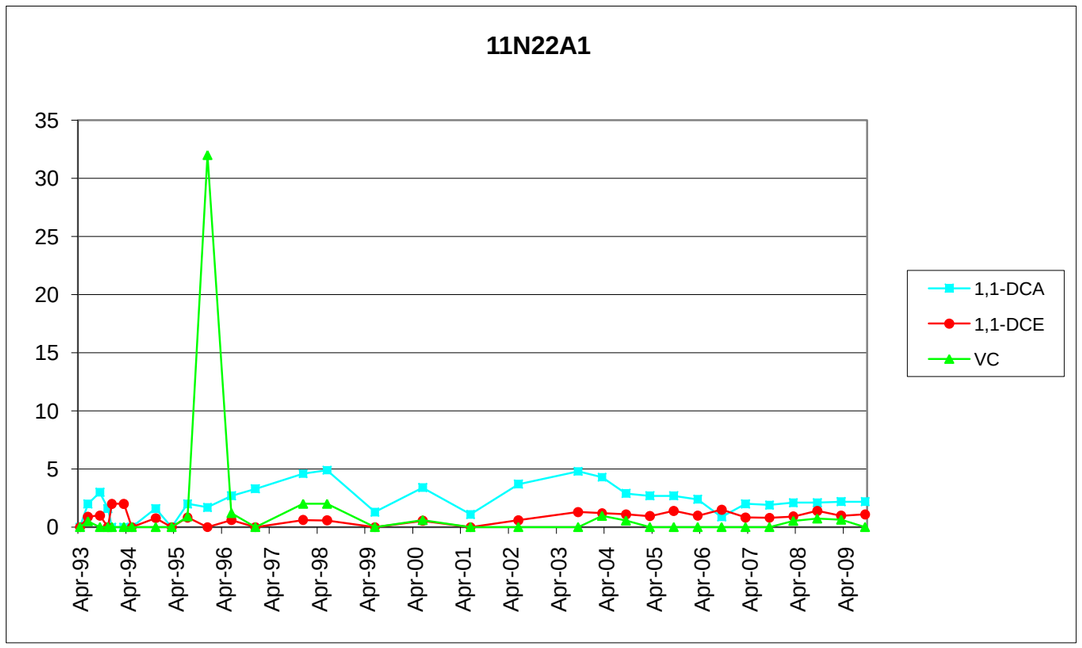
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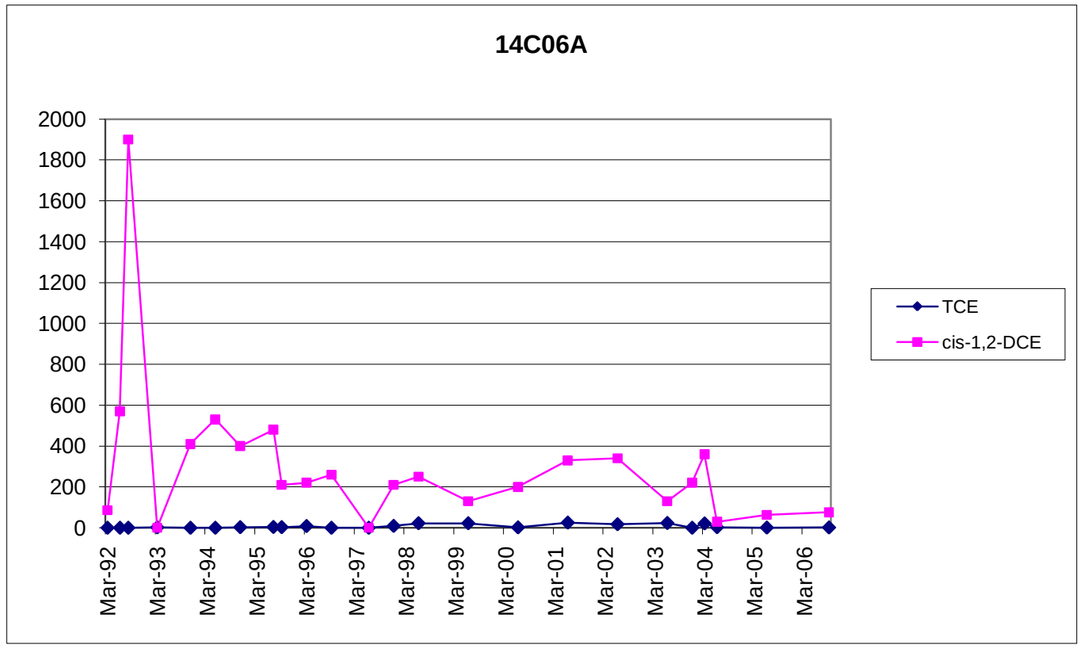
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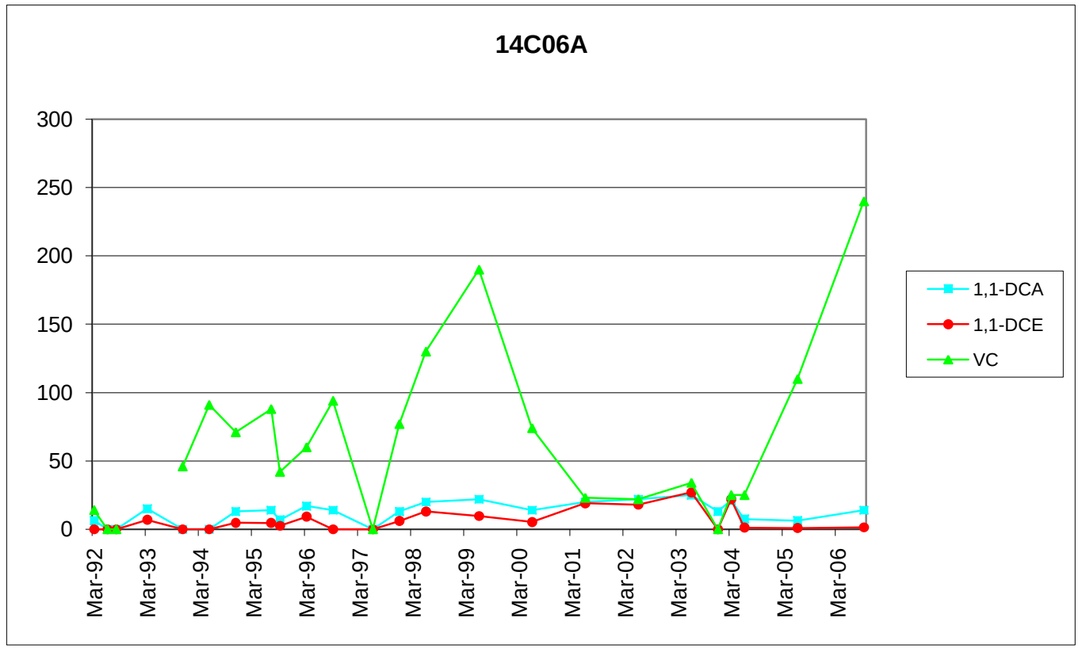
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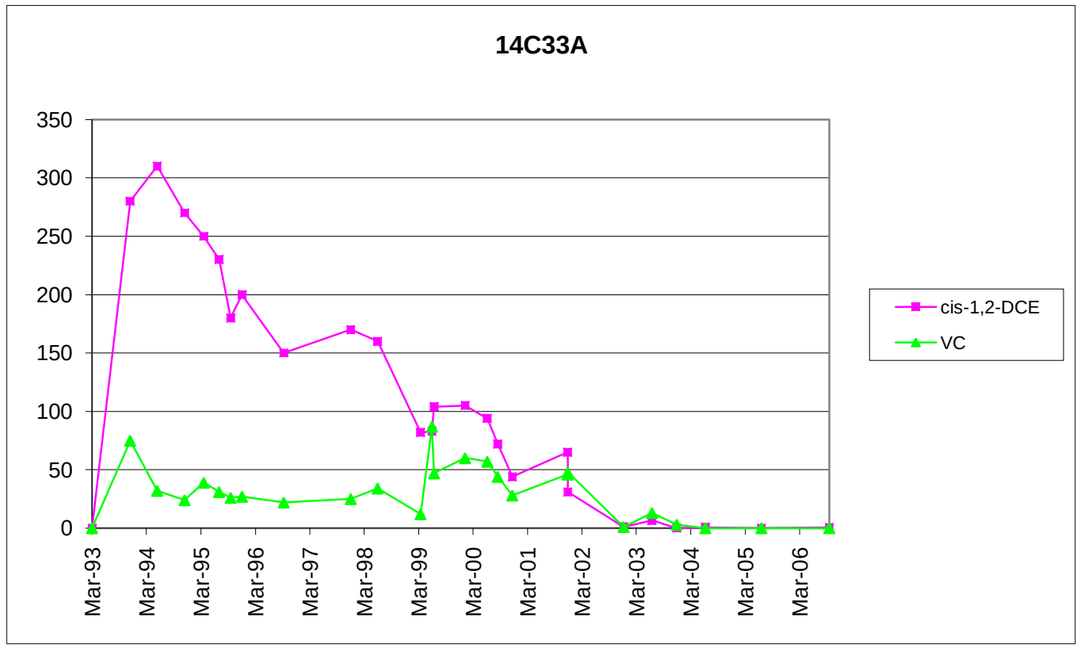
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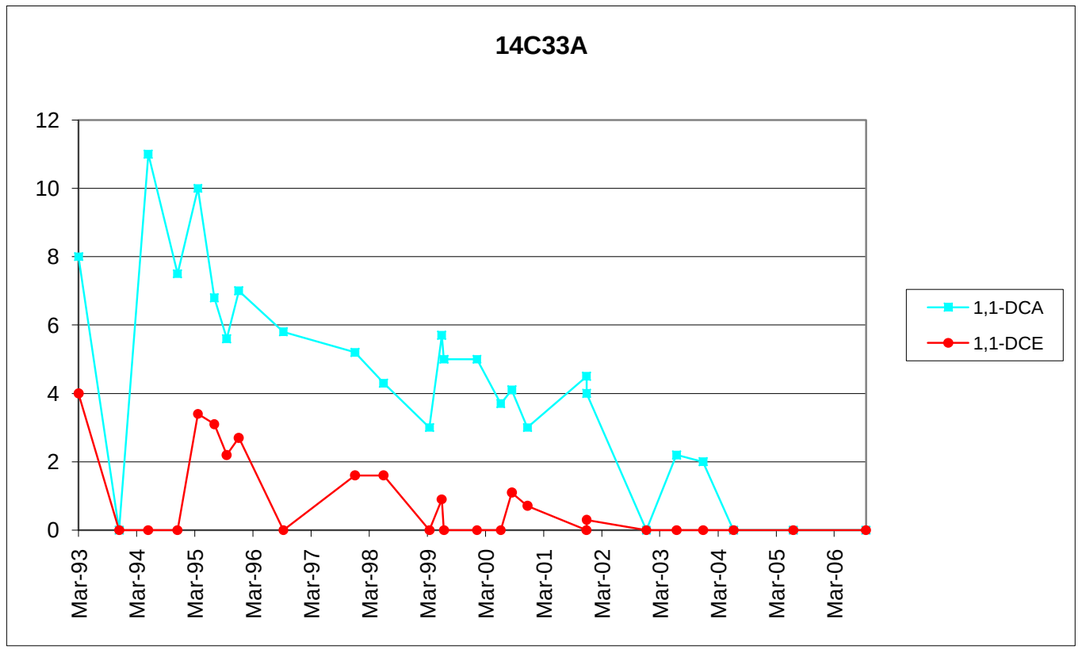
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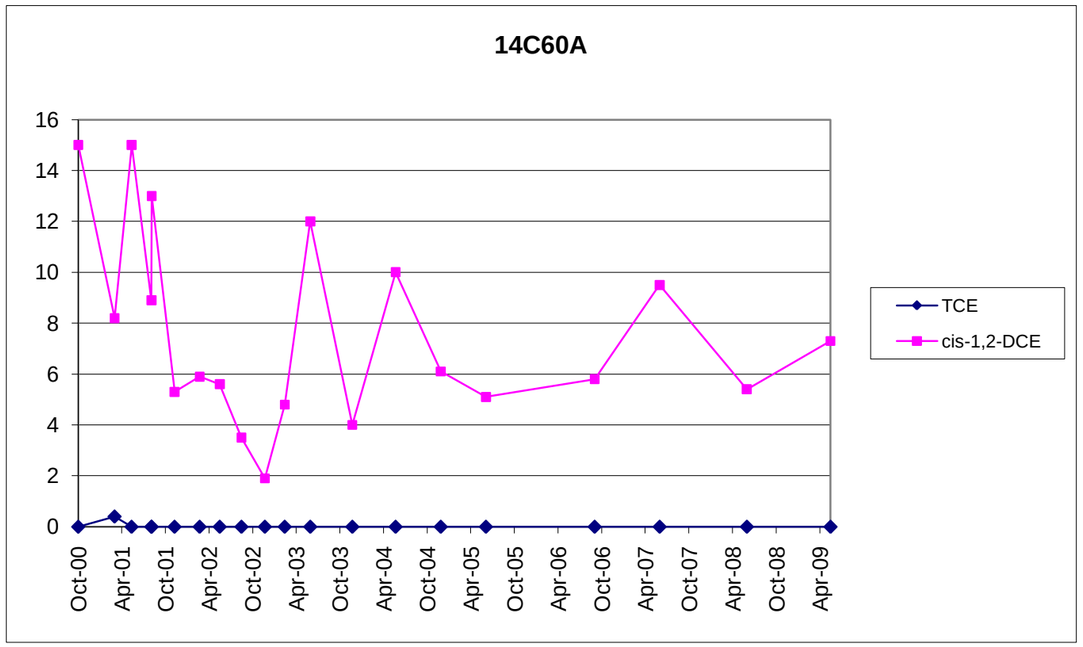
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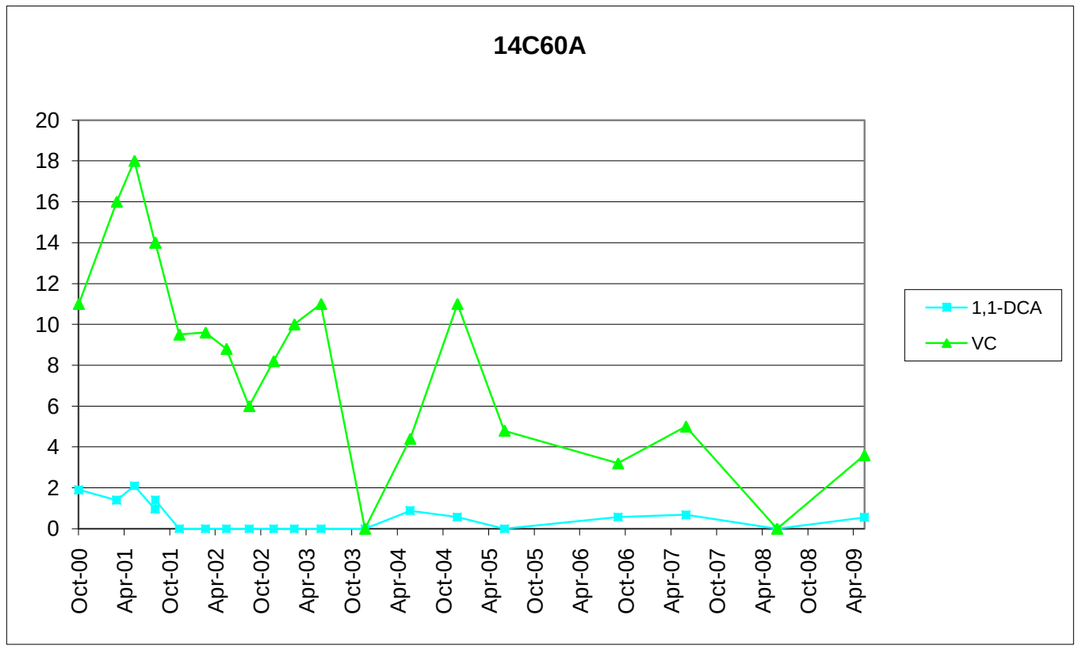
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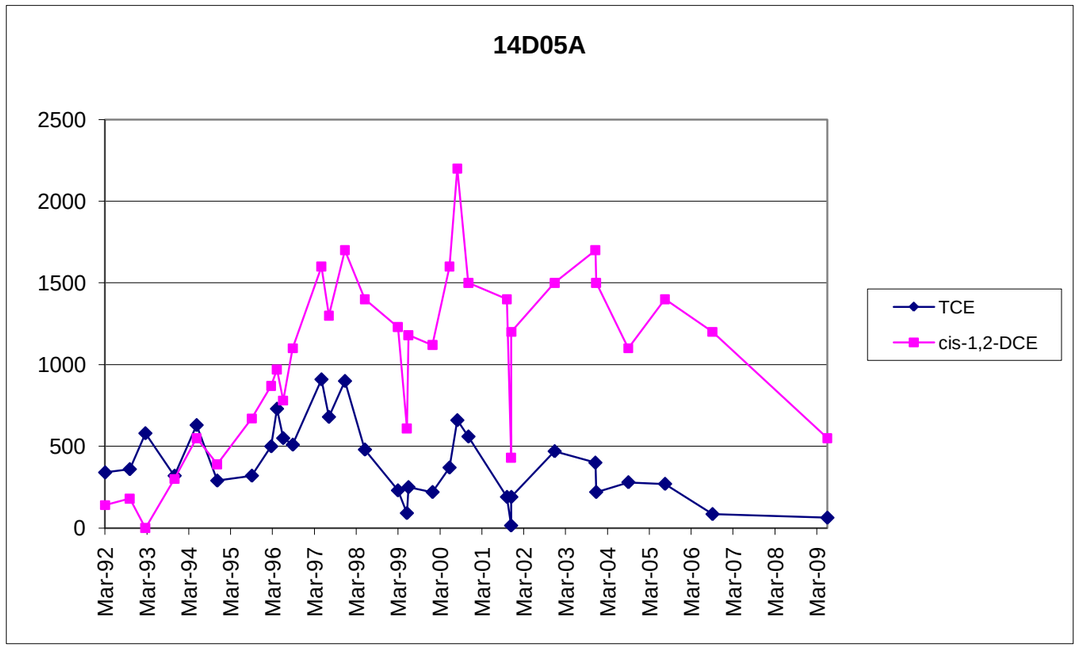
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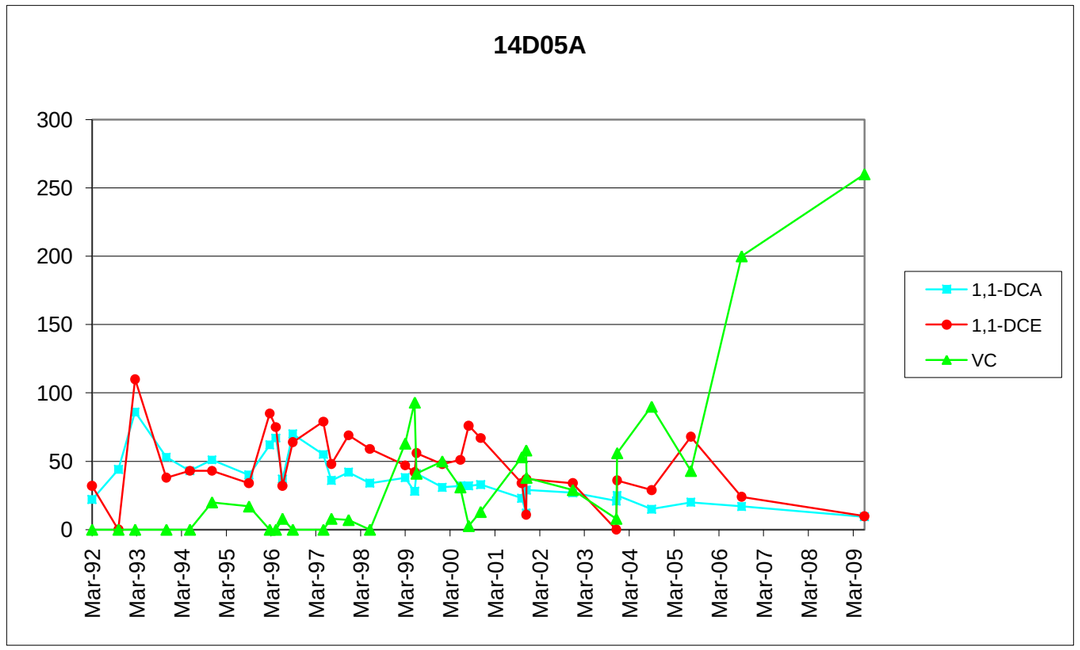
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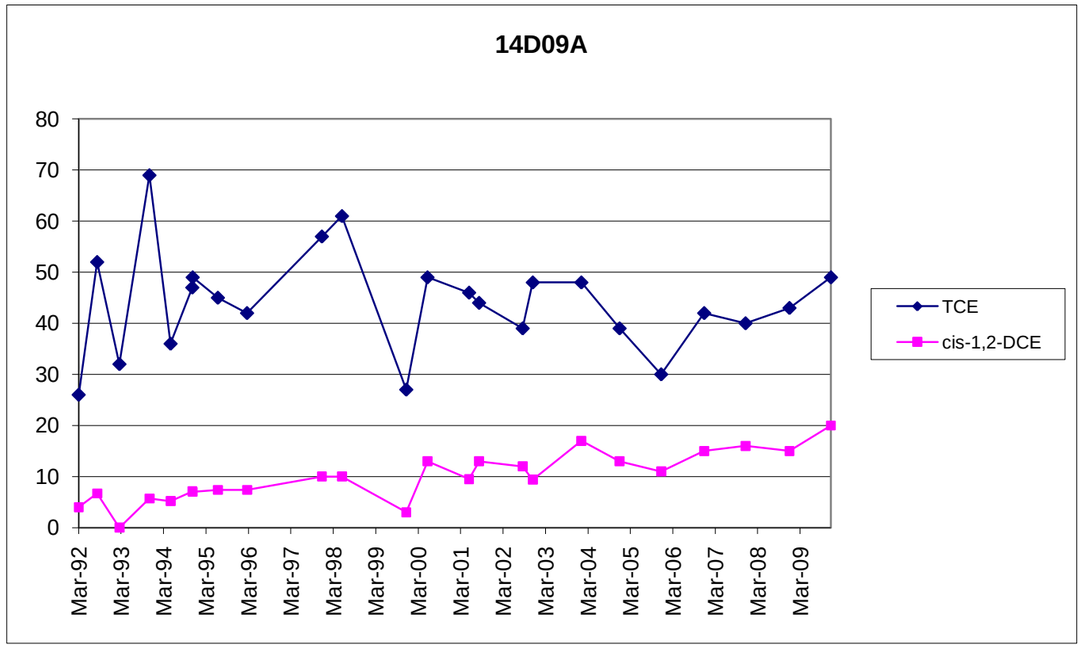
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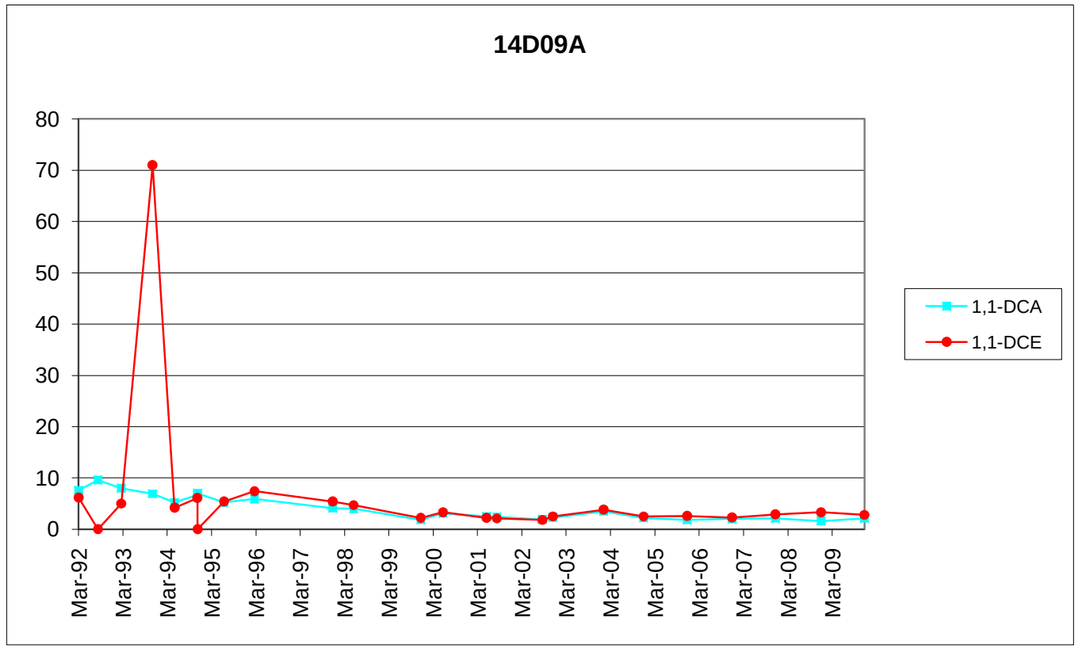
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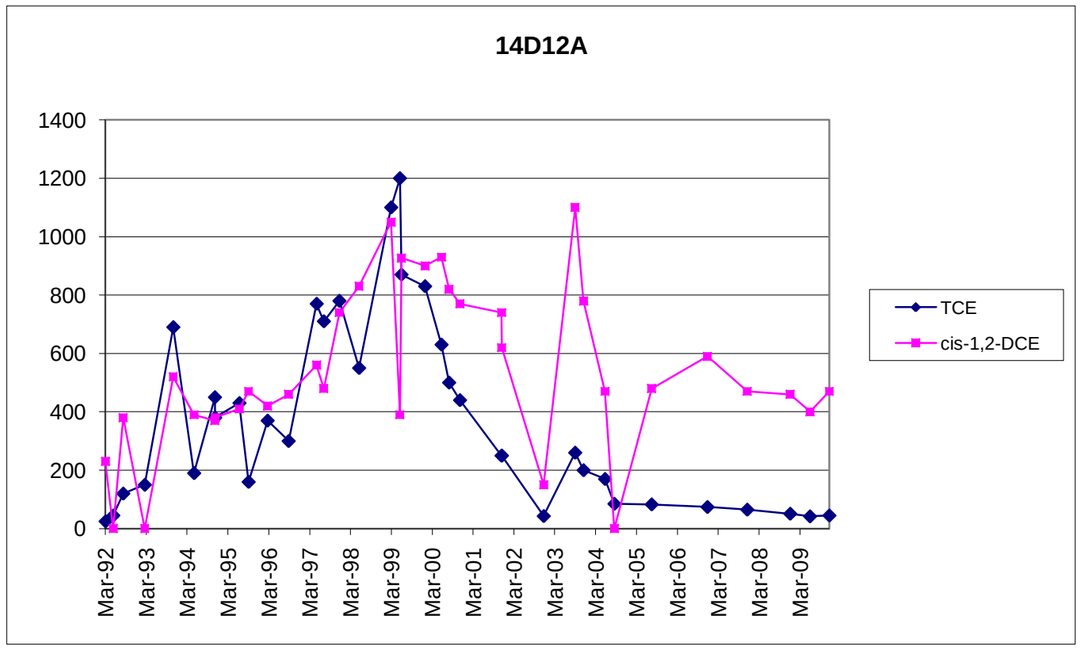
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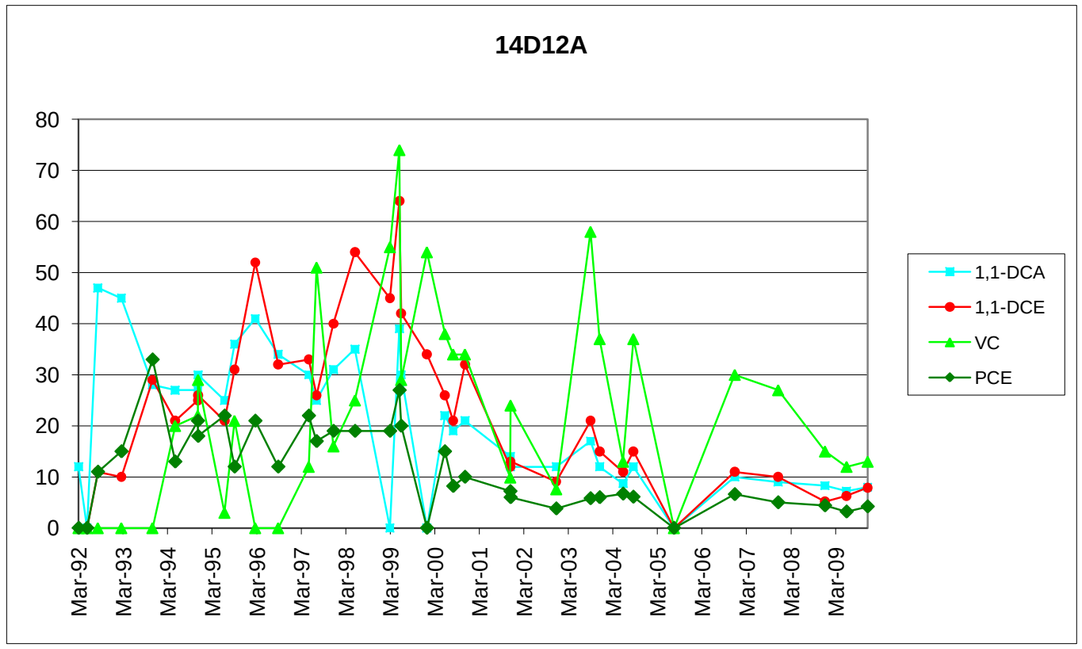
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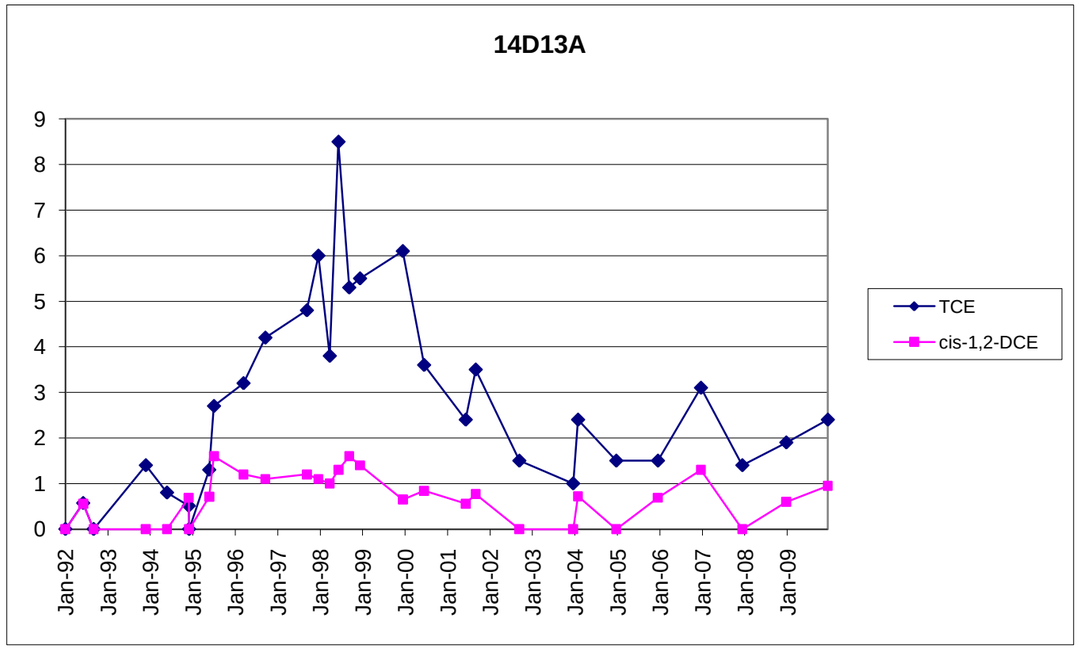
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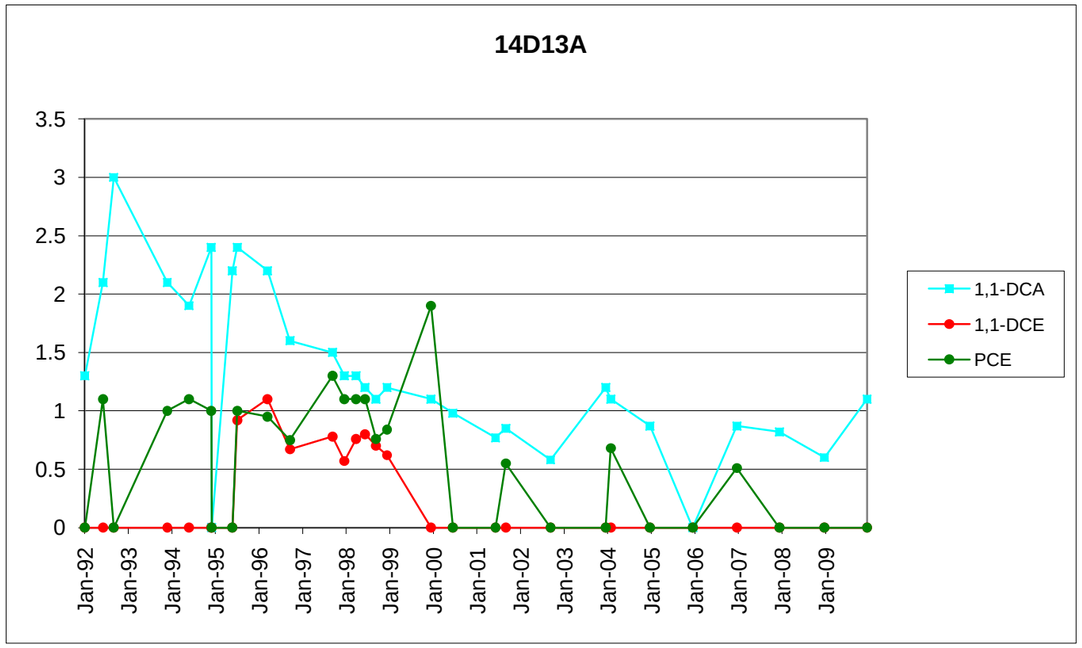
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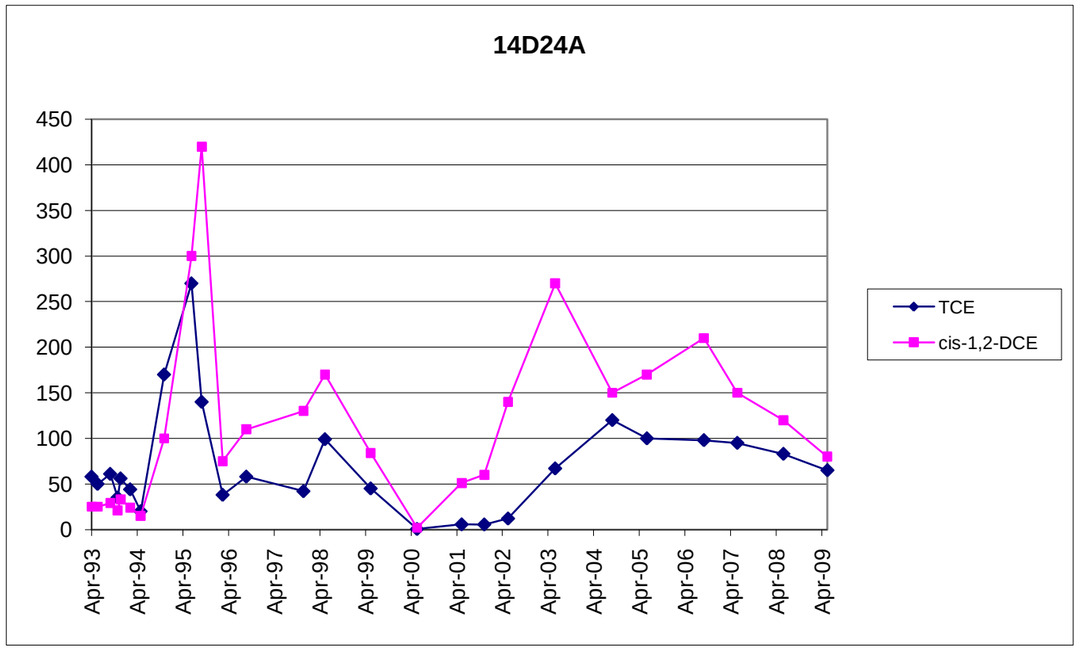
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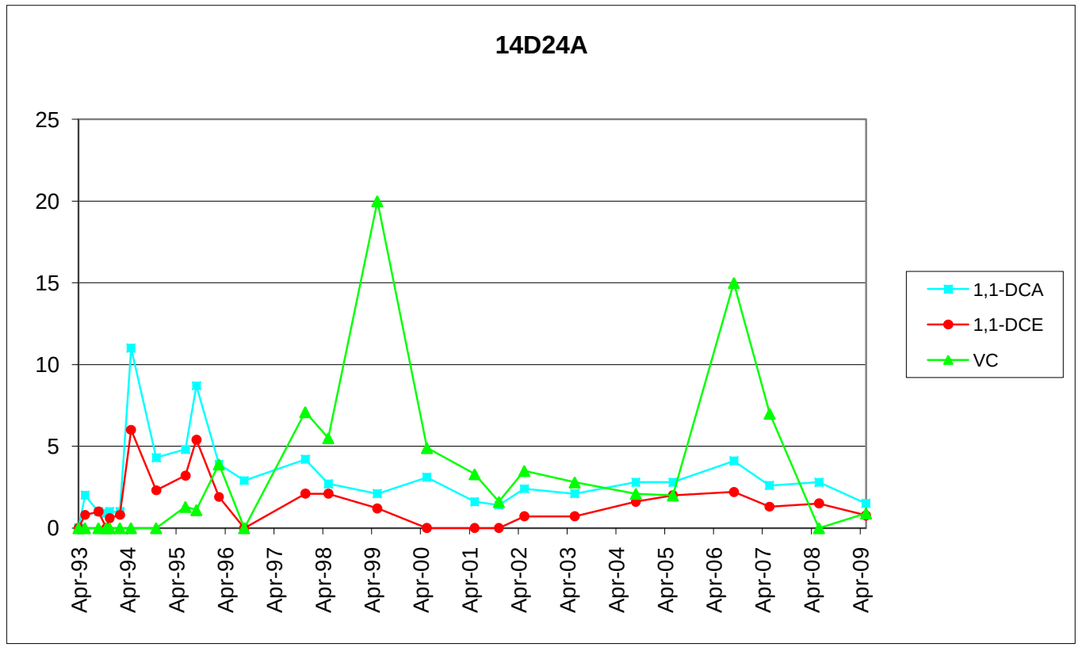
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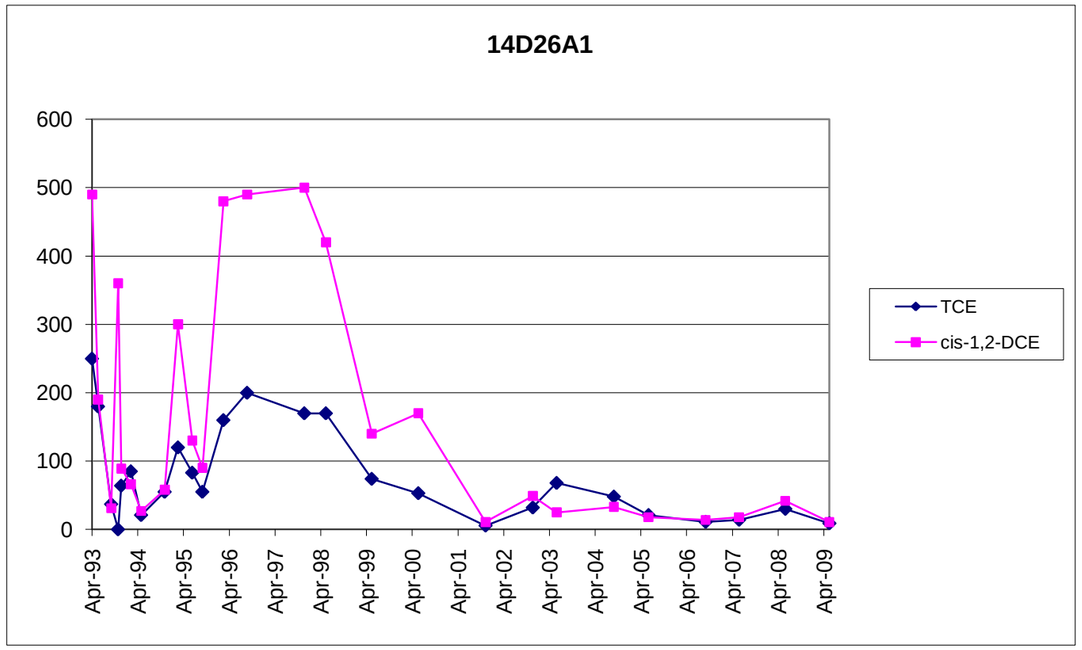
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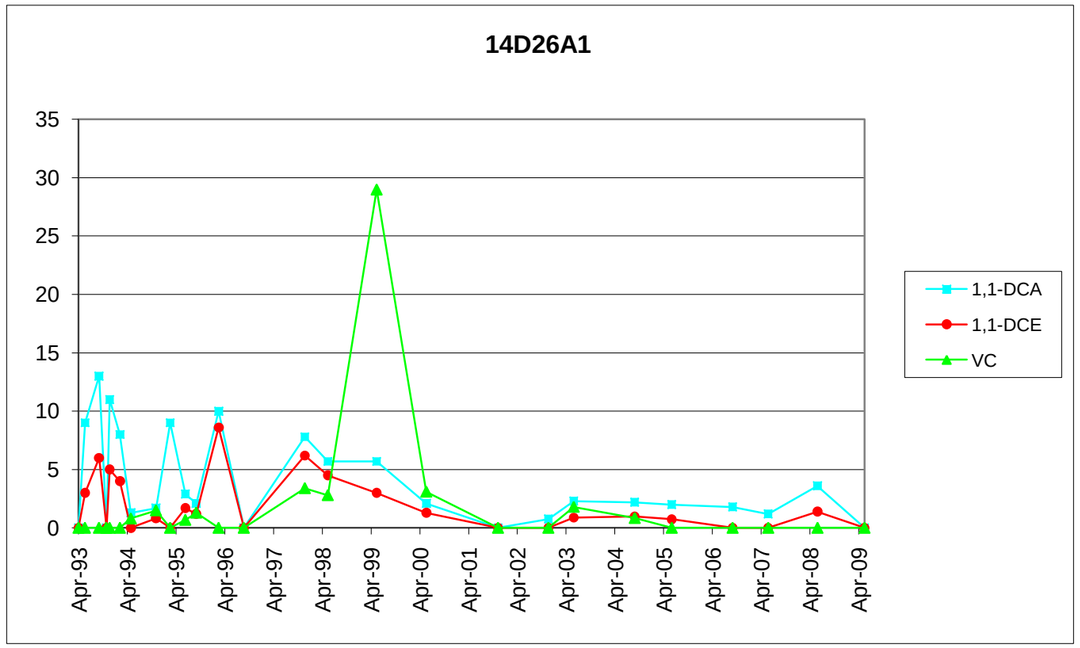
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1,1-DCA
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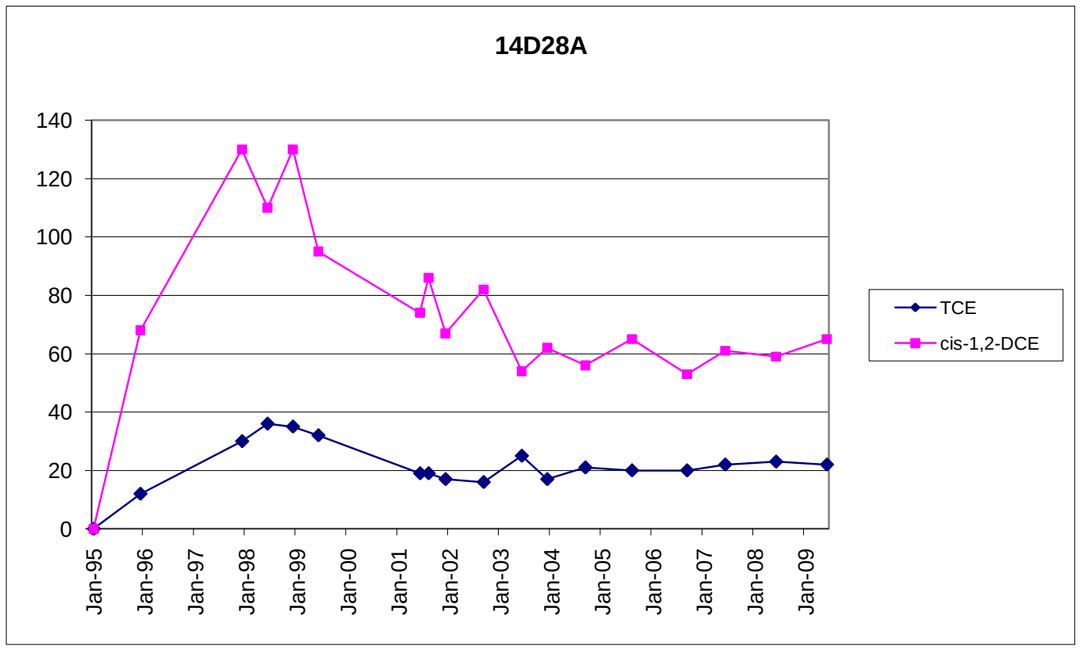
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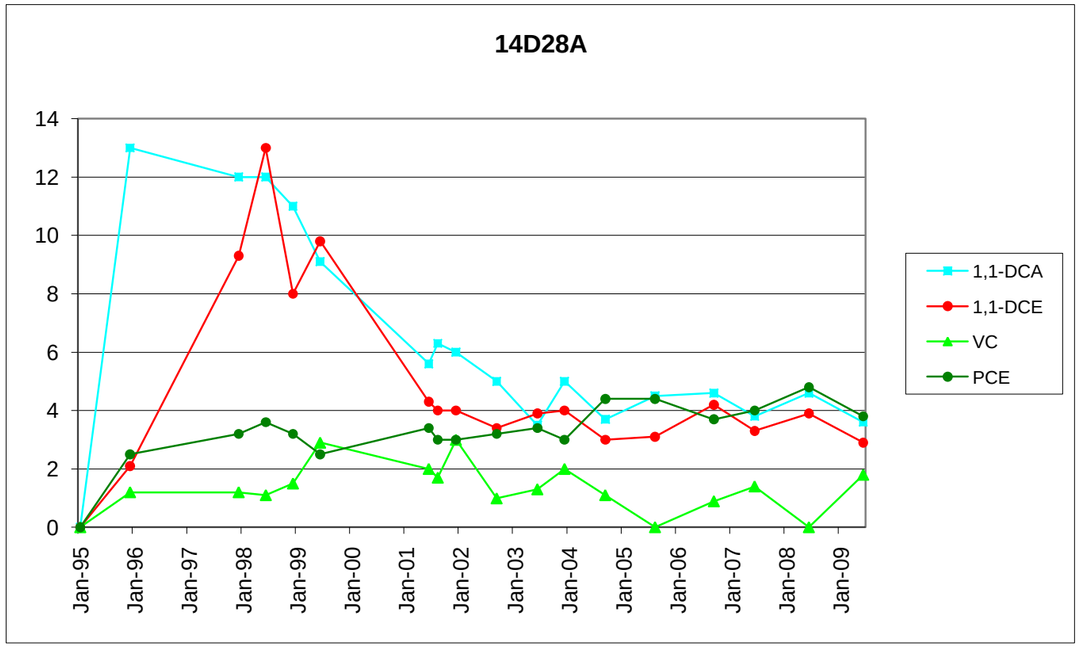
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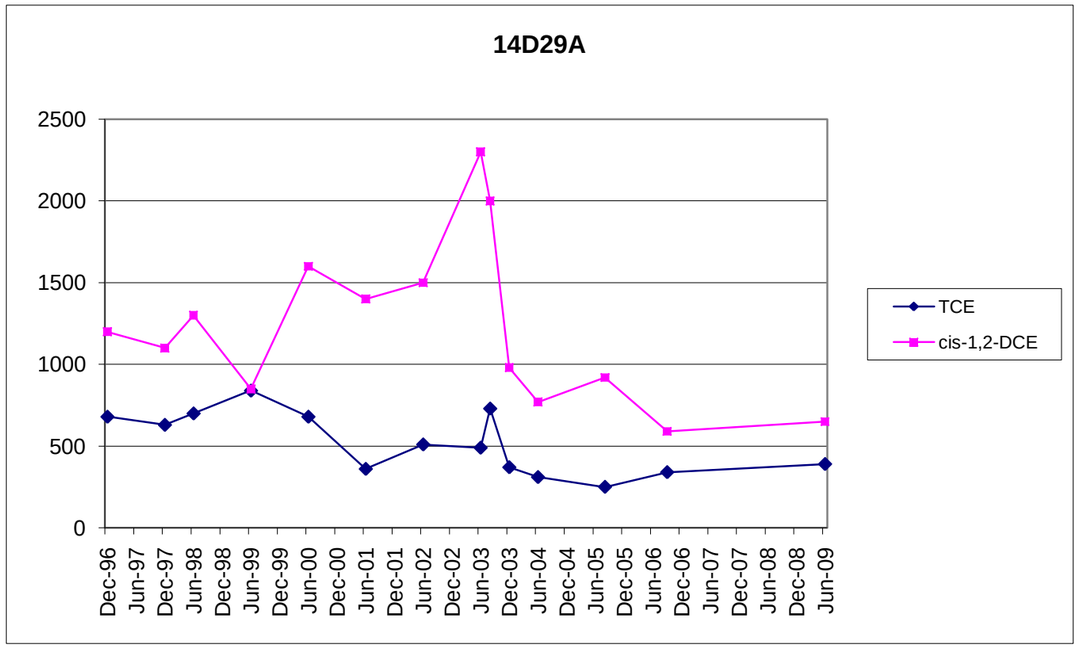
PCE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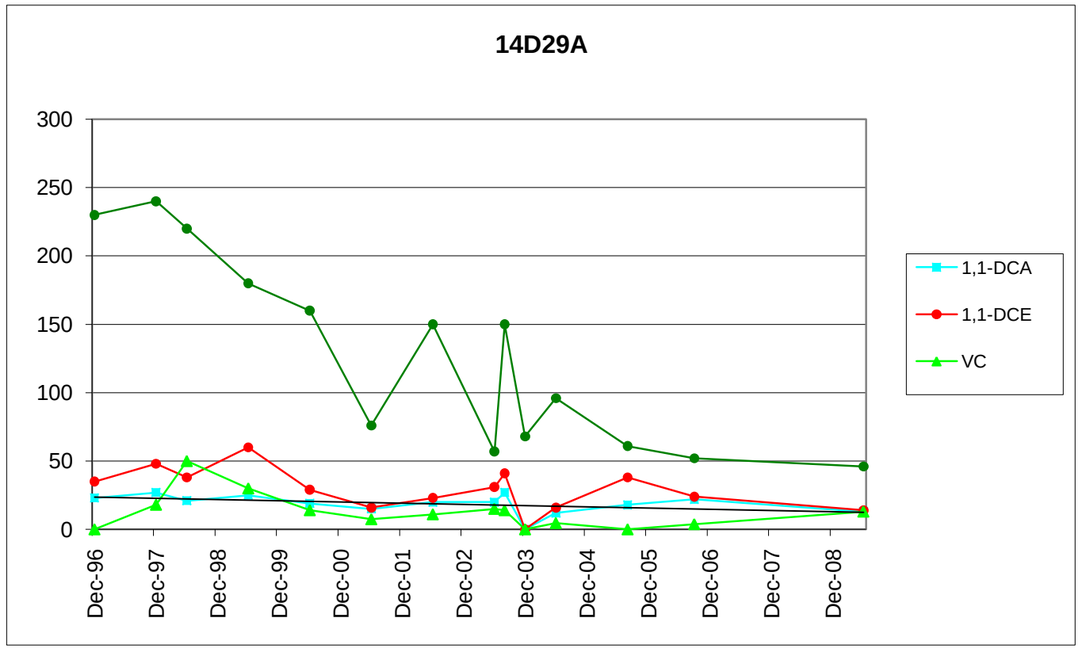
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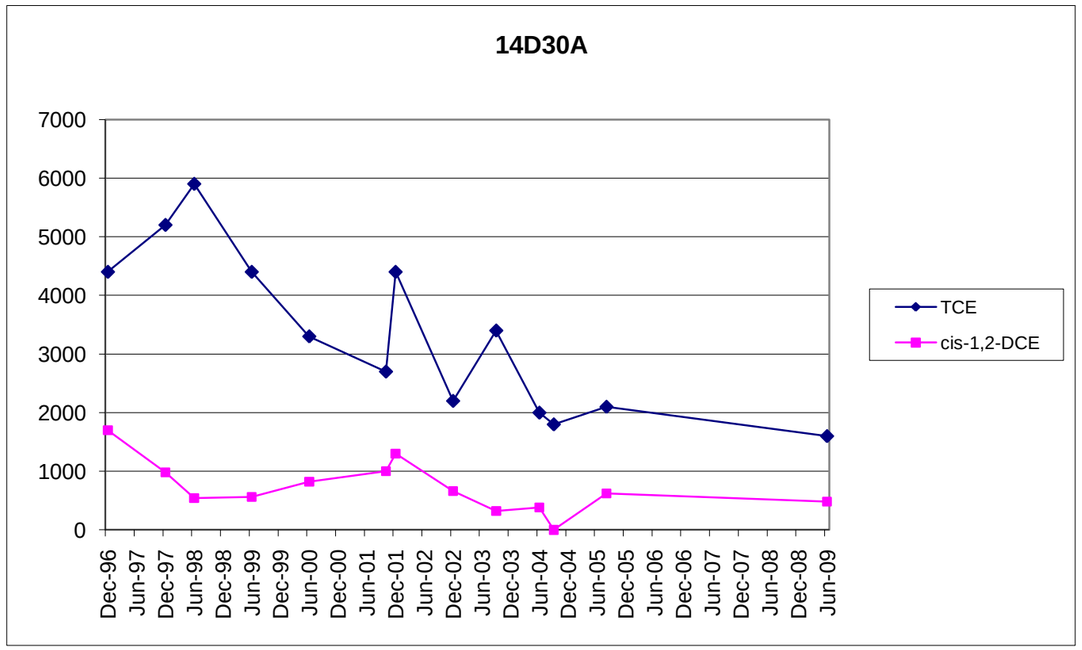
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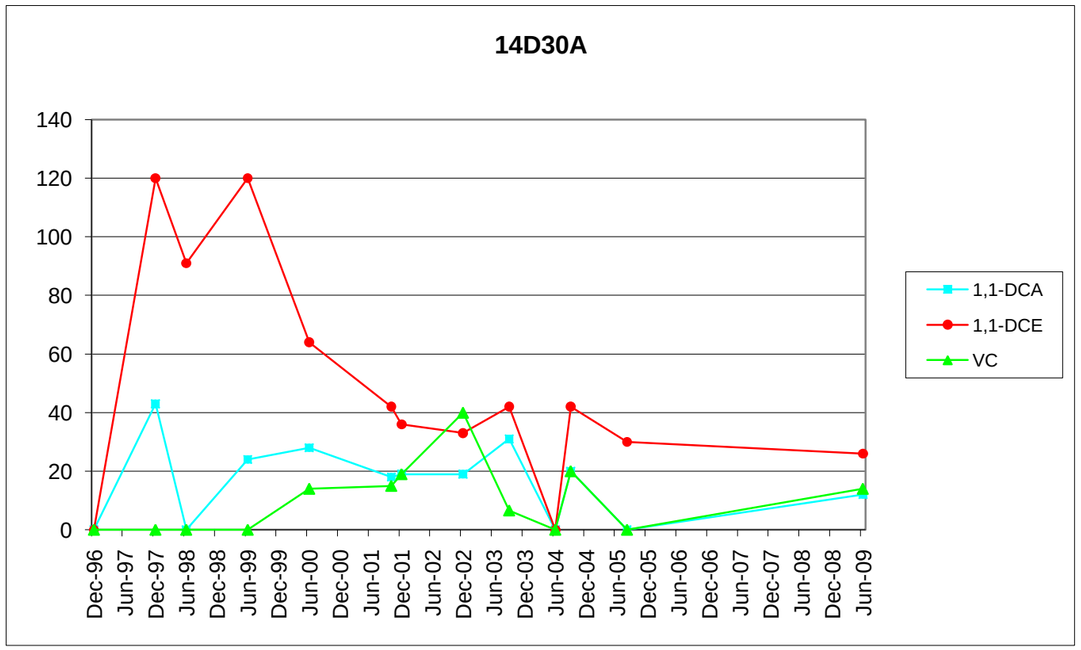
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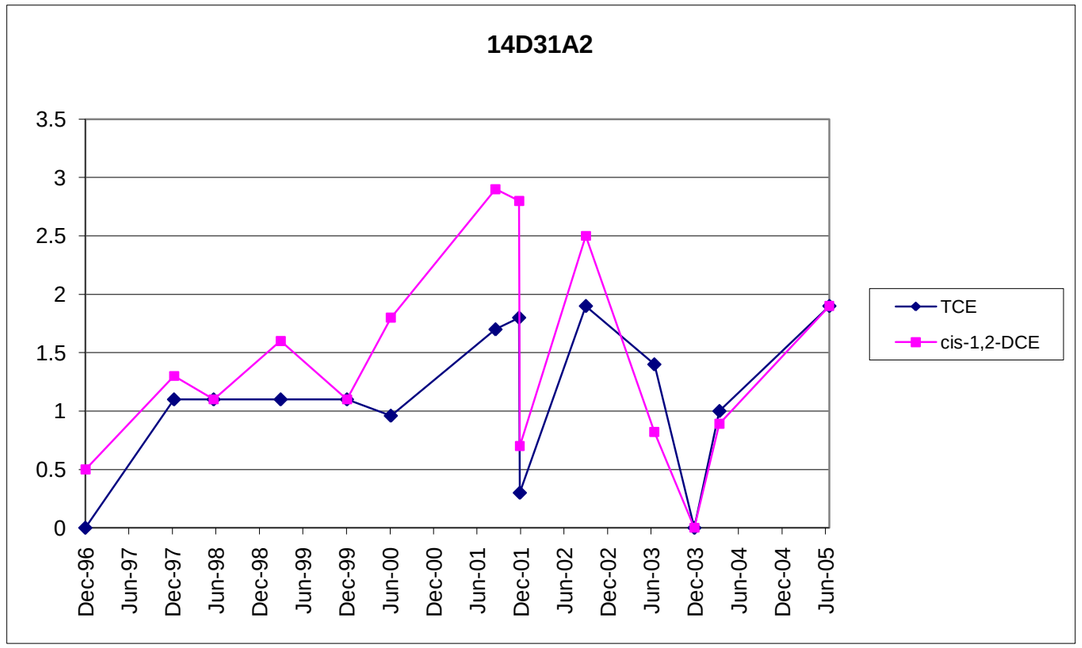
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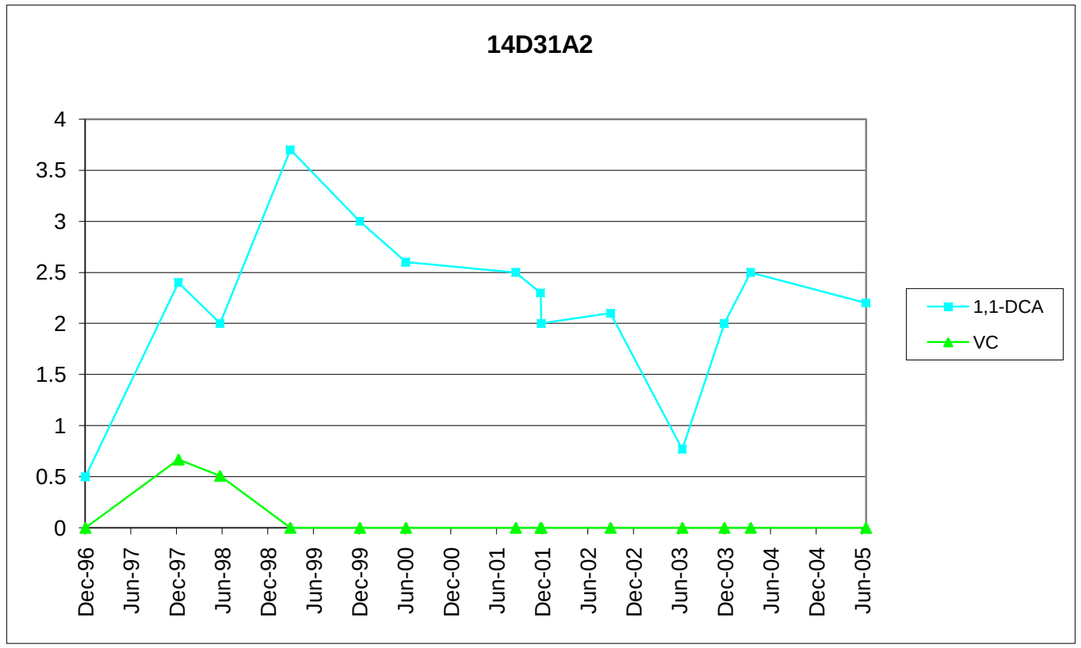
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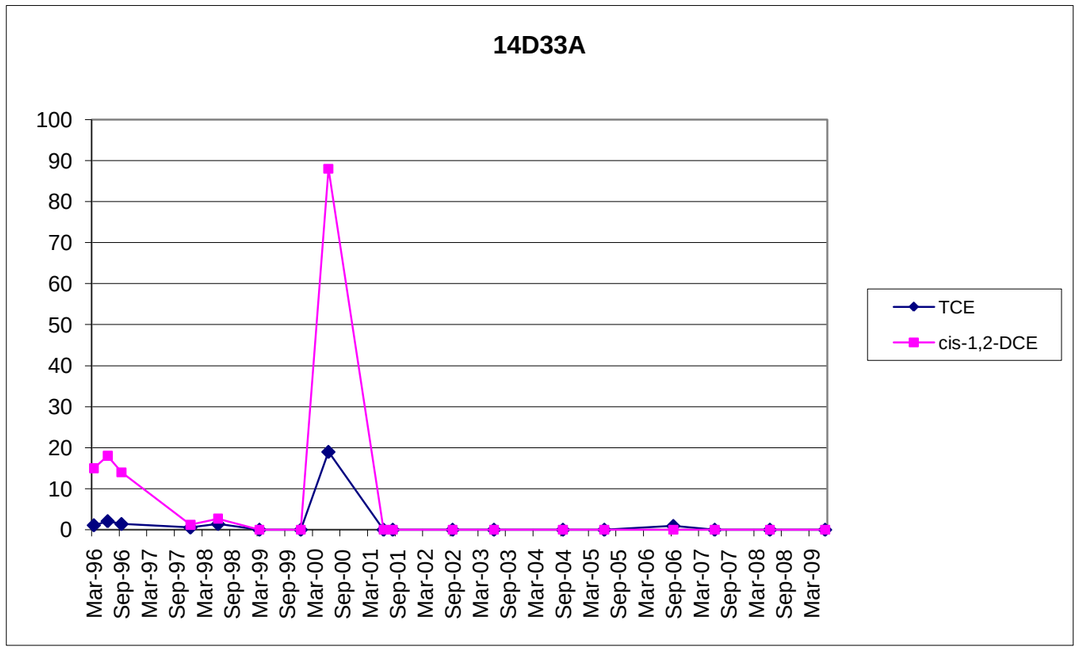
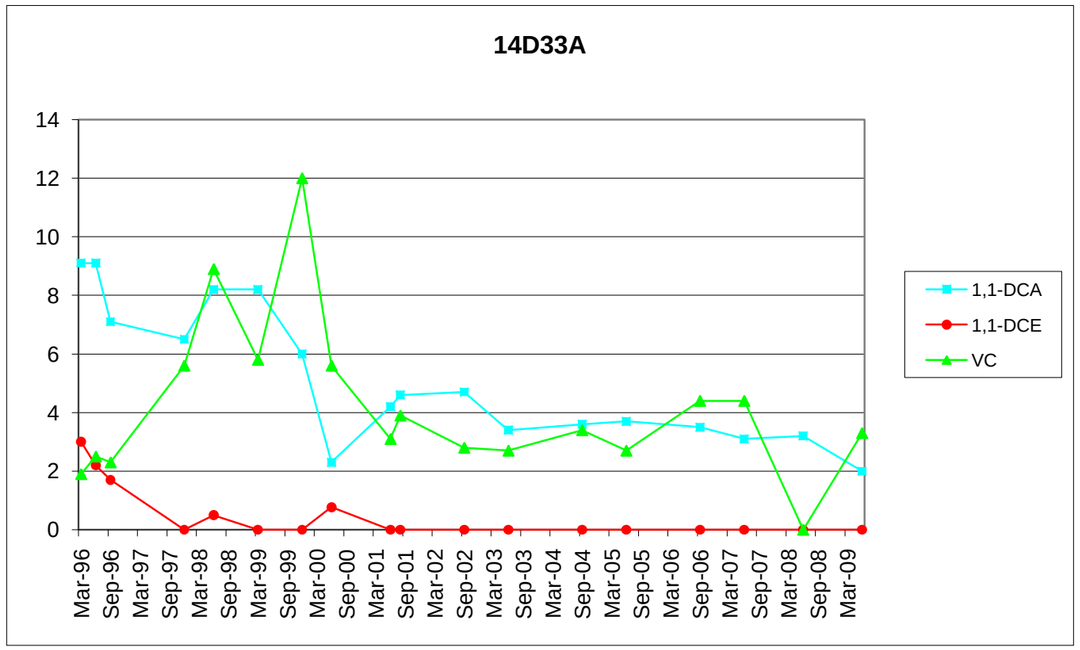
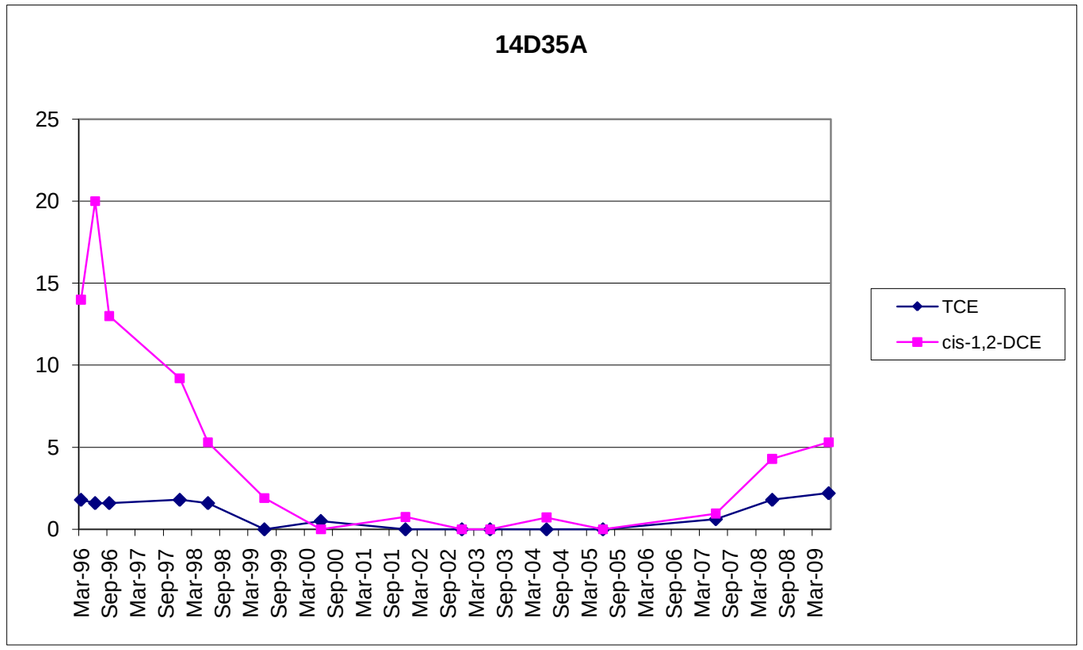
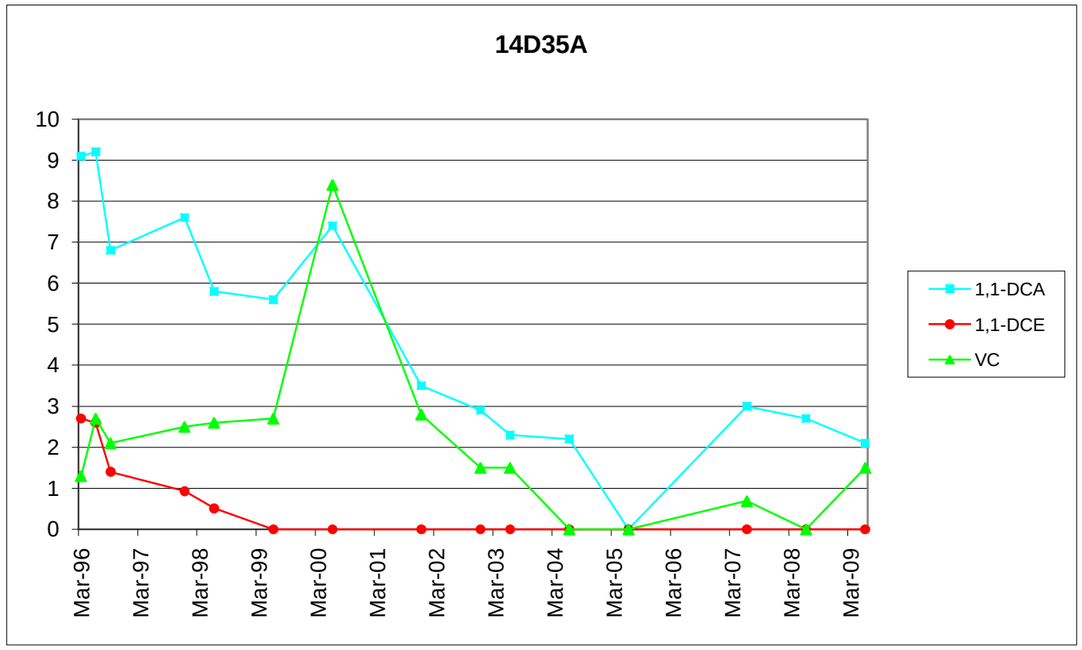
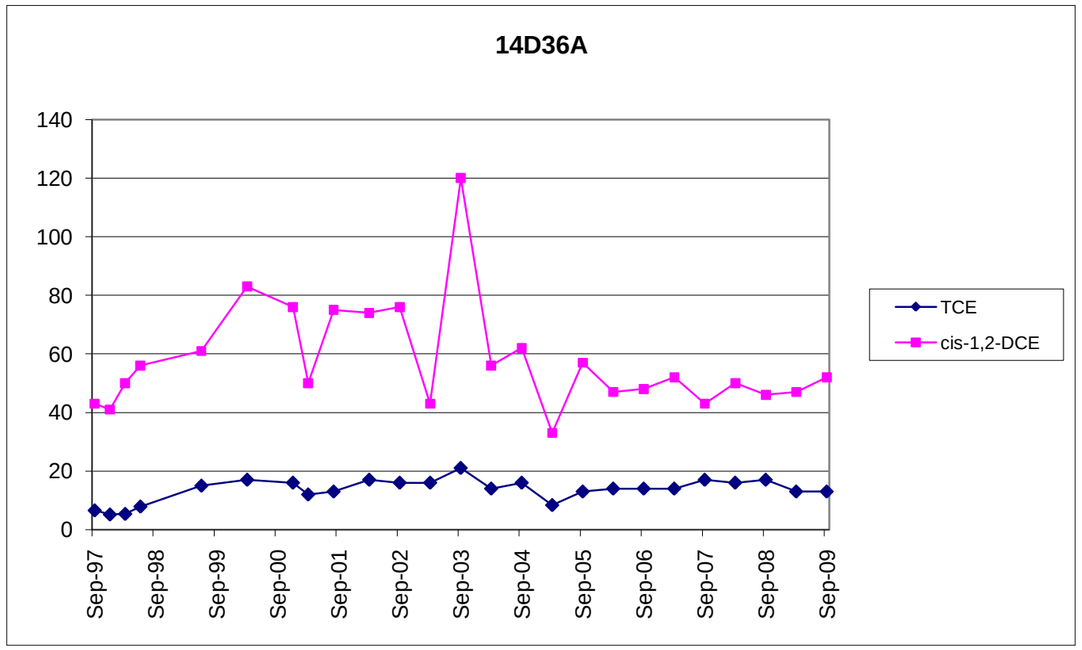
1,1-DCA
VC

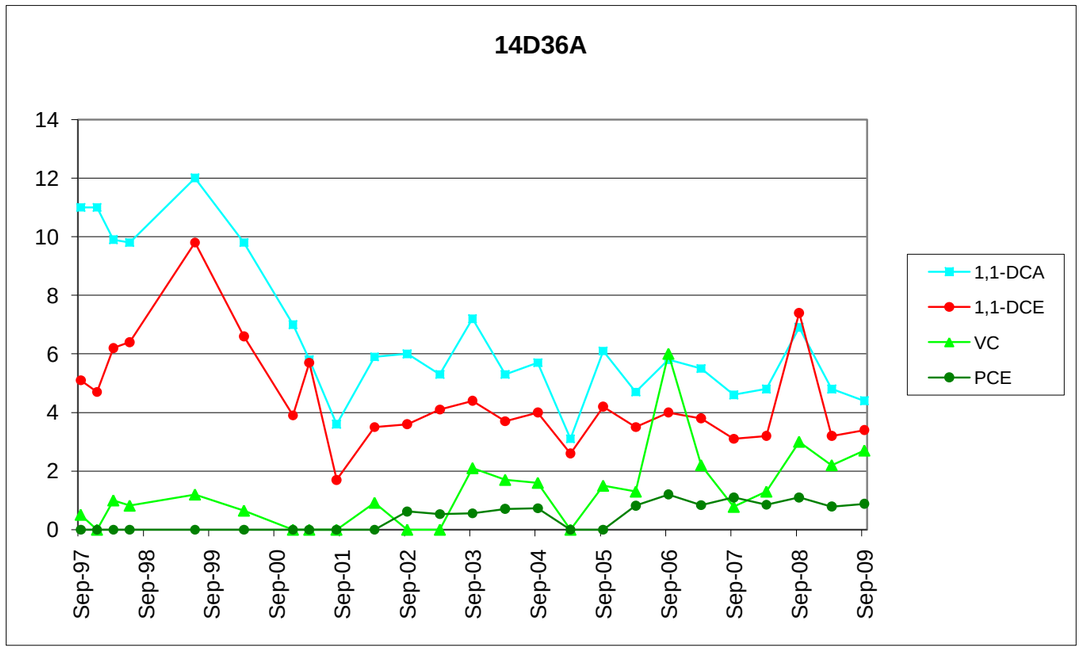

14D33A
100
90
80
70
60
50
40
30
20
10
0
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
TCE
cis-1,2-DCE

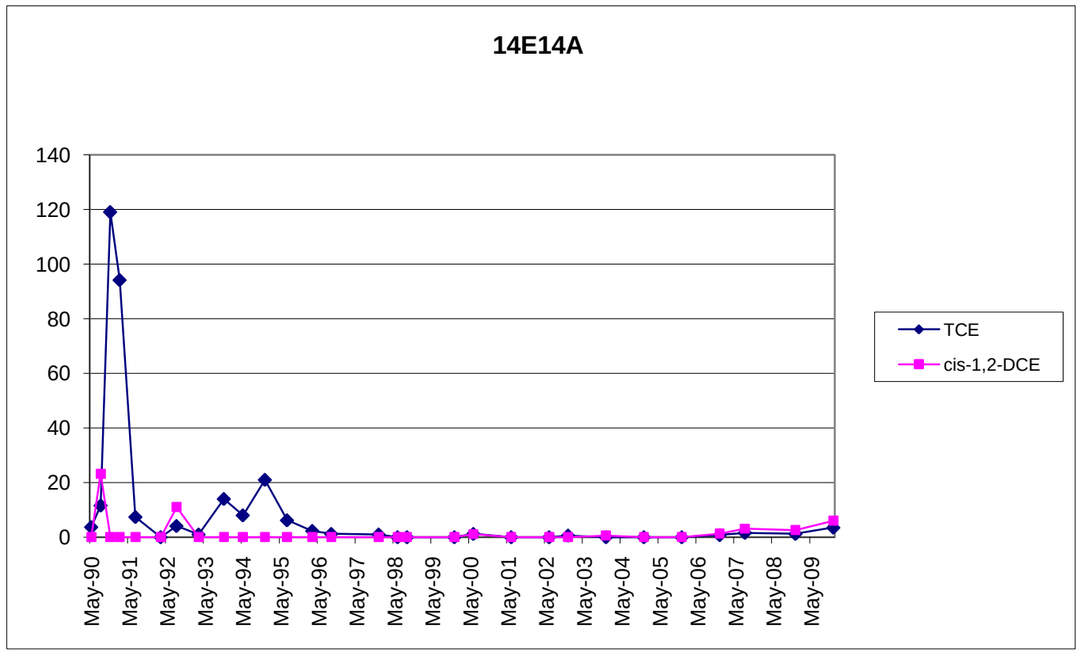

14D33A
14
12
10
8
6
4
2
0
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
1,1-DCA
1,1-DCE
VC

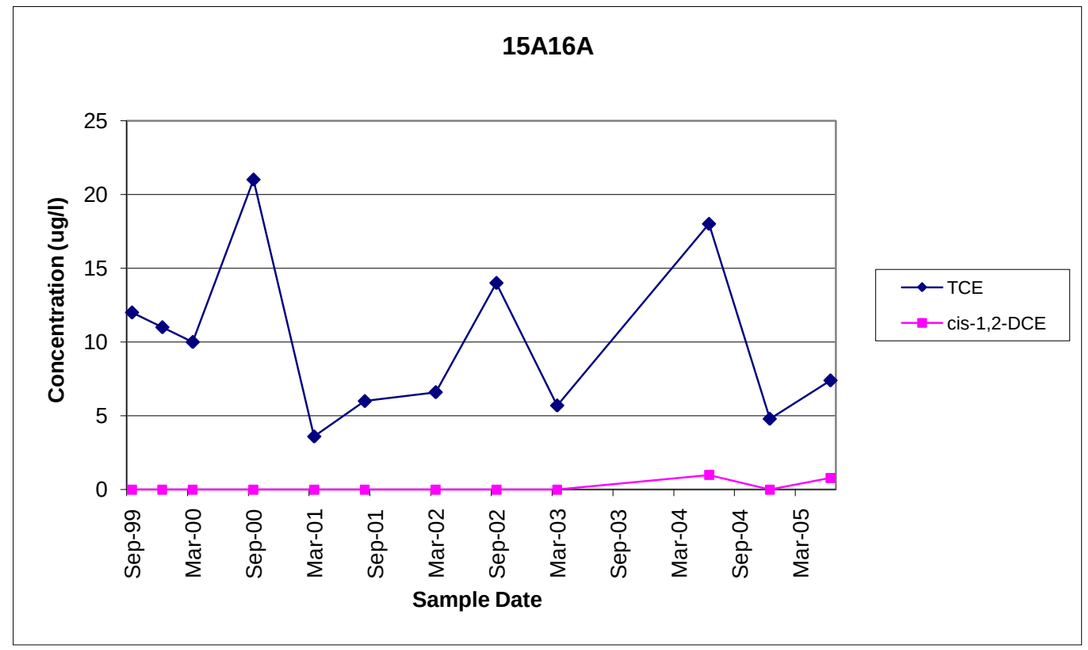

14D35A
25
20
15
10
5
0
Mar-96
Sep-96
Mar-97
Sep-97
Mar-98
Sep-98
Mar-99
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
TCE
cis-1,2-DCE

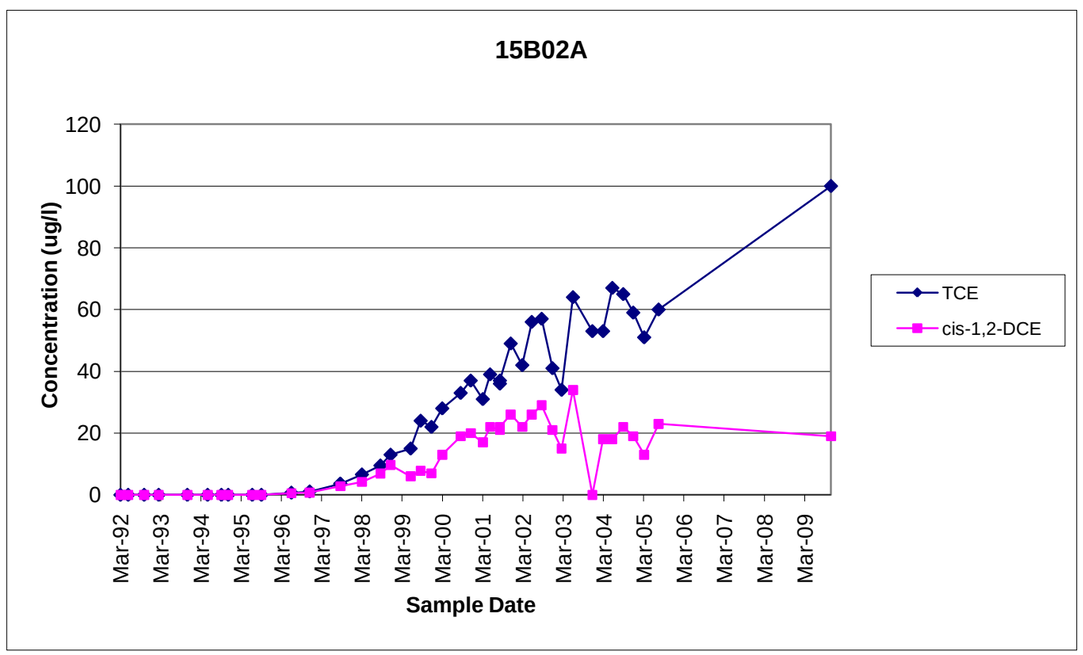

14D35A
10
9
8
7
6
5
4
3
2
1
0
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
1,1-DCA
1,1-DCE
VC

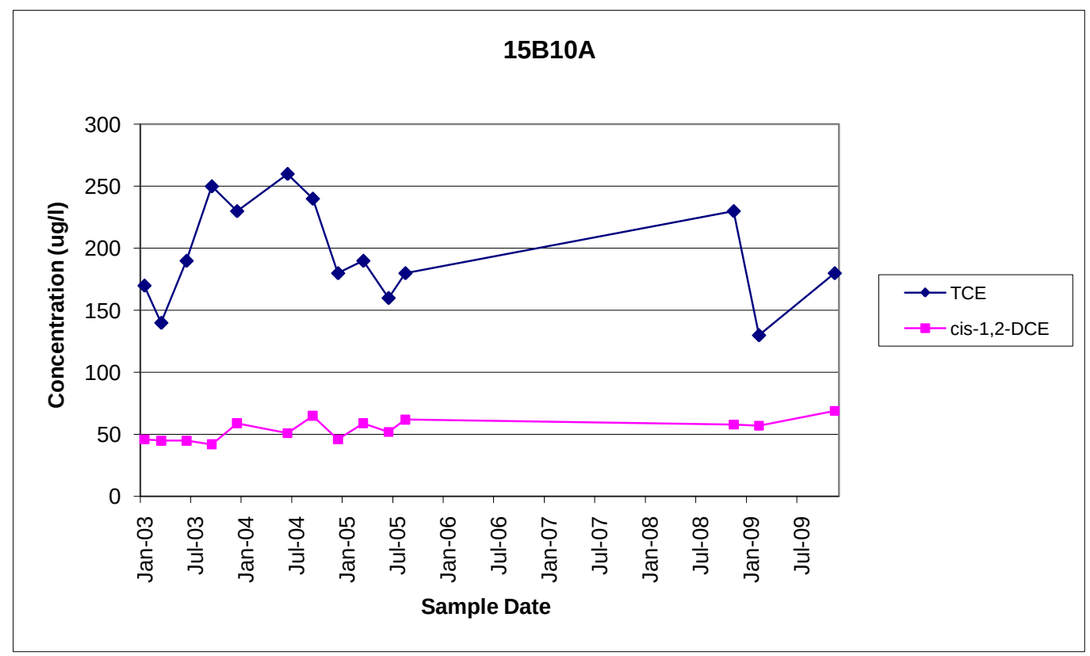

14D36A
140
120
100
80
60
40
20
0
Sep-97
Sep-98
Sep-99
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
TCE
cis-1,2-DCE

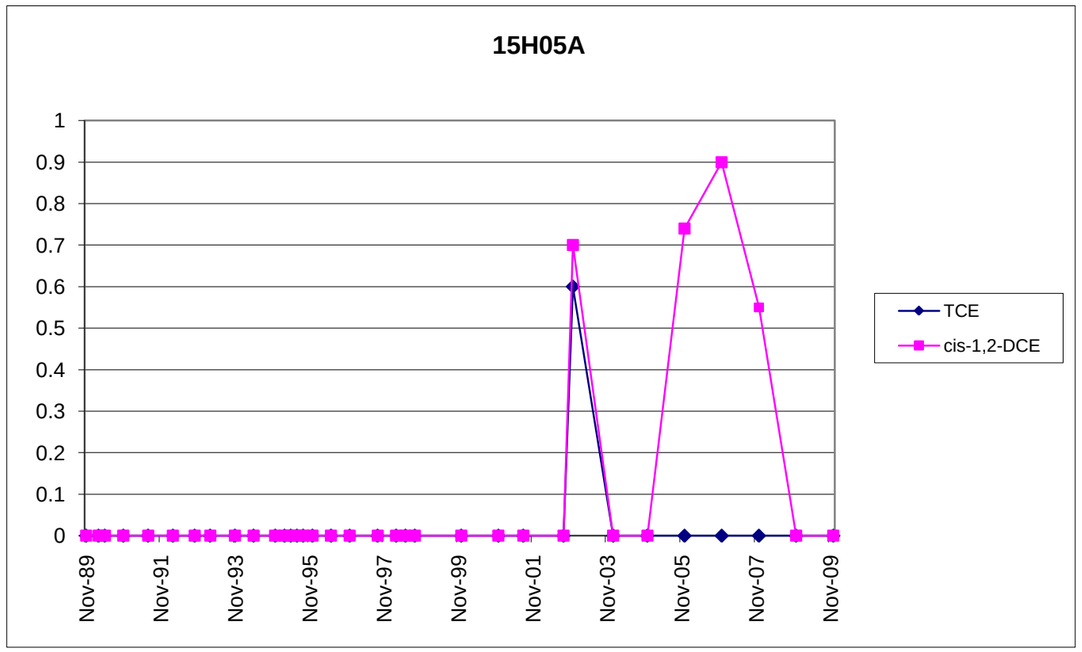

14D36A
14
12
10
8
6
4
2
0
Sep-97
Sep-98
Sep-99
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
1,1-DCA
1,1-DCE
VC
PCE

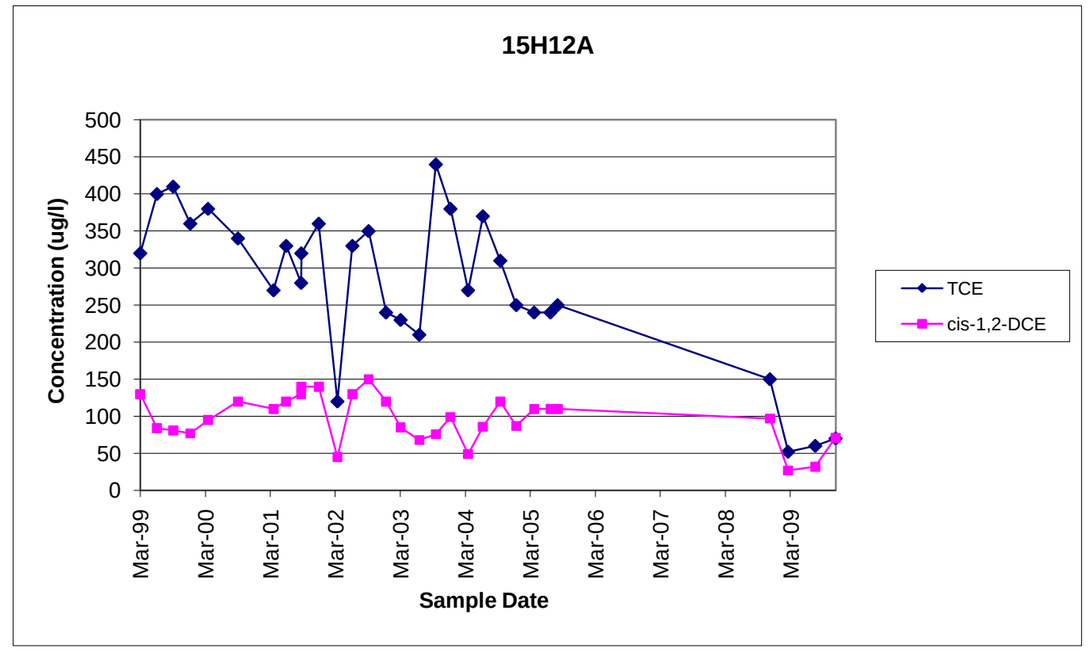

14E14A
140
120
100
80
60
40
20
0
May-90
May-91
May-92
May-93
May-94
May-95
May-96
May-97
May-98
May-99
May-00
May-01
May-02
May-03
May-04
May-05
May-06
May-07
May-08
May-09
TCE
cis-1,2-DCE

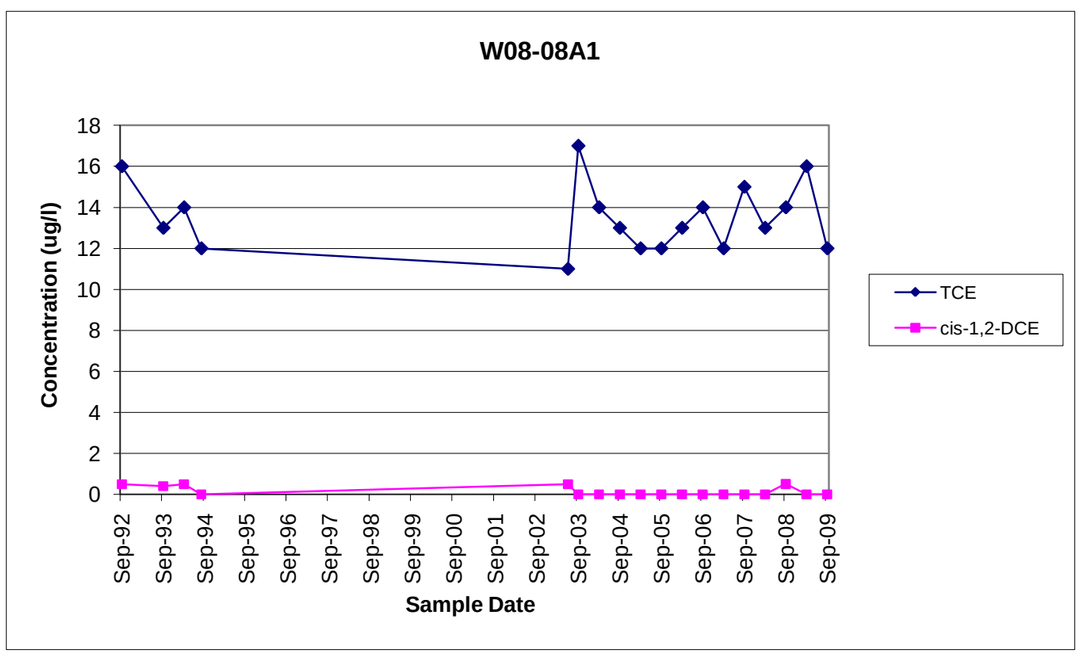

15A16A
Concentration (ug/l)
25
20
15
10
5
0
Sep-99
Mar-00
Sep-00
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sample Date
TCE
cis-1,2-DCE

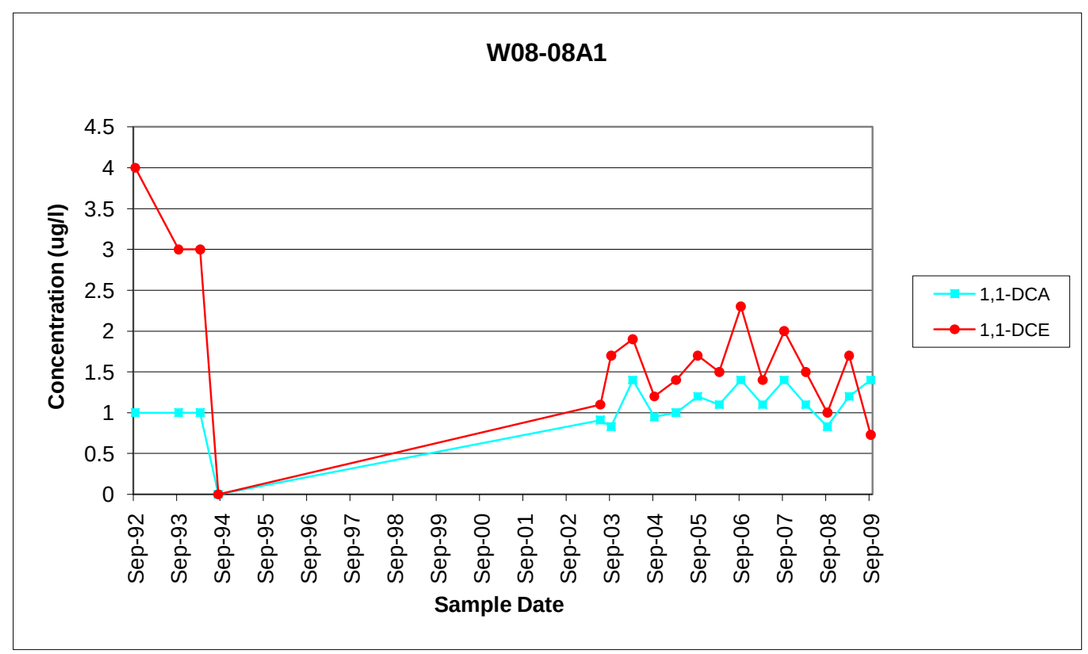

15B02A
Concentration (ug/l)
120
100
80
60
40
20
0
Mar-92
Mar-93
Mar-94
Mar-95
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
Sample Date
TCE
cis-1,2-DCE

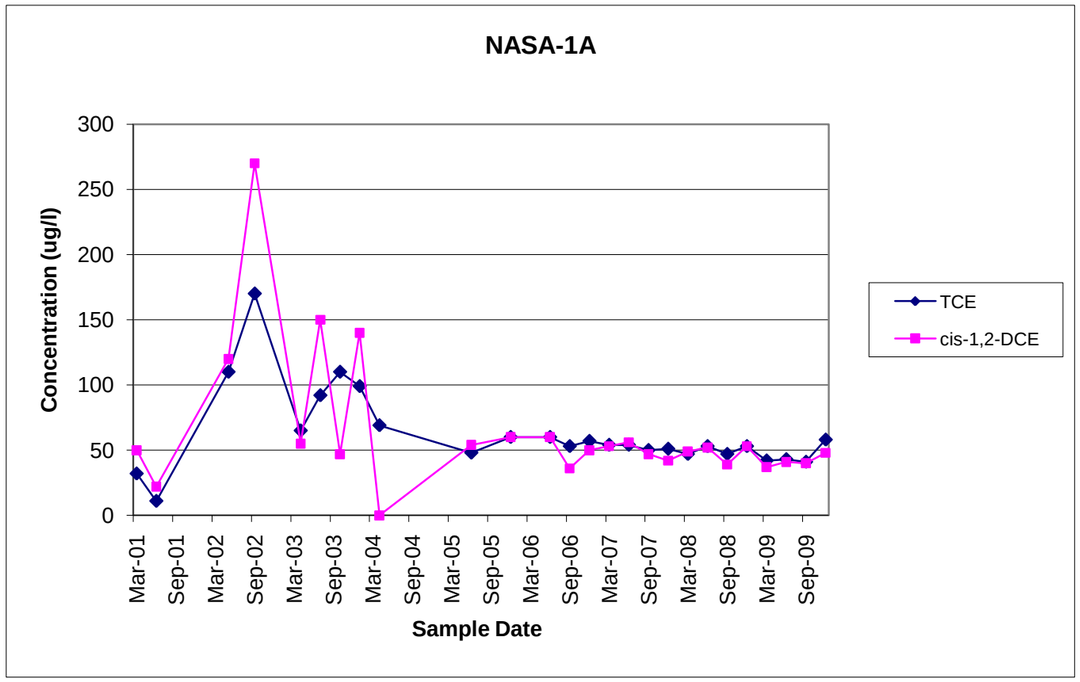

15B10A
Concentration (ug/l)
300
250
200
150
100
50
0
Jan-03
Jul-03
Jan-04
Jul-04
Jan-05
Jul-05
Jan-06
Jul-06
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Sample Date
TCE
cis-1,2-DCE

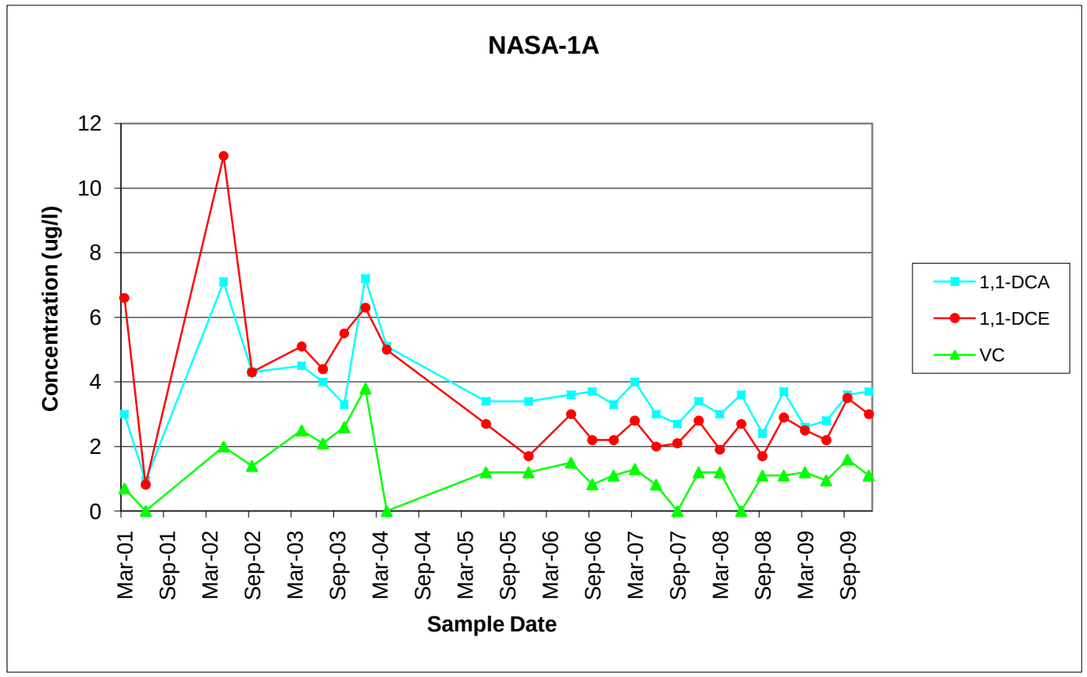

15H05A
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Nov-89
Nov-91
Nov-93
Nov-95
Nov-97
Nov-99
Nov-01
Nov-03
Nov-05
Nov-07
Nov-09
TCE
cis-1,2-DCE

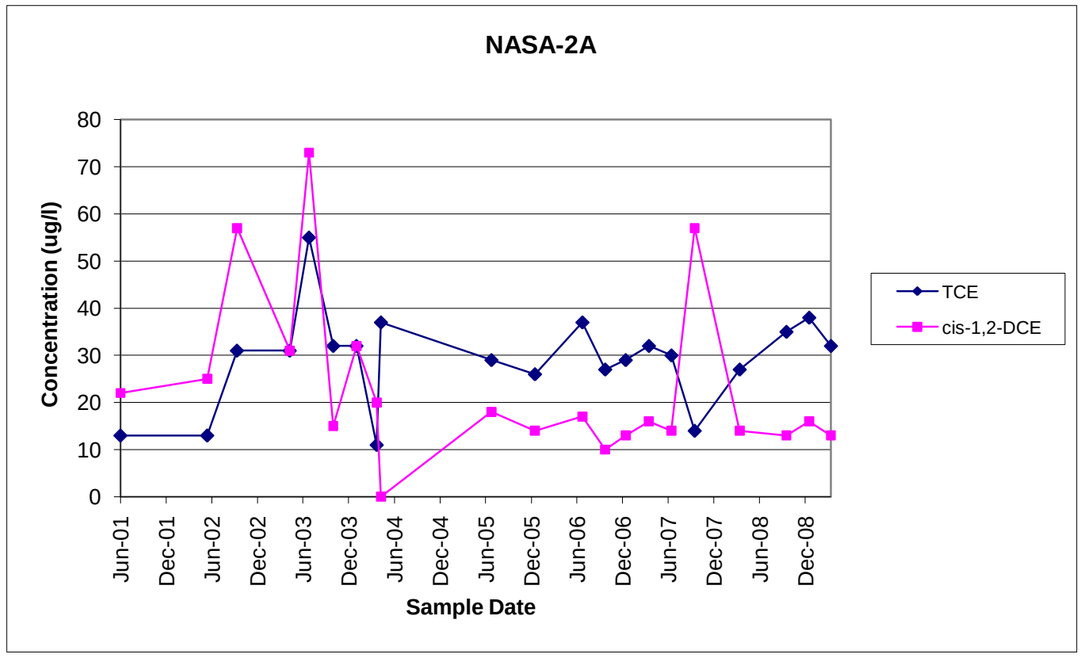

15H12A
Concentration (ug/l)
500
450
400
350
300
250
200
150
100
50
0
Mar-99
Mar-00
Mar-01
Mar-02
Mar-03
Mar-04
Mar-05
Mar-06
Mar-07
Mar-08
Mar-09
Sample Date
TCE
cis-1,2-DCE

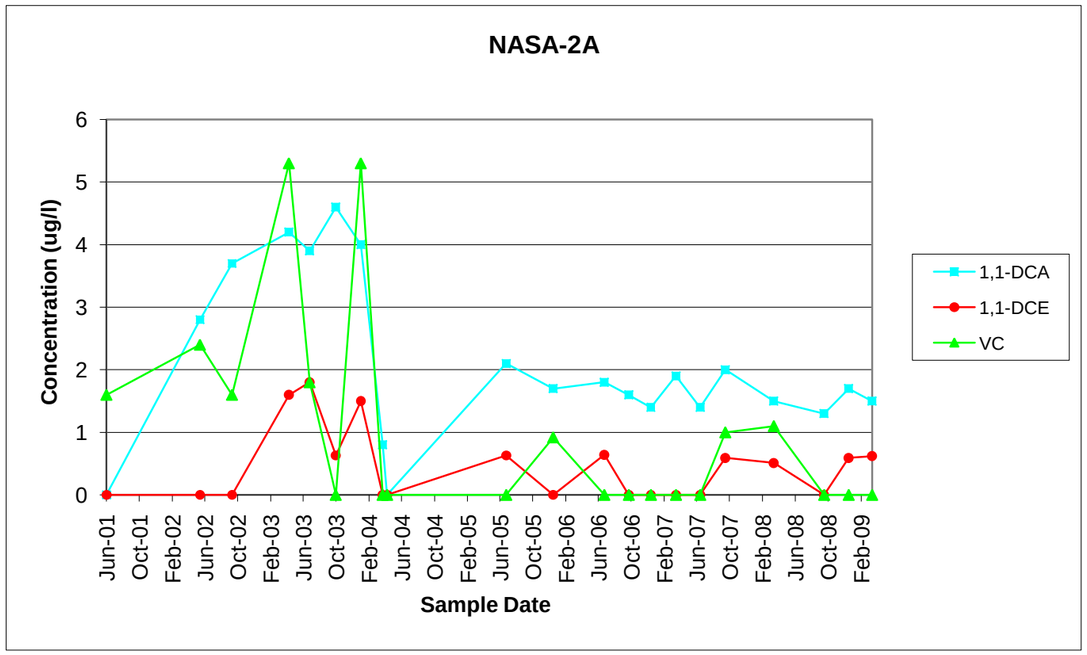

W08-08A1
Concentration (ug/l)
18
16
14
12
10
8
6
4
2
0
Sep-92
Sep-93
Sep-94
Sep-95
Sep-96
Sep-97
Sep-98
Sep-99
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
Sample Date
TCE
cis-1,2-DCE

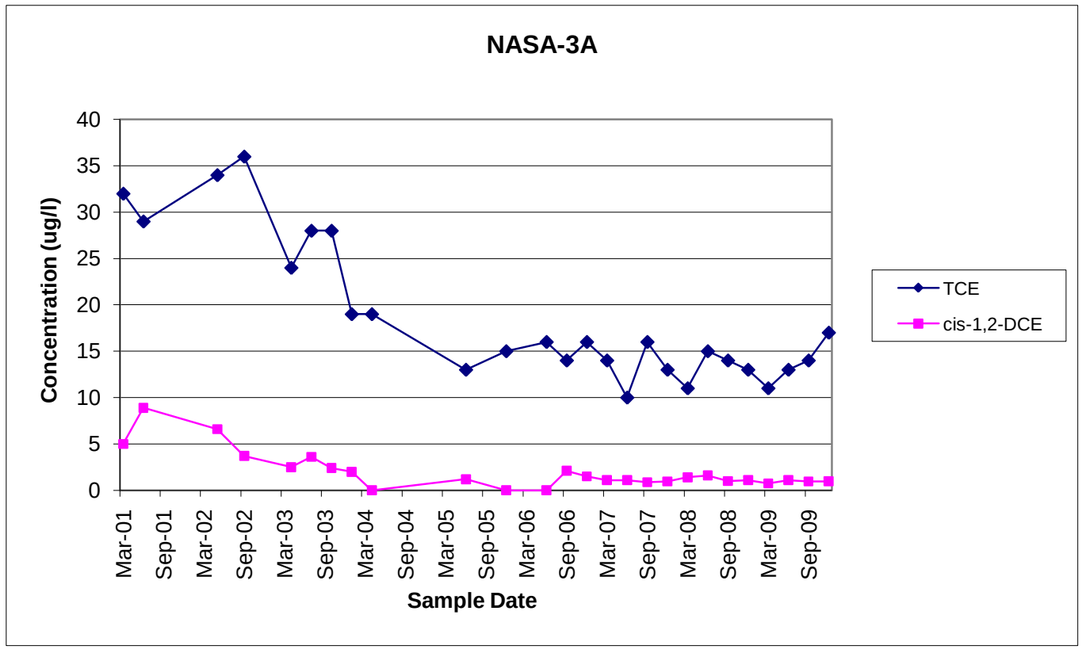

W08-08A1
Concentration (ug/l)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Sep-92
Sep-93
Sep-94
Sep-95
Sep-96
Sep-97
Sep-98
Sep-99
Sep-00
Sep-01
Sep-02
Sep-03
Sep-04
Sep-05
Sep-06
Sep-07
Sep-08
Sep-09
Sample Date
1,1-DCA
1,1-DCE

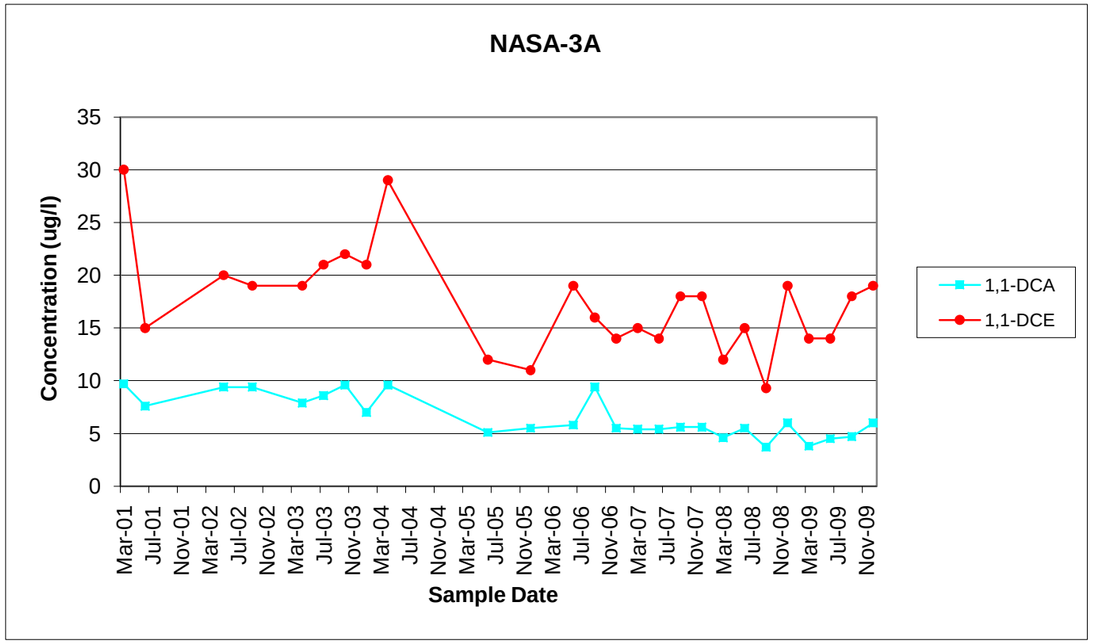

NASA-1A
Concentration (ug/l)
300
250
200
150
100
50
0
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Sample Date
TCE
cis-1,2-DCE

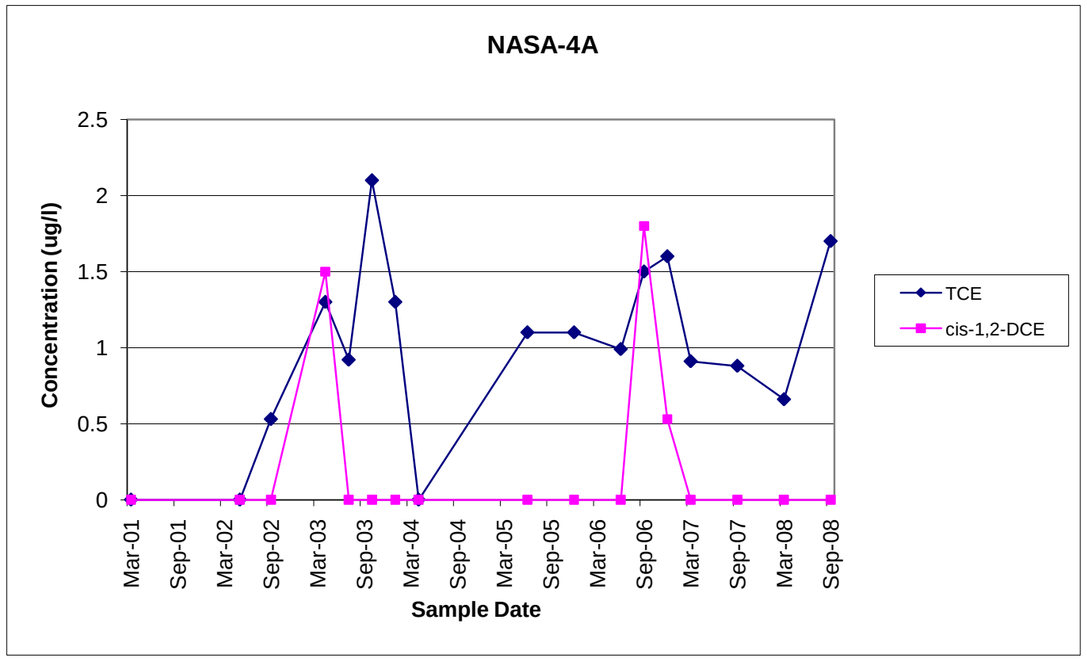

NASA-1A
Concentration (ug/l)
12
10
8
6
4
2
0
Mar-01
Sep-01
Mar-02
Sep-02
Mar-03
Sep-03
Mar-04
Sep-04
Mar-05
Sep-05
Mar-06
Sep-06
Mar-07
Sep-07
Mar-08
Sep-08
Mar-09
Sep-09
Sample Date
1,1-DCA
1,1-DCE
VC

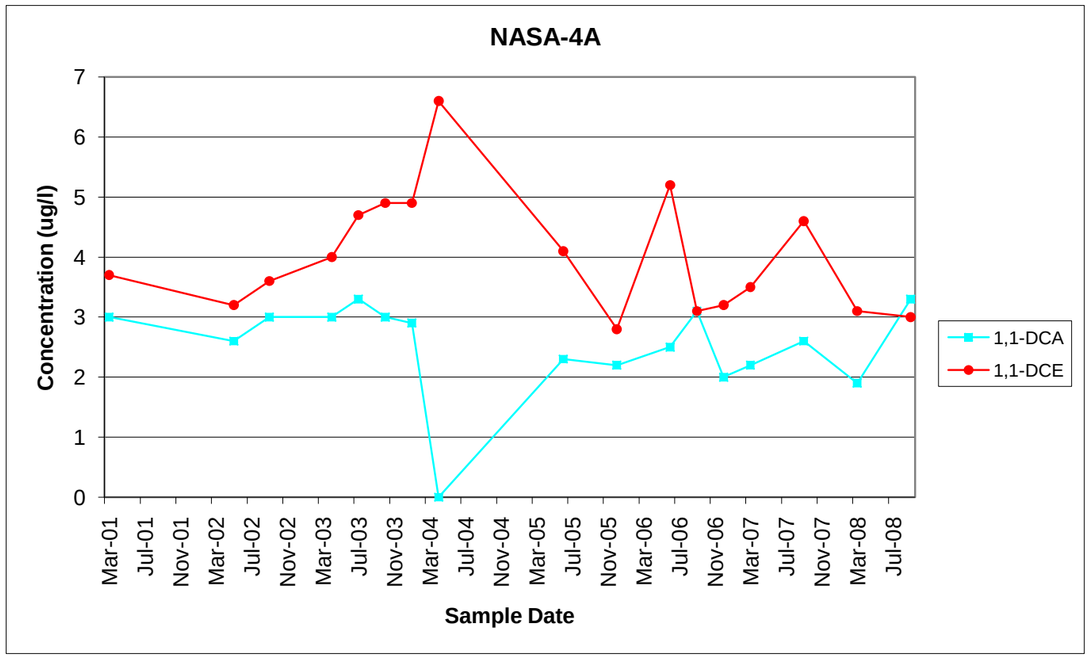

NASA-2A
Concentration (ug/l)
80
70
60
50
40
30
20
10
0
Jun-01
Dec-01
Jun-02
Dec-02
Jun-03
Dec-03
Jun-04
Dec-04
Jun-05
Dec-05
Jun-06
Dec-06
Jun-07
Dec-07
Jun-08
Dec-08
Sample Date
TCE
cis-1,2-DCE

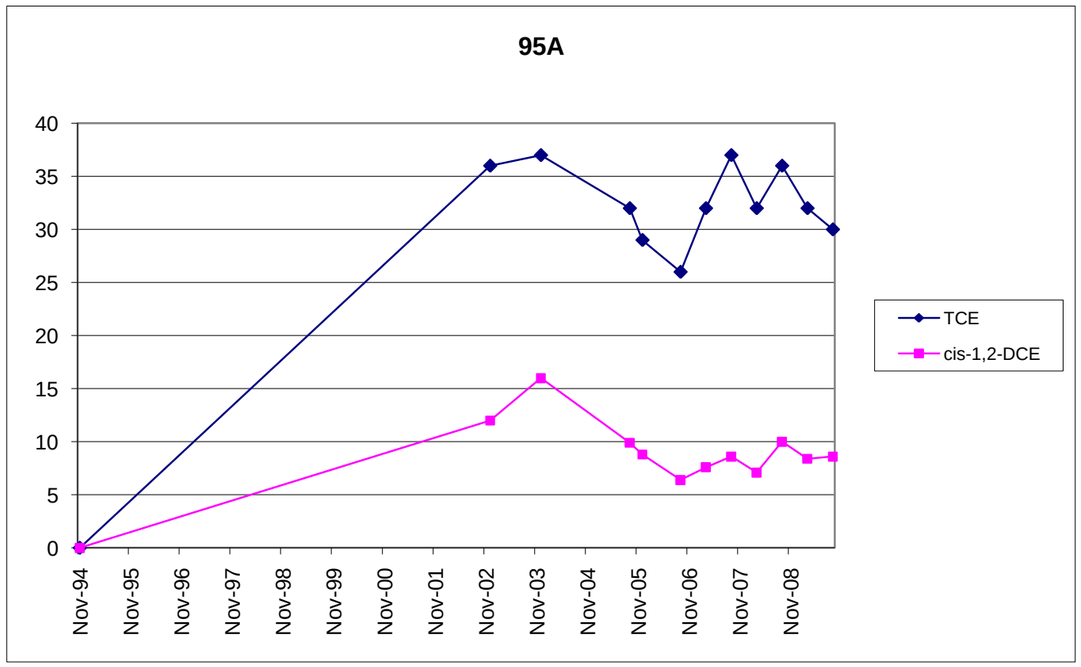

NASA-2A
Concentration (ug/l)
6
5
4
3
2
1
0
Jun-01
Oct-01
Feb-02
Jun-02
Oct-02
Feb-03
Jun-03
Oct-03
Feb-04
Jun-04
Oct-04
Feb-05
Jun-05
Oct-05
Feb-06
Jun-06
Oct-06
Feb-07
Jun-07
Oct-07
Feb-08
Jun-08
Oct-08
Feb-09
Sample Date
1,1-DCA
1,1-DCE
VC

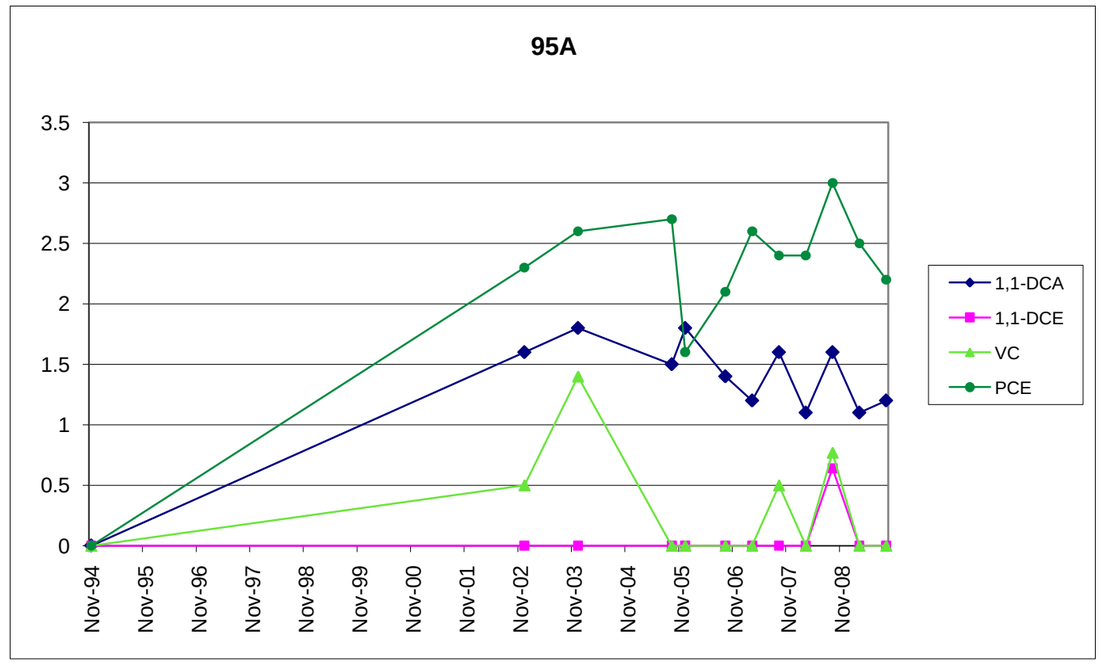

NASA-3A
Concentration (ug/l)
Sample Date
TCE
cis-1,2-DCE


NASA-3A
Concentration (ug/l)
Sample Date
1,1-DCA
1,1-DCE


NASA-4A
Concentration (ug/l)
Sample Date
TCE
cis-1,2-DCE


NASA-4A
Concentration (ug/l)
Sample Date
1,1-DCA
1,1-DCE


95A
40
35
30
25
20
15
10
5
0
Nov-94
Nov-95
Nov-96
Nov-97
Nov-98
Nov-99
Nov-00
Nov-01
Nov-02
Nov-03
Nov-04
Nov-05
Nov-06
Nov-07
Nov-08
TCE
cis-1,2-DCE


95A
3.5
3
2.5
2
1.5
1
0.5
0
Nov-94
Nov-95
Nov-96
Nov-97
Nov-98
Nov-99
Nov-00
Nov-01
Nov-02
Nov-03
Nov-04
Nov-05
Nov-06
Nov-07
Nov-08
1,1-DCA
1,1-DCE
VC
PCE

APPENDIX G

NASA 2009 ANALYTICAL LABORATORY REPORTS

Quarter 1, 2009

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

March 31, 2009

CLS Work Order #: CSC0882
COC #: 95036

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: AOI 4 O+M Quarterly Sampling

Enclosed are the results of analyses for samples received by the laboratory on 03/24/09 16:50. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

CLS - Labs

CHAIN OF CUSTODY

CLS ID No.; CSC0882 LOG NO. 95036

REPORT TO:

NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA

PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315

PROJECT NAME: AOI 4 O+M

SAMPLED BY: BR/LM

JOB DESCRIPTION:

SITE LOCATION:

CLIENT JOB NUMBER: N401-203

DESTINATION LABORATORY: [X] CLS (916) 638-7301, 3249 FITZGERALD RD., RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO

GLOBAL ID:

COMPOSITE:

FIELD CONDITIONS:

TURN AROUND TIME: 1 DAY / 2 DAY / 5 DAY / 10 DAY

SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TPH-G/BTEX	TPH-D, JP5/JP8, MO	1 DAY	2 DAY	5 DAY	10 DAY
3/24/09	930	TANK1-E	Ground water	4	mixed	1,3	X	X			X	
	1015	ISA11A		4		1,3	X	X			X	
	1250	ISK11A		4		1,3	X	X			X	

LAB

INVOICE TO:

P.O. #:

QUOTE #:

SUSPECTED CONSTITUENTS:

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	3/24/09 @ 1910		CLS
	CLS	3/24/09 @ 1650		

REC'D AT LAB BY: JonR DATE / TIME: 3-24-9 1650 CONDITIONS / COMMENTS: 6.7°C

SHIPPED BY: [ ] FED X [ ] UPS [V] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Tank1-E (CSC0882-01) Water Sampled: 03/24/09 09:30 Received: 03/24/09 16:50									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*79 %*	*65-135*		"	"	"	"	
15A11A (CSC0882-02) Water Sampled: 03/24/09 10:15 Received: 03/24/09 16:50									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.17**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*99 %*	*65-135*		"	"	"	"	
15K11A (CSC0882-03) Water Sampled: 03/24/09 12:50 Received: 03/24/09 16:50									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.17**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*86 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Tank1-E (CSC0882-01) Water Sampled: 03/24/09 09:30 Received: 03/24/09 16:50									
Gasoline	ND	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*113 %*		*65-135*	"	"	"	"	
15A11A (CSC0882-02) Water Sampled: 03/24/09 10:15 Received: 03/24/09 16:50									
Gasoline	**59**	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*120 %*		*65-135*	"	"	"	"	
15K11A (CSC0882-03) Water Sampled: 03/24/09 12:50 Received: 03/24/09 16:50									
Gasoline	**63**	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*101 %*		*65-135*	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02266 - EPA 3510B GCNV										
Blank (CS02266-BLK1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0185*		*"*	*0.0250*		*74*	*65-135*			
LCS (CS02266-BS1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.93	0.050	mg/L	2.50		77	65-135			
Surrogate: o-Terphenyl	*0.0189*		*"*	*0.0250*		*76*	*65-135*			
LCS Dup (CS02266-BSD1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.94	0.050	mg/L	2.50		77	65-135	0.3	30	
Surrogate: o-Terphenyl	*0.0188*		*"*	*0.0250*		*75*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02278 - EPA 5030 Water GC										
Blank (CS02278-BLK1)				Prepared & Analyzed: 03/26/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*29.3*		*"*	*20.0*		*147*	*65-135*			*QS-HI*
Surrogate: o-Chlorotoluene (Gas)	*20.2*		*"*	*20.0*		*101*	*65-135*			
LCS (CS02278-BS1)				Prepared & Analyzed: 03/26/09						
Gasoline	479	50	µg/L	500		96	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.8*		*"*	*20.0*		*114*	*65-135*			
LCS Dup (CS02278-BSD1)				Prepared & Analyzed: 03/26/09						
Gasoline	478	50	µg/L	500		96	65-135	0.2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.6*		*"*	*20.0*		*113*	*65-135*			
Matrix Spike (CS02278-MS1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	500	50	µg/L	500	29.5	94	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.9*		*"*	*20.0*		*115*	*65-135*			
Matrix Spike Dup (CS02278-MSD1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	509	50	µg/L	500	29.5	96	65-135	2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.2*		*"*	*20.0*		*111*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:10

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M Quarterly Sampling	
NASA Ames MS T20-G	Project Number: N401-203	**CLS Work Order #: CSC0882**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95036

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

March 31, 2009

CLS Work Order #: CSC0794
COC #: 95033

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q1 2009 Groundwater

Enclosed are the results of analyses for samples received by the laboratory on 03/20/09 14:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSC0794 LOG NO. 95033

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: Q1 2009 Groundwater
SAMPLED BY: BR
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N404-203 (Reg)
DESTINATION LABORATORY: ☒ CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JP5/8, MO	TURN AROUND TIME 1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
3/19/09	920	NASA-3A	Ground water	3	VOA	1	X					X		
	935	NASA-1A		5	mixed	1,3	X	X	X			X		
	955	NASA-2A		5	mixed	1,3	X	X	X			X		

INVOICE TO:
P.O. #
QUOTE #

SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	3/20/09 @ 1205H		CLS
	CLS	3/20/09 @ 1430H		

RECD AT LAB BY: John DATE / TIME: 3-20-9 1430 CONDITIONS / COMMENTS: 3.5°C
SHIPPED BY: ☐ FED X ☐ UPS ☒ OTHER CLS AIR BILL #

LAB

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSC0794-02) Water Sampled: 03/19/09 09:35 Received: 03/20/09 14:30									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/27/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*69 %*	*65-135*		"	"	"	"	
NASA-2A (CSC0794-03) Water Sampled: 03/19/09 09:55 Received: 03/20/09 14:30									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/27/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*69 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSC0794-02) Water Sampled: 03/19/09 09:35 Received: 03/20/09 14:30									
Gasoline	ND	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*84 %*	*65-135*		"	"	"	"	
NASA-2A (CSC0794-03) Water Sampled: 03/19/09 09:55 Received: 03/20/09 14:30									
Gasoline	ND	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*101 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project:	Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number:	N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager:	Brian Reddig	COC #: 95033

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSC0794-01) Water Sampled: 03/19/09 09:20 Received: 03/20/09 14:30									
Benzene	ND	0.30	µg/L	1	CS02130	03/20/09	03/20/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**3.8**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**14**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.74**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**1.2**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**11**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSC0794-01) Water Sampled: 03/19/09 09:20 Received: 03/20/09 14:30									
Trichlorofluoromethane	**2.8**	0.50	µg/L	1	CS02130	"	03/20/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**2.7**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*115 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*116 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*126 %*		*73-125*	"	"	"	"	*QS-HI*
NASA-1A (CSC0794-02) Water Sampled: 03/19/09 09:35 Received: 03/20/09 14:30									
Benzene	ND	0.30	µg/L	1	CS02130	03/20/09	03/20/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.6**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.5**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**37**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**0.92**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSC0794-02) Water Sampled: 03/19/09 09:35 Received: 03/20/09 14:30									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02130	"	03/20/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**42**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.9**	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.2**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*110 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*116 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*124 %*	*73-125*		"	"	"	"	
NASA-2A (CSC0794-03) Water Sampled: 03/19/09 09:55 Received: 03/20/09 14:30									
Benzene	ND	0.30	µg/L	1	CS02130	03/20/09	03/20/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-2A (CSC0794-03) Water Sampled: 03/19/09 09:55 Received: 03/20/09 14:30									
Chloromethane	ND	0.50	µg/L	1	CS02130	"	03/20/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.5**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**0.62**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**13**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**32**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.63**	0.50	"	"	"	"	"	"	
Vinyl chloride	**0.66**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*111 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*116 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*128 %*	*73-125*		"	"	"	"	*QS-HI*

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02266 - EPA 3510B GCNV										
Blank (CS02266-BLK1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0185*		*"*	*0.0250*		*74*	*65-135*			
LCS (CS02266-BS1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.93	0.050	mg/L	2.50		77	65-135			
Surrogate: o-Terphenyl	*0.0189*		*"*	*0.0250*		*76*	*65-135*			
LCS Dup (CS02266-BSD1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.94	0.050	mg/L	2.50		77	65-135	0.3	30	
Surrogate: o-Terphenyl	*0.0188*		*"*	*0.0250*		*75*	*65-135*			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02278 - EPA 5030 Water GC										
Blank (CS02278-BLK1)				Prepared & Analyzed: 03/26/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*29.3*		*"*	*20.0*		*147*	*65-135*			*QS-HI*
Surrogate: o-Chlorotoluene (Gas)	*20.2*		*"*	*20.0*		*101*	*65-135*			
LCS (CS02278-BS1)				Prepared & Analyzed: 03/26/09						
Gasoline	479	50	µg/L	500		96	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.8*		*"*	*20.0*		*114*	*65-135*			
LCS Dup (CS02278-BSD1)				Prepared & Analyzed: 03/26/09						
Gasoline	478	50	µg/L	500		96	65-135	0.2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.6*		*"*	*20.0*		*113*	*65-135*			
Matrix Spike (CS02278-MS1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	500	50	µg/L	500	29.5	94	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.9*		*"*	*20.0*		*115*	*65-135*			
Matrix Spike Dup (CS02278-MSD1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	509	50	µg/L	500	29.5	96	65-135	2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.2*		*"*	*20.0*		*111*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02130 - EPA 5030 Water MS										
Blank (CS02130-BLK1)				Prepared & Analyzed: 03/20/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02130 - EPA 5030 Water MS										
Blank (CS02130-BLK1)				Prepared & Analyzed: 03/20/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*9.77*		*"*	*10.0*		*98*	*65-135*			
Surrogate: Toluene-d8	*11.1*		*"*	*10.0*		*111*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*12.7*		*"*	*10.0*		*127*	*73-125*			*QS-HI*
LCS (CS02130-BS1)				Prepared & Analyzed: 03/20/09						
Benzene	18.7	0.30	µg/L	20.0		94	37-151			
Bromodichloromethane	19.2	0.50	"	20.0		96	35-155			
Bromoform	20.0	0.50	"	20.0		100	45-169			
Bromomethane	11.8	0.50	"	20.0		59	10-242			
Carbon tetrachloride	20.3	0.50	"	20.0		102	70-140			
Chlorobenzene	20.3	0.30	"	20.0		101	37-160			
Chloroethane	13.9	0.50	"	20.0		70	14-230			
Chloroform	18.0	0.50	"	20.0		90	51-138			
Chloromethane	14.9	0.50	"	20.0		74	10-273			
Dibromochloromethane	18.7	0.50	"	20.0		94	53-149			
1,2-Dichlorobenzene	20.8	0.30	"	20.0		104	18-190			
1,3-Dichlorobenzene	21.6	0.30	"	20.0		108	59-156			
1,4-Dichlorobenzene	20.8	0.30	"	20.0		104	18-190			
Dichlorodifluoromethane (Freon 12)	16.9	0.50	"	20.0		84	50-150			
1,1-Dichloroethane	17.0	0.50	"	20.0		85	59-155			
1,2-Dichloroethane	16.5	0.50	"	20.0		82	49-155			
1,1-Dichloroethene	14.4	0.50	"	20.0		72	5-234			
trans-1,2-Dichloroethene	16.9	0.50	"	20.0		85	54-156			
1,2-Dichloropropane	18.3	0.50	"	20.0		92	5-210			
cis-1,3-Dichloropropene	19.3	0.50	"	20.0		96	5-227			
trans-1,3-Dichloropropene	18.6	0.50	"	20.0		93	17-183			
Ethylbenzene	21.8	0.30	"	20.0		109	37-162			

CALIFORNIA LABORATORY SERVICES

 03/31/09 10:46

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02130 - EPA 5030 Water MS										
LCS (CS02130-BS1)				Prepared & Analyzed: 03/20/09						
Methylene chloride	17.9	0.50	µg/L	20.0		90	5-221			
1,1,2,2-Tetrachloroethane	17.2	0.50	"	20.0		86	46-148			
Tetrachloroethene	20.7	0.50	"	20.0		104	64-148			
Toluene	19.2	0.30	"	20.0		96	47-150			
1,1,1-Trichloroethane	19.8	0.50	"	20.0		99	52-162			
1,1,2-Trichloroethane	16.7	0.50	"	20.0		83	52-150			
Trichloroethene	19.8	0.50	"	20.0		99	71-157			
Trichlorofluoromethane	16.6	0.50	"	20.0		83	47-181			
Vinyl chloride	12.9	0.50	"	20.0		64	10-251			
Surrogate: 1,2-Dichloroethane-d4	*10.0*		*"*	*10.0*		*100*	*65-135*			
Surrogate: Toluene-d8	*11.5*		*"*	*10.0*		*115*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*12.4*		*"*	*10.0*		*124*	*73-125*			
LCS Dup (CS02130-BSD1)				Prepared & Analyzed: 03/20/09						
Benzene	18.8	0.30	µg/L	20.0		94	37-151	0.4	30	
Bromodichloromethane	19.8	0.50	"	20.0		99	35-155	3	30	
Bromoform	20.4	0.50	"	20.0		102	45-169	2	30	
Bromomethane	12.2	0.50	"	20.0		61	10-242	3	30	
Carbon tetrachloride	19.5	0.50	"	20.0		97	70-140	4	30	
Chlorobenzene	20.6	0.30	"	20.0		103	37-160	1	30	
Chloroethane	13.9	0.50	"	20.0		69	14-230	0.4	30	
Chloroform	17.8	0.50	"	20.0		89	51-138	1	30	
Chloromethane	14.7	0.50	"	20.0		74	10-273	1	30	
Dibromochloromethane	18.7	0.50	"	20.0		94	53-149	0.1	30	
1,2-Dichlorobenzene	20.6	0.30	"	20.0		103	18-190	0.9	30	
1,3-Dichlorobenzene	21.5	0.30	"	20.0		107	59-156	0.6	30	
1,4-Dichlorobenzene	20.6	0.30	"	20.0		103	18-190	0.7	30	
Dichlorodifluoromethane (Freon 12)	16.5	0.50	"	20.0		82	50-150	2	30	
1,1-Dichloroethane	16.7	0.50	"	20.0		84	59-155	2	30	
1,2-Dichloroethane	16.4	0.50	"	20.0		82	49-155	0.7	30	
1,1-Dichloroethene	14.2	0.50	"	20.0		71	5-234	1	30	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02130 - EPA 5030 Water MS										
LCS Dup (CS02130-BSD1)				Prepared & Analyzed: 03/20/09						
trans-1,2-Dichloroethene	16.5	0.50	µg/L	20.0		82	54-156	3	30	
1,2-Dichloropropane	18.4	0.50	"	20.0		92	5-210	0.5	30	
cis-1,3-Dichloropropene	19.6	0.50	"	20.0		98	5-227	1	30	
trans-1,3-Dichloropropene	19.0	0.50	"	20.0		95	17-183	2	30	
Ethylbenzene	22.0	0.30	"	20.0		110	37-162	0.8	30	
Methylene chloride	14.5	0.50	"	20.0		73	5-221	21	30	
1,1,2,2-Tetrachloroethane	17.7	0.50	"	20.0		88	46-148	3	30	
Tetrachloroethene	20.9	0.50	"	20.0		104	64-148	0.6	30	
Toluene	19.3	0.30	"	20.0		97	47-150	0.5	30	
1,1,1-Trichloroethane	19.2	0.50	"	20.0		96	52-162	3	30	
1,1,2-Trichloroethane	16.9	0.50	"	20.0		84	52-150	1	30	
Trichloroethene	20.0	0.50	"	20.0		100	71-157	1	30	
Trichlorofluoromethane	16.3	0.50	"	20.0		81	47-181	2	30	
Vinyl chloride	13.0	0.50	"	20.0		65	10-251	0.9	30	
Surrogate: 1,2-Dichloroethane-d4	*9.89*		*"*	*10.0*		*99*	*65-135*			
Surrogate: Toluene-d8	*11.5*		*"*	*10.0*		*115*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*12.0*		*"*	*10.0*		*120*	*73-125*			

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203 (Reg)	**CLS Work Order #: CSC0794**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95033

Notes and Definitions

QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

April 02, 2009

CLS Work Order #: CSC0843
COC #: 95035

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q1 2009 Groundwater

Enclosed are the results of analyses for samples received by the laboratory on 03/23/09 16:25. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 04/02/09 15:02

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSC0843 LOG NO. 95035

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Redding PHONE#: 650-604-1315
PROJECT NAME: Q1 2009 Groundwater
SAMPLED BY: BR/LM
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N404-203 (Quarterly)
DESTINATION LABORATORY#: [X] CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JPS/S, MC	PCBs (include 1265)	Lead				TURN AROUND TIME 1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
3/23/09	940	11E02A	ground water	5	mixed	1,2,3	X			X	X						X		
	1000	11M25A		5	mixed	1,2,3	X			X	X						X		
	1020	11M03A		3	VOA	1	X										X		
	1045	11M17A		3	VOA	1	X										X		
	1115	11N26A		5	mixed	1,3	X	X	X								X		

LAB

INVOICE TO:
P.O. #
QUOTE #

SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Redding	Brian Redding/ISSI	3/23/09 @ 1300		CLS
	CLS	3/23/09 @ 1625		

REC'D AT LAB BY: JonR DATE / TIME: 3-23-9 1625 CONDITIONS / COMMENTS: 8.5°C

SHIPPED BY: [ ] FED X [ ] UPS [N] OTHER AIR BILL #

CALIFORNIA LABORATORY SERVICES

 04/02/09 15:02

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N26A (CSC0843-05) Water Sampled: 03/23/09 11:15 Received: 03/23/09 16:25									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.99**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*93 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 04/02/09 15:02

ISSI/NASA Ames MS221-10	Project:	Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number:	N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager:	Brian Reddig	COC #: 95035

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N26A (CSC0843-05) Water Sampled: 03/23/09 11:15 Received: 03/23/09 16:25									
Gasoline	ND	50	µg/L	1	CS02322	03/30/09	03/30/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*109 %*		*65-135*	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 04/02/09 15:02

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Metals by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSC0843-01) Water Sampled: 03/23/09 09:40 Received: 03/23/09 16:25									
Lead	ND	5.0	µg/L	1	CS02180	03/24/09	03/24/09	EPA 200.8	
11M25A (CSC0843-02) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
Lead	ND	5.0	µg/L	1	CS02180	03/24/09	03/24/09	EPA 200.8	

CALIFORNIA LABORATORY SERVICES

 04/02/09 15:02

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Polychlorinated Biphenyls by EPA Method 8082A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSC0843-01) Water Sampled: 03/23/09 09:40 Received: 03/23/09 16:25									
Aroclor 1016	ND	0.50	µg/L	1	CS02345	03/30/09	04/02/09	EPA 8082A	
Aroclor 1221	ND	0.50	"	"	"	"	"	"	
Aroclor 1232	ND	0.50	"	"	"	"	"	"	
Aroclor 1242	ND	0.50	"	"	"	"	"	"	
Aroclor 1248	ND	0.50	"	"	"	"	"	"	
Aroclor 1254	ND	0.50	"	"	"	"	"	"	
Aroclor 1260	ND	0.50	"	"	"	"	"	"	
Aroclor 1268	ND	0.50	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*85 %*	*50-150*		"	"	"	"	
11M25A (CSC0843-02) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
Aroclor 1016	ND	0.50	µg/L	1	CS02345	03/30/09	04/02/09	EPA 8082A	
Aroclor 1221	ND	0.50	"	"	"	"	"	"	
Aroclor 1232	ND	0.50	"	"	"	"	"	"	
Aroclor 1242	ND	0.50	"	"	"	"	"	"	
Aroclor 1248	ND	0.50	"	"	"	"	"	"	
Aroclor 1254	ND	0.50	"	"	"	"	"	"	
Aroclor 1260	ND	0.50	"	"	"	"	"	"	
Aroclor 1268	ND	0.50	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*74 %*	*50-150*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSC0843-01) Water Sampled: 03/23/09 09:40 Received: 03/23/09 16:25									
Benzene	ND	0.30	µg/L	1	CS02173	03/23/09	03/23/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.82**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**1.2**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSC0843-01) Water Sampled: 03/23/09 09:40 Received: 03/23/09 16:25									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS02173	"	03/23/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*129 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*118 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*126 %*		*73-125*	"	"	"	"	*QS-HI*
11M25A (CSC0843-02) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
Benzene	ND	0.30	µg/L	1	CS02173	03/23/09	03/23/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M25A (CSC0843-02) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02173	"	03/23/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**0.53**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**0.62**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*130 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*118 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*125 %*	*73-125*		"	"	"	"	
11M03A (CSC0843-03) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
Benzene	ND	0.30	µg/L	1	CS02173	03/23/09	03/23/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M03A (CSC0843-03) Water Sampled: 03/23/09 10:00 Received: 03/23/09 16:25									
Chloromethane	ND	0.50	µg/L	1	CS02173	"	03/23/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.3**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**8.6**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**0.76**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**9.0**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**1.8**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**3.1**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*128 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*118 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*130 %*		*73-125*	"	"	"	"	*QS-HI*

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M17A (CSC0843-04) Water Sampled: 03/23/09 10:45 Received: 03/23/09 16:25									
Benzene	ND	0.30	µg/L	1	CS02173	03/23/09	03/23/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.58**	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.4**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.2**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**0.68**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**20**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M17A (CSC0843-04) Water Sampled: 03/23/09 10:45 Received: 03/23/09 16:25									
Trichlorofluoromethane	**1.8**	0.50	µg/L	1	CS02173	"	03/23/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.82**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*115 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*118 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*126 %*		*73-125*	"	"	"	"	*QS-HI*
11N26A (CSC0843-05) Water Sampled: 03/23/09 11:15 Received: 03/23/09 16:25									
Benzene	ND	0.30	µg/L	1	CS02173	03/23/09	03/23/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N26A (CSC0843-05) Water Sampled: 03/23/09 11:15 Received: 03/23/09 16:25									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02173	"	03/23/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*107 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*133 %*	*72-125*		"	"	"	"	*QS-HI*
Surrogate: 4-Bromofluorobenzene		*124 %*	*73-125*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02266 - EPA 3510B GCNV										
Blank (CS02266-BLK1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0185*		*"*	*0.0250*		*74*	*65-135*			
LCS (CS02266-BS1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.93	0.050	mg/L	2.50		77	65-135			
Surrogate: o-Terphenyl	*0.0189*		*"*	*0.0250*		*76*	*65-135*			
LCS Dup (CS02266-BSD1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.94	0.050	mg/L	2.50		77	65-135	0.3	30	
Surrogate: o-Terphenyl	*0.0188*		*"*	*0.0250*		*75*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02322 - EPA 5030 Water GC										
Blank (CS02322-BLK1)				Prepared & Analyzed: 03/30/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*30.3*		*"*	*20.0*		*151*	*65-135*			*QS-HI*
Surrogate: o-Chlorotoluene (Gas)	*21.6*		*"*	*20.0*		*108*	*65-135*			
LCS (CS02322-BS1)				Prepared & Analyzed: 03/30/09						
Gasoline	579	50	µg/L	500		116	65-135			
Surrogate: o-Chlorotoluene (Gas)	*23.2*		*"*	*20.0*		*116*	*65-135*			
LCS Dup (CS02322-BSD1)				Prepared & Analyzed: 03/30/09						
Gasoline	590	50	µg/L	500		118	65-135	2	30	
Surrogate: o-Chlorotoluene (Gas)	*23.3*		*"*	*20.0*		*116*	*65-135*			
Matrix Spike (CS02322-MS1)		**Source: CSC0956-02**		Prepared & Analyzed: 03/30/09						
Gasoline	607	50	µg/L	500	44.3	113	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.9*		*"*	*20.0*		*115*	*65-135*			
Matrix Spike Dup (CS02322-MSD1)		**Source: CSC0956-02**		Prepared & Analyzed: 03/30/09						
Gasoline	514	50	µg/L	500	44.3	94	65-135	17	30	
Surrogate: o-Chlorotoluene (Gas)	*22.0*		*"*	*20.0*		*110*	*65-135*			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Metals by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02180 - EPA 3020A										
Blank (CS02180-BLK1)				Prepared & Analyzed: 03/24/09						
Lead	ND	5.0	µg/L							
LCS (CS02180-BS1)				Prepared & Analyzed: 03/24/09						
Lead	104	5.0	µg/L	100		104	80-120			
LCS Dup (CS02180-BSD1)				Prepared & Analyzed: 03/24/09						
Lead	102	5.0	µg/L	100		102	80-120	3	20	
Matrix Spike (CS02180-MS1)		**Source: CSC0816-01**		Prepared & Analyzed: 03/24/09						
Lead	104	5.0	µg/L	100	1.43	102	75-125			
Matrix Spike Dup (CS02180-MSD1)		**Source: CSC0816-01**		Prepared & Analyzed: 03/24/09						
Lead	103	5.0	µg/L	100	1.43	101	75-125	1	25	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Polychlorinated Biphenyls by EPA Method 8082A - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02345 - EPA 3510B GCNV										
Blank (CS02345-BLK1)				Prepared: 03/30/09	Analyzed: 04/02/09					
Aroclor 1016	ND	0.50	µg/L							
Aroclor 1221	ND	0.50	"							
Aroclor 1232	ND	0.50	"							
Aroclor 1242	ND	0.50	"							
Aroclor 1248	ND	0.50	"							
Aroclor 1254	ND	0.50	"							
Aroclor 1260	ND	0.50	"							
Aroclor 1268	ND	0.50	"							
Surrogate: Decachlorobiphenyl	*0.140*		*"*	*0.250*		*56*	*50-150*			
LCS (CS02345-BS1)				Prepared: 03/30/09	Analyzed: 04/02/09					
Aroclor 1260	2.22	0.50	µg/L	2.50		89	31-138			
Surrogate: Decachlorobiphenyl	*0.140*		*"*	*0.250*		*56*	*50-150*			
LCS Dup (CS02345-BSD1)				Prepared: 03/30/09	Analyzed: 04/02/09					
Aroclor 1260	2.27	0.50	µg/L	2.50		91	31-138	2	30	
Surrogate: Decachlorobiphenyl	*0.159*		*"*	*0.250*		*64*	*50-150*			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02173 - EPA 5030 Water MS										
Blank (CS02173-BLK1)				Prepared & Analyzed: 03/23/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02173 - EPA 5030 Water MS										
Blank (CS02173-BLK1)				Prepared & Analyzed: 03/23/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*10.8*		*"*	*10.0*		*108*	*65-135*			
Surrogate: Toluene-d8	*11.2*		*"*	*10.0*		*112*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*12.8*		*"*	*10.0*		*128*	*73-125*			*QS-HI*
LCS (CS02173-BS1)				Prepared & Analyzed: 03/23/09						
Benzene	20.2	0.30	µg/L	20.0		101	37-151			
Bromodichloromethane	20.6	0.50	"	20.0		103	35-155			
Bromoform	21.3	0.50	"	20.0		107	45-169			
Bromomethane	18.1	0.50	"	20.0		91	10-242			
Carbon tetrachloride	21.7	0.50	"	20.0		108	70-140			
Chlorobenzene	21.6	0.30	"	20.0		108	37-160			
Chloroethane	23.2	0.50	"	20.0		116	14-230			
Chloroform	19.2	0.50	"	20.0		96	51-138			
Chloromethane	16.5	0.50	"	20.0		83	10-273			
Dibromochloromethane	20.1	0.50	"	20.0		100	53-149			
1,2-Dichlorobenzene	21.2	0.30	"	20.0		106	18-190			
1,3-Dichlorobenzene	22.5	0.30	"	20.0		112	59-156			
1,4-Dichlorobenzene	21.5	0.30	"	20.0		107	18-190			
Dichlorodifluoromethane (Freon 12)	17.3	0.50	"	20.0		87	50-150			
1,1-Dichloroethane	19.3	0.50	"	20.0		96	59-155			
1,2-Dichloroethane	17.7	0.50	"	20.0		88	49-155			
1,1-Dichloroethene	18.5	0.50	"	20.0		93	5-234			
trans-1,2-Dichloroethene	19.0	0.50	"	20.0		95	54-156			
1,2-Dichloropropane	19.9	0.50	"	20.0		99	5-210			
cis-1,3-Dichloropropene	20.4	0.50	"	20.0		102	5-227			
trans-1,3-Dichloropropene	19.8	0.50	"	20.0		99	17-183			
Ethylbenzene	23.7	0.30	"	20.0		118	37-162			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02173 - EPA 5030 Water MS										
LCS (CS02173-BS1)				Prepared & Analyzed: 03/23/09						
Methylene chloride	16.5	0.50	µg/L	20.0		83	5-221			
1,1,2,2-Tetrachloroethane	17.8	0.50	"	20.0		89	46-148			
Tetrachloroethene	22.6	0.50	"	20.0		113	64-148			
Toluene	21.3	0.30	"	20.0		106	47-150			
1,1,1-Trichloroethane	20.8	0.50	"	20.0		104	52-162			
1,1,2-Trichloroethane	18.1	0.50	"	20.0		90	52-150			
Trichloroethene	21.2	0.50	"	20.0		106	71-157			
Trichlorofluoromethane	26.0	0.50	"	20.0		130	47-181			
Vinyl chloride	20.8	0.50	"	20.0		104	10-251			
Surrogate: 1,2-Dichloroethane-d4	*10.2*		*"*	*10.0*		*102*	*65-135*			
Surrogate: Toluene-d8	*12.0*		*"*	*10.0*		*120*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*11.9*		*"*	*10.0*		*119*	*73-125*			
LCS Dup (CS02173-BSD1)				Prepared & Analyzed: 03/23/09						
Benzene	19.2	0.30	µg/L	20.0		96	37-151	5	30	
Bromodichloromethane	19.7	0.50	"	20.0		98	35-155	5	30	
Bromoform	19.6	0.50	"	20.0		98	45-169	8	30	
Bromomethane	19.0	0.50	"	20.0		95	10-242	5	30	
Carbon tetrachloride	20.3	0.50	"	20.0		101	70-140	7	30	
Chlorobenzene	19.9	0.30	"	20.0		99	37-160	8	30	
Chloroethane	23.2	0.50	"	20.0		116	14-230	0.2	30	
Chloroform	18.4	0.50	"	20.0		92	51-138	4	30	
Chloromethane	17.3	0.50	"	20.0		87	10-273	5	30	
Dibromochloromethane	19.4	0.50	"	20.0		97	53-149	4	30	
1,2-Dichlorobenzene	19.8	0.30	"	20.0		99	18-190	7	30	
1,3-Dichlorobenzene	21.0	0.30	"	20.0		105	59-156	7	30	
1,4-Dichlorobenzene	20.2	0.30	"	20.0		101	18-190	6	30	
Dichlorodifluoromethane (Freon 12)	17.2	0.50	"	20.0		86	50-150	0.9	30	
1,1-Dichloroethane	18.0	0.50	"	20.0		90	59-155	7	30	
1,2-Dichloroethane	16.9	0.50	"	20.0		85	49-155	4	30	
1,1-Dichloroethene	18.2	0.50	"	20.0		91	5-234	2	30	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02173 - EPA 5030 Water MS										
LCS Dup (CS02173-BSD1)				Prepared & Analyzed: 03/23/09						
trans-1,2-Dichloroethene	17.5	0.50	µg/L	20.0		87	54-156	8	30	
1,2-Dichloropropane	19.0	0.50	"	20.0		95	5-210	5	30	
cis-1,3-Dichloropropene	19.7	0.50	"	20.0		98	5-227	4	30	
trans-1,3-Dichloropropene	19.0	0.50	"	20.0		95	17-183	4	30	
Ethylbenzene	21.6	0.30	"	20.0		108	37-162	9	30	
Methylene chloride	15.9	0.50	"	20.0		79	5-221	4	30	
1,1,2,2-Tetrachloroethane	17.3	0.50	"	20.0		86	46-148	3	30	
Tetrachloroethene	21.2	0.50	"	20.0		106	64-148	6	30	
Toluene	20.2	0.30	"	20.0		101	47-150	5	30	
1,1,1-Trichloroethane	19.6	0.50	"	20.0		98	52-162	6	30	
1,1,2-Trichloroethane	17.2	0.50	"	20.0		86	52-150	5	30	
Trichloroethene	20.0	0.50	"	20.0		100	71-157	6	30	
Trichlorofluoromethane	26.3	0.50	"	20.0		132	47-181	1	30	
Vinyl chloride	21.0	0.50	"	20.0		105	10-251	0.9	30	
Surrogate: 1,2-Dichloroethane-d4	*10.1*		*"*	*10.0*		*101*	*65-135*			
Surrogate: Toluene-d8	*12.2*		*"*	*10.0*		*122*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*11.6*		*"*	*10.0*		*116*	*73-125*			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0843**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95035

Notes and Definitions

QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

March 31, 2009

CLS Work Order #: CSC0884
COC #: 95038

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q1 2009 Groundwater

Enclosed are the results of analyses for samples received by the laboratory on 03/24/09 16:50. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSC0884 LOG NO. 95038

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650 604-1315
PROJECT NAME: Q1 2009 Groundwater
SAMPLED BY: BR/LM
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N404-203 (Quarterly)
DESTINATION LABORATORY: ☒ CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER

ANALYSIS REQUESTED: VOCs (EPA 624)

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS / OR ALT. ID:
3/24/09	1045	11N21A1	Ground Water	3	VOA	1	X			X		
↓	1110	11M16A1	↓	3	VOA	1	X			X		
↓	1145	9SA	↓	3	VOA	1	X			X		

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY
INVOICE TO:
P.O. #:
QUOTE #:
SUSPECTED CONSTITUENTS:
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	3/24/09 @ 1210A	[signature]	CLS
[signature]	CLS	3/24/09 @ 1650		

RECD AT LAB BY: JonR DATE / TIME: 3-24-9 1650 CONDITIONS / COMMENTS: 6.8°C
SHIPPED BY: ☐ FED X ☐ UPS ☒ OTHER CLS AIR BILL #

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N21A1 (CSC0884-01) Water Sampled: 03/24/09 10:45 Received: 03/24/09 16:50									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**0.63**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.91**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**1.2**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N21A1 (CSC0884-01) Water Sampled: 03/24/09 10:45 Received: 03/24/09 16:50									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*114 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*94 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*102 %*		*73-125*	"	"	"	"	
11M16A1 (CSC0884-02) Water Sampled: 03/24/09 11:10 Received: 03/24/09 16:50									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**0.79**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M16A1 (CSC0884-02) Water Sampled: 03/24/09 11:10 Received: 03/24/09 16:50									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**14**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*118 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*96 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*	*73-125*		"	"	"	"	
95A (CSC0884-03) Water Sampled: 03/24/09 11:45 Received: 03/24/09 16:50									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
95A (CSC0884-03) Water Sampled: 03/24/09 11:45 Received: 03/24/09 16:50									
Chloromethane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.1**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**8.4**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**1.2**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**2.5**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**32**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*116 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*95 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*	*73-125*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
Blank (CS02254-BLK1)				Prepared & Analyzed: 03/26/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
Blank (CS02254-BLK1)				Prepared & Analyzed: 03/26/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*10.6*		*"*	*10.0*		*106*	*65-135*			
Surrogate: Toluene-d8	*9.36*		*"*	*10.0*		*94*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*73-125*			
LCS (CS02254-BS1)				Prepared & Analyzed: 03/26/09						
Benzene	19.0	0.30	µg/L	20.0		95	37-151			
Bromodichloromethane	17.5	0.50	"	20.0		87	35-155			
Bromoform	18.4	0.50	"	20.0		92	45-169			
Bromomethane	27.7	0.50	"	20.0		138	10-242			
Carbon tetrachloride	18.1	0.50	"	20.0		90	70-140			
Chlorobenzene	19.2	0.30	"	20.0		96	37-160			
Chloroethane	24.1	0.50	"	20.0		120	14-230			
Chloroform	17.5	0.50	"	20.0		88	51-138			
Chloromethane	23.9	0.50	"	20.0		120	10-273			
Dibromochloromethane	17.5	0.50	"	20.0		87	53-149			
1,2-Dichlorobenzene	19.8	0.30	"	20.0		99	18-190			
1,3-Dichlorobenzene	20.1	0.30	"	20.0		100	59-156			
1,4-Dichlorobenzene	19.7	0.30	"	20.0		98	18-190			
Dichlorodifluoromethane (Freon 12)	24.2	0.50	"	20.0		121	50-150			
1,1-Dichloroethane	18.5	0.50	"	20.0		92	59-155			
1,2-Dichloroethane	17.5	0.50	"	20.0		88	49-155			
1,1-Dichloroethene	19.7	0.50	"	20.0		98	5-234			
trans-1,2-Dichloroethene	19.1	0.50	"	20.0		95	54-156			
1,2-Dichloropropane	18.7	0.50	"	20.0		93	5-210			
cis-1,3-Dichloropropene	19.9	0.50	"	20.0		100	5-227			
trans-1,3-Dichloropropene	19.0	0.50	"	20.0		95	17-183			
Ethylbenzene	20.7	0.30	"	20.0		103	37-162			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
LCS (CS02254-BS1)				Prepared & Analyzed: 03/26/09						
Methylene chloride	19.6	0.50	µg/L	20.0		98	5-221			
1,1,2,2-Tetrachloroethane	19.3	0.50	"	20.0		96	46-148			
Tetrachloroethene	18.3	0.50	"	20.0		92	64-148			
Toluene	18.7	0.30	"	20.0		93	47-150			
1,1,1-Trichloroethane	18.4	0.50	"	20.0		92	52-162			
1,1,2-Trichloroethane	17.5	0.50	"	20.0		88	52-150			
Trichloroethene	18.7	0.50	"	20.0		93	71-157			
Trichlorofluoromethane	22.8	0.50	"	20.0		114	47-181			
Vinyl chloride	23.4	0.50	"	20.0		117	10-251			
Surrogate: 1,2-Dichloroethane-d4	*9.07*		*"*	*10.0*		*91*	*65-135*			
Surrogate: Toluene-d8	*9.45*		*"*	*10.0*		*94*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*73-125*			
LCS Dup (CS02254-BSD1)				Prepared & Analyzed: 03/26/09						
Benzene	21.0	0.30	µg/L	20.0		105	37-151	10	30	
Bromodichloromethane	19.6	0.50	"	20.0		98	35-155	12	30	
Bromoform	20.5	0.50	"	20.0		103	45-169	11	30	
Bromomethane	26.5	0.50	"	20.0		132	10-242	4	30	
Carbon tetrachloride	19.7	0.50	"	20.0		99	70-140	9	30	
Chlorobenzene	20.9	0.30	"	20.0		105	37-160	9	30	
Chloroethane	22.4	0.50	"	20.0		112	14-230	7	30	
Chloroform	19.3	0.50	"	20.0		97	51-138	10	30	
Chloromethane	22.3	0.50	"	20.0		112	10-273	7	30	
Dibromochloromethane	20.0	0.50	"	20.0		100	53-149	14	30	
1,2-Dichlorobenzene	17.7	0.30	"	20.0		89	18-190	11	30	
1,3-Dichlorobenzene	20.0	0.30	"	20.0		100	59-156	0.7	30	
1,4-Dichlorobenzene	21.5	0.30	"	20.0		108	18-190	9	30	
Dichlorodifluoromethane (Freon 12)	21.9	0.50	"	20.0		110	50-150	10	30	
1,1-Dichloroethane	20.3	0.50	"	20.0		101	59-155	9	30	
1,2-Dichloroethane	19.2	0.50	"	20.0		96	49-155	9	30	
1,1-Dichloroethene	21.5	0.50	"	20.0		108	5-234	9	30	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
LCS Dup (CS02254-BSD1)				Prepared & Analyzed: 03/26/09						
trans-1,2-Dichloroethene	20.7	0.50	µg/L	20.0		103	54-156	8	30	
1,2-Dichloropropane	21.4	0.50	"	20.0		107	5-210	14	30	
cis-1,3-Dichloropropene	22.5	0.50	"	20.0		113	5-227	12	30	
trans-1,3-Dichloropropene	21.5	0.50	"	20.0		108	17-183	12	30	
Ethylbenzene	23.1	0.30	"	20.0		115	37-162	11	30	
Methylene chloride	21.9	0.50	"	20.0		109	5-221	11	30	
1,1,2,2-Tetrachloroethane	19.4	0.50	"	20.0		97	46-148	0.4	30	
Tetrachloroethene	20.6	0.50	"	20.0		103	64-148	12	30	
Toluene	21.0	0.30	"	20.0		105	47-150	12	30	
1,1,1-Trichloroethane	20.4	0.50	"	20.0		102	52-162	10	30	
1,1,2-Trichloroethane	20.5	0.50	"	20.0		102	52-150	15	30	
Trichloroethene	21.0	0.50	"	20.0		105	71-157	12	30	
Trichlorofluoromethane	20.9	0.50	"	20.0		105	47-181	9	30	
Vinyl chloride	22.9	0.50	"	20.0		115	10-251	2	30	
Surrogate: 1,2-Dichloroethane-d4	*9.17*		*"*	*10.0*		*92*	*65-135*			
Surrogate: Toluene-d8	*9.70*		*"*	*10.0*		*97*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.81*		*"*	*10.0*		*98*	*73-125*			

CALIFORNIA LABORATORY SERVICES

 03/31/09 12:15

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0884**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95038

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

April 01, 2009

CLS Work Order #: CSC0927
COC #: 95039

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q1 2009 Groundwater

Enclosed are the results of analyses for samples received by the laboratory on 03/25/09 14:25. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 04/01/09 13:54

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

CLS - Labs

CHAIN OF CUSTODY

CLS ID No.: CSC0927 LOG NO. 95039

REPORT TO:

NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA

PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315

PROJECT NAME: Q1 2009 Groundwater

SAMPLED BY: BR

JOB DESCRIPTION:

SITE LOCATION:

CLIENT JOB NUMBER: N404-203 (Quarterly)

DESTINATION LABORATORY: [X] CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO

GLOBAL ID:

COMPOSITE:

FIELD CONDITIONS:

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY

SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JP5/JP8, MO				1 DAY	2 DAY	5 DAY	10 DAY
3/25/09	855	W08-08A1	Groundwater	3	VOA	1	X								X	
	920	11M21A		3	VOA	1	X								X	
	1020	11N22A1		3	VOA	1	X								X	
	1050	14D36A		5	mixed	1,3	X	X	X						X	
	1135	14D37A		5	mixed	1,3	X	X	X						X	

INVOICE TO:

P.O. #:

QUOTE #:

SUSPECTED CONSTITUENTS:

PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	3/25/09 @ 1200		CLS
	CLS	3/25/09 @ 1425		

REC'D AT LAB BY: JonR

DATE / TIME: 3-25-9 1425

CONDITIONS / COMMENTS: 9.2°C

SHIPPED BY: [ ] FED X [ ] UPS [X] OTHER CLS AIR BILL #

LAB

CALIFORNIA LABORATORY SERVICES

 04/01/09 13:54

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSC0927-04) Water Sampled: 03/25/09 10:50 Received: 03/25/09 14:25									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.098**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*91 %*	*65-135*		"	"	"	"	
14D37A (CSC0927-05) Water Sampled: 03/25/09 11:35 Received: 03/25/09 14:25									
Diesel	ND	0.050	mg/L	1	CS02266	03/26/09	03/29/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**1.2**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*88 %*	*65-135*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSC0927-04) Water Sampled: 03/25/09 10:50 Received: 03/25/09 14:25									
Gasoline	ND	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*101 %*	*65-135*		"	"	"	"	
14D37A (CSC0927-05) Water Sampled: 03/25/09 11:35 Received: 03/25/09 14:25									
Gasoline	**290**	50	µg/L	1	CS02278	03/26/09	03/26/09	8015M/8021B	TPH-X
Benzene	**0.51**	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	**3.1**	0.50	"	"	"	"	"	"	
Xylenes (total)	**1.8**	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*123 %*	*65-135*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
W08-08A1 (CSC0927-01) Water Sampled: 03/25/09 08:55 Received: 03/25/09 14:25									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.2**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.7**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**0.66**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**16**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
W08-08A1 (CSC0927-01) Water Sampled: 03/25/09 08:55 Received: 03/25/09 14:25									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**2.1**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*122 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*94 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*		*73-125*	"	"	"	"	
11M21A (CSC0927-02) Water Sampled: 03/25/09 09:20 Received: 03/25/09 14:25									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.60**	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.0**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**16**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**3.0**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M21A (CSC0927-02) Water Sampled: 03/25/09 09:20 Received: 03/25/09 14:25									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**1.2**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**15**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**1.7**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**2.1**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*113 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*94 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*104 %*	*73-125*		"	"	"	"	
11N22A1 (CSC0927-03) Water Sampled: 03/25/09 10:20 Received: 03/25/09 14:25									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N22A1 (CSC0927-03) Water Sampled: 03/25/09 10:20 Received: 03/25/09 14:25									
Chloromethane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.2**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**0.99**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**22**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**1.2**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**65**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.8**	0.50	"	"	"	"	"	"	
Vinyl chloride	**0.63**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*113 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*96 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*	*73-125*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSC0927-04) Water Sampled: 03/25/09 10:50 Received: 03/25/09 14:25									
Benzene	**0.50**	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.8**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**3.2**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**47**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**0.64**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**0.79**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**13**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSC0927-04) Water Sampled: 03/25/09 10:50 Received: 03/25/09 14:25									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.82**	0.50	"	"	"	"	"	"	
Vinyl chloride	**2.2**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*115 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*94 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*100 %*		*73-125*	"	"	"	"	
14D37A (CSC0927-05) Water Sampled: 03/25/09 11:35 Received: 03/25/09 14:25									
Benzene	ND	0.30	µg/L	1	CS02254	03/26/09	03/26/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D37A (CSC0927-05) Water Sampled: 03/25/09 11:35 Received: 03/25/09 14:25									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS02254	"	03/26/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*104 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*99 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*106 %*	*73-125*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02266 - EPA 3510B GCNV										
Blank (CS02266-BLK1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0185*		*"*	*0.0250*		*74*	*65-135*			
LCS (CS02266-BS1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.93	0.050	mg/L	2.50		77	65-135			
Surrogate: o-Terphenyl	*0.0189*		*"*	*0.0250*		*76*	*65-135*			
LCS Dup (CS02266-BSD1)				Prepared: 03/26/09	Analyzed: 03/27/09					
Diesel	1.94	0.050	mg/L	2.50		77	65-135	0.3	30	
Surrogate: o-Terphenyl	*0.0188*		*"*	*0.0250*		*75*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 04/01/09 13:54

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02278 - EPA 5030 Water GC										
Blank (CS02278-BLK1)				Prepared & Analyzed: 03/26/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*29.3*		*"*	*20.0*		*147*	*65-135*			*QS-HI*
Surrogate: o-Chlorotoluene (Gas)	*20.2*		*"*	*20.0*		*101*	*65-135*			
LCS (CS02278-BS1)				Prepared & Analyzed: 03/26/09						
Gasoline	479	50	µg/L	500		96	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.8*		*"*	*20.0*		*114*	*65-135*			
LCS Dup (CS02278-BSD1)				Prepared & Analyzed: 03/26/09						
Gasoline	478	50	µg/L	500		96	65-135	0.2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.6*		*"*	*20.0*		*113*	*65-135*			
Matrix Spike (CS02278-MS1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	500	50	µg/L	500	29.5	94	65-135			
Surrogate: o-Chlorotoluene (Gas)	*22.9*		*"*	*20.0*		*115*	*65-135*			
Matrix Spike Dup (CS02278-MSD1)		**Source: CSC0794-02**		Prepared & Analyzed: 03/26/09						
Gasoline	509	50	µg/L	500	29.5	96	65-135	2	30	
Surrogate: o-Chlorotoluene (Gas)	*22.2*		*"*	*20.0*		*111*	*65-135*			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
Blank (CS02254-BLK1)				Prepared & Analyzed: 03/26/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
Blank (CS02254-BLK1)				Prepared & Analyzed: 03/26/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*10.6*		*"*	*10.0*		*106*	*65-135*			
Surrogate: Toluene-d8	*9.36*		*"*	*10.0*		*94*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*73-125*			
LCS (CS02254-BS1)				Prepared & Analyzed: 03/26/09						
Benzene	19.0	0.30	µg/L	20.0		95	37-151			
Bromodichloromethane	17.5	0.50	"	20.0		87	35-155			
Bromoform	18.4	0.50	"	20.0		92	45-169			
Bromomethane	27.7	0.50	"	20.0		138	10-242			
Carbon tetrachloride	18.1	0.50	"	20.0		90	70-140			
Chlorobenzene	19.2	0.30	"	20.0		96	37-160			
Chloroethane	24.1	0.50	"	20.0		120	14-230			
Chloroform	17.5	0.50	"	20.0		88	51-138			
Chloromethane	23.9	0.50	"	20.0		120	10-273			
Dibromochloromethane	17.5	0.50	"	20.0		87	53-149			
1,2-Dichlorobenzene	19.8	0.30	"	20.0		99	18-190			
1,3-Dichlorobenzene	20.1	0.30	"	20.0		100	59-156			
1,4-Dichlorobenzene	19.7	0.30	"	20.0		98	18-190			
Dichlorodifluoromethane (Freon 12)	24.2	0.50	"	20.0		121	50-150			
1,1-Dichloroethane	18.5	0.50	"	20.0		92	59-155			
1,2-Dichloroethane	17.5	0.50	"	20.0		88	49-155			
1,1-Dichloroethene	19.7	0.50	"	20.0		98	5-234			
trans-1,2-Dichloroethene	19.1	0.50	"	20.0		95	54-156			
1,2-Dichloropropane	18.7	0.50	"	20.0		93	5-210			
cis-1,3-Dichloropropene	19.9	0.50	"	20.0		100	5-227			
trans-1,3-Dichloropropene	19.0	0.50	"	20.0		95	17-183			
Ethylbenzene	20.7	0.30	"	20.0		103	37-162			

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
LCS (CS02254-BS1)				Prepared & Analyzed: 03/26/09						
Methylene chloride	19.6	0.50	µg/L	20.0		98	5-221			
1,1,2,2-Tetrachloroethane	19.3	0.50	"	20.0		96	46-148			
Tetrachloroethene	18.3	0.50	"	20.0		92	64-148			
Toluene	18.7	0.30	"	20.0		93	47-150			
1,1,1-Trichloroethane	18.4	0.50	"	20.0		92	52-162			
1,1,2-Trichloroethane	17.5	0.50	"	20.0		88	52-150			
Trichloroethene	18.7	0.50	"	20.0		93	71-157			
Trichlorofluoromethane	22.8	0.50	"	20.0		114	47-181			
Vinyl chloride	23.4	0.50	"	20.0		117	10-251			
Surrogate: 1,2-Dichloroethane-d4	*9.07*		*"*	*10.0*		*91*	*65-135*			
Surrogate: Toluene-d8	*9.45*		*"*	*10.0*		*94*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*73-125*			
LCS Dup (CS02254-BSD1)				Prepared & Analyzed: 03/26/09						
Benzene	21.0	0.30	µg/L	20.0		105	37-151	10	30	
Bromodichloromethane	19.6	0.50	"	20.0		98	35-155	12	30	
Bromoform	20.5	0.50	"	20.0		103	45-169	11	30	
Bromomethane	26.5	0.50	"	20.0		132	10-242	4	30	
Carbon tetrachloride	19.7	0.50	"	20.0		99	70-140	9	30	
Chlorobenzene	20.9	0.30	"	20.0		105	37-160	9	30	
Chloroethane	22.4	0.50	"	20.0		112	14-230	7	30	
Chloroform	19.3	0.50	"	20.0		97	51-138	10	30	
Chloromethane	22.3	0.50	"	20.0		112	10-273	7	30	
Dibromochloromethane	20.0	0.50	"	20.0		100	53-149	14	30	
1,2-Dichlorobenzene	17.7	0.30	"	20.0		89	18-190	11	30	
1,3-Dichlorobenzene	20.0	0.30	"	20.0		100	59-156	0.7	30	
1,4-Dichlorobenzene	21.5	0.30	"	20.0		108	18-190	9	30	
Dichlorodifluoromethane (Freon 12)	21.9	0.50	"	20.0		110	50-150	10	30	
1,1-Dichloroethane	20.3	0.50	"	20.0		101	59-155	9	30	
1,2-Dichloroethane	19.2	0.50	"	20.0		96	49-155	9	30	
1,1-Dichloroethene	21.5	0.50	"	20.0		108	5-234	9	30	

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS02254 - EPA 5030 Water MS										
LCS Dup (CS02254-BSD1)				Prepared & Analyzed: 03/26/09						
trans-1,2-Dichloroethene	20.7	0.50	µg/L	20.0		103	54-156	8	30	
1,2-Dichloropropane	21.4	0.50	"	20.0		107	5-210	14	30	
cis-1,3-Dichloropropene	22.5	0.50	"	20.0		113	5-227	12	30	
trans-1,3-Dichloropropene	21.5	0.50	"	20.0		108	17-183	12	30	
Ethylbenzene	23.1	0.30	"	20.0		115	37-162	11	30	
Methylene chloride	21.9	0.50	"	20.0		109	5-221	11	30	
1,1,2,2-Tetrachloroethane	19.4	0.50	"	20.0		97	46-148	0.4	30	
Tetrachloroethene	20.6	0.50	"	20.0		103	64-148	12	30	
Toluene	21.0	0.30	"	20.0		105	47-150	12	30	
1,1,1-Trichloroethane	20.4	0.50	"	20.0		102	52-162	10	30	
1,1,2-Trichloroethane	20.5	0.50	"	20.0		102	52-150	15	30	
Trichloroethene	21.0	0.50	"	20.0		105	71-157	12	30	
Trichlorofluoromethane	20.9	0.50	"	20.0		105	47-181	9	30	
Vinyl chloride	22.9	0.50	"	20.0		115	10-251	2	30	
Surrogate: 1,2-Dichloroethane-d4	*9.17*		*"*	*10.0*		*92*	*65-135*			
Surrogate: Toluene-d8	*9.70*		*"*	*10.0*		*97*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.81*		*"*	*10.0*		*98*	*73-125*			

ISSI/NASA Ames MS221-10	Project: Q1 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N404-203	**CLS Work Order #: CSC0927**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95039

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Quarter 2, 2009

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

June 18, 2009

CLS Work Order #: CSF0551
COC #: 95094

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: AOI 4 O+M

Enclosed are the results of analyses for samples received by the laboratory on 06/11/09 16:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSF0551 LOG NO. 95094

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: AOI 4 O+M
SAMPLED BY: BR
JOB DESCRIPTION: Q2 2009 Sampling
SITE LOCATION:

CLIENT JOB NUMBER: N504-341
DESTINATION LABORATORY #: [X] CLS (916) 638-7301, 3249 FITZGERALD RD., RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TPH-G/BTEX	TPH-D,JPS/JPS,MO							1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
6/9/09	950	TANK1-E	ground water	4	mixed	1,3	X	X									X		
	1030	15A11A		4	mixed	1,3	X	X									X		
	1050	15K11A		4	mixed	1,3	X	X									X		

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY
INVOICE TO:
P.O. #
QUOTE #
SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	6/11/09 @ 1324		CLS
	CLS	6/11/09 @ 1647		

RECD AT LAB BY: [signature] DATE / TIME: 6/11/09 1645 CLS CONDITIONS / COMMENTS: 4.5°C
SHIPPED BY: [ ] FED X [ ] UPS [X] OTHER AIR BILL #

LAB

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TANK1-E (CSF0551-01) Water Sampled: 06/09/09 09:50 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*106 %*	*65-135*		"	"	"	"	
15A11A (CSF0551-02) Water Sampled: 06/09/09 10:30 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.28**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*104 %*	*65-135*		"	"	"	"	
15k11A (CSF0551-03) Water Sampled: 06/09/09 10:50 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.29**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*119 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TANK1-E (CSF0551-01) Water Sampled: 06/09/09 09:50 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04364	06/15/09	06/15/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*111 %*	*65-135*		"	"	"	"	
15A11A (CSF0551-02) Water Sampled: 06/09/09 10:30 Received: 06/11/09 16:45									
Gasoline	**51**	50	µg/L	1	CS04444	06/16/09	06/16/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*117 %*	*65-135*		"	"	"	"	
15k11A (CSF0551-03) Water Sampled: 06/09/09 10:50 Received: 06/11/09 16:45									
Gasoline	**92**	50	µg/L	1	CS04472	06/17/09	06/17/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	**0.55**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*119 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04368 - EPA 3510B GCNV										
Blank (CS04368-BLK1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0251*		*"*	*0.0250*		*100*	*65-135*			
LCS (CS04368-BS1)				Prepared & Analyzed: 06/12/09						
Diesel	2.83	0.050	mg/L	2.50		113	65-135			
Surrogate: o-Terphenyl	*0.0267*		*"*	*0.0250*		*107*	*65-135*			
LCS Dup (CS04368-BSD1)				Prepared & Analyzed: 06/12/09						
Diesel	2.79	0.050	mg/L	2.50		111	65-135	1	30	
Surrogate: o-Terphenyl	*0.0266*		*"*	*0.0250*		*106*	*65-135*			
Matrix Spike (CS04368-MS1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L				46-137			QM-9
Surrogate: o-Terphenyl	*0.00*		*"*				*65-135*			*QM-9*
Matrix Spike Dup (CS04368-MSD1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L				46-137		30	QM-9
Surrogate: o-Terphenyl	*0.00*		*"*				*65-135*			*QM-9*

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04364 - EPA 5030 Water GC										
Blank (CS04364-BLK1)				Prepared & Analyzed: 06/15/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*24.0*		*"*	*20.0*		*120*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*21.3*		*"*	*20.0*		*107*	*65-135*			
LCS (CS04364-BS1)				Prepared & Analyzed: 06/15/09						
Gasoline	453	50	µg/L	500		91	65-135			
Surrogate: o-Chlorotoluene (Gas)	*24.4*		*"*	*20.0*		*122*	*65-135*			
LCS Dup (CS04364-BSD1)				Prepared & Analyzed: 06/15/09						
Gasoline	534	50	µg/L	500		107	65-135	17	30	
Surrogate: o-Chlorotoluene (Gas)	*25.5*		*"*	*20.0*		*127*	*65-135*			
Matrix Spike (CS04364-MS1)		**Source: CSF0435-01**		Prepared & Analyzed: 06/15/09						
Gasoline	497	50	µg/L	500	47.6	90	65-135			
Surrogate: o-Chlorotoluene (Gas)	*23.7*		*"*	*20.0*		*118*	*65-135*			
Matrix Spike Dup (CS04364-MSD1)		**Source: CSF0435-01**		Prepared & Analyzed: 06/15/09						
Gasoline	463	50	µg/L	500	47.6	83	65-135	7	30	
Surrogate: o-Chlorotoluene (Gas)	*24.4*		*"*	*20.0*		*122*	*65-135*			
Batch CS04444 - EPA 5030 Water GC										
Blank (CS04444-BLK1)				Prepared & Analyzed: 06/16/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04444 - EPA 5030 Water GC										
Blank (CS04444-BLK1)				Prepared & Analyzed: 06/16/09						
Surrogate: o-Chlorotoluene (BTEX)	*24.6*		*µg/L*	*20.0*		*123*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*21.7*		*"*	*20.0*		*109*	*65-135*			
LCS (CS04444-BS1)				Prepared & Analyzed: 06/16/09						
Gasoline	453	50	µg/L	500		91	65-135			
Surrogate: o-Chlorotoluene (Gas)	*24.2*		*"*	*20.0*		*121*	*65-135*			
LCS Dup (CS04444-BSD1)				Prepared & Analyzed: 06/16/09						
Gasoline	478	50	µg/L	500		96	65-135	5	30	
Surrogate: o-Chlorotoluene (Gas)	*23.4*		*"*	*20.0*		*117*	*65-135*			
Matrix Spike (CS04444-MS1)		**Source: CSF0550-02**		Prepared & Analyzed: 06/16/09						
Gasoline	350	50	µg/L	500	29.9	64	65-135			QM-7
Surrogate: o-Chlorotoluene (Gas)	*19.4*		*"*	*20.0*		*97*	*65-135*			
Matrix Spike Dup (CS04444-MSD1)		**Source: CSF0550-02**		Prepared & Analyzed: 06/16/09						
Gasoline	441	50	µg/L	500	29.9	82	65-135	23	30	
Surrogate: o-Chlorotoluene (Gas)	*20.5*		*"*	*20.0*		*103*	*65-135*			
Batch CS04472 - EPA 5030 Water GC										
Blank (CS04472-BLK1)				Prepared & Analyzed: 06/17/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*24.8*		*"*	*20.0*		*124*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*21.1*		*"*	*20.0*		*105*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04472 - EPA 5030 Water GC										
LCS (CS04472-BS1)				Prepared & Analyzed: 06/17/09						
Gasoline	483	50	µg/L	500		97	65-135			
Surrogate: o-Chlorotoluene (Gas)	*26.1*		*"*	*20.0*		*130*	*65-135*			
LCS Dup (CS04472-BSD1)				Prepared & Analyzed: 06/17/09						
Gasoline	535	50	µg/L	500		107	65-135	10	30	
Surrogate: o-Chlorotoluene (Gas)	*26.1*		*"*	*20.0*		*131*	*65-135*			
Matrix Spike (CS04472-MS1)		**Source: CSF0720-01**		Prepared & Analyzed: 06/17/09						
Gasoline	2160	50	µg/L	500	2050	22	65-135			QM-7
Surrogate: o-Chlorotoluene (Gas)	*26.2*		*"*	*20.0*		*131*	*65-135*			
Matrix Spike Dup (CS04472-MSD1)		**Source: CSF0720-01**		Prepared & Analyzed: 06/17/09						
Gasoline	2240	50	µg/L	500	2050	36	65-135	3	30	QM-7
Surrogate: o-Chlorotoluene (Gas)	*25.9*		*"*	*20.0*		*129*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 06/18/09 14:32

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSF0551**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95094

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QM-9	MS/MSD recovery data could not be generated due to insufficient sample. LCS/LCSD data validate methodology.
QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

June 18, 2009

CLS Work Order #: CSF0550
COC #: 95093

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q2 2009 Groundwater

Enclosed are the results of analyses for samples received by the laboratory on 06/11/09 16:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSF0550 LOG NO. 95093

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Redding PHONE#: 650-604-1315
PROJECT NAME: Q2 2009 Groundwater
SAMPLED BY: BR
JOB DESCRIPTION: NASA RGRP Support wells
SITE LOCATION:

CLIENT JOB NUMBER: N518-141
DESTINATION LABORATORY#: ☒ CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

TURN AROUND TIME: 1 DAY / 2 DAY / 5 DAY / 10 DAY
SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JP5/JP8, MO	1 DAY	2 DAY	5 DAY	10 DAY
6/9/09	1050	11M14A1	ground water	3	VOA	1	X					X	
6/10/09	800	14D26A1		5	mixed	1,3	X	X	X			X	
	820	14D24A		5	mixed	1,3	X	X	X			X	
	840	NASA-1A		5	mixed	1,3	X	X	X			X	
	1220	14D28A		5	mixed	1,3	X	X	X			X	
	1240	14D33A		5	mixed	1,3	X	X	X			X	
	100	14D35A		5	mixed	1,3	X	X	X			X	
	145	14C60A		5	mixed	1,3	X	X	X			X	
	200	NASA-3A		3	VOA	1	X					X	

INVOICE TO:
P.O. #
QUOTE #

SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	6/11/09 @ 1528		CONRAD/CLS
	CLS	6/11/09 @ 1645		

RECD AT LAB BY: Will Chellana DATE / TIME: 6/11/09 1645 CONDITIONS / COMMENTS: 4.05°C

SHIPPED BY: ☐ FED X ☐ UPS ☒ OTHER CL AIR BILL #

LAB

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D26A1 (CSF0550-02) Water Sampled: 06/10/09 08:00 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*119 %*	*65-135*		"	"	"	"	
14D24A (CSF0550-03) Water Sampled: 06/10/09 08:20 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*110 %*	*65-135*		"	"	"	"	
NASA-1A (CSF0550-04) Water Sampled: 06/10/09 08:40 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*105 %*	*65-135*		"	"	"	"	
14D28A (CSF0550-05) Water Sampled: 06/10/09 12:20 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*99 %*	*65-135*		"	"	"	"	
14D33A (CSF0550-06) Water Sampled: 06/10/09 12:40 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.12**	0.050	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D33A (CSF0550-06) Water Sampled: 06/10/09 12:40 Received: 06/11/09 16:45									
Surrogate: o-Terphenyl		*117 %*	*65-135*		*CS04368*	"	*06/12/09*	*EPA 8015M*	
14D35A (CSF0550-07) Water Sampled: 06/10/09 13:00 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*103 %*	*65-135*		"	"	"	"	
14C60A (CSF0550-08) Water Sampled: 06/10/09 13:45 Received: 06/11/09 16:45									
Diesel	ND	0.050	mg/L	1	CS04368	06/12/09	06/12/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.14**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*115 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M14A1 (CSF0550-01) Water Sampled: 06/09/09 10:50 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.51**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**4.9**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M14A1 (CSF0550-01) Water Sampled: 06/09/09 10:50 Received: 06/11/09 16:45									
Trichlorofluoromethane	**0.63**	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*116 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*97 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*106 %*	*73-125*		"	"	"	"	
14D26A1 (CSF0550-02) Water Sampled: 06/10/09 08:00 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**11**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D26A1 (CSF0550-02) Water Sampled: 06/10/09 08:00 Received: 06/11/09 16:45									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**8.9**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*116 %*	*65-135*		*"*	*"*	*"*	*"*	
Surrogate: Toluene-d8		*96 %*	*72-125*		*"*	*"*	*"*	*"*	
Surrogate: 4-Bromofluorobenzene		*103 %*	*73-125*		*"*	*"*	*"*	*"*	
14D24A (CSF0550-03) Water Sampled: 06/10/09 08:20 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D24A (CSF0550-03) Water Sampled: 06/10/09 08:20 Received: 06/11/09 16:45									
Chloromethane	ND	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.5**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**0.77**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**80**	1.0	"	2	"	"	06/17/09	"	
trans-1,2-Dichloroethene	**2.3**	0.50	"	1	"	"	06/12/09	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**65**	1.0	"	2	"	"	06/17/09	"	
Trichlorofluoromethane	ND	0.50	"	1	"	"	06/12/09	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	**0.90**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*112 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*96 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*108 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSF0550-04) Water Sampled: 06/10/09 08:40 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.8**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.2**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**41**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**43**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSF0550-04) Water Sampled: 06/10/09 08:40 Received: 06/11/09 16:45									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.6**	0.50	"	"	"	"	"	"	
Vinyl chloride	**0.95**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*113 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*99 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*104 %*	*73-125*		"	"	"	"	
14D28A (CSF0550-05) Water Sampled: 06/10/09 12:20 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**3.6**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.9**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**65**	1.0	"	2	"	"	06/17/09	"	
trans-1,2-Dichloroethene	ND	0.50	"	1	"	"	06/12/09	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D28A (CSF0550-05) Water Sampled: 06/10/09 12:20 Received: 06/11/09 16:45									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**3.8**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**22**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.62**	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.8**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*113 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*99 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*104 %*	*73-125*		"	"	"	"	
14D33A (CSF0550-06) Water Sampled: 06/10/09 12:40 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04360	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D33A (CSF0550-06) Water Sampled: 06/10/09 12:40 Received: 06/11/09 16:45									
Chloromethane	ND	0.50	µg/L	1	CS04360	"	06/12/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.0**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	**3.3**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*118 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*102 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*106 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D35A (CSF0550-07) Water Sampled: 06/10/09 13:00 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04362	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.1**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**5.3**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**2.2**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D35A (CSF0550-07) Water Sampled: 06/10/09 13:00 Received: 06/11/09 16:45									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS04362	"	06/12/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.5**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*107 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*105 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*	*73-125*		"	"	"	"	
14C60A (CSF0550-08) Water Sampled: 06/10/09 13:45 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04362	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**0.56**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**7.3**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14C60A (CSF0550-08) Water Sampled: 06/10/09 13:45 Received: 06/11/09 16:45									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS04362	"	06/12/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	**3.6**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*107 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*106 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*		*73-125*	"	"	"	"	
NASA-3A (CSF0550-09) Water Sampled: 06/10/09 14:00 Received: 06/11/09 16:45									
Benzene	ND	0.30	µg/L	1	CS04362	06/12/09	06/12/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.62**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSF0550-09) Water Sampled: 06/10/09 14:00 Received: 06/11/09 16:45									
Chloromethane	ND	0.50	µg/L	1	CS04362	"	06/12/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.5**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**14**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**1.4**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**13**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**2.6**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**2.7**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*107 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*102 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

TPH-Gasoline by GC FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D26A1 (CSF0550-02) Water Sampled: 06/10/09 08:00 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	
Surrogate: o-Chlorotoluene (Gas)		*102 %*	*65-135*		"	"	"	"	
14D24A (CSF0550-03) Water Sampled: 06/10/09 08:20 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	
Surrogate: o-Chlorotoluene (Gas)		*101 %*	*65-135*		"	"	"	"	
NASA-1A (CSF0550-04) Water Sampled: 06/10/09 08:40 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	
Surrogate: o-Chlorotoluene (Gas)		*102 %*	*65-135*		"	"	"	"	
14D28A (CSF0550-05) Water Sampled: 06/10/09 12:20 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	
Surrogate: o-Chlorotoluene (Gas)		*100 %*	*65-135*		"	"	"	"	
14D33A (CSF0550-06) Water Sampled: 06/10/09 12:40 Received: 06/11/09 16:45									
Gasoline	ND	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	
Surrogate: o-Chlorotoluene (Gas)		*100 %*	*65-135*		"	"	"	"	
14D35A (CSF0550-07) Water Sampled: 06/10/09 13:00 Received: 06/11/09 16:45									
Gasoline	**59**	50	µg/L	1	CS04444	06/16/09	06/16/09	EPA 8015M	TPH-X
Surrogate: o-Chlorotoluene (Gas)		*98 %*	*65-135*		"	"	"	"	
14C60A (CSF0550-08) Water Sampled: 06/10/09 13:45 Received: 06/11/09 16:45									
Gasoline	**380**	50	µg/L	1	CS04472	06/17/09	06/17/09	EPA 8015M	TPH-X

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ISSI/NASA Ames MS221-10	Project:	Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number:	N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager:	Brian Reddig	COC #: 95093

TPH-Gasoline by GC FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14C60A (CSF0550-08) Water Sampled: 06/10/09 13:45 Received: 06/11/09 16:45									
Surrogate: o-Chlorotoluene (Gas)		*130 %*	*65-135*		*CS04472*	"	*06/17/09*	*EPA 8015M*	

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04368 - EPA 3510B GCNV										
Blank (CS04368-BLK1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0251*		*"*	*0.0250*		*100*	*65-135*			
LCS (CS04368-BS1)				Prepared & Analyzed: 06/12/09						
Diesel	2.83	0.050	mg/L	2.50		113	65-135			
Surrogate: o-Terphenyl	*0.0267*		*"*	*0.0250*		*107*	*65-135*			
LCS Dup (CS04368-BSD1)				Prepared & Analyzed: 06/12/09						
Diesel	2.79	0.050	mg/L	2.50		111	65-135	1	30	
Surrogate: o-Terphenyl	*0.0266*		*"*	*0.0250*		*106*	*65-135*			
Matrix Spike (CS04368-MS1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L				46-137			QM-9
Surrogate: o-Terphenyl	*0.00*		*"*				*65-135*			*QM-9*
Matrix Spike Dup (CS04368-MSD1)				Prepared & Analyzed: 06/12/09						
Diesel	ND	0.050	mg/L				46-137		30	QM-9
Surrogate: o-Terphenyl	*0.00*		*"*				*65-135*			*QM-9*

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ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04360 - EPA 5030 Water MS										
Blank (CS04360-BLK1)				Prepared & Analyzed: 06/12/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04360 - EPA 5030 Water MS										
Blank (CS04360-BLK1)				Prepared & Analyzed: 06/12/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*11.2*		*"*	*10.0*		*112*	*65-135*			
Surrogate: Toluene-d8	*9.61*		*"*	*10.0*		*96*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*73-125*			
LCS (CS04360-BS1)				Prepared & Analyzed: 06/12/09						
Benzene	18.5	0.30	µg/L	20.0		92	37-151			
Bromodichloromethane	18.5	0.50	"	20.0		92	35-155			
Bromoform	19.0	0.50	"	20.0		95	45-169			
Bromomethane	20.9	0.50	"	20.0		104	10-242			
Carbon tetrachloride	19.7	0.50	"	20.0		98	70-140			
Chlorobenzene	18.9	0.30	"	20.0		95	37-160			
Chloroethane	18.7	0.50	"	20.0		93	14-230			
Chloroform	17.1	0.50	"	20.0		86	51-138			
Chloromethane	18.7	0.50	"	20.0		93	10-273			
Dibromochloromethane	18.4	0.50	"	20.0		92	53-149			
1,2-Dichlorobenzene	18.6	0.30	"	20.0		93	18-190			
1,3-Dichlorobenzene	18.6	0.30	"	20.0		93	59-156			
1,4-Dichlorobenzene	18.1	0.30	"	20.0		91	18-190			
Dichlorodifluoromethane (Freon 12)	21.8	0.50	"	20.0		109	50-150			
1,1-Dichloroethane	20.1	0.50	"	20.0		101	59-155			
1,2-Dichloroethane	19.2	0.50	"	20.0		96	49-155			
1,1-Dichloroethene	16.8	0.50	"	20.0		84	5-234			
trans-1,2-Dichloroethene	20.4	0.50	"	20.0		102	54-156			
1,2-Dichloropropane	17.3	0.50	"	20.0		86	5-210			
cis-1,3-Dichloropropene	18.6	0.50	"	20.0		93	5-227			
trans-1,3-Dichloropropene	18.3	0.50	"	20.0		92	17-183			
Ethylbenzene	18.4	0.30	"	20.0		92	37-162			

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04360 - EPA 5030 Water MS										
LCS (CS04360-BS1)				Prepared & Analyzed: 06/12/09						
Methylene chloride	19.1	0.50	µg/L	20.0		96	5-221			
1,1,2,2-Tetrachloroethane	19.0	0.50	"	20.0		95	46-148			
Tetrachloroethene	18.7	0.50	"	20.0		93	64-148			
Toluene	17.2	0.30	"	20.0		86	47-150			
1,1,1-Trichloroethane	19.6	0.50	"	20.0		98	52-162			
1,1,2-Trichloroethane	18.6	0.50	"	20.0		93	52-150			
Trichloroethene	18.5	0.50	"	20.0		92	71-157			
Trichlorofluoromethane	20.6	0.50	"	20.0		103	47-181			
Vinyl chloride	20.0	0.50	"	20.0		100	10-251			
Surrogate: 1,2-Dichloroethane-d4	*9.86*		*"*	*10.0*		*99*	*65-135*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.62*		*"*	*10.0*		*96*	*73-125*			
LCS Dup (CS04360-BSD1)				Prepared & Analyzed: 06/12/09						
Benzene	19.0	0.30	µg/L	20.0		95	37-151	3	30	
Bromodichloromethane	19.0	0.50	"	20.0		95	35-155	3	30	
Bromoform	19.4	0.50	"	20.0		97	45-169	2	30	
Bromomethane	21.5	0.50	"	20.0		107	10-242	3	30	
Carbon tetrachloride	19.0	0.50	"	20.0		95	70-140	4	30	
Chlorobenzene	19.2	0.30	"	20.0		96	37-160	1	30	
Chloroethane	18.8	0.50	"	20.0		94	14-230	0.9	30	
Chloroform	16.6	0.50	"	20.0		83	51-138	3	30	
Chloromethane	19.0	0.50	"	20.0		95	10-273	2	30	
Dibromochloromethane	19.1	0.50	"	20.0		96	53-149	4	30	
1,2-Dichlorobenzene	19.9	0.30	"	20.0		99	18-190	7	30	
1,3-Dichlorobenzene	19.9	0.30	"	20.0		99	59-156	7	30	
1,4-Dichlorobenzene	19.5	0.30	"	20.0		98	18-190	7	30	
Dichlorodifluoromethane (Freon 12)	22.2	0.50	"	20.0		111	50-150	2	30	
1,1-Dichloroethane	19.3	0.50	"	20.0		96	59-155	5	30	
1,2-Dichloroethane	18.6	0.50	"	20.0		93	49-155	3	30	
1,1-Dichloroethene	15.9	0.50	"	20.0		79	5-234	6	30	

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04360 - EPA 5030 Water MS										
LCS Dup (CS04360-BSD1)				Prepared & Analyzed: 06/12/09						
trans-1,2-Dichloroethene	19.3	0.50	µg/L	20.0		97	54-156	5	30	
1,2-Dichloropropane	17.8	0.50	"	20.0		89	5-210	3	30	
cis-1,3-Dichloropropene	19.3	0.50	"	20.0		96	5-227	4	30	
trans-1,3-Dichloropropene	18.8	0.50	"	20.0		94	17-183	2	30	
Ethylbenzene	18.9	0.30	"	20.0		94	37-162	2	30	
Methylene chloride	18.2	0.50	"	20.0		91	5-221	5	30	
1,1,2,2-Tetrachloroethane	20.5	0.50	"	20.0		102	46-148	7	30	
Tetrachloroethene	19.4	0.50	"	20.0		97	64-148	4	30	
Toluene	17.6	0.30	"	20.0		88	47-150	3	30	
1,1,1-Trichloroethane	18.2	0.50	"	20.0		91	52-162	7	30	
1,1,2-Trichloroethane	18.9	0.50	"	20.0		95	52-150	2	30	
Trichloroethene	18.9	0.50	"	20.0		95	71-157	2	30	
Trichlorofluoromethane	20.7	0.50	"	20.0		104	47-181	0.4	30	
Vinyl chloride	19.9	0.50	"	20.0		99	10-251	0.6	30	
Surrogate: 1,2-Dichloroethane-d4	*9.07*		*"*	*10.0*		*91*	*65-135*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.98*		*"*	*10.0*		*100*	*73-125*			
Batch CS04362 - EPA 5030 Water MS										
Blank (CS04362-BLK1)				Prepared & Analyzed: 06/12/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04362 - EPA 5030 Water MS										
Blank (CS04362-BLK1)				Prepared & Analyzed: 06/12/09						
1,2-Dichlorobenzene	ND	0.30	µg/L							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							
Trichlorofluoromethane	ND	0.50	"							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*9.79*		"	*10.0*		*98*	*65-135*			
Surrogate: Toluene-d8	*10.1*		"	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.0*		"	*10.0*		*100*	*73-125*			

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04362 - EPA 5030 Water MS										
LCS (CS04362-BS1)				Prepared & Analyzed: 06/12/09						
Benzene	22.4	0.30	µg/L	20.0		112	37-151			
Bromodichloromethane	20.4	0.50	"	20.0		102	35-155			
Bromoform	17.9	0.50	"	20.0		89	45-169			
Bromomethane	18.7	0.50	"	20.0		93	10-242			
Carbon tetrachloride	19.0	0.50	"	20.0		95	70-140			
Chlorobenzene	22.2	0.30	"	20.0		111	37-160			
Chloroethane	23.4	0.50	"	20.0		117	14-230			
Chloroform	21.6	0.50	"	20.0		108	51-138			
Chloromethane	16.8	0.50	"	20.0		84	10-273			
Dibromochloromethane	18.5	0.50	"	20.0		93	53-149			
1,2-Dichlorobenzene	19.9	0.30	"	20.0		99	18-190			
1,3-Dichlorobenzene	20.8	0.30	"	20.0		104	59-156			
1,4-Dichlorobenzene	20.8	0.30	"	20.0		104	18-190			
Dichlorodifluoromethane (Freon 12)	18.4	0.50	"	20.0		92	50-150			
1,1-Dichloroethane	22.4	0.50	"	20.0		112	59-155			
1,2-Dichloroethane	20.7	0.50	"	20.0		104	49-155			
1,1-Dichloroethene	21.6	0.50	"	20.0		108	5-234			
trans-1,2-Dichloroethene	22.6	0.50	"	20.0		113	54-156			
1,2-Dichloropropane	21.4	0.50	"	20.0		107	5-210			
cis-1,3-Dichloropropene	20.9	0.50	"	20.0		104	5-227			
trans-1,3-Dichloropropene	19.5	0.50	"	20.0		97	17-183			
Ethylbenzene	22.1	0.30	"	20.0		111	37-162			
Methylene chloride	21.8	0.50	"	20.0		109	5-221			
1,1,2,2-Tetrachloroethane	18.6	0.50	"	20.0		93	46-148			
Tetrachloroethene	21.7	0.50	"	20.0		109	64-148			
Toluene	21.7	0.30	"	20.0		108	47-150			
1,1,1-Trichloroethane	19.6	0.50	"	20.0		98	52-162			
1,1,2-Trichloroethane	20.4	0.50	"	20.0		102	52-150			
Trichloroethene	22.2	0.50	"	20.0		111	71-157			
Trichlorofluoromethane	23.9	0.50	"	20.0		120	47-181			
Vinyl chloride	22.2	0.50	"	20.0		111	10-251			

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04362 - EPA 5030 Water MS										
LCS (CS04362-BS1)				Prepared & Analyzed: 06/12/09						
Surrogate: 1,2-Dichloroethane-d4	*9.02*		*µg/L*	*10.0*		*90*	*65-135*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.68*		*"*	*10.0*		*97*	*73-125*			
LCS Dup (CS04362-BSD1)				Prepared & Analyzed: 06/12/09						
Benzene	22.7	0.30	µg/L	20.0		113	37-151	1	30	
Bromodichloromethane	21.3	0.50	"	20.0		106	35-155	4	30	
Bromoform	20.0	0.50	"	20.0		100	45-169	11	30	
Bromomethane	25.4	0.50	"	20.0		127	10-242	30	30	
Carbon tetrachloride	19.7	0.50	"	20.0		99	70-140	4	30	
Chlorobenzene	21.8	0.30	"	20.0		109	37-160	2	30	
Chloroethane	23.5	0.50	"	20.0		117	14-230	0.5	30	
Chloroform	20.5	0.50	"	20.0		103	51-138	5	30	
Chloromethane	17.8	0.50	"	20.0		89	10-273	6	30	
Dibromochloromethane	20.5	0.50	"	20.0		102	53-149	10	30	
1,2-Dichlorobenzene	20.6	0.30	"	20.0		103	18-190	4	30	
1,3-Dichlorobenzene	20.9	0.30	"	20.0		105	59-156	0.7	30	
1,4-Dichlorobenzene	20.9	0.30	"	20.0		105	18-190	0.7	30	
Dichlorodifluoromethane (Freon 12)	19.6	0.50	"	20.0		98	50-150	7	30	
1,1-Dichloroethane	21.0	0.50	"	20.0		105	59-155	6	30	
1,2-Dichloroethane	20.1	0.50	"	20.0		101	49-155	3	30	
1,1-Dichloroethene	21.0	0.50	"	20.0		105	5-234	3	30	
trans-1,2-Dichloroethene	21.2	0.50	"	20.0		106	54-156	6	30	
1,2-Dichloropropane	21.7	0.50	"	20.0		109	5-210	1	30	
cis-1,3-Dichloropropene	22.2	0.50	"	20.0		111	5-227	6	30	
trans-1,3-Dichloropropene	21.1	0.50	"	20.0		106	17-183	8	30	
Ethylbenzene	22.1	0.30	"	20.0		111	37-162	0.09	30	
Methylene chloride	20.3	0.50	"	20.0		101	5-221	7	30	
1,1,2,2-Tetrachloroethane	19.9	0.50	"	20.0		99	46-148	6	30	
Tetrachloroethene	22.3	0.50	"	20.0		112	64-148	3	30	
Toluene	23.6	0.30	"	20.0		118	47-150	8	30	

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04362 - EPA 5030 Water MS										
LCS Dup (CS04362-BSD1)				Prepared & Analyzed: 06/12/09						
1,1,1-Trichloroethane	19.2	0.50	µg/L	20.0		96	52-162	2	30	
1,1,2-Trichloroethane	21.3	0.50	"	20.0		107	52-150	5	30	
Trichloroethene	22.7	0.50	"	20.0		114	71-157	2	30	
Trichlorofluoromethane	25.0	0.50	"	20.0		125	47-181	4	30	
Vinyl chloride	22.8	0.50	"	20.0		114	10-251	3	30	
Surrogate: 1,2-Dichloroethane-d4	*9.32*		*"*	*10.0*		*93*	*65-135*			
Surrogate: Toluene-d8	*10.4*		*"*	*10.0*		*104*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.77*		*"*	*10.0*		*98*	*73-125*			

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

TPH-Gasoline by GC FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04444 - EPA 5030 Water GC										
Blank (CS04444-BLK1)				Prepared & Analyzed: 06/16/09						
Gasoline	ND	50	µg/L							
Surrogate: o-Chlorotoluene (Gas)	*21.7*		*"*	*20.0*		*109*	*65-135*			
LCS (CS04444-BS1)				Prepared & Analyzed: 06/16/09						
Gasoline	453	50	µg/L	500		91	65-135			
Surrogate: o-Chlorotoluene (Gas)	*24.2*		*"*	*20.0*		*121*	*65-135*			
LCS Dup (CS04444-BSD1)				Prepared & Analyzed: 06/16/09						
Gasoline	478	50	µg/L	500		96	65-135	5	30	
Surrogate: o-Chlorotoluene (Gas)	*23.4*		*"*	*20.0*		*117*	*65-135*			
Matrix Spike (CS04444-MS1)		**Source: CSF0550-02**		Prepared & Analyzed: 06/16/09						
Gasoline	350	50	µg/L	500	29.9	64	68-132			QM-7
Surrogate: o-Chlorotoluene (Gas)	*19.4*		*"*	*20.0*		*97*	*65-135*			
Matrix Spike Dup (CS04444-MSD1)		**Source: CSF0550-02**		Prepared & Analyzed: 06/16/09						
Gasoline	441	50	µg/L	500	29.9	82	68-132	23	32	
Surrogate: o-Chlorotoluene (Gas)	*20.5*		*"*	*20.0*		*103*	*65-135*			
Batch CS04472 - EPA 5030 Water GC										
Blank (CS04472-BLK1)				Prepared & Analyzed: 06/17/09						
Gasoline	ND	50	µg/L							
Surrogate: o-Chlorotoluene (Gas)	*21.1*		*"*	*20.0*		*105*	*65-135*			
LCS (CS04472-BS1)				Prepared & Analyzed: 06/17/09						
Gasoline	483	50	µg/L	500		97	65-135			
Surrogate: o-Chlorotoluene (Gas)	*26.1*		*"*	*20.0*		*130*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 06/18/09 09:57

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

TPH-Gasoline by GC FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS04472 - EPA 5030 Water GC										
LCS Dup (CS04472-BSD1)				Prepared & Analyzed: 06/17/09						
Gasoline	535	50	µg/L	500		107	65-135	10	30	
Surrogate: o-Chlorotoluene (Gas)	*26.1*		*"*	*20.0*		*131*	*65-135*			
Matrix Spike (CS04472-MS1)		**Source: CSF0720-01**		Prepared & Analyzed: 06/17/09						
Gasoline	2160	50	µg/L	500	2050	22	68-132			QM-7
Surrogate: o-Chlorotoluene (Gas)	*26.2*		*"*	*20.0*		*131*	*65-135*			
Matrix Spike Dup (CS04472-MSD1)		**Source: CSF0720-01**		Prepared & Analyzed: 06/17/09						
Gasoline	2240	50	µg/L	500	2050	36	68-132	3	32	QM-7
Surrogate: o-Chlorotoluene (Gas)	*25.9*		*"*	*20.0*		*129*	*65-135*			

ISSI/NASA Ames MS221-10	Project: Q2 2009 Groundwater	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSF0550**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95093

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QM-9	MS/MSD recovery data could not be generated due to insufficient sample. LCS/LCSD data validate methodology.
QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Quarter 3, 2009

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

September 29, 2009

CLS Work Order #: CSI0863
COC #: 107307

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: AOI4 O+M

Enclosed are the results of analyses for samples received by the laboratory on 09/22/09 15:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSI0863 LOG NO. 107307

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: AOI 4 O+M
SAMPLED BY: BR
JOB DESCRIPTION: Q3 2009
SITE LOCATION: AOI 4

CLIENT JOB NUMBER: N504-341
DESTINATION LABORATORY#: [X] CLS (916) 638-7301, 3249 FITZGERALD RD., RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TPH-G/BTEX	TPH-D, JP5/8, MO						1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
9-22-09	1000	15K11A	groundwater	4	mixed	1,3	X	X								X		
	1010	TANK1-E		4	mixed	1,3	X	X								X		
	1045	15A11A		4	mixed	1,3	X	X								X		

LAB

INVOICE TO:
P.O. #
QUOTE #

SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	9/22/09 CP 1630		CLS
	CLS	9/22/09 C 1530		

REC'D AT LAB BY: JonR DATE / TIME: 9-22-9 15:30 CONDITIONS / COMMENTS: 5.9°C

SHIPPED BY: [ ] FED X [ ] UPS [X] OTHER CLS AIR BILL #

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
15K11A (CSI0863-01) Water Sampled: 09/22/09 10:00 Received: 09/22/09 15:30									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.22**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*101 %*	*65-135*		"	"	"	"	
Tank1-E (CSI0863-02) Water Sampled: 09/22/09 10:10 Received: 09/22/09 15:30									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*114 %*	*65-135*		"	"	"	"	
15A11A (CSI0863-03) Water Sampled: 09/22/09 10:45 Received: 09/22/09 15:30									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.20**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*96 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
15K11A (CSI0863-01) Water Sampled: 09/22/09 10:00 Received: 09/22/09 15:30									
Gasoline	**97**	50	µg/L	1	CS07179	09/23/09	09/23/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*87 %*	*65-135*		"	"	"	"	
Tank1-E (CSI0863-02) Water Sampled: 09/22/09 10:10 Received: 09/22/09 15:30									
Gasoline	ND	50	µg/L	1	CS07179	09/23/09	09/23/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*81 %*	*65-135*		"	"	"	"	
15A11A (CSI0863-03) Water Sampled: 09/22/09 10:45 Received: 09/22/09 15:30									
Gasoline	**110**	50	µg/L	1	CS07179	09/23/09	09/23/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*91 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07301 - EPA 3510B GCNV										
Blank (CS07301-BLK1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0243*		*"*	*0.0250*		*97*	*65-135*			
LCS (CS07301-BS1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.14	0.050	mg/L	2.50		86	65-135			
Surrogate: o-Terphenyl	*0.0291*		*"*	*0.0250*		*116*	*65-135*			
LCS Dup (CS07301-BSD1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.01	0.050	mg/L	2.50		80	65-135	6	30	
Surrogate: o-Terphenyl	*0.0295*		*"*	*0.0250*		*118*	*65-135*			
Matrix Spike (CS07301-MS1)		**Source: CSI0850-01**		Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.18	0.050	mg/L	2.50	ND	87	46-137			
Surrogate: o-Terphenyl	*0.0249*		*"*	*0.0250*		*100*	*65-135*			
Matrix Spike Dup (CS07301-MSD1)		**Source: CSI0850-01**		Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.22	0.050	mg/L	2.50	ND	89	46-137	2	30	
Surrogate: o-Terphenyl	*0.0236*		*"*	*0.0250*		*94*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07179 - EPA 5030 Water GC										
Blank (CS07179-BLK1)				Prepared & Analyzed: 09/23/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*26.0*		*"*	*20.0*		*130*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*15.3*		*"*	*20.0*		*77*	*65-135*			
LCS (CS07179-BS1)				Prepared & Analyzed: 09/23/09						
Gasoline	507	50	µg/L	500		101	65-135			
Surrogate: o-Chlorotoluene (Gas)	*18.3*		*"*	*20.0*		*92*	*65-135*			
LCS Dup (CS07179-BSD1)				Prepared & Analyzed: 09/23/09						
Gasoline	593	50	µg/L	500		119	65-135	16	30	
Surrogate: o-Chlorotoluene (Gas)	*19.2*		*"*	*20.0*		*96*	*65-135*			
Matrix Spike (CS07179-MS1)		**Source: CSI0783-01**		Prepared & Analyzed: 09/23/09						
Gasoline	545	50	µg/L	500	10.3	107	65-135			
Surrogate: o-Chlorotoluene (Gas)	*17.6*		*"*	*20.0*		*88*	*65-135*			
Matrix Spike Dup (CS07179-MSD1)		**Source: CSI0783-01**		Prepared & Analyzed: 09/23/09						
Gasoline	505	50	µg/L	500	10.3	99	65-135	7	30	
Surrogate: o-Chlorotoluene (Gas)	*17.4*		*"*	*20.0*		*87*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:18

ISSI/NASA Ames MS221-10	Project: AOI4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSI0863**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107307

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

September 29, 2009

CLS Work Order #: CSI0874
COC #: 107306

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q3 2009 Groundwater Sampling

Enclosed are the results of analyses for samples received by the laboratory on 09/22/09 15:30. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:21

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSI0874 LOG NO. 107306

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-8115
PROJECT NAME: Q3 2009 Groundwater Sampling
SAMPLED BY: BR
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N679-334
DESTINATION LABORATORY: [X] CLS (916) 638-7301, 3249 FITZGERALD RD., RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	EPA 624	PCBs (include 1265)	Lead					1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
9-21-09	120	11E02A	ground water	5	mixed	1,2,3	X	X	X							X		
	145	11M25A		5	mixed	1,2,3	X	X	X							X		
	225	11M03A		3	VOA	1	X									X		
	310	W08-08A1		3	VOA	1	X									X		

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY
INVOICE TO:
P.O. #:
QUOTE #:
LAB

SUSPECTED CONSTITUENTS:
PRESERVATIVES: (1) HCL (2) HNO_3 (3) COLD (4) NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig ISSI	9/21/09 @ 1600		CLS
	CLS	9/21/09 @ 1530		

RECD AT LAB BY: JO AR DATE / TIME: 9-22-9 1530 CLS CONDITIONS / COMMENTS: 5-9°C

SHIPPED BY: [ ] FED X [ ] UPS [X] OTHER CLS AIR BILL #

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:21

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Metals by EPA 200 Series Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSI0874-01) Water Sampled: 09/21/09 13:20 Received: 09/22/09 15:30									
Lead	ND	5.0	µg/L	1	CS07267	09/24/09	09/24/09	EPA 200.8	
11M25A (CSI0874-02) Water Sampled: 09/21/09 13:45 Received: 09/22/09 15:30									
Lead	ND	5.0	µg/L	1	CS07267	09/24/09	09/24/09	EPA 200.8	

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:21

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Polychlorinated Biphenyls by EPA Method 8082A

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSI0874-01) Water Sampled: 09/21/09 13:20 Received: 09/22/09 15:30									
Aroclor 1016	ND	0.50	µg/L	1	CS07272	09/24/09	09/24/09	EPA 8082A	
Aroclor 1221	ND	0.50	"	"	"	"	"	"	
Aroclor 1232	ND	0.50	"	"	"	"	"	"	
Aroclor 1242	ND	0.50	"	"	"	"	"	"	
Aroclor 1248	ND	0.50	"	"	"	"	"	"	
Aroclor 1254	ND	0.50	"	"	"	"	"	"	
Aroclor 1260	ND	0.50	"	"	"	"	"	"	
Aroclor 1268	ND	0.50	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*87 %*	*50-150*		"	"	"	"	
11M25A (CSI0874-02) Water Sampled: 09/21/09 13:45 Received: 09/22/09 15:30									
Aroclor 1016	ND	0.50	µg/L	1	CS07272	09/24/09	09/24/09	EPA 8082A	
Aroclor 1221	ND	0.50	"	"	"	"	"	"	
Aroclor 1232	ND	0.50	"	"	"	"	"	"	
Aroclor 1242	ND	0.50	"	"	"	"	"	"	
Aroclor 1248	ND	0.50	"	"	"	"	"	"	
Aroclor 1254	ND	0.50	"	"	"	"	"	"	
Aroclor 1260	ND	0.50	"	"	"	"	"	"	
Aroclor 1268	ND	0.50	"	"	"	"	"	"	
Surrogate: Decachlorobiphenyl		*73 %*	*50-150*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 09/29/09 15:21

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSI0874-01) Water Sampled: 09/21/09 13:20 Received: 09/22/09 15:30									
Benzene	ND	0.30	µg/L	1	CS07311	09/25/09	09/25/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.4**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**1.2**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11E02A (CSI0874-01) Water Sampled: 09/21/09 13:20 Received: 09/22/09 15:30									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS07311	"	09/25/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*132 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*97 %*	*73-125*		"	"	"	"	
11M25A (CSI0874-02) Water Sampled: 09/21/09 13:45 Received: 09/22/09 15:30									
Benzene	ND	0.30	µg/L	1	CS07311	09/25/09	09/25/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M25A (CSI0874-02) Water Sampled: 09/21/09 13:45 Received: 09/22/09 15:30									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS07311	"	09/25/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**0.82**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**1.1**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*133 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96 %*	*73-125*		"	"	"	"	
11M03A (CSI0874-03) Water Sampled: 09/21/09 14:25 Received: 09/22/09 15:30									
Benzene	ND	0.30	µg/L	1	CS07311	09/25/09	09/25/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M03A (CSI0874-03) Water Sampled: 09/21/09 14:25 Received: 09/22/09 15:30									
Chloromethane	ND	0.50	µg/L	1	CS07311	"	09/25/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.3**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**7.3**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**0.99**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**7.1**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**1.1**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.6**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*132 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*99 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96 %*		*73-125*	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
W08-08A1 (CSI0874-04) Water Sampled: 09/21/09 15:10 Received: 09/22/09 15:30									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.4**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.1**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**0.73**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**12**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
W08-08A1 (CSI0874-04) Water Sampled: 09/21/09 15:10 Received: 09/22/09 15:30									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.4**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*129 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*100 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Metals by EPA 200 Series Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07267 - EPA 3020A										
Blank (CS07267-BLK1)				Prepared & Analyzed: 09/24/09						
Lead	ND	5.0	µg/L							
LCS (CS07267-BS1)				Prepared & Analyzed: 09/24/09						
Lead	108	5.0	µg/L	100		108	80-120			
LCS Dup (CS07267-BSD1)				Prepared & Analyzed: 09/24/09						
Lead	106	5.0	µg/L	100		106	80-120	1	20	
Matrix Spike (CS07267-MS1)		**Source: CSI0919-18**		Prepared & Analyzed: 09/24/09						
Lead	107	5.0	µg/L	100	ND	107	75-125			
Matrix Spike (CS07267-MS2)		**Source: CSI0891-01**		Prepared & Analyzed: 09/24/09						
Lead	109	5.0	µg/L	100	0.350	109	75-125			
Matrix Spike Dup (CS07267-MSD1)		**Source: CSI0919-18**		Prepared & Analyzed: 09/24/09						
Lead	107	5.0	µg/L	100	ND	107	75-125	0.7	25	
Matrix Spike Dup (CS07267-MSD2)		**Source: CSI0891-01**		Prepared & Analyzed: 09/24/09						
Lead	109	5.0	µg/L	100	0.350	109	75-125	0.4	25	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Polychlorinated Biphenyls by EPA Method 8082A - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07272 - EPA 3510B GCNV										
Blank (CS07272-BLK1)				Prepared & Analyzed: 09/24/09						
Aroclor 1016	ND	0.50	µg/L							
Aroclor 1221	ND	0.50	"							
Aroclor 1232	ND	0.50	"							
Aroclor 1242	ND	0.50	"							
Aroclor 1248	ND	0.50	"							
Aroclor 1254	ND	0.50	"							
Aroclor 1260	ND	0.50	"							
Surrogate: Decachlorobiphenyl	*0.283*		*"*	*0.250*		*113*	*50-150*			
LCS (CS07272-BS1)				Prepared & Analyzed: 09/24/09						
Aroclor 1260	2.68	0.50	µg/L	2.50		107	31-138			
Surrogate: Decachlorobiphenyl	*0.235*		*"*	*0.250*		*94*	*50-150*			
LCS Dup (CS07272-BSD1)				Prepared & Analyzed: 09/24/09						
Aroclor 1260	2.73	0.50	µg/L	2.50		109	31-138	2	30	
Surrogate: Decachlorobiphenyl	*0.240*		*"*	*0.250*		*96*	*50-150*			

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07311 - EPA 5030 Water MS										
Blank (CS07311-BLK1)				Prepared & Analyzed: 09/25/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07311 - EPA 5030 Water MS										
Blank (CS07311-BLK1)				Prepared & Analyzed: 09/25/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*12.9*		*"*	*10.0*		*129*	*65-135*			
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.61*		*"*	*10.0*		*96*	*73-125*			
LCS (CS07311-BS1)				Prepared & Analyzed: 09/25/09						
Benzene	16.6	0.30	µg/L	20.0		83	37-151			
Bromodichloromethane	17.1	0.50	"	20.0		85	35-155			
Bromoform	15.4	0.50	"	20.0		77	45-169			
Bromomethane	17.6	0.50	"	20.0		88	10-242			
Carbon tetrachloride	18.9	0.50	"	20.0		95	70-140			
Chlorobenzene	15.9	0.30	"	20.0		80	37-160			
Chloroethane	22.2	0.50	"	20.0		111	14-230			
Chloroform	16.4	0.50	"	20.0		82	51-138			
Chloromethane	18.8	0.50	"	20.0		94	10-273			
Dibromochloromethane	16.1	0.50	"	20.0		81	53-149			
1,2-Dichlorobenzene	19.3	0.30	"	20.0		97	18-190			
1,3-Dichlorobenzene	19.5	0.30	"	20.0		97	59-156			
1,4-Dichlorobenzene	19.5	0.30	"	20.0		98	18-190			
Dichlorodifluoromethane (Freon 12)	22.6	0.50	"	20.0		113	50-150			
1,1-Dichloroethane	16.1	0.50	"	20.0		81	59-155			
1,2-Dichloroethane	17.3	0.50	"	20.0		87	49-155			
1,1-Dichloroethene	20.0	0.50	"	20.0		100	5-234			
trans-1,2-Dichloroethene	16.2	0.50	"	20.0		81	54-156			
1,2-Dichloropropane	16.2	0.50	"	20.0		81	5-210			
cis-1,3-Dichloropropene	16.6	0.50	"	20.0		83	5-227			
trans-1,3-Dichloropropene	16.7	0.50	"	20.0		84	17-183			
Ethylbenzene	16.6	0.30	"	20.0		83	37-162			

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07311 - EPA 5030 Water MS										
LCS (CS07311-BS1)				Prepared & Analyzed: 09/25/09						
Methylene chloride	16.4	0.50	µg/L	20.0		82	5-221			
1,1,2,2-Tetrachloroethane	18.6	0.50	"	20.0		93	46-148			
Tetrachloroethene	15.9	0.50	"	20.0		79	64-148			
Toluene	16.7	0.30	"	20.0		83	47-150			
1,1,1-Trichloroethane	20.0	0.50	"	20.0		100	52-162			
1,1,2-Trichloroethane	15.3	0.50	"	20.0		77	52-150			
Trichloroethene	16.3	0.50	"	20.0		81	71-157			
Trichlorofluoromethane	24.7	0.50	"	20.0		124	47-181			
Vinyl chloride	21.3	0.50	"	20.0		106	10-251			
Surrogate: 1,2-Dichloroethane-d4	*18.8*		*"*	*10.0*		*188*	*65-135*			*QS-HI*
Surrogate: Toluene-d8	*11.3*		*"*	*10.0*		*113*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*11.3*		*"*	*10.0*		*113*	*73-125*			
LCS Dup (CS07311-BSD1)				Prepared & Analyzed: 09/25/09						
Benzene	22.6	0.30	µg/L	20.0		113	37-151	31	30	QR-2
Bromodichloromethane	24.2	0.50	"	20.0		121	35-155	34	30	QR-2
Bromoform	23.6	0.50	"	20.0		118	45-169	42	30	QR-2
Bromomethane	19.7	0.50	"	20.0		98	10-242	11	30	
Carbon tetrachloride	20.2	0.50	"	20.0		101	70-140	6	30	
Chlorobenzene	21.6	0.30	"	20.0		108	37-160	30	30	
Chloroethane	23.7	0.50	"	20.0		119	14-230	7	30	
Chloroform	21.0	0.50	"	20.0		105	51-138	24	30	
Chloromethane	19.0	0.50	"	20.0		95	10-273	1	30	
Dibromochloromethane	24.2	0.50	"	20.0		121	53-149	40	30	QR-2
1,2-Dichlorobenzene	22.2	0.30	"	20.0		111	18-190	14	30	
1,3-Dichlorobenzene	21.5	0.30	"	20.0		108	59-156	10	30	
1,4-Dichlorobenzene	21.6	0.30	"	20.0		108	18-190	10	30	
Dichlorodifluoromethane (Freon 12)	24.6	0.50	"	20.0		123	50-150	8	30	
1,1-Dichloroethane	20.3	0.50	"	20.0		102	59-155	23	30	
1,2-Dichloroethane	22.2	0.50	"	20.0		111	49-155	25	30	
1,1-Dichloroethene	25.5	0.50	"	20.0		127	5-234	24	30	

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07311 - EPA 5030 Water MS										
LCS Dup (CS07311-BSD1)				Prepared & Analyzed: 09/25/09						
trans-1,2-Dichloroethene	20.6	0.50	µg/L	20.0		103	54-156	24	30	
1,2-Dichloropropane	22.6	0.50	"	20.0		113	5-210	33	30	QR-2
cis-1,3-Dichloropropene	24.0	0.50	"	20.0		120	5-227	36	30	QR-2
trans-1,3-Dichloropropene	25.3	0.50	"	20.0		126	17-183	41	30	QR-2
Ethylbenzene	22.8	0.30	"	20.0		114	37-162	31	30	QR-2
Methylene chloride	21.2	0.50	"	20.0		106	5-221	26	30	
1,1,2,2-Tetrachloroethane	22.5	0.50	"	20.0		112	46-148	19	30	
Tetrachloroethene	22.8	0.50	"	20.0		114	64-148	36	30	QR-2
Toluene	22.9	0.30	"	20.0		114	47-150	31	30	QR-2
1,1,1-Trichloroethane	19.8	0.50	"	20.0		99	52-162	1	30	
1,1,2-Trichloroethane	23.5	0.50	"	20.0		117	52-150	42	30	QR-2
Trichloroethene	22.6	0.50	"	20.0		113	71-157	33	30	QR-2
Trichlorofluoromethane	25.2	0.50	"	20.0		126	47-181	2	30	
Vinyl chloride	22.6	0.50	"	20.0		113	10-251	6	30	
Surrogate: 1,2-Dichloroethane-d4	*10.8*		*"*	*10.0*		*108*	*65-135*			
Surrogate: Toluene-d8	*10.7*		*"*	*10.0*		*107*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.39*		*"*	*10.0*		*94*	*73-125*			
Batch CS07356 - EPA 5030 Water MS										
Blank (CS07356-BLK1)				Prepared & Analyzed: 09/28/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
Blank (CS07356-BLK1)				Prepared & Analyzed: 09/28/09						
1,2-Dichlorobenzene	ND	0.30	µg/L							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							
Trichlorofluoromethane	ND	0.50	"							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*16.1*		*"*	*10.0*		*161*	*65-135*			*QS-HI*
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.26*		*"*	*10.0*		*93*	*73-125*			

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
LCS (CS07356-BS1)				Prepared & Analyzed: 09/28/09						
Benzene	22.2	0.30	µg/L	20.0		111	37-151			
Bromodichloromethane	23.7	0.50	"	20.0		119	35-155			
Bromoform	21.9	0.50	"	20.0		109	45-169			
Bromomethane	19.4	0.50	"	20.0		97	10-242			
Carbon tetrachloride	23.5	0.50	"	20.0		117	70-140			
Chlorobenzene	20.2	0.30	"	20.0		101	37-160			
Chloroethane	24.1	0.50	"	20.0		121	14-230			
Chloroform	22.2	0.50	"	20.0		111	51-138			
Chloromethane	19.7	0.50	"	20.0		98	10-273			
Dibromochloromethane	22.5	0.50	"	20.0		112	53-149			
1,2-Dichlorobenzene	22.4	0.30	"	20.0		112	18-190			
1,3-Dichlorobenzene	21.0	0.30	"	20.0		105	59-156			
1,4-Dichlorobenzene	21.7	0.30	"	20.0		109	18-190			
Dichlorodifluoromethane (Freon 12)	17.1	0.50	"	20.0		85	50-150			
1,1-Dichloroethane	21.4	0.50	"	20.0		107	59-155			
1,2-Dichloroethane	24.0	0.50	"	20.0		120	49-155			
1,1-Dichloroethene	27.2	0.50	"	20.0		136	5-234			
trans-1,2-Dichloroethene	22.3	0.50	"	20.0		111	54-156			
1,2-Dichloropropane	22.3	0.50	"	20.0		112	5-210			
cis-1,3-Dichloropropene	23.2	0.50	"	20.0		116	5-227			
trans-1,3-Dichloropropene	24.2	0.50	"	20.0		121	17-183			
Ethylbenzene	20.2	0.30	"	20.0		101	37-162			
Methylene chloride	22.7	0.50	"	20.0		113	5-221			
1,1,2,2-Tetrachloroethane	24.0	0.50	"	20.0		120	46-148			
Tetrachloroethene	17.7	0.50	"	20.0		88	64-148			
Toluene	21.7	0.30	"	20.0		108	47-150			
1,1,1-Trichloroethane	25.1	0.50	"	20.0		126	52-162			
1,1,2-Trichloroethane	21.7	0.50	"	20.0		109	52-150			
Trichloroethene	20.4	0.50	"	20.0		102	71-157			
Trichlorofluoromethane	25.1	0.50	"	20.0		126	47-181			
Vinyl chloride	22.0	0.50	"	20.0		110	10-251			

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
LCS (CS07356-BS1)				Prepared & Analyzed: 09/28/09						
Surrogate: 1,2-Dichloroethane-d4	*11.8*		*µg/L*	*10.0*		*118*	*65-135*			
Surrogate: Toluene-d8	*10.8*		*"*	*10.0*		*108*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.3*		*"*	*10.0*		*103*	*73-125*			
LCS Dup (CS07356-BSD1)				Prepared & Analyzed: 09/28/09						
Benzene	23.6	0.30	µg/L	20.0		118	37-151	6	30	
Bromodichloromethane	25.5	0.50	"	20.0		127	35-155	7	30	
Bromoform	23.7	0.50	"	20.0		118	45-169	8	30	
Bromomethane	19.7	0.50	"	20.0		98	10-242	1	30	
Carbon tetrachloride	24.5	0.50	"	20.0		123	70-140	4	30	
Chlorobenzene	21.2	0.30	"	20.0		106	37-160	5	30	
Chloroethane	25.3	0.50	"	20.0		127	14-230	5	30	
Chloroform	23.7	0.50	"	20.0		119	51-138	6	30	
Chloromethane	21.7	0.50	"	20.0		108	10-273	10	30	
Dibromochloromethane	24.3	0.50	"	20.0		121	53-149	8	30	
1,2-Dichlorobenzene	22.7	0.30	"	20.0		114	18-190	2	30	
1,3-Dichlorobenzene	21.9	0.30	"	20.0		109	59-156	4	30	
1,4-Dichlorobenzene	22.2	0.30	"	20.0		111	18-190	2	30	
Dichlorodifluoromethane (Freon 12)	18.1	0.50	"	20.0		90	50-150	6	30	
1,1-Dichloroethane	22.7	0.50	"	20.0		114	59-155	6	30	
1,2-Dichloroethane	25.7	0.50	"	20.0		129	49-155	7	30	
1,1-Dichloroethene	28.2	0.50	"	20.0		141	5-234	4	30	
trans-1,2-Dichloroethene	23.6	0.50	"	20.0		118	54-156	6	30	
1,2-Dichloropropane	23.8	0.50	"	20.0		119	5-210	6	30	
cis-1,3-Dichloropropene	24.9	0.50	"	20.0		125	5-227	7	30	
trans-1,3-Dichloropropene	25.9	0.50	"	20.0		130	17-183	7	30	
Ethylbenzene	22.7	0.30	"	20.0		114	37-162	12	30	
Methylene chloride	23.9	0.50	"	20.0		120	5-221	5	30	
1,1,2,2-Tetrachloroethane	23.9	0.50	"	20.0		120	46-148	0.4	30	
Tetrachloroethene	20.3	0.50	"	20.0		102	64-148	14	30	
Toluene	23.3	0.30	"	20.0		116	47-150	7	30	

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
LCS Dup (CS07356-BSD1)				Prepared & Analyzed: 09/28/09						
1,1,1-Trichloroethane	25.9	0.50	µg/L	20.0		129	52-162	3	30	
1,1,2-Trichloroethane	23.7	0.50	"	20.0		119	52-150	9	30	
Trichloroethene	21.8	0.50	"	20.0		109	71-157	6	30	
Trichlorofluoromethane	25.9	0.50	"	20.0		129	47-181	3	30	
Vinyl chloride	23.1	0.50	"	20.0		115	10-251	5	30	
Surrogate: 1,2-Dichloroethane-d4	*12.5*		*"*	*10.0*		*125*	*65-135*			
Surrogate: Toluene-d8	*10.9*		*"*	*10.0*		*109*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.30*		*"*	*10.0*		*93*	*73-125*			

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0874**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107306

Notes and Definitions

QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
QR-2	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

October 01, 2009

CLS Work Order #: CSI0958
COC #: 107312

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: Q3 2009 Groundwater Sampling

Enclosed are the results of analyses for samples received by the laboratory on 09/24/09 15:20. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSI0958 LOG NO. 107312

REPORT TO:
NAME AND ADDRESS: ISSI NASA Ames Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: Q3 2009 Groundwater Sampling
SAMPLED BY: BR
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N679-334
DESTINATION LABORATORY#: ☒ CLS (916) 638-7301 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

TURN AROUND TIME: 1 DAY / 2 DAY / 5 DAY ✓ / 10 DAY
SPECIAL INSTRUCTIONS OR ALT. ID:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	EPA 624	TPH-G/BTEX	TPH-D, JPS/S, MO							
9-22-09	135	11N21A1	Ground water	3	VOA	1	X								X	
	210	11M16A1		3	VOA	1	X								X	
	245	95A		3	VOA	1	X								X	
9-23-09	1015	11M17A		3	VOA	1	X								X	
	1025	NASA-3A		3	VOA	1	X								X	
	1045	11M21A		3	VOA	1	X								X	
	1110	11N22A1		3	VOA	1	X								X	
	1130	NASA-1A		5	mixed	1,3	X	X	X						X	
9-24-09	800	14K37A		3	VOA	1	X								X	
	850	14D36A		5	mixed	1,3	X	X	X						X	
	910	14D37A		5	mixed	1,3	X	X	X						X	
	930	11N26A		5	mixed	1,3	X	X	X						X	

INVOICE TO:
P.O. #:
QUOTE #:
SUSPECTED CONSTITUENTS:
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig ISSI	9/24/09 @ 1234		JONKSD / CLS
	CLS	9/24/09 @ 1520		

REC'D AT LAB BY: JonR DATE / TIME: 9-24-9 1520 CONDITIONS / COMMENTS: 5.1°C

SHIPPED BY: ☐ FED X ☐ UPS ☑ OTHER CLS AIR BILL #

LAB

CALIFORNIA LABORATORY SERVICES

 10/01/09 15:27

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSI0958-08) Water Sampled: 09/23/09 11:30 Received: 09/24/09 15:20									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*92 %*	*65-135*		"	"	"	"	
14D36A (CSI0958-10) Water Sampled: 09/24/09 08:50 Received: 09/24/09 15:20									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**2.1**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*97 %*	*65-135*		"	"	"	"	
14D37A (CSI0958-11) Water Sampled: 09/24/09 09:10 Received: 09/24/09 15:20									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.58**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*112 %*	*65-135*		"	"	"	"	
11N26A (CSI0958-12) Water Sampled: 09/24/09 09:30 Received: 09/24/09 15:20									
Diesel	ND	0.050	mg/L	1	CS07301	09/25/09	09/28/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	**0.74**	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*102 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSI0958-08) Water Sampled: 09/23/09 11:30 Received: 09/24/09 15:20									
Gasoline	ND	50	µg/L	1	CS07300	09/25/09	09/25/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*81 %*	*65-135*		"	"	"	"	
14D36A (CSI0958-10) Water Sampled: 09/24/09 08:50 Received: 09/24/09 15:20									
Gasoline	ND	50	µg/L	1	CS07300	09/25/09	09/25/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*81 %*	*65-135*		"	"	"	"	
14D37A (CSI0958-11) Water Sampled: 09/24/09 09:10 Received: 09/24/09 15:20									
Gasoline	**200**	50	µg/L	1	CS07300	09/25/09	09/25/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	**1.6**	0.50	"	"	"	"	"	"	
Xylenes (total)	**1.2**	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*98 %*	*65-135*		"	"	"	"	
11N26A (CSI0958-12) Water Sampled: 09/24/09 09:30 Received: 09/24/09 15:20									
Gasoline	**430**	50	µg/L	1	CS07300	09/25/09	09/25/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	**1.6**	0.50	"	"	"	"	"	"	
Ethylbenzene	**0.57**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N26A (CSI0958-12) Water Sampled: 09/24/09 09:30 Received: 09/24/09 15:20									
Xylenes (total)	**4.4**	1.0	µg/L	1	CS07300	"	09/25/09	8015M/8021B	
Surrogate: o-Chlorotoluene (Gas)		*120 %*		*65-135*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N21A1 (CSI0958-01) Water Sampled: 09/22/09 13:35 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**0.68**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.79**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**0.91**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N21A1 (CSI0958-01) Water Sampled: 09/22/09 13:35 Received: 09/24/09 15:20									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*129 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*101 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92 %*		*73-125*	"	"	"	"	
11M16A1 (CSI0958-02) Water Sampled: 09/22/09 14:10 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**0.97**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M16A1 (CSI0958-02) Water Sampled: 09/22/09 14:10 Received: 09/24/09 15:20									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**14**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*134 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*100 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*91 %*		*73-125*	"	"	"	"	
95A (CSI0958-03) Water Sampled: 09/22/09 14:45 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
95A (CSI0958-03) Water Sampled: 09/22/09 14:45 Received: 09/24/09 15:20									
Chloromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.2**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**8.6**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**1.3**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**2.2**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**30**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*133 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*100 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M17A (CSI0958-04) Water Sampled: 09/23/09 10:15 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.92**	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.7**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**6.9**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.80**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**1.2**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**27**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M17A (CSI0958-04) Water Sampled: 09/23/09 10:15 Received: 09/24/09 15:20									
Trichlorofluoromethane	**1.8**	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.2**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*135 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*102 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93 %*		*73-125*	"	"	"	"	
NASA-3A (CSI0958-05) Water Sampled: 09/23/09 10:25 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.67**	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.7**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**18**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.96**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSI0958-05) Water Sampled: 09/23/09 10:25 Received: 09/24/09 15:20									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**2.0**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**14**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**2.5**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.7**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*132 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*101 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*90 %*		*73-125*	"	"	"	"	
11M21A (CSI0958-06) Water Sampled: 09/23/09 10:45 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.60**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11M21A (CSI0958-06) Water Sampled: 09/23/09 10:45 Received: 09/24/09 15:20									
Chloromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.7**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**21**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**4.7**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**1.6**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**20**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	**1.9**	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.1**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*131 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*101 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N22A1 (CSI0958-07) Water Sampled: 09/23/09 11:10 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.2**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**1.1**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**23**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**1.3**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**54**	2.5	"	5	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N22A1 (CSI0958-07) Water Sampled: 09/23/09 11:10 Received: 09/24/09 15:20									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.7**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*130 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*102 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*89 %*		*73-125*	"	"	"	"	
NASA-1A (CSI0958-08) Water Sampled: 09/23/09 11:30 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**3.6**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**3.5**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**40**	1.0	"	2	"	"	"	"	
trans-1,2-Dichloroethene	**1.4**	0.50	"	1	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSI0958-08) Water Sampled: 09/23/09 11:30 Received: 09/24/09 15:20									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**41**	1.0	"	2	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	1	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.5**	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.6**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*129 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*100 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*92 %*	*73-125*		"	"	"	"	
14K37A (CSI0958-09) Water Sampled: 09/24/09 08:00 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14K37A (CSI0958-09) Water Sampled: 09/24/09 08:00 Received: 09/24/09 15:20									
Chloromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*131 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*108 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*93 %*		*73-125*	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSI0958-10) Water Sampled: 09/24/09 08:50 Received: 09/24/09 15:20									
Benzene	**0.43**	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**4.4**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**3.4**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**52**	1.0	"	2	"	"	"	"	
trans-1,2-Dichloroethene	**1.1**	0.50	"	1	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**0.88**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**13**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D36A (CSI0958-10) Water Sampled: 09/24/09 08:50 Received: 09/24/09 15:20									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.60**	0.50	"	"	"	"	"	"	
Vinyl chloride	**2.7**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*122 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*103 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96 %*	*73-125*		"	"	"	"	
14D37A (CSI0958-11) Water Sampled: 09/24/09 09:10 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D37A (CSI0958-11) Water Sampled: 09/24/09 09:10 Received: 09/24/09 15:20									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.2**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*131 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*103 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96 %*	*73-125*		"	"	"	"	
11N26A (CSI0958-12) Water Sampled: 09/24/09 09:30 Received: 09/24/09 15:20									
Benzene	ND	0.30	µg/L	1	CS07356	09/28/09	09/28/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
11N26A (CSI0958-12) Water Sampled: 09/24/09 09:30 Received: 09/24/09 15:20									
Chloromethane	ND	0.50	µg/L	1	CS07356	"	09/28/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*122 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*106 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*96 %*	*73-125*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07301 - EPA 3510B GCNV										
Blank (CS07301-BLK1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
JP-5/JP-8	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0243*		*"*	*0.0250*		*97*	*65-135*			
LCS (CS07301-BS1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.14	0.050	mg/L	2.50		86	65-135			
Surrogate: o-Terphenyl	*0.0291*		*"*	*0.0250*		*116*	*65-135*			
LCS Dup (CS07301-BSD1)				Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.01	0.050	mg/L	2.50		80	65-135	6	30	
Surrogate: o-Terphenyl	*0.0295*		*"*	*0.0250*		*118*	*65-135*			
Matrix Spike (CS07301-MS1)		**Source: CSI0850-01**		Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.18	0.050	mg/L	2.50	ND	87	46-137			
Surrogate: o-Terphenyl	*0.0249*		*"*	*0.0250*		*100*	*65-135*			
Matrix Spike Dup (CS07301-MSD1)		**Source: CSI0850-01**		Prepared: 09/25/09		Analyzed: 09/28/09				
Diesel	2.22	0.050	mg/L	2.50	ND	89	46-137	2	30	
Surrogate: o-Terphenyl	*0.0236*		*"*	*0.0250*		*94*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07300 - EPA 5030 Water GC										
Blank (CS07300-BLK1)				Prepared & Analyzed: 09/25/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*24.1*		*"*	*20.0*		*121*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*16.2*		*"*	*20.0*		*81*	*65-135*			
LCS (CS07300-BS1)				Prepared & Analyzed: 09/25/09						
Gasoline	529	50	µg/L	500		106	65-135			
Surrogate: o-Chlorotoluene (Gas)	*19.0*		*"*	*20.0*		*95*	*65-135*			
LCS Dup (CS07300-BSD1)				Prepared & Analyzed: 09/25/09						
Gasoline	455	50	µg/L	500		91	65-135	15	30	
Surrogate: o-Chlorotoluene (Gas)	*17.7*		*"*	*20.0*		*88*	*65-135*			
Matrix Spike (CS07300-MS1)		**Source: CSI0958-12**		Prepared & Analyzed: 09/25/09						
Gasoline	847	50	µg/L	500	429	84	65-135			
Surrogate: o-Chlorotoluene (Gas)	*25.5*		*"*	*20.0*		*128*	*65-135*			
Matrix Spike Dup (CS07300-MSD1)		**Source: CSI0958-12**		Prepared & Analyzed: 09/25/09						
Gasoline	901	50	µg/L	500	429	94	65-135	6	30	
Surrogate: o-Chlorotoluene (Gas)	*24.8*		*"*	*20.0*		*124*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
Blank (CS07356-BLK1)				Prepared & Analyzed: 09/28/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
Blank (CS07356-BLK1)				Prepared & Analyzed: 09/28/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*16.1*		*"*	*10.0*		*161*	*65-135*			*QS-HI*
Surrogate: Toluene-d8	*10.1*		*"*	*10.0*		*101*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.26*		*"*	*10.0*		*93*	*73-125*			
LCS (CS07356-BS1)				Prepared & Analyzed: 09/28/09						
Benzene	22.2	0.30	µg/L	20.0		111	37-151			
Bromodichloromethane	23.7	0.50	"	20.0		119	35-155			
Bromoform	21.9	0.50	"	20.0		109	45-169			
Bromomethane	19.4	0.50	"	20.0		97	10-242			
Carbon tetrachloride	23.5	0.50	"	20.0		117	70-140			
Chlorobenzene	20.2	0.30	"	20.0		101	37-160			
Chloroethane	24.1	0.50	"	20.0		121	14-230			
Chloroform	22.2	0.50	"	20.0		111	51-138			
Chloromethane	19.7	0.50	"	20.0		98	10-273			
Dibromochloromethane	22.5	0.50	"	20.0		112	53-149			
1,2-Dichlorobenzene	22.4	0.30	"	20.0		112	18-190			
1,3-Dichlorobenzene	21.0	0.30	"	20.0		105	59-156			
1,4-Dichlorobenzene	21.7	0.30	"	20.0		109	18-190			
Dichlorodifluoromethane (Freon 12)	17.1	0.50	"	20.0		85	50-150			
1,1-Dichloroethane	21.4	0.50	"	20.0		107	59-155			
1,2-Dichloroethane	24.0	0.50	"	20.0		120	49-155			
1,1-Dichloroethene	27.2	0.50	"	20.0		136	5-234			
trans-1,2-Dichloroethene	22.3	0.50	"	20.0		111	54-156			
1,2-Dichloropropane	22.3	0.50	"	20.0		112	5-210			
cis-1,3-Dichloropropene	23.2	0.50	"	20.0		116	5-227			
trans-1,3-Dichloropropene	24.2	0.50	"	20.0		121	17-183			
Ethylbenzene	20.2	0.30	"	20.0		101	37-162			

CALIFORNIA LABORATORY SERVICES

 10/01/09 15:27

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
LCS (CS07356-BS1)				Prepared & Analyzed: 09/28/09						
Methylene chloride	22.7	0.50	µg/L	20.0		113	5-221			
1,1,2,2-Tetrachloroethane	24.0	0.50	"	20.0		120	46-148			
Tetrachloroethene	17.7	0.50	"	20.0		88	64-148			
Toluene	21.7	0.30	"	20.0		108	47-150			
1,1,1-Trichloroethane	25.1	0.50	"	20.0		126	52-162			
1,1,2-Trichloroethane	21.7	0.50	"	20.0		109	52-150			
Trichloroethene	20.4	0.50	"	20.0		102	71-157			
Trichlorofluoromethane	25.1	0.50	"	20.0		126	47-181			
Vinyl chloride	22.0	0.50	"	20.0		110	10-251			
Surrogate: 1,2-Dichloroethane-d4	*11.8*		*"*	*10.0*		*118*	*65-135*			
Surrogate: Toluene-d8	*10.8*		*"*	*10.0*		*108*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.3*		*"*	*10.0*		*103*	*73-125*			
LCS Dup (CS07356-BSD1)				Prepared & Analyzed: 09/28/09						
Benzene	23.6	0.30	µg/L	20.0		118	37-151	6	30	
Bromodichloromethane	25.5	0.50	"	20.0		127	35-155	7	30	
Bromoform	23.7	0.50	"	20.0		118	45-169	8	30	
Bromomethane	19.7	0.50	"	20.0		98	10-242	1	30	
Carbon tetrachloride	24.5	0.50	"	20.0		123	70-140	4	30	
Chlorobenzene	21.2	0.30	"	20.0		106	37-160	5	30	
Chloroethane	25.3	0.50	"	20.0		127	14-230	5	30	
Chloroform	23.7	0.50	"	20.0		119	51-138	6	30	
Chloromethane	21.7	0.50	"	20.0		108	10-273	10	30	
Dibromochloromethane	24.3	0.50	"	20.0		121	53-149	8	30	
1,2-Dichlorobenzene	22.7	0.30	"	20.0		114	18-190	2	30	
1,3-Dichlorobenzene	21.9	0.30	"	20.0		109	59-156	4	30	
1,4-Dichlorobenzene	22.2	0.30	"	20.0		111	18-190	2	30	
Dichlorodifluoromethane (Freon 12)	18.1	0.50	"	20.0		90	50-150	6	30	
1,1-Dichloroethane	22.7	0.50	"	20.0		114	59-155	6	30	
1,2-Dichloroethane	25.7	0.50	"	20.0		129	49-155	7	30	
1,1-Dichloroethene	28.2	0.50	"	20.0		141	5-234	4	30	

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS07356 - EPA 5030 Water MS										
LCS Dup (CS07356-BSD1)				Prepared & Analyzed: 09/28/09						
trans-1,2-Dichloroethene	23.6	0.50	µg/L	20.0		118	54-156	6	30	
1,2-Dichloropropane	23.8	0.50	"	20.0		119	5-210	6	30	
cis-1,3-Dichloropropene	24.9	0.50	"	20.0		125	5-227	7	30	
trans-1,3-Dichloropropene	25.9	0.50	"	20.0		130	17-183	7	30	
Ethylbenzene	22.7	0.30	"	20.0		114	37-162	12	30	
Methylene chloride	23.9	0.50	"	20.0		120	5-221	5	30	
1,1,2,2-Tetrachloroethane	23.9	0.50	"	20.0		120	46-148	0.4	30	
Tetrachloroethene	20.3	0.50	"	20.0		102	64-148	14	30	
Toluene	23.3	0.30	"	20.0		116	47-150	7	30	
1,1,1-Trichloroethane	25.9	0.50	"	20.0		129	52-162	3	30	
1,1,2-Trichloroethane	23.7	0.50	"	20.0		119	52-150	9	30	
Trichloroethene	21.8	0.50	"	20.0		109	71-157	6	30	
Trichlorofluoromethane	25.9	0.50	"	20.0		129	47-181	3	30	
Vinyl chloride	23.1	0.50	"	20.0		115	10-251	5	30	
Surrogate: 1,2-Dichloroethane-d4	*12.5*		*"*	*10.0*		*125*	*65-135*			
Surrogate: Toluene-d8	*10.9*		*"*	*10.0*		*109*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*9.30*		*"*	*10.0*		*93*	*73-125*			

ISSI/NASA Ames MS221-10	Project: Q3 2009 Groundwater Sampling	
NASA Ames MS T20-G	Project Number: N679-334	**CLS Work Order #: CSI0958**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107312

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Quarter 4, 2009

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

December 21, 2009

CLS Work Order #: CSL0543
COC #: 95040

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: AOI 4 O+M

Enclosed are the results of analyses for samples received by the laboratory on 12/14/09 18:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSL0543 1 of 1 LOG NO. 95040

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: AOI 4 O+M
SAMPLED BY: BR
JOB DESCRIPTION: Q4 2009
SITE LOCATION: AOI 4

CLIENT JOB NUMBER: N504-341
DESTINATION LABORATORY: ☒ CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 ☐ OTHER

GEOTRACKER: EDF REPORT ☐ YES ☐ NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	TPH-G/BTEX	TPH-D, JPS/8, MO							1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
12-14-09	9:15	15K11A	ground water	4	mixed	1,3	X	X									X		
	9:45	TANK1-E		4		1,3	X	X									X		
	10:15	15A11A		4		1,3	X	X									X		

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY
SPECIAL INSTRUCTIONS OR ALT. ID:
INVOICE TO:
P.O. #
QUOTE #
SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	12/14/09 1700		CLS
	CLS	12/14/09 1800		

LAB

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
15K11A (CSL0543-01) Water Sampled: 12/14/09 09:15 Received: 12/14/09 18:00									
Diesel	**0.25**	0.050	mg/L	1	CS09492	12/17/09	12/21/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*89 %*	*65-135*		"	"	"	"	
TANK1-E (CSL0543-02) Water Sampled: 12/14/09 09:45 Received: 12/14/09 18:00									
Diesel	ND	0.050	mg/L	1	CS09492	12/17/09	12/21/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*100 %*	*65-135*		"	"	"	"	
15A11A (CSL0543-03) Water Sampled: 12/14/09 10:15 Received: 12/14/09 18:00									
Diesel	**0.24**	0.050	mg/L	1	CS09492	12/17/09	12/21/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*98 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
15K11A (CSL0543-01) Water Sampled: 12/14/09 09:15 Received: 12/14/09 18:00									
Gasoline	**78**	50	µg/L	1	CS09420	12/16/09	12/16/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	QC-2H
Toluene	ND	0.50	"	"	"	"	"	"	QC-2H
Ethylbenzene	ND	0.50	"	"	"	"	"	"	QC-2H
Xylenes (total)	ND	1.0	"	"	"	"	"	"	QC-2H
Surrogate: o-Chlorotoluene (Gas)		*81 %*	*65-135*		"	"	"	"	
TANK1-E (CSL0543-02) Water Sampled: 12/14/09 09:45 Received: 12/14/09 18:00									
Gasoline	ND	50	µg/L	1	CS09420	12/16/09	12/16/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	QC-2H
Toluene	ND	0.50	"	"	"	"	"	"	QC-2H
Ethylbenzene	ND	0.50	"	"	"	"	"	"	QC-2H
Xylenes (total)	ND	1.0	"	"	"	"	"	"	QC-2H
Surrogate: o-Chlorotoluene (Gas)		*67 %*	*65-135*		"	"	"	"	
15A11A (CSL0543-03) Water Sampled: 12/14/09 10:15 Received: 12/14/09 18:00									
Gasoline	**110**	50	µg/L	1	CS09420	12/16/09	12/16/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	"	"	QC-2H
Toluene	ND	0.50	"	"	"	"	"	"	QC-2H
Ethylbenzene	ND	0.50	"	"	"	"	"	"	QC-2H
Xylenes (total)	ND	1.0	"	"	"	"	"	"	QC-2H
Surrogate: o-Chlorotoluene (Gas)		*85 %*	*65-135*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09492 - EPA 3510B GCNV										
Blank (CS09492-BLK1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0210*		*"*	*0.0250*		*84*	*65-135*			
LCS (CS09492-BS1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.35	0.050	mg/L	2.50		94	65-135			
Surrogate: o-Terphenyl	*0.0225*		*"*	*0.0250*		*90*	*65-135*			
LCS Dup (CS09492-BSD1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.55	0.050	mg/L	2.50		102	65-135	8	30	
Surrogate: o-Terphenyl	*0.0278*		*"*	*0.0250*		*111*	*65-135*			
Matrix Spike (CS09492-MS1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.75	0.050	mg/L	2.50	ND	110	46-137			
Surrogate: o-Terphenyl	*0.0255*		*"*	*0.0250*		*102*	*65-135*			
Matrix Spike Dup (CS09492-MSD1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.49	0.050	mg/L	2.50	ND	100	46-137	10	30	
Surrogate: o-Terphenyl	*0.0231*		*"*	*0.0250*		*92*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09420 - EPA 5030 Water GC										
Blank (CS09420-BLK1)				Prepared & Analyzed: 12/16/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*25.6*		*"*	*20.0*		*128*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*15.3*		*"*	*20.0*		*77*	*65-135*			
LCS (CS09420-BS1)				Prepared & Analyzed: 12/16/09						
Gasoline	473	50	µg/L	500		95	65-135			
Surrogate: o-Chlorotoluene (Gas)	*18.8*		*"*	*20.0*		*94*	*65-135*			
LCS Dup (CS09420-BSD1)				Prepared & Analyzed: 12/16/09						
Gasoline	499	50	µg/L	500		100	65-135	5	30	
Surrogate: o-Chlorotoluene (Gas)	*17.5*		*"*	*20.0*		*88*	*65-135*			
Matrix Spike (CS09420-MS1)		**Source: CSL0593-02**		Prepared & Analyzed: 12/16/09						
Gasoline	519	50	µg/L	500	18.0	100	65-135			
Surrogate: o-Chlorotoluene (Gas)	*16.7*		*"*	*20.0*		*84*	*65-135*			
Matrix Spike Dup (CS09420-MSD1)		**Source: CSL0593-02**		Prepared & Analyzed: 12/16/09						
Gasoline	463	50	µg/L	500	18.0	89	65-135	11	30	
Surrogate: o-Chlorotoluene (Gas)	*17.2*		*"*	*20.0*		*86*	*65-135*			

CALIFORNIA LABORATORY SERVICES

 12/21/09 15:54

ISSI/NASA Ames MS221-10	Project: AOI 4 O+M	
NASA Ames MS T20-G	Project Number: N504-341	**CLS Work Order #: CSL0543**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 95040

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QC-2H	The recovery of one CCV was greater than the acceptance limit. However, all analytes in the associated samples were ND; therefore a reanalysis was not performed.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

December 22, 2009

CLS Work Order #: CSL0578
COC #: 107325

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: RGRP - Q4 2009

Enclosed are the results of analyses for samples received by the laboratory on 12/15/09 16:00. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 12/22/09 16:33

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

CLS - Labs CHAIN OF CUSTODY CLS ID No.: CSL0578 1 of 1 LOG NO. 107325

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: RGRP Q4 2009
SAMPLED BY: BR
JOB DESCRIPTION:
SITE LOCATION:

CLIENT JOB NUMBER: N518-141
DESTINATION LABORATORY#: [X] CLS (916) 638-7301, 3249 FITZGERALD RD., RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JPS/S, MO	TURN AROUND TIME 1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
12-14-09	1045	14D12A	ground water	3	voA	1	X					X		
1	130	14D02A	1	5	mixed	1,3	X	X	X			X		

LAB

INVOICE TO:
P.O. #
QUOTE #

SUSPECTED CONSTITUENTS
PRESERVATIVES: (1) HCL (2) HNO_3 (3) = COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	12/15/09 @ 1457		CLS
	CLS	12/15/09 @ 1600		

RECEIVED BY LAB: Will Orellana DATE / TIME: 12/15/09 1600 CONDITIONS / COMMENTS: 3.0 6C

SHIPPED BY: [ ] FED X [ ] UPS [X] OTHER CLS AIR BILL #

CALIFORNIA LABORATORY SERVICES

 12/22/09 16:33

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D02A (CSL0578-02) Water Sampled: 12/14/09 13:30 Received: 12/15/09 16:00									
Diesel	ND	0.050	mg/L	1	CS09492	12/17/09	12/21/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*109 %*	*65-135*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D02A (CSL0578-02) Water Sampled: 12/14/09 13:30 Received: 12/15/09 16:00									
Gasoline	**140**	50	µg/L	1	CS09420	12/16/09	12/16/09	8015M/8021B	TPH-X
Benzene	ND	0.50	"	"	"	"	12/21/09	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*79 %*	*65-135*		*"*	*"*	*12/16/09*	*"*	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D12A (CSL0578-01) Water Sampled: 12/14/09 10:45 Received: 12/15/09 16:00									
Benzene	**0.66**	0.30	µg/L	1	CS09480	12/16/09	12/16/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**8.0**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**7.9**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**470**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**4.8**	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	**4.2**	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**45**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D12A (CSL0578-01) Water Sampled: 12/14/09 10:45 Received: 12/15/09 16:00									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS09480	"	12/16/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**1.8**	0.50	"	"	"	"	"	"	
Vinyl chloride	**13**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*93 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*87 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*113 %*	*73-125*		"	"	"	"	
14D02A (CSL0578-02) Water Sampled: 12/14/09 13:30 Received: 12/15/09 16:00									
Benzene	ND	0.30	µg/L	1	CS09480	12/16/09	12/16/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**1.9**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D02A (CSL0578-02) Water Sampled: 12/14/09 13:30 Received: 12/15/09 16:00									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS09480	"	12/16/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*115 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*93 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*126 %*	*73-125*		"	"	"	"	*QS-HI*

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09492 - EPA 3510B GCNV										
Blank (CS09492-BLK1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0210*		*"*	*0.0250*		*84*	*65-135*			
LCS (CS09492-BS1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.35	0.050	mg/L	2.50		94	65-135			
Surrogate: o-Terphenyl	*0.0225*		*"*	*0.0250*		*90*	*65-135*			
LCS Dup (CS09492-BSD1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.55	0.050	mg/L	2.50		102	65-135	8	30	
Surrogate: o-Terphenyl	*0.0278*		*"*	*0.0250*		*111*	*65-135*			
Matrix Spike (CS09492-MS1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.75	0.050	mg/L	2.50	ND	110	46-137			
Surrogate: o-Terphenyl	*0.0255*		*"*	*0.0250*		*102*	*65-135*			
Matrix Spike Dup (CS09492-MSD1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.49	0.050	mg/L	2.50	ND	100	46-137	10	30	
Surrogate: o-Terphenyl	*0.0231*		*"*	*0.0250*		*92*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09420 - EPA 5030 Water GC										
Blank (CS09420-BLK1)				Prepared & Analyzed: 12/16/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*25.6*		*"*	*20.0*		*128*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*15.3*		*"*	*20.0*		*77*	*65-135*			
LCS (CS09420-BS1)				Prepared & Analyzed: 12/16/09						
Gasoline	473	50	µg/L	500		95	65-135			
Surrogate: o-Chlorotoluene (Gas)	*18.8*		*"*	*20.0*		*94*	*65-135*			
LCS Dup (CS09420-BSD1)				Prepared & Analyzed: 12/16/09						
Gasoline	499	50	µg/L	500		100	65-135	5	30	
Surrogate: o-Chlorotoluene (Gas)	*17.5*		*"*	*20.0*		*88*	*65-135*			
Matrix Spike (CS09420-MS1)		**Source: CSL0593-02**		Prepared & Analyzed: 12/16/09						
Gasoline	519	50	µg/L	500	18.0	100	65-135			
Surrogate: o-Chlorotoluene (Gas)	*16.7*		*"*	*20.0*		*84*	*65-135*			
Matrix Spike Dup (CS09420-MSD1)		**Source: CSL0593-02**		Prepared & Analyzed: 12/16/09						
Gasoline	463	50	µg/L	500	18.0	89	65-135	11	30	
Surrogate: o-Chlorotoluene (Gas)	*17.2*		*"*	*20.0*		*86*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09480 - EPA 5030 Water MS										
Blank (CS09480-BLK1)				Prepared & Analyzed: 12/16/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09480 - EPA 5030 Water MS										
Blank (CS09480-BLK1)				Prepared & Analyzed: 12/16/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*14.1*		*"*	*10.0*		*141*	*65-135*			*QS-HI*
Surrogate: Toluene-d8	*8.91*		*"*	*10.0*		*89*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*73-125*			
LCS (CS09480-BS1)				Prepared & Analyzed: 12/16/09						
Benzene	19.9	0.30	µg/L	20.0		100	37-151			
Bromodichloromethane	19.6	0.50	"	20.0		98	35-155			
Bromoform	18.4	0.50	"	20.0		92	45-169			
Bromomethane	18.2	0.50	"	20.0		91	10-242			
Carbon tetrachloride	22.2	0.50	"	20.0		111	70-140			
Chlorobenzene	18.2	0.30	"	20.0		91	37-160			
Chloroethane	21.7	0.50	"	20.0		109	14-230			
Chloroform	19.6	0.50	"	20.0		98	51-138			
Chloromethane	21.6	0.50	"	20.0		108	10-273			
Dibromochloromethane	19.6	0.50	"	20.0		98	53-149			
1,2-Dichlorobenzene	17.4	0.30	"	20.0		87	18-190			
1,3-Dichlorobenzene	18.4	0.30	"	20.0		92	59-156			
1,4-Dichlorobenzene	17.0	0.30	"	20.0		85	18-190			
Dichlorodifluoromethane (Freon 12)	25.6	0.50	"	20.0		128	50-150			
1,1-Dichloroethane	19.6	0.50	"	20.0		98	59-155			
1,2-Dichloroethane	20.2	0.50	"	20.0		101	49-155			
1,1-Dichloroethene	19.9	0.50	"	20.0		99	5-234			
trans-1,2-Dichloroethene	20.7	0.50	"	20.0		103	54-156			
1,2-Dichloropropane	19.9	0.50	"	20.0		99	5-210			
cis-1,3-Dichloropropene	19.3	0.50	"	20.0		97	5-227			
trans-1,3-Dichloropropene	19.1	0.50	"	20.0		96	17-183			
Ethylbenzene	22.0	0.30	"	20.0		110	37-162			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09480 - EPA 5030 Water MS										
LCS (CS09480-BS1)				Prepared & Analyzed: 12/16/09						
Methylene chloride	21.3	0.50	µg/L	20.0		106	5-221			
1,1,2,2-Tetrachloroethane	16.8	0.50	"	20.0		84	46-148			
Tetrachloroethene	19.6	0.50	"	20.0		98	64-148			
Toluene	20.1	0.30	"	20.0		100	47-150			
1,1,1-Trichloroethane	20.3	0.50	"	20.0		101	52-162			
1,1,2-Trichloroethane	18.8	0.50	"	20.0		94	52-150			
Trichloroethene	19.5	0.50	"	20.0		98	71-157			
Trichlorofluoromethane	23.4	0.50	"	20.0		117	47-181			
Vinyl chloride	22.9	0.50	"	20.0		114	10-251			
Surrogate: 1,2-Dichloroethane-d4	*9.93*		*"*	*10.0*		*99*	*65-135*			
Surrogate: Toluene-d8	*10.5*		*"*	*10.0*		*105*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.2*		*"*	*10.0*		*102*	*73-125*			
LCS Dup (CS09480-BSD1)				Prepared & Analyzed: 12/16/09						
Benzene	19.8	0.30	µg/L	20.0		99	37-151	0.8	30	
Bromodichloromethane	19.5	0.50	"	20.0		98	35-155	0.5	30	
Bromoform	18.1	0.50	"	20.0		91	45-169	2	30	
Bromomethane	18.9	0.50	"	20.0		94	10-242	4	30	
Carbon tetrachloride	22.0	0.50	"	20.0		110	70-140	0.8	30	
Chlorobenzene	18.2	0.30	"	20.0		91	37-160	0.2	30	
Chloroethane	21.7	0.50	"	20.0		109	14-230	0.09	30	
Chloroform	19.4	0.50	"	20.0		97	51-138	0.6	30	
Chloromethane	21.6	0.50	"	20.0		108	10-273	0.05	30	
Dibromochloromethane	19.2	0.50	"	20.0		96	53-149	2	30	
1,2-Dichlorobenzene	17.6	0.30	"	20.0		88	18-190	1	30	
1,3-Dichlorobenzene	18.6	0.30	"	20.0		93	59-156	1	30	
1,4-Dichlorobenzene	17.2	0.30	"	20.0		86	18-190	1	30	
Dichlorodifluoromethane (Freon 12)	24.9	0.50	"	20.0		124	50-150	3	30	
1,1-Dichloroethane	19.4	0.50	"	20.0		97	59-155	0.9	30	
1,2-Dichloroethane	19.6	0.50	"	20.0		98	49-155	3	30	
1,1-Dichloroethene	20.0	0.50	"	20.0		100	5-234	0.9	30	

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09480 - EPA 5030 Water MS										
LCS Dup (CS09480-BSD1)				Prepared & Analyzed: 12/16/09						
trans-1,2-Dichloroethene	20.4	0.50	µg/L	20.0		102	54-156	1	30	
1,2-Dichloropropane	19.7	0.50	"	20.0		98	5-210	1	30	
cis-1,3-Dichloropropene	19.4	0.50	"	20.0		97	5-227	0.5	30	
trans-1,3-Dichloropropene	19.0	0.50	"	20.0		95	17-183	0.9	30	
Ethylbenzene	22.1	0.30	"	20.0		110	37-162	0.6	30	
Methylene chloride	20.8	0.50	"	20.0		104	5-221	2	30	
1,1,2,2-Tetrachloroethane	16.5	0.50	"	20.0		82	46-148	2	30	
Tetrachloroethene	19.7	0.50	"	20.0		98	64-148	0.5	30	
Toluene	19.8	0.30	"	20.0		99	47-150	1	30	
1,1,1-Trichloroethane	20.3	0.50	"	20.0		102	52-162	0.3	30	
1,1,2-Trichloroethane	18.8	0.50	"	20.0		94	52-150	0	30	
Trichloroethene	19.6	0.50	"	20.0		98	71-157	0.7	30	
Trichlorofluoromethane	23.3	0.50	"	20.0		116	47-181	0.8	30	
Vinyl chloride	23.2	0.50	"	20.0		116	10-251	2	30	
Surrogate: 1,2-Dichloroethane-d4	*9.66*		*"*	*10.0*		*97*	*65-135*			
Surrogate: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.4*		*"*	*10.0*		*104*	*73-125*			

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0578**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107325

Notes and Definitions

TPH-X	Although the sample contains compounds in the retention time range of target parameter, the chromatogram was not consistent with the expected chromatographic pattern or "fingerprint". However, the reported concentration is based on the target parameter.
QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

CALIFORNIA LABORATORY SERVICES

3249 Fitzgerald Road Rancho Cordova, CA 95742

December 23, 2009

CLS Work Order #: CSL0649
COC #: 107324

Brian Reddig
ISSI/NASA Ames MS221-10
NASA Ames MS T20-G
Moffet Field, CA 94035-1000

Project Name: RGRP - Q4 2009

Enclosed are the results of analyses for samples received by the laboratory on 12/16/09 17:45. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that the results are in compliance both technically and for completeness.

Analytical results are attached to this letter. Please call if we can provide additional assistance.

Sincerely,

James Liang, Ph.D.
Laboratory Director

CA DOHS ELAP Accreditation/Registration number 1233

CALIFORNIA LABORATORY SERVICES

 12/23/09 10:41

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

CLS - Labs

CHAIN OF CUSTODY CLS ID No.: CSL0649 LOG NO. 107324

REPORT TO:
NAME AND ADDRESS: ISSI, NASA Ames, Moffett Field, CA
PROJECT MANAGER: Brian Reddig PHONE#: 650-604-1315
PROJECT NAME: RGRP Q4 2009
SAMPLED BY: BR
JOB DESCRIPTION:
SITE LOCATION: RGRP

CLIENT JOB NUMBER: N518-141
DESTINATION LABORATORY#: [X] CLS (916) 638-7301, 3249 FITZGERALD RD. RANCHO CORDOVA, CA. 95742 [ ] OTHER

GEOTRACKER: EDF REPORT [ ] YES [ ] NO
GLOBAL ID:
COMPOSITE:
FIELD CONDITIONS:

DATE	TIME	SAMPLE IDENTIFICATION	MATRIX	CONTAINER NO.	CONTAINER TYPE	PRESERVATIVES	VOCs (EPA 624)	TPH-G/BTEX	TPH-D, JP5/8, MO	1 DAY	2 DAY	5 DAY	10 DAY	SPECIAL INSTRUCTIONS OR ALT. ID:
12-15-09	1215	14E14A	ground water	3	VOA	1	X					X		
	1230	14D09A		3	VOA	1	X					X		
	100	14D13A		3	VOA	1	X					X		
12-16-09	120	NASA-3A		3	VOA	1	X					X		
	130	NASA-1A		5	mixed	1,3	X	X	X			X		
	200	15H05A		3	VOA	1	X					X		

TURN AROUND TIME: 1 DAY, 2 DAY, 5 DAY, 10 DAY

INVOICE TO:
P.O. #:
QUOTE #:

SUSPECTED CONSTITUENTS:
PRESERVATIVES: (1) HCl (2) HNO_3 (3) ↓ COLD (4) = NaOH (5) = H_2SO_4 (6) = $Na_2S_2O_3$ (7) =

RELINQUISHED BY (SIGN)	PRINT NAME / COMPANY	DATE / TIME	RECEIVED BY (SIGN)	PRINT NAME / COMPANY
Brian Reddig	Brian Reddig / ISSI	12/16/09 @ 1504		CLS
	CLS	12/16/09 @ 1745		

RECD AT LAB BY: DATE / TIME: CONDITIONS / COMMENTS:

LAB

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Extractable Petroleum Hydrocarbons by EPA Method 8015M

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSL0649-05) Water Sampled: 12/16/09 13:30 Received: 12/16/09 17:45									
Diesel	ND	0.050	mg/L	1	CS09492	12/17/09	12/21/09	EPA 8015M	
Motor Oil	ND	0.050	"	"	"	"	"	"	
JP-5/JP-8	ND	0.050	"	"	"	"	"	"	
Surrogate: o-Terphenyl		*116 %*	*65-135*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Gas/BTEX by GC PID/FID

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSL0649-05) Water Sampled: 12/16/09 13:30 Received: 12/16/09 17:45									
Gasoline	ND	50	µg/L	1	CS09589	12/22/09	12/22/09	8015M/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	1.0	"	"	"	"	"	"	
Surrogate: o-Chlorotoluene (Gas)		*77 %*	*65-135*		"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14E14A (CSL0649-01) Water Sampled: 12/15/09 12:15 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**6.0**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**3.5**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14E14A (CSL0649-01) Water Sampled: 12/15/09 12:15 Received: 12/16/09 17:45									
Trichlorofluoromethane	ND	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*130 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*90 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*105 %*		*73-125*	"	"	"	"	
14D09A (CSL0649-02) Water Sampled: 12/15/09 12:30 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**2.1**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**2.8**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**20**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D09A (CSL0649-02) Water Sampled: 12/15/09 12:30 Received: 12/16/09 17:45									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**49**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**0.90**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*127 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*92 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*107 %*		*73-125*	"	"	"	"	
14D13A (CSL0649-03) Water Sampled: 12/15/09 13:00 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
14D13A (CSL0649-03) Water Sampled: 12/15/09 13:00 Received: 12/16/09 17:45									
Chloromethane	ND	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**1.1**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.95**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**2.4**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*127 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*89 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*103 %*	*73-125*		"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSL0649-04) Water Sampled: 12/16/09 13:20 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	**0.77**	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**6.0**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**19**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**0.97**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	**2.0**	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**17**	0.50	"	"	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-3A (CSL0649-04) Water Sampled: 12/16/09 13:20 Received: 12/16/09 17:45									
Trichlorofluoromethane	**2.7**	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**3.3**	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*128 %*		*65-135*	"	"	"	"	
Surrogate: Toluene-d8		*95 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*105 %*		*73-125*	"	"	"	"	
NASA-1A (CSL0649-05) Water Sampled: 12/16/09 13:30 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	
Chloromethane	ND	0.50	"	"	"	"	"	"	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	**3.7**	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	**0.61**	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	**3.0**	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	**48**	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	**1.2**	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
NASA-1A (CSL0649-05) Water Sampled: 12/16/09 13:30 Received: 12/16/09 17:45									
1,2-Dichloropropane	ND	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	**58**	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	**2.1**	0.50	"	"	"	"	"	"	
Vinyl chloride	**1.1**	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*127 %*	*65-135*		"	"	"	"	
Surrogate: Toluene-d8		*93 %*	*72-125*		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*99 %*	*73-125*		"	"	"	"	
15H05A (CSL0649-06) Water Sampled: 12/16/09 14:00 Received: 12/16/09 17:45									
Benzene	ND	0.30	µg/L	1	CS09495	12/17/09	12/17/09	EPA 624	
Bromodichloromethane	ND	0.50	"	"	"	"	"	"	
Bromoform	ND	0.50	"	"	"	"	"	"	
Bromomethane	ND	0.50	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.50	"	"	"	"	"	"	
Chlorobenzene	ND	0.30	"	"	"	"	"	"	
Chloroethane	ND	0.50	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	2.0	"	"	"	"	"	"	
Chloroform	ND	0.50	"	"	"	"	"	"	

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
15H05A (CSL0649-06) Water Sampled: 12/16/09 14:00 Received: 12/16/09 17:45									
Chloromethane	ND	0.50	µg/L	1	CS09495	"	12/17/09	EPA 624	
Dibromochloromethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.30	"	"	"	"	"	"	
Dichlorodifluoromethane (Freon 12)	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.50	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.50	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.50	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.50	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.30	"	"	"	"	"	"	
Methylene chloride	ND	0.50	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.50	"	"	"	"	"	"	
Tetrachloroethene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.30	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.50	"	"	"	"	"	"	
Trichloroethene	ND	0.50	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.50	"	"	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"	"	"	"	"	"	
Vinyl chloride	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		*145 %*		*65-135*	"	"	"	"	*QS-HI*
Surrogate: Toluene-d8		*94 %*		*72-125*	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*98 %*		*73-125*	"	"	"	"	

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Extractable Petroleum Hydrocarbons by EPA Method 8015M - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09492 - EPA 3510B GCNV										
Blank (CS09492-BLK1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	ND	0.050	mg/L							
Motor Oil	ND	0.050	"							
Surrogate: o-Terphenyl	*0.0210*		*"*	*0.0250*		*84*	*65-135*			
LCS (CS09492-BS1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.35	0.050	mg/L	2.50		94	65-135			
Surrogate: o-Terphenyl	*0.0225*		*"*	*0.0250*		*90*	*65-135*			
LCS Dup (CS09492-BSD1)				Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.55	0.050	mg/L	2.50		102	65-135	8	30	
Surrogate: o-Terphenyl	*0.0278*		*"*	*0.0250*		*111*	*65-135*			
Matrix Spike (CS09492-MS1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.75	0.050	mg/L	2.50	ND	110	46-137			
Surrogate: o-Terphenyl	*0.0255*		*"*	*0.0250*		*102*	*65-135*			
Matrix Spike Dup (CS09492-MSD1)		**Source: CSL0564-01**		Prepared: 12/17/09		Analyzed: 12/21/09				
Diesel	2.49	0.050	mg/L	2.50	ND	100	46-137	10	30	
Surrogate: o-Terphenyl	*0.0231*		*"*	*0.0250*		*92*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Gas/BTEX by GC PID/FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09589 - EPA 5030 Water GC										
Blank (CS09589-BLK1)				Prepared & Analyzed: 12/22/09						
Gasoline	ND	50	µg/L							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	1.0	"							
Surrogate: o-Chlorotoluene (BTEX)	*26.0*		*"*	*20.0*		*130*	*65-135*			
Surrogate: o-Chlorotoluene (Gas)	*16.2*		*"*	*20.0*		*81*	*65-135*			
LCS (CS09589-BS1)				Prepared & Analyzed: 12/22/09						
Gasoline	454	50	µg/L	500		91	65-135			
Surrogate: o-Chlorotoluene (Gas)	*19.1*		*"*	*20.0*		*96*	*65-135*			
LCS Dup (CS09589-BSD1)				Prepared & Analyzed: 12/22/09						
Gasoline	455	50	µg/L	500		91	65-135	0.2	30	
Surrogate: o-Chlorotoluene (Gas)	*17.8*		*"*	*20.0*		*89*	*65-135*			
Matrix Spike (CS09589-MS1)		**Source: CSL0794-09**		Prepared & Analyzed: 12/22/09						
Gasoline	422	50	µg/L	500	13.7	82	65-135			
Surrogate: o-Chlorotoluene (Gas)	*17.9*		*"*	*20.0*		*89*	*65-135*			
Matrix Spike Dup (CS09589-MSD1)		**Source: CSL0794-09**		Prepared & Analyzed: 12/22/09						
Gasoline	447	50	µg/L	500	13.7	87	65-135	6	30	
Surrogate: o-Chlorotoluene (Gas)	*18.3*		*"*	*20.0*		*92*	*65-135*			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09495 - EPA 5030 Water MS										
Blank (CS09495-BLK1)				Prepared & Analyzed: 12/17/09						
Benzene	ND	0.30	µg/L							
Bromodichloromethane	ND	0.50	"							
Bromoform	ND	0.50	"							
Bromomethane	ND	0.50	"							
Carbon tetrachloride	ND	0.50	"							
Chlorobenzene	ND	0.30	"							
Chloroethane	ND	0.50	"							
2-Chloroethylvinyl ether	ND	2.0	"							
Chloroform	ND	0.50	"							
Chloromethane	ND	0.50	"							
Dibromochloromethane	ND	0.50	"							
1,2-Dichlorobenzene	ND	0.30	"							
1,3-Dichlorobenzene	ND	0.30	"							
1,4-Dichlorobenzene	ND	0.30	"							
Dichlorodifluoromethane (Freon 12)	ND	0.50	"							
1,1-Dichloroethane	ND	0.50	"							
1,2-Dichloroethane	ND	0.50	"							
1,1-Dichloroethene	ND	0.50	"							
cis-1,2-Dichloroethene	ND	0.50	"							
trans-1,2-Dichloroethene	ND	0.50	"							
1,2-Dichloropropane	ND	0.50	"							
cis-1,3-Dichloropropene	ND	0.50	"							
trans-1,3-Dichloropropene	ND	0.50	"							
Ethylbenzene	ND	0.30	"							
Methylene chloride	ND	0.50	"							
1,1,2,2-Tetrachloroethane	ND	0.50	"							
Tetrachloroethene	ND	0.50	"							
Toluene	ND	0.30	"							
1,1,1-Trichloroethane	ND	0.50	"							
1,1,2-Trichloroethane	ND	0.50	"							
Trichloroethene	ND	0.50	"							

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09495 - EPA 5030 Water MS										
Blank (CS09495-BLK1)				Prepared & Analyzed: 12/17/09						
Trichlorofluoromethane	ND	0.50	µg/L							
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.50	"							
Vinyl chloride	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	*14.6*		*"*	*10.0*		*146*	*65-135*			*QS-HI*
Surrogate: Toluene-d8	*8.93*		*"*	*10.0*		*89*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.3*		*"*	*10.0*		*103*	*73-125*			
LCS (CS09495-BS1)				Prepared & Analyzed: 12/17/09						
Benzene	22.7	0.30	µg/L	20.0		113	37-151			
Bromodichloromethane	20.6	0.50	"	20.0		103	35-155			
Bromoform	19.1	0.50	"	20.0		95	45-169			
Bromomethane	19.1	0.50	"	20.0		96	10-242			
Carbon tetrachloride	23.8	0.50	"	20.0		119	70-140			
Chlorobenzene	19.2	0.30	"	20.0		96	37-160			
Chloroethane	21.7	0.50	"	20.0		108	14-230			
Chloroform	20.7	0.50	"	20.0		103	51-138			
Chloromethane	21.3	0.50	"	20.0		106	10-273			
Dibromochloromethane	20.8	0.50	"	20.0		104	53-149			
1,2-Dichlorobenzene	19.7	0.30	"	20.0		99	18-190			
1,3-Dichlorobenzene	20.6	0.30	"	20.0		103	59-156			
1,4-Dichlorobenzene	19.3	0.30	"	20.0		96	18-190			
Dichlorodifluoromethane (Freon 12)	23.2	0.50	"	20.0		116	50-150			
1,1-Dichloroethane	22.3	0.50	"	20.0		111	59-155			
1,2-Dichloroethane	21.1	0.50	"	20.0		106	49-155			
1,1-Dichloroethene	23.2	0.50	"	20.0		116	5-234			
trans-1,2-Dichloroethene	24.1	0.50	"	20.0		121	54-156			
1,2-Dichloropropane	21.2	0.50	"	20.0		106	5-210			
cis-1,3-Dichloropropene	20.4	0.50	"	20.0		102	5-227			
trans-1,3-Dichloropropene	18.8	0.50	"	20.0		94	17-183			
Ethylbenzene	23.6	0.30	"	20.0		118	37-162			

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ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09495 - EPA 5030 Water MS										
LCS (CS09495-BS1)				Prepared & Analyzed: 12/17/09						
Methylene chloride	23.8	0.50	µg/L	20.0		119	5-221			
1,1,2,2-Tetrachloroethane	19.0	0.50	"	20.0		95	46-148			
Tetrachloroethene	21.9	0.50	"	20.0		110	64-148			
Toluene	21.9	0.30	"	20.0		110	47-150			
1,1,1-Trichloroethane	21.5	0.50	"	20.0		108	52-162			
1,1,2-Trichloroethane	20.2	0.50	"	20.0		101	52-150			
Trichloroethene	20.7	0.50	"	20.0		104	71-157			
Trichlorofluoromethane	22.0	0.50	"	20.0		110	47-181			
Vinyl chloride	23.1	0.50	"	20.0		115	10-251			
Surrogate: 1,2-Dichloroethane-d4	*9.90*		*"*	*10.0*		*99*	*65-135*			
Surrogate: Toluene-d8	*11.0*		*"*	*10.0*		*110*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.8*		*"*	*10.0*		*108*	*73-125*			
LCS Dup (CS09495-BSD1)				Prepared & Analyzed: 12/17/09						
Benzene	21.8	0.30	µg/L	20.0		109	37-151	4	30	
Bromodichloromethane	19.7	0.50	"	20.0		98	35-155	5	30	
Bromoform	18.5	0.50	"	20.0		92	45-169	3	30	
Bromomethane	20.8	0.50	"	20.0		104	10-242	8	30	
Carbon tetrachloride	24.6	0.50	"	20.0		123	70-140	3	30	
Chlorobenzene	18.7	0.30	"	20.0		93	37-160	3	30	
Chloroethane	23.5	0.50	"	20.0		117	14-230	8	30	
Chloroform	21.2	0.50	"	20.0		106	51-138	3	30	
Chloromethane	23.0	0.50	"	20.0		115	10-273	8	30	
Dibromochloromethane	19.9	0.50	"	20.0		99	53-149	5	30	
1,2-Dichlorobenzene	17.5	0.30	"	20.0		87	18-190	12	30	
1,3-Dichlorobenzene	18.1	0.30	"	20.0		90	59-156	13	30	
1,4-Dichlorobenzene	17.1	0.30	"	20.0		86	18-190	12	30	
Dichlorodifluoromethane (Freon 12)	25.1	0.50	"	20.0		125	50-150	8	30	
1,1-Dichloroethane	22.1	0.50	"	20.0		111	59-155	0.5	30	
1,2-Dichloroethane	21.4	0.50	"	20.0		107	49-155	1	30	
1,1-Dichloroethene	24.9	0.50	"	20.0		124	5-234	7	30	

ISSI/NASA Ames MS221-10	Project: RGRP - Q4 2009	
NASA Ames MS T20-G	Project Number: N518-141	**CLS Work Order #: CSL0649**
Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Purgeables by EPA Method 624 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch CS09495 - EPA 5030 Water MS										
LCS Dup (CS09495-BSD1)				Prepared & Analyzed: 12/17/09						
trans-1,2-Dichloroethene	24.5	0.50	µg/L	20.0		122	54-156	1	30	
1,2-Dichloropropane	20.6	0.50	"	20.0		103	5-210	3	30	
cis-1,3-Dichloropropene	20.0	0.50	"	20.0		100	5-227	2	30	
trans-1,3-Dichloropropene	18.5	0.50	"	20.0		92	17-183	2	30	
Ethylbenzene	22.9	0.30	"	20.0		114	37-162	3	30	
Methylene chloride	24.2	0.50	"	20.0		121	5-221	2	30	
1,1,2,2-Tetrachloroethane	16.6	0.50	"	20.0		83	46-148	13	30	
Tetrachloroethene	20.6	0.50	"	20.0		103	64-148	6	30	
Toluene	21.1	0.30	"	20.0		105	47-150	4	30	
1,1,1-Trichloroethane	22.1	0.50	"	20.0		111	52-162	3	30	
1,1,2-Trichloroethane	19.7	0.50	"	20.0		99	52-150	3	30	
Trichloroethene	20.5	0.50	"	20.0		103	71-157	1	30	
Trichlorofluoromethane	23.8	0.50	"	20.0		119	47-181	8	30	
Vinyl chloride	24.7	0.50	"	20.0		123	10-251	7	30	
Surrogate: 1,2-Dichloroethane-d4	*10.1*		*"*	*10.0*		*101*	*65-135*			
Surrogate: Toluene-d8	*10.8*		*"*	*10.0*		*108*	*72-125*			
Surrogate: 4-Bromofluorobenzene	*10.0*		*"*	*10.0*		*100*	*73-125*			

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Moffet Field, CA 94035-1000	Project Manager: Brian Reddig	COC #: 107324

Notes and Definitions

QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference