2014 OPERATIONS, MAINTENANCE & MONITORING ANNUAL REPORT

DEL AMO WASTE PITS
LOS ANGELES, CALIFORNIA

PREPARED FOR:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PREPARED ON BEHALF OF:

THE DEL AMO RESPONDENTS

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ACRONYMS AND ABBREVIATIONS
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AO	Administrative Order
Annual Report	2014 OM&M Annual Report
ASTM	American Society of Testing and Materials
C_1	Carbon Vessel 1
Cap Gas System	Cap Gas Collection and Treatment System
CO_2	carbon dioxide
COC	constituents of concern
CPT	Cone Penetro Meter Test
DTSC	Department of Toxic Substances Control
kg	kilograms
lbs	pounds
LEL	lower explosive limit
mcl	maximum contaminant level
msl	mean sea level
ND	non-detect
O_2	oxygen
OM&M	Operations, Maintenance and Monitoring
OM&M Manual	Operations, Maintenance and Monitoring Manual
PID	photo ionization detector
Phase III Redesign	Preliminary SVE/IBT Remedial Phase III Design
PLC	programmable logic controller
PME	Performance Monitoring Event
PME ROF	Draft Performance Monitoring Event Report of Findings
ppm	parts per million
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RSPS	ROD-Specified Performance Standard
SCAQMD	South Coast Air Quality Management District
scf	standard cubic feet
scfm	standard cubic feet per minute
SVE/IBT	Soil Vapor Extraction/Insitu Biodegradation Technology
SVOCs	semi-volatile organic compound
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WT	water table
Waste Pits OU	Del Amo Waste Pits Operable Unit

1.0 INTRODUCTION

This 2014 Operations, Maintenance, and Monitoring (OM&M) Annual Report (Annual Report) has been prepared by C2 REM on behalf of the Del Amo Respondents to summarize the OM&M activities conducted at the Del Amo Waste Pits Operable Unit (Waste Pits OU) site located in Torrance, California, pursuant to requirements in the *Administrative Order (AO) for Remedial Action, Docket No. 99-08, Del Amo Waste Pits Operable Unit, Torrance, California,* United States Environmental Protection Agency (USEPA,1999), and the *Operations, Maintenance and Monitoring Manual, Del Amo Waste Pits Operable Unit, Torrance, California,* (C2 REM, 2012) (OM&M Manual).

This Annual Report provides a summation of the OM&M activities conducted in 2014 at the Waste Pits OU during the 15th year of operation of the Phase I remedy (e.g., multi-layer cap, soil vapor monitoring probes) and the 8th year of operation of the Phase II remedy (i.e., Soil Vapor Extraction/In-Situ Biodegradation Technology System [SVE/IBT System]).

As presented in the 2013 OM&M Annual Report, the current SVE/IBT system design was re-evaluated and a new plan, the Preliminary SVE/IBT Remedial *Phase III Design* (Phase III Redesign) (C2 REM, 2013a) was submitted to USEPA on April 9, 2013 and subsequently approved on April 11, 2014. As a result of the approved Phase III Redesign activities the SVE/IBT system was shut down and no system monitoring/sampling was conducted from May 2014 through December 2014.

This Annual Report includes discussions on:

- OM&M activities for the Cap Gas Collection and Treatment System (Cap Gas System) and SVE/IBT System;
- OM&M activities for groundwater monitoring and analysis;
- Inspections (pursuant to both quarterly requirements and post rain) of the cover system, drainage systems, Cap Gas System, SVE/IBT System and general physical site characteristics;
- Summaries of maintenance and repairs; and,
- Summary of the Phase III extraction and conveyance system - abandonment and new system installation field activities.

2.0 SITE HISTORY

The Waste Pits OU includes Lots 36 and 37 of the Los Angeles County Assessor's Map of Tract 4671 and is bounded by Vermont Avenue to the east and approximately equivalent to Budlong Avenue (if extended to the north) (see Figure 1.0). The northern boundary of the property is a Los Angeles Department of Water and Power easement, and the southern boundary is Del Amo Boulevard. One petroleum/petrochemical pipeline corridor is located within the property near the southern boundary of the Site oriented from east to west.

The Waste Pits OU includes two adjoining parcels of land (Lots 36 and 37), which previously contained six small rectangular pits (2-series pits) and three large rectangular impoundments (1-series pits) (see Figure 2.0). Both the 1-series and the 2-series pits were used for the disposal of wastes and/or waste liquids during operation of a synthetic rubber manufacturing facility which ceased operations in 1972. The 2-series pits were located on the western side of Lot 36 and the 1-series pits, 1-B and 1-C, were located on the eastern side of Lot 36. Immediately east of Lot 36 is Lot 37, which contains a former large, rectangular impoundment designated as Pit 1-A. Impacted soils from Pit 1-A were excavated in four phases from 1982 – 1984 to a depth of 6 feet below ground surface (bgs) at the east side of the pit and to a depth of 25 feet bgs at the west side of the pit. This excavation process was completed under the direction of the California Department of Health Services (now Department of Toxic Substances Control [DTSC]).

As outlined in the *Remedial Design Work Plan, Del Amo Pits Operable Unit*, *Torrance, California*, (Dames and Moore, 1998), the USEPA provided oversight for the construction and installation of the Phase I remedy including installation of the SVE wells (a component of the Phase II remedy). The Phase I remedy, which was performed on the 1-series and 2-series pits, consisted of a Resource Conservation and Recovery Act (RCRA)-equivalent multi-layer cap, soil vapor monitoring probes, a Cap Gas System, security fences, deed restrictions, and surface and subsurface drainage features and operated under the *Operational, Maintenance and Monitoring Manual for the Del Amo Waste Pits Operable Unit* (Parsons, 1999). During 2006, the treatment technology for site vapor was selected, designed, and installed. The Phase II remedy, which is the SVE/IBT System, was placed into optimization testing and full-time operation on August 7, 2006.

In 2013 the SVE/IBT System was analyzed and, based on the conclusions presented in the *Performance Monitoring Event Report of Findings* (PME ROF) (C2 REM, 2014) and approval of the Phase III Redesign, field activities for the abandonment and installation of the new monitoring wells commenced on August 19, 2014.

3.0 SYSTEMS OPERATION AND MONITORING

3.1 CAP GAS SYSTEM OVERVIEW

The Cap Gas System utilizes a series of perforated pipes within the sand layer of the multi-layer cap to capture vapors that may accumulate beneath the cap through extraction via a blower into two activated carbon vessels for treatment. The Cap Gas System monitoring activities in 2014 were conducted pursuant to the requirements, approved by the USEPA, presented in the report entitled *Cap Gas Collection and Treatment Baseline Monitoring and Long-term Monitoring Recommendations Report, Del Amo Waste Pits Operable Unit, Los Angeles County, California,* (C2 REM, 2000). These monitoring activities were conducted to assess the efficiency of the Cap Gas System in the collection and treatment of fugitive soil vapor emissions from the sand layer within the cap (see Figure 3.0).

The Cap Gas System operates for 4 hours a day (10:00 am - 2:00 pm), 5 days a week (Monday - Friday). The Cap Gas System is controlled by a programmable logic controller (PLC) unit, with capability to control and monitor the system and allows for the remote

start and stop operation. In an effort to assess the efficiency and performance of the carbon units of the Cap Gas System, biweekly monitoring was conducted from four sample locations: 1) system influent, 2) effluent of the lead carbon vessel, 3) effluent of the secondary carbon vessel, and 4) system effluent.

3.2 CAP GAS SYSTEM FIELD MONITORING RESULTS

A site-dedicated photo ionization detector (PID) (calibrated to 5 parts per million volume [ppmv] benzene) was used to measure total volatile organic compound (VOC) concentrations at each of the four sample locations. As indicated in Table 1.0, influent sample concentrations recorded in 2014 ranging from 0.0 ppmv to 2.8 ppmv, and system effluent concentrations ranging from 0.0 ppmv to 0.1 ppmv (see Figure 4.0). The average VOC concentration at the influent in 2014 was 0.42 ppmv. Field forms used to record results of the Cap Gas System monitoring events are presented in Appendix A. Due to the Phase III Redesign field activities, the Cap Gas System was only monitored from January 2014 through June 2014.

As outlined in the OM&M Manual and the USEPA-approved carbon bed change-out protocol, when VOC concentrations at the effluent of the Cap Gas System are greater than 5 ppmv and/or when the lead vessel efficiency (in relation to the system influent) falls within Zone 2 for two consecutive monitoring events or Zone 3, carbon shall be replaced to ensure the System is operating within compliance (see Figure 5.0). Based upon this protocol, the lead and/or secondary carbon canisters were not changed out during 2014. Low influent concentrations in the Cap Gas System during 2014 equated to very little carbon usage and based upon the protocol, operational compliance was met.

3.2.1 CAP GAS SYSTEM LABORATORY CONFIRMATION SAMPLING

C2 REM, with the approval of the USEPA (December 4, 2002), modified the scope and frequency of the annual confirmation sampling event for the Cap Gas System from an annual program to once every 5 years. In addition, South Coast Air Quality Management District (SCAQMD) Method 25.1 has been eliminated from the required list of analyses for collected Cap Gas System samples due to the lack of relevant information obtained from the method, as well as the redundancy of using both SCAQMD Method 25.1 and USEPA Method 8260B (the latter of which provides an adequately detailed analysis of site constituents of concern [COC] and other related compounds).

A confirmation sampling event of the Cap Gas System was last conducted on September 11, 2010 and concluded that the PID data and laboratory data have a good correlation with a coefficient of 0.99; thereby, ensuring the effectiveness of field PID monitoring. The next confirmation sampling event will be conducted in 2015 (to coincide with the 3rd 5-year review) and thereafter in 2020.

3.3 SVE/IBT SYSTEM OVERVIEW

The SVE/IBT System was placed into optimization testing and full-time operation on August 7, 2006. The SVE/IBT System monitoring activities in 2014 were conducted pursuant to the requirements as approved by the USEPA and as presented in the report entitled *SVE/IBT Operations, Maintenance and Monitoring Manual* (C2 REM, 2006a). Additional information regarding the design, construction, and performance of the SVE/IBT System can be found in the following documents:

- *Remedial Design Work Plan Addendum,* C2 REM 2005a
- *SVE/IBT Pre-Final Design Report Addendum*, C2 REM 2005b
- *Process Hazard Analysis Report* ,Webb, Murray, & Associates 2005
- *SVE/IBT Operations, Maintenance, & Monitoring Manual*, C2 REM 2006a
- *SVE/IBT Final Design Report,* C2 REM 2006b
- *SVE/IBT Construction Quality Assurance Plan,* C2 REM 2006c
- *SVE/IBT Remedial Action Workplan,* C2 REM 2006d
- *Performance Monitoring Event Report of Findings,* C2 REM 2014
- Preliminary SVE/IBT Remedial *Phase III Design,* C2 REM 2013b

The SVE/IBT System utilizes the extraction/monitoring well network installed during the Phase I remedy to extract vapors at the outer edges of the Waste Pits OU and inject re-circulated vapors along with generated oxygen (O_2) to allow for enhanced vadose zone biodegradation in order to comply with the *Record of Decision* (ROD) (USEPA, 1997). The intent of the ROD cleanup goal is to prevent the migration of contaminants, primarily benzene, from the Waste Pits OU such that they do not contribute more than a 0.5% increase in contaminant concentration of the existing impacted groundwater underlying the Waste Pits OU.

The original SVE/IBT System's final design includes extraction of soil vapors at eight SVE wells (1, 2, 5, 6, 7, 10, 11, and 12), treatment of a portion of the extracted vapors through granular activated carbon (GAC) adsorption, then amendment of the remaining soil vapor volume with generated oxygen and re-injection at four SVE wells (3, 4, 8, and 9) to enhance the natural aerobic degradation observed within the vadose zone.

The SVE/IBT System normally operates 8 hours per day (8:00 am – 4:00 pm), 5 days per week (Monday – Friday). The SVE/IBT System is controlled via a PLC unit with capabilities to automatically monitor and control operation, alarm/shutdown capability, and the means to remotely start and stop system operation. The results of both the pre-system and short-term operations are presented in the *Summary of SVE/IBT Pre-System Startup Operations Technical Memorandum,* (C2 REM, 2007) and the *Summary of SVE/IBT 3-Month Short-Term Operations Technical Memorandum,* (C2 REM, 2006e).

On November 8, 2006, short-term operations ended and the SVE/IBT System has been operating in a long-term OM&M process. The results from the 8th year long-term OM&M period for the SVE/IBT System are presented in this Annual Report. While, benzene is not

the only constituent detected at the Waste Pits OU, it is detected at concentrations in excess of other COCs (e.g. monthly laboratory results for benzene at the inlet of the SVE/IBT System averaged 16,486 ppmv versus the ethylbenzene average of 1,243 ppmv and the toluene average of 50 ppm during this period). Therefore, given that the current SVE/IBT System performance parameters are chemical specific, benzene was selected for discussion purposes. A summary of select laboratory data collected from the SVE/IBT System is provided in Table 2.0.

During the months of February 2012 through January 2013 a PME was conducted to obtain a representative evaluation of the concentrations of COCs. The PME activities consisted of converting and operating the SVE/IBT system as a soil vapor extraction (SVE) only system for a defined period of time (i.e., 5 and 10 pore volume sweeping events) and collect soil vapor concentration measurements conducted in multiple events to evaluate system-wide and sub-area performance in terms of protection of groundwater, achievement of performance standards, and soil vapor rebound characteristics. Results of the PME were presented in the Final PME ROF (C2 REM, 2014)

Information related to the SVE/IBT System collected during this period includes field monitoring results (see Appendix A), field reports (see Appendix B), SVE/IBT System laboratory data results (see Appendix C), and in-line sensor data (see Appendix D), which are discussed in detail in the following subsections.

As stated within the PME ROF, the current SVE/IBT system design was no longer appropriate to address residual conditions due to SVE well screen intervals being impacted by rising groundwater. As a result, a re-evaluation of parameters of the current system configuration and operation were conducted and the proposed Phase III Redesign of the SVE/IBT system was submitted to USEPA on April 9, 2013 and subsequently approved on April 11, 2014.

3.3.1 SVE/IBT SYSTEM OM&M ACTIVITIES

The 8th year of the long-term OM&M activities began in January 2014 and included bi-weekly field monitoring, monthly laboratory sampling of the SVE/IBT System, monthly perimeter well monitoring, and quarterly full-scale field monitoring of perimeter, cluster, vacuum performance, and SVE wells (see Appendix A for all field monitoring results and Figure 6.0 for all well locations). Due to the Phase III Redesign field activities, the SVE/IBT System was only monitored from January 2014 through June 2014.

The SVE/IBT System was monitored at the following four stations (see Figure 7.0):

- Station 1 - Influent: (the combined flow of the nine extraction wells);
- Station 2 - Post Ambient Air: the diversion loop (to the granulated activated carbon beds) just after the ambient air intake;
- Station 3 - Carbon Vessel 1 (C_1): at the effluent of the primary carbon vessel; and,
- Station 4 - Effluent: the effluent stack.

These four measurement points were monitored for VOCs, O_2, carbon dioxide (CO_2), and flow rate using hand-held monitoring instruments. Along with the field monitoring, laboratory samples were obtained at the four sample stations once a month and analyzed for VOCs using USEPA Method 8260B and for fixed gases (i.e., O_2, CO_2, nitrogen, carbon monoxide, and methane) using American Society of Testing and Materials (ASTM) Method D1946 (see Table 2.0 and Appendix C). Corresponding in-line measurements from the PLC unit were also recorded where applicable. The SVE/IBT System in-line sensors record the following parameters: O_2, flow rate, % lower explosive limit (LEL), temperature, relative humidity, and benzene (ppm). Figure 7.0 shows the location of each in-line sensor and its average reading during normal operations in 2014.

Full-scale field monitoring was scheduled quarterly and its scope included taking readings from all the Site's soil vapor monitoring locations (perimeter, vacuum performance, cluster, and SVE wells [see Figure 6.0]). Furthermore, perimeter wells were monitored monthly (wells A, B, C, D, and H) and quarterly (wells E, F, G, I, J, K, L) for VOCs, O_2, and CO_2 to confirm that soil vapors do not migrate beyond the cap boundaries.[1] The procedures for monitoring all wells included measuring well pressure (inches of water), purging the appropriate well volume and analyzing vapors from each well for VOCs, O_2, LEL, and CO_2 with a PID calibrated to benzene and a multi-gas instrument (i.e., RKI) (see Appendix A). In 2014, full-scale monitoring was only conducted in the first 6 months (March and June) due to the Phase III redesign field activities. Additionally, perimeter wells B, C, D, E, F, G, vacuum performance well B', and cluster wells E" , G" located within the Los Angeles Department of Water and Power (LADWP) property in the northern boundary of the site were not monitored due to access limitations from the LADWP. C2REM is currently working with the LADWP in drafting a site access agreement for the property and is expected to be finalized within the 1st quarter of 2015. Upon execution of the site access agreement, monitoring of the subject wells will resume.

3.3.1.1 SVE/IBT System Monitoring Results

Based on laboratory results, the benzene concentrations at the SVE/IBT System influent ranged from 9,400 ppmv to 35,000 ppmv with an average of 16,486 ppmv. The benzene concentrations detected at the post ambient air location ranged from 610 ppmv to 4,900 ppmv. The benzene concentrations at the outlet of C_1 ranged from 0.015 ppmv to 2,600 ppmv. The benzene concentrations at the effluent were non-detect (ND) (<0.005 ppmv) to 0.29 ppmv (see Table 2.0[2]). Benzene concentrations at Stations 1-4 demonstrated that the SVE/IBT System was effective in treating benzene and maintaining acceptable emission limits (i.e., less than 50 ppm) (see Figure 8.0). O_2 concentration at the influent ranged from 8.7% to 12.5% with an average of 11.0. CO_2 concentration at the influent ranged from 17.1% to 21.1% with an average of 19.2. The O_2 generator was operated concurrently with the SVE/IBT System operation during 2014.

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[1] Pursuant to USEPA request (August 15, 2008), monthly monitoring of perimeter wells A, B, C, D, and H began in August 2008.

[2] The sample results at inlet on April 23 (7,500 ppmv benzene, 5.54% CO_2, and 18.3% O_2) were identified as outliers, and these values were excluded in calculating the annual average.

3.3.1.2 Cluster Well Monitoring Results

The primary function of the cluster wells is to assist in determining vertical soil vapor concentration profiles and evaluate the effectiveness of the SVE/IBT System. The field data collected from the cluster wells during this operation period is presented in Table 3.0. O_2 concentrations ranged from 0% to 20.9% with an average of 16.2. CO_2 concentrations ranged from 0% to 27.0% with an average of 4.1%. VOC concentrations ranged from 0 ppm to greater than 15,000 ppm (Note: No average was calculated as some wells were greater than the upper range limit of the PID [0-15,000 ppm]).

3.3.1.3 Vacuum Performance Well Monitoring Results

The primary function of the vacuum performance wells is to measure the pressure response to extraction throughout the targeted zone of remediation (+10 ft. mean sea level [msl] layer). The field data collected from the vacuum performance wells during this operation period is presented in Table 4.0. O_2 concentrations ranged from 2.4% to 20.9% with an average of 13.2%. CO_2 concentrations ranged from 0% to 29.8% with an average of 6.4%. VOC concentrations ranged from 0 ppm to greater than 15,000 ppm (Note: No average was calculated as some wells were greater than the upper range limit of the PID [0-15,000 ppm]).

Based on a review of the 2014 monitoring data for the vacuum performance wells, negative pressure was observed at these wells during quarterly sampling events with the exceptions of Wells C' and N'. The positive or neutral pressure detected at these two locations is most likely due to their close proximity to injection wells.

Additionally, the vacuum performance wells are used to assess the radius of influence of the SVE/IBT System. The nature of the SVE/IBT System (i.e., air re-circulation) makes this observation difficult in Sub-Areas 1 and 2 (where the active remedy is targeted) due to the close proximity of the extraction and injection wells.

3.3.1.4 SVE Well Monitoring Results

The field data collected from the SVE wells during this operational period is presented in Table 5.0. O_2 concentrations ranged from 0% to 23.9% with an average of 4.8%. CO_2 concentrations ranged from 0.2% to 36.6% with an average of 16.9%. VOC concentrations ranged from 0.1 ppm to greater than 15,000 ppm (Note: No average was calculated as some wells were greater than the upper range limit of the PID [0-15,000 ppm]).

3.3.1.5 Perimeter Well Monitoring Results

The primary function of the perimeter wells is to monitor any potential lateral migration of COC's beyond the RCRA-equivalent cap. The field data collected from the perimeter wells during this operational period is presented in Table 6.0. O_2 concentrations ranged from 10.0% to 22.1% with an average of 18.6%. CO_2 concentrations ranged from 0% to

6.8% with an average of 1.8%. VOC concentrations measured with a PID ranged from 0 ppm to 1.3 ppm with an average of 0.06 ppm.

The concentrations of VOCs detected at the perimeter wells indicate appropriate control of the injected air volume, proper performance of the cover system, and demonstrates that soil vapors containing COCs are not migrating beyond the cap boundaries (see Figure 9.0).

3.3.2 SVE/IBT SYSTEM OPERATION SUMMARY

In 2014, the SVE/IBT System operated for 776.2 hours out of 912 possible hours (assuming 8 hours/day, Monday-Friday [January - May and December 2014]). The continuous operation of the O_2 generator concurrent with the SVE/IBT System, coupled with minimal increase in O_2 concentrations at the SVE/IBT influent, provide strong indications of a sustained microbial population removing benzene through biodegradation. Downtime during this period is attributed to carbon change-outs, monitoring, and routine system maintenance (see Table 7.0). In addition to the above mentioned downtime, the system did not operate during the Phase III Redesign field activities (1168 hours).

The overall operation efficiency during this period was 85%. Total estimated operating parameters are as follows:

- Injected re-circulated air volume - approximately 1,103,756 standard cubic feet (scf) at an average flow rate of 23.7 standard cubic feet per minute (scfm);
- Generated O_2 gas injected - approximately 186,288 scf at an average flow rate of 4.0 scfm and 91% purity;
- Extracted air volume - approximately 1,518,247 scf at an average flow rate of 32.6 scfm; and,
- Treated air volume - approximately 414,491 scf at an average flow rate of 8.9 scfm.

During normal operational period in 2014, the SVE/IBT System operated in a manner consistent with design parameters and has effectively removed a total of approximately 3,222 kg (7,103 lbs) of benzene through degradation (2,591 kg [5,713 lbs]) and adsorption (631 kg [1,390 lbs]). Table 8.0 provides the parameters and calculations used to estimate the total mass of benzene removed through degradation and adsorption. Based on the treatment rate monitored by in-line sensor and the average benzene concentration from laboratory analytical results, the SVE/IBT System is adsorbing approximately 6.5 kg/day (14.3 lbs/day) of benzene through the carbon beds (based upon the operational hours stated above), and is degrading approximately 16.4 kg/day (36.2 lbs/day) of benzene *in situ* as measured by O_2 utilization (based upon continual degradation [24 hrs/day, 158 days for normal operation]).

Fresh and spent carbon weights are recorded before and after each SVE/IBT System carbon change-out. Based on these weight comparisons, approximately 1,468 kg (3,237 lbs) of Site constituents and SVE/IBT System condensate were adsorbed to both the primary and secondary vessels. There were three carbon change-outs conducted during 2014 (including one carbon change-out on 1/13/2015, resulting from system operation

from 12/02/2014 – 1/12/2015). An average of 489 kg (1,079 lbs) of Site constituents were adsorbed per carbon change-out (see Table 9.0). All carbon was transported offsite to a certified carbon reactivation facility (see Appendix E).

Since the startup of the SVE/IBT System on August 6, 2006, a total of approximately 60,485 kg (133,346 lbs) of benzene have been removed from the Waste Pits OU (approximately 45,745 kg [100,850 lbs] through degradation and approximately 14,740 kg [32,496 lbs] through adsorption to carbon) (see Figure 10.0).

4.0 GROUNDWATER MONITORING

4.1 INTRODUCTION

Annual groundwater monitoring, including gauging and sampling of eleven Site groundwater monitoring wells, completed in the water table aquifer, was conducted in accordance with the recommendations contained within the *Second Five Year Review Report* (USEPA, 2010). The Groundwater monitoring event occurred in September 2014.

The monitoring event was conducted pursuant to requirements in the *Administrative Order (AO) for Remedial Action, Docket No. 99-08, Del Amo Waste Pits Operable Unit, Torrance, California* (USEPA, 1999) and the *Operations, Maintenance and Monitoring Manual for the Del Amo Waste Pits Operable Unit, Torrance, California*, (C2 REM, 2013c) (OM&M Manual).

4.2 BACKGROUND

Nineteen groundwater monitoring locations around the Del Amo Waste Pits area were utilized to provide means of monitoring the Water Table (WT) Aquifer which assisted in developing Site remedial action objectives (RAOs) in 1998. Groundwater data collected in 1998 were used to calculate the baseline average groundwater concentration in each of the four sub-areas. Of these 19 groundwater monitoring locations, some were one-time Cone Penetrometer Test (CPT) locations and others have been abandoned, leaving 11 wells remaining. These 11 existing wells are used for gauging and sampling during monitoring events (see Figure 11.0).

Groundwater monitoring was conducted in connection with the Del Amo and Montrose Chemical Superfund groundwater operable units from 1994 through 2000 and again in 2004 and 2006. Not all of the 11 groundwater monitoring wells associated with the Site were gauged and sampled in each of the referenced events. The historical records of these events are summarized in the *Combined 2006 Baseline Monitoring / TCE and Benzene Plumes Data Acquisition Report* (URS, 2007) and the *Groundwater Monitoring Report, Dual Site Groundwater Operable Unit* (URS, 2012).

In 2014, groundwater sampling was conducted as a part of AECOM/URS Baseline Groundwater Monitoring event for the dual Montrose Chemical and Del Amo Superfund site. The purpose of the baseline event is to establish groundwater conditions prior to

start-up of the newly installed Torrance Groundwater Remediation System (TGRS) designed to treat the combined Operable Unit plume.

4.3 OBJECTIVES

The primary objective for sampling the subject 11 groundwater monitoring wells is to verify that the specified performance standard for the Site is being achieved (i.e., COCs from the Waste Pits OU shall not cause an incremental groundwater contribution in excess of 0.5% of the existing groundwater COC concentration).

The Second Five Year Review Report issued on September 22, 2010, further identifies the necessity of finalizing or revising the methodology for measuring progress toward achieving the soil cleanup standard. The 2014 annual groundwater sampling provides relevant data needed to develop the finalization/revision of the RAOs for this Site.

4.4 METHODOLOGY

Groundwater gauging, sample collection and handling of purged water was conducted in accordance with the previously prepared and USEPA-approved Field Sampling Plan and Quality Assurance Project Plan (URS, 2004). Each of the monitoring wells was gauged for total well depth and depth to water. Purging and sampling of each well was completed using a low-flow submersible pump and attached polyethylene tubing. For wells without dedicated pumps and tubing, a cleaned temporary pump and new disposable tubing was used. Water quality parameters were field analyzed for temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation reduction potential (see Table 10.0). Purge rates were maintained from 200 to 400 milliliters per minute and were adjusted to achieve three consecutive measurements within 10% of each other.

Groundwater samples were placed into laboratory supplied sample containers then placed in a cooler and chilled to a temperature of approximately 4°C for shipment to a laboratory for chemical analysis. Each laboratory-provided container was labeled with the following information: location, ID number, date, time, sampling personnel, and analyses required. This information was also entered on a chain-of-custody form. At the end of the sampling efforts, groundwater samples were forwarded to Eurofins/CalScience Analytical Laboratories, Inc., along with chain-of-custody forms, for the analysis of VOCs including tert-butyl alcohol (TBA) by EPA Method 8260B and biodegradation indicators, including methane by RSK-175M, ferrous iron by SM 3500-FeB, sulfate and nitrate by EPA Method 300.0, total alkalinity by SM 2320B, and carbon dioxide by SM4500-CO2D.

4.5 GROUNDWATER ELEVATIONS

Groundwater gauging of the 11 existing Site wells in 2014 demonstrates that groundwater elevations have remained relatively unchanged from the previous year. Groundwater elevations ranged from a high of -9.25 feet at SWL0044 to a low of -10.44 feet at XP02. In a short-term observation, groundwater elevation had declined from 2011 to 2013. This decline is suspected to be the result of the recent drought conditions in Southern California

causing a reduction in groundwater recharge. In a long-term observation, groundwater elevations have an overall rising trend in relationship to previous levels, generally 1.0 to 1.5 feet since the 2006 sampling event (see Figure 12.0). This rising is due to an overall reduction of regional pumping for both potable and agricultural uses. The *Groundwater Monitoring Report* (URS, 2012), states, "the gradient is generally southwesterly, but is highly variable, including local areas of mounding in the vicinity of the waste pits area and near the southeast corner of the plant site". Based on the 2014 groundwater data collected, the gradient in the vicinity of the Waste Pits is relatively flat (see Figure 13.0). Some of the deeper soil-vapor monitoring points (-10' msl), as well as the deeper intervals of the recently abandoned SVE wells, are at or near the saturated zone and are influenced by vapor off-gassing from groundwater.

4.6 GROUNDWATER QUALITY

Analytical laboratory results and field data sheets are presented in Appendices F and G, respectively; and a tabular summary of results is presented in Table 11.0 and 12.0.

VOCs are primary COCs for the Site with benzene being the most prevalent constituent. Benzene was detected at groundwater wells at PZL0020, SWL0008, SWL0044, XMW-29, and XP-02. Benzene concentrations exceeding the Federal maximum contaminant level (MCL) were reported at PZL0020 with 280,000 µg/L, XMW-29 with 36,000 µg/L and SWL0008 with 12 µg/L. Benzene concentrations exceeding the California MCL were reported at SWL0044 with 2.1 µg/L, and XP-02 with 2.1 µg/L in addition to the wells listed above. Benzene was not detected in samples collected from PZL0018, PZL0022, PZL0024, PZL0025, and SWL0051, with the laboratory detection limits (<0.5 µg/L), which is below the California MCL of 1 µg/L.

To further assess benzene concentration trends, a non-parametric statistical analysis was performed (Mann-Kendall analysis), which identified either an increasing trend, decreasing trend, stable, or no trend. Historical benzene concentrations for each well are also shown in Figure 14.0.

Presented below is a summary of the Mann-Kendall trends, based on the sampling events conducted from 1994 – 2014 (this statistical analysis is presented in Appendix H):

Well	**Mann-Kendall Trend**
PZL0018	No Trend – Result Below Detection Limit
PZL0019	Stable – (1994-2013)
PZL0020	Decreasing
PZL0022	Stable – Result Below Detection Limit
PZL0024	Decreasing – Result Below Detection Limit
PZL0025	Decreasing – Result Below Detection Limit

Well	**Mann-Kendall Trend**
SWL0008	Decreasing
SWL0044	Decreasing

SWL0051	Decreasing – Result Below Detection Limit
XMW29	No Trend
XP02	No Trend

Based on review of the analytical laboratory results and the Mann-Kendall analysis, the benzene concentration in the groundwater samples collected from monitoring wells PZL0018, PZL0022, XMW29, and XP02, had no trends. Benzene concentration at PZL0019 also had no trend from 1994 through 2013 although groundwater sample was not collected in 2014 due to the presence of non-aqueous phase liquid (NAPL). The benzene concentration in the groundwater samples collected from monitoring wells PZL0020, PZL024, PZL0025, SWL0008, SWL0044, and SWL0051 had decreasing trends and there were no wells identified with increasing trends.

Benzene concentration at PZL0018 was non-detect and the concentration has decreased since the last concentration increase that occurred sometime after the 2000 sampling event. Benzene concentration at PZL0020 has remained consistent although PZL0020 had a decreasing trend. Benzene concentration at XMW29 was 36,000 µg/L, which was an increase from 5,100 µg/L in 2013 while the concentration remains within the recent observed range. Benzene concentration at SWL0008 was 12 µg/L and the concentration for this well has fluctuated from 1994 to 2004 and the concentrations have decreased from 2004 to 2014. Benzene concentrations were non-detect to low concentration at PZL0022, PZL0024, PZL0025, SWL0044, SWL0051 and XP02. Benzene concentrations at PZL0022, SWL0051, and XP02 have remained low or non-detect over time. Benzene concentrations at PZL0024 remained consistent from 1994 to 2000 but the recent concentrations at this well have decreased and remained non-detect. Benzene concentrations at PZL0025 remained consistent from 1994 to 1997, but the recent concentrations at this well have decreased and remained non-detect. Benzene concentrations at SWL0044 remained high from 1995 to 2006, but the recent concentrations at this well have decreased and remained low.

During the 2014 monitoring event, NAPL was observed in well PZL0019, which is located in the northwest end of the Waste Pits in sub area 2 (approximately 65 feet north of Pit-2D). Benzene has historically been detected in this groundwater well with concentrations ranging from 240,000 µg/L to 400,000 µg/L over the past several years, which is approximately 13.4 to 22.3 percent of the solubility limit of benzene in water (1,790 mg/L A sample of the NAPL was obtained and was analyzed at the Shell Technology Center in Houston by gas chromatography/mass spectrometry (GC/MS; a method similar to EPA Method 8270). Results indicate that the sample contained a mixture of mostly aromatic hydrocarbons, primarily benzene, substituted benzenes (i.e., ethylbenzene, toluene, styrene, etc.), polycyclic aromatic hydrocarbons (PAHs), and sulfur. Additional testing with infrared spectroscopy indicated that the sample was comprised of a mixture of styrene-containing polymers and aromatics. These analyses are consistent with historical waste pit samples, indicating that the identified material is a historical remnant that recently entered the well and is not associated with a new/unknown source.

Other VOCs detected at concentrations above a Federal or California MCL were ethylbenzene, toluene, and trichloroethene (TCE). Ethylbenzene and toluene were detected at PZL0020 at concentrations of 9,800 µg/L (Federal MCL is 700 µg/L) and 970 µg/L (California MCL is 150 µg/L), respectively. These VOCs were detected where the benzene was concurrently detected at the highest concentration (280,000 µg/L). TCE was detected at SWL0051 at a concentration of 5.9 µg/L. (Federal MCL is 5 µg/L) where benzene was not detected.

Other constituents detected at concentration above Notification level were naphthalene and TBA. Naphthalene was detected at XP02 at a concentration of 24 µg/L (Notification level is 17 µg/L). Naphthalene was not detected at other groundwater wells; however, elevated reporting limits were noted for the samples analyzed at PZL0020 and XMW29 due to the laboratory dilution factor because of benzene concentrations. TBA was detected in the sample collected at SWL0008 only, and the concentration was 36 µg/L (the Notification Level is 12 µg/L) (see Table 11.0).

Groundwater samples had been analyzed for semi-volatile organic compounds (SVOCs) by USEPA Test Method 8270C until 2013. SVOC concentrations were generally low and consistent with historic levels, with naphthalene being the only SVOC that is present in concentrations above the California Notification Level. Within the 2012 Annual Report, C2 REM recommended that SVOC testing be dropped from future groundwater monitoring events, while maintaining naphthalene in the analytical methodology (USEPA 8260B) and the recommendation was approved by USEPA in February, 2014.

In addition to VOCs analysis, biodegradation indicators were analyzed in 2014 as a part of AECOM/URS Baseline Groundwater Monitoring event for the dual Montrose Chemical and Del Amo Superfund site. The primary purpose of groundwater monitoring for the 11 groundwater wells is to analyze dissolved VOCs, primarily benzene, in groundwater and to calculate the specified performance standards. The discussion of analytical results in this report is focused on the VOC concentrations and their trends. Other analytes in Table 12.0 are presented for completeness.

4.7 GROUNDWATER AVERAGE AND PERFORMANCE STANDARDS

In accordance with the OM&M Manual, Appendix G, Attachment 1 (C2 REM, 2012), protocols for calculating an average groundwater concentration and developing performance standards (including Soil Remediation Goals [SRG] and Soil Remediation Contingency Standards) were developed for each of the four sub-areas. The ROD-Specified Performance Standard (RSPS) is a requirement for limiting the incremental contaminant contribution from the vadose zone to groundwater (0.5% of the existing average groundwater concentration) at any point in time, and it was calculated for each sub-area using the average groundwater concentration and other input parameters selected to be representative of the specific site conditions. Finally, the Soil Remediation Contingency Standard and SRG were calculated using the average groundwater concentration and the RSPS. In addition, Appendix I also includes example calculations of the initial values of these parameters prior to the SVE/IBT operation. The average

groundwater concentrations and performance standards will be periodically updated with data collected from groundwater sampling.

4.7.1 AVERAGE GROUNDWATER CONCENTRATION

Groundwater monitoring results were used to calculate an average groundwater concentration and a vapor concentration equivalent to groundwater for each sub-area. Groundwater concentrations in each sub-area were estimated using the method of kriging utilizing the SURFER program (Golden Software Inc.). Analytical results from the 11 existing groundwater wells were used and each sub-area was divided into a grid of square cells measuring 2-feet on each side and kriged to obtain concentrations for each cell (see Figure 15.0). As groundwater was not sampled in 2014 at PZL0019 due to the presence of NAPL, data for this well was substituted with 2013 groundwater data. An average groundwater concentration was calculated in each of the 4 sub-areas. The calculated average concentrations are 144,300 µg/l, 238,600 µg/l, 67,800 µg/l, and 12 µg/l in sub-areas 1 through 4, respectively (see Table 13.0).

Additionally, the groundwater data was supplemented with additional historical data collected from abandoned locations, using data collected in 1993 and 1998. The data from 11 existing wells and 8 historical wells was kriged and an average groundwater concentration was calculated in each of the 4 sub-areas as described above (see Figure 16.0). The calculated average concentrations are 149,500 µg/l, 365,400 µg/l, 146,200 µg/l, and 4,700 µg/l in sub-areas 1 through 4, respectively (see Table 13.0).

4.7.2 PRFORMANCE STANDARDS

The SRG for each sub-area was calculated in accordance with the protocols described in the OM&M Manual Appendix G, Attachment 1 (C2 REM, 2012). The SRG is defined as the geometric mean of the RSPS and soil vapor concentration that is in equilibrium with the groundwater concentration. The calculated SRG, using only the 11 existing wells is 730 ppmv, 1,200 ppmv, 340 ppmv, and 0.06 ppmv in sub-areas 1 through 4, respectively (see Table 13.0 and Appendix I). The calculated SRG, using the data collected from the 8 abandoned wells in addition to the 11 existing wells is 760 ppmv, 1,800 ppmv, 740 ppmv, and 24 ppmv in sub-areas 1 through 4, respectively (see Table 13.0 and Appendix I).

5.0 INSPECTIONS

Quarterly inspections were conducted in accordance with the OM&M Manual (Section 4.0) on March 28, 2014; June 19, 2014; September 29, 2014; and December 22, 2014, for the cover system, the Cap Gas System, the SVE/IBT System, surface and subsurface water drainage systems, security fences, and access roads.

Additionally, all SVE well heads, connected and not connected to the SVE/IBT System, were inspected and monitored for leaks utilizing a PID calibrated to benzene. These inspections are conducted quarterly and will continue at this frequency throughout the SVE/IBT System's operations (see OM&M Manual, Section 6.2.1).

A post rain inspection was conducted on March 3, 2014. No post-seismic inspections were warranted in 2014. The OM&M Manual established the criteria necessitating such inspections in order to identify any matters of concern and/or areas in need of repair following a qualifying rain or seismic event. Post-rain inspection events are conducted following periods of heavy rainfall, defined as 1 inch or greater within a 24-hour period. Further, post-seismic inspection events are conducted based upon an earthquake's magnitude and the epicenter's distance from the Site. The completed inspection forms used during quarterly, post-rain, and post-seismic inspection events are presented in Appendix J.

5.1 SUMMARY OF COVER SYSTEM INSPECTION EVENTS

During the cover system inspection events, no unusual or significant settlement, erosion, sediment build-up, slope instability, or shifting were observed. A few areas exhibited some evidence of burrowing animals and a few areas of vegetation stress, which were addressed during routine site maintenance and/or through ongoing monitoring/observation. The temporary above-ground irrigation system, which was installed in July of 2007 to assist with maintaining the cover system vegetation, operated from January through June 2014; however, due to the start of the Phase III field activities, the irrigation system was removed in August 2014. Due to the limited irrigation and repetitive traffic on the cover system by the field rigs during the Phase III field activities, vegetation die-back was observed in large areas of the cover system. A new irrigation system will be installed in 2015 to reestablish vegetation of the cover system. The results of the cover system inspection events are presented in Table 14.0. In addition, the cover system is subject to monument elevation measurements to monitor and track historical ground movement and settlement. The most recent monument survey was conducted in March of 2010. The next survey event is scheduled in 2015.

5.2 SUMMARY OF CAP GAS SYSTEM INSPECTIONS

Inspection of the Cap Gas System included observations of the above-ground components including: air intake and outlet collection headers, inlet and outlet valves, hoses and fittings, two 55-gallon carbon canisters, an extraction blower, sampling ports, and a moisture separator canister. The treatment system did not operate during Phase III redesign field activities (June 25 to December 1, 2014). The Cap Gas System inspection events did not reveal any significant issues in 2014, outside of routine remedial maintenance, and the results are presented in Table 15.0.

5.3 SUMMARY OF SURFACE AND SUBSURFACE DRAINAGE INSPECTIONS

The concrete-lined drainage swales, catch basins, and drainage culverts were visually inspected to identify the presence of cracks, plugging, ponding, sediment or vegetation build-up, separation, and/or structural failure (see Tables 16.0 and 17.0). The results of the surface and subsurface drainage inspection events did not reveal any significant issues and minor repairs were made during routine site maintenance.

5.4 SUMMARY OF SECURITY FENCE AND ACCESS ROAD INSPECTIONS

Visual inspections of the security fence, gates, and signage were performed to identify breaks, vandalism, settlement damage, loose tension, and corrosion. The security fence inspection events did not reveal any significant issues, outside of minor routine maintenance, and the results are presented in Table 18.0. The gravel access road was inspected to identify dispersion of gravel and/or vegetation overgrowth. The access road inspection events did not reveal any significant issues, outside of minor routine maintenance, and the results are presented in Table 19.0. Additionally, C2 REM submitted a request to the Los Angeles Department of Transportation to red mark the curbs to the site's entrance along Vermont Ave. in order to create a necessary buffer for safe entry and exit of emergency responders and service/work vehicles. This request was implemented in July 2014.

5.5 SUMMARY OF SVE/IBT INSPECTIONS

Inspections of the SVE/IBT System included visual assessments of system conditions as well as mechanical assessments on an as-needed basis (see Table 20.0). Visual inspections were conducted on above-ground components and included the following:

- SVE wellheads;
- Ball valves;
- Sampling ports;
- Piping and Fittings;
- Carbon absorber vessels;
- Blowers A & B;
- O_2 generator;
- System in-line sensors; and,
- PLC unit, instrumentation, and data recorders.

The system did not operate during Phase III redesign field activities and their preparation from May 8 to December 1, 2014. No significant repairs were made to the SVE/IBT System in 2014. Periodic calibration and maintenance were performed on the in-line sensors during the first and second quarter in 2014. Sensors that needed repair were returned to the manufacturer and re-installed following corrective measures.

6.0 ROUTINE MAINTENANCE

Routine observations and corrective actions were conducted in 2014 to: 1) ensure that the integrity of the containment system is maintained; 2) reduce the probability of malfunction; 3) provide a mechanism for early detection of system failures; 4) repair identified system failures; and, 5) ensure the efficient management of OM&M activities (see Appendix B for field daily reports). Repairs of failed and non-functional components of the Phase I and Phase II remedies are conducted pursuant to Section 10.0 of the OM&M Manual.

6.1 COVER SYSTEM

Routine maintenance of the cover system included control of weeds and debris, vegetation (turf height), and burrowing animals. Regularly scheduled mowing of the grass (California mix) on the cap and the surrounding areas has maintained the required turf height (less than 1 foot) and helped control potential fire outbreaks by eliminating the build-up of dry grass thatch. The occurrence of burrowing animals is regulated in order to prevent damage to the cover system. During the Phase III field activities, limited maintenance was implemented for vegetation cover system due to the removal of irrigation system, repetitive traffic by the field rigs, and consequent vegetation die-back. (Note: a new irrigation system will be installed in 2015 to replace the system removed during the Phase III field activities).

6.2 GAS COLLECTION AND TREATMENT SYSTEM

Weekly visual observations were conducted of the Cap Gas System's above-ground components and system enclosure to identify potential maintenance requirements and/or repairs. Further, the Cap Gas System was routinely accessed via the PLC unit to ensure that the mechanical components of the blower and control unit were properly operating to reduce the probability of malfunction.

6.3 SURFACE AND SUBSURFACE DRAINAGE SYSTEMS

As part of the scheduled landscape and maintenance of the site cover system, the surface and subsurface drainage systems were routinely inspected for any cracking, settlement, and/or debris build-up. The surface drainage swales and catch basins were regularly cleared of vegetative debris and/or sediment build-up. Minor caulking repairs were made to v-ditch joints periodically when signs of weathering were observed; however, no additional maintenance or repair of the surface and subsurface drainage systems was required in 2014.

6.4 SECURITY AND PERIMETER FENCE

Breaks, vandalism, and general signs of deterioration of the perimeter fencing are repaired as part of routine maintenance. Signage and locks were replaced periodically when found missing or damaged as well.

6.5 ACCESS ROAD

The gravel access road was routinely inspected for the dispersion of gravel and/or vegetation overgrowth. The access road was heavily used during the injection well construction on Lot 37 (discussed in Section 6) and restored to good condition by the Contractor following the completion of construction activities. The access road was regularly cleared of encroaching vegetative material during scheduled landscape maintenance activities. The existing gravel access road was well-maintained and no significant repairs were required in 2014.

6.6 SVE/IBT SYSTEM

SVE/IBT components that require routine maintenance and monitoring to ensure proper functioning include the following inline meters: five O_2, five LEL, five flow/temperature, three temperature, one relative humidity, one pressure sensor, two air-moisture separator level switches, and one effluent PID. Also included as part of the SVE/IBT components are one O_2 generator, two blowers, and four automated motor-actuated valves. Daily visual confirmation of the functioning and trends of each component is conducted through accessing the PLC unit remotely to ensure that these components are properly operating to reduce the probability of malfunction. Weekly onsite visual observations of the SVE/IBT System's above-ground components and system enclosure were conducted to identify potential maintenance requirements and/or repairs.

Routine maintenance items conducted on the SVE/IBT System in 2014 included: replacement of sample ports, replacement of portions of the piping insulation, change-out of carbon, calibration/maintenance of in-line meters, and greasing of the O_2 generator blower. Additionally, bi-weekly SVE/IBT field monitoring was conducted to compare the readings with the in-line meters to assess any significant deviations. Lastly, routine calibration of the O_2, LEL, and effluent PID meters was performed to ensure ideal gas ranges are present in each meter.

6.7 ONSITE TRAILERS AND STORAGE BIN

The onsite trailer and storage bin are routinely inspected for damage and incidents of vandalism. In an effort to further deter individuals from approaching onsite structures and to protect integral remedial system components, new cameras, motion detection sensors, and an alarm system were installed in 2009. Continuous monitoring with the motion detectors and surveillance cameras occurs during non-working hours and the cameras can be assessed remotely to observe Site status. No incidents of vandalism were observed on the property during 2014.

7.0 WASTE DISPOSAL

In 2014, the Waste Pits OU generated waste from different activities and included activated carbon, SVE/IBT System condensate, soils, PVC pipes, cement grout, and personal protective equipment/sampling media. All waste generated on-site was handled, stored, transported, and recycled/disposed in a manner consistent with current USEPA regulations. Additionally, all containerized waste was properly characterized, labeled, and then picked up from the Waste Pits OU within all required time frames by the designated primary licensed waste haulers. All waste generated at the Waste Pits OU was properly manifested using appropriate non-hazardous and hazardous waste manifest forms to track the waste from the point of generation to the point of final disposition. Lastly, all waste was shipped to an authorized waste disposal facility. See Table 21.0 for a summary of the Site-generated waste in 2014.

8.0 PHASE III REDESIGN

As presented in the PME ROF, the current SVE/IBT system design was no longer appropriately addressing residual conditions due to the rising groundwater in the SVE well screen intervals. Based upon this condition, a Phase III Redesign was developed and presented to the USEPA on April 9, 2013. The redesign consisted of abandoning a total of 23 soil vapor wells to mitigate water intrusion caused by the rising groundwater table (since their installation in 1999) and to eliminate the potential for creating a conduit from vapors in the groundwater capillary fringe across stratigraphic units. Upon completion of the well abandonment activities, nine multi-depth soil vapor wells were installed under the oversight of the USEPA.

8.1 SITE PREPARATION AND HEALTH & SAFETY

Prior to the commencement of field activities, various site preparation activities were conducted. The site Health and Safety plan (C2 REM, 2014) was revised to incorporate the proposed Phase III field activities and included task specific Job Safety Analysis, Standard Operating Procedures and supporting documents/procedures. The system was shut down and vapor probe field monitoring conducted to ensure concentrations for VOCs and oxygen were within acceptable safety ranges prior to drilling activities. The conveyance piping was purged with ambient air to clear any residual vapor and condensate prior to the pipe removal. Underground Service Alert (Dig Alert) was notified prior to the start of field work to allow for member utility companies to mark underground lines that might conflict with the abandonment/installation activities. On July 3, 2014, a USEPA Community Flyer was distributed to the neighboring residents to inform them of the upcoming activities.

Additionally, site access was restricted via a controlled perimeter fence and exclusion zones were properly delineated and further restricted to authorized work personnel. The decontamination zone and equipment preparation area were located adjacent to the exclusion zones in order to limit personnel in the exclusion zone to essential workers only. Due to the potential for elevated benzene concentrations during the well abandonment phase of the work, several personal air monitoring events were conducted by a certified industrial hygienist (CHI) to ensure the respiratory safety of all field personnel. Tailgate safety meeting was conducted daily with all contractors' personnel in attendance to discuss JSAs, SOPs, modifications, and any potential hazard identified during pre-work site walk. Stop work events, positive interventions, and safe work practice changes were recorded daily and discussed with staff and subcontractors during a daily twilight safety meeting.

8.2 DESCRIPTION OF REDESIGN FIELD ACTIVITIES

The redesign field activities primarily consist of well abandonment, well installation, conveyance pipe removal, and conveyance pipe installation.

The abandonment of the SVE wells commenced on August 20, 2014 and consisted of abandoning the 23 existing SVE wells within subareas 1 – 4 (see Figure 17.0). The wells were abandoned using pressure grouting along with nitrogen purge. A flexible tremie line

was used to introduce cement grout into the 30° angled wells. Cement grout was filled up to the ground surface and the remaining wellheads were removed. Well abandonment was completed on September 3, 2014.

Installation of surface casings commenced on September 8, 2014 and consists of excavation, liner penetration, and surface casing placement for the nine new well locations. The excavation and liner penetration was conducted using air knife, dig bar, and cordless reciprocating saw. Surface casing placement was conducted using hydraulic push with drill rig and completed on September 12, 2014.

Well installations commenced on September 15, 2014 and consist of soil core sampling and dual screen well installations for nine locations (see Figure 18.0). Drilling activities for soil core sampling were conducted prior to drilling activities for well installations, and a boring log was completed for each location by a professional geologist. Well construction diagrams were completed during well installations. Soil samples collected during drilling activities were analyzed for waste characterization. Soil waste generated from drilling activities was placed into the waste bin and disposed offsite as RCRA hazardous waste for incineration. Well installations were completed on October 6, 2014.

Liner Repair commenced on October 20, 2014 and consisted of excavation around surface casing and booting. Excavation around surface casing was conducted using mini-excavator to 1 foot above liners. The remaining excavations to the liners were conducted using an air knife. The liner and surface casing were sealed using a fabricated high-density polyethylene boot that was extrusion welded to the existing VFPE (low density polyethylene) liner and sealed to the casing with butyl rubber gaskets, liner repair was completed on October 31, 2014 and surface casing excavation was backfilled on November 11, 2014.

The removal of conveyance piping commenced on October 9, 2014. The conveyance pipes were purged with ambient air to clear any residual vapor and condensate prior to removal (see Figure 19.0). Pipes were exposed by hand digging and cut into approximately 10 foot pieces and place in a waste bin for offsite disposal to an approved RCRA hazardous waste for macro/micro encapsulation facility. Removal of conveyance piping was completed on October 21, 2014.

The trenching, wellhead and conveyance piping installation was conducted from October 21 through November 24, 2014. The pipe consisted of 4 inch and 2 inch PVC pipes, and they were placed in the 1 foot deep trench (see Figure 20.0).

8.3 DESIGN DEVIATIONS & PROCESS HAZARD ANALYSIS

While no substantial deviations were encountered during the implementation of the Phase III redesign, several adjustments / modifications were made in the field to the proposed design and have been properly documented in the As-Built drawings (see Appendix K-1). The adjustments / modifications are as follows:

- An additional ball valve was added to each SVE well (both extraction and injection) in order to enable isolation of both the well and conveyance piping for sampling activities that are required under normal operational conditions. The change reflects a similar configuration modification made to the original SVE wells shortly after systems operations began in 2007.

- Wellhead design was modified to exclude the use of a 4 in. flange to flange connection point due to space limitations that would have resulted in wellhead finished elevation above ground surface to exceed 2 -1/2 ft. with no appreciable benefit. The flange connections were replaced with removable threaded caps sealed with thread sealing tape.

- The surface casing was re-designed from a continuous cement grout (surface to grout) to only add grout up to the liner and hydrated bentonite from the liner to approximately 4-6 in. from the top of the surface casing for a better seal. Cement grout will be added to the completion of the final well in 2015.

- Wells IW-1 and IW-2 were relocated south of the design coordinates due to the presence of gas cap collection piping encountered when penetrating the subsurface liners. The As-Built coordinates are provided and represent only minor deviations from the original design as survey staked prior to well installation.

- Well EW-4 was relocated approximately 3 ft. west of the design coordinates to avoid posing a potential obstruction to vehicular traffic entering the site to perform carbon change-out events and other similar operations and maintenance operations.

- A 4 in. PVC sump designed to be placed on the extraction header piping located behind the treatment enclosure was not installed due to space limitations and potential hazards associated with collection piping unsecured and above ground.

Additionally, a process hazard analysis (PHA) was performed to identify and analyze events/conditions that could potentially develop into a process hazard. The PHA focused on the SVE/IBT treatment system equipment located in the treatment compound. Two items related to the wellheads were evaluated in this PHA and include: 1) All Injection wells being blocked-in during startup; and 2) All extraction wells being blocked-in during startup. Both of the above items are considered low risks that can be mitigated through operating procedures and process instrumentation. After completing the PHA, a minor design modification was made at each wellhead to facilitate well purging during sampling events and to improve flow control. The modification consisted of a pipe 'tee' with a threaded plug and an angle globe valve added to the wellhead between the isolation ball valve and the pipe manifold. The additional valve and threaded plug do not significantly impact the hazard analysis, and any associated process risks are addressed in the operating procedures. Additional PHA investigation associated with the minor process change is not required.

8.4 THE SYSTEM START UP

The system started extracting and recirculating along with GAC treatment without oxygen injection on December 1, 2014. Installation of oxygen pipes was completed and oxygen injection was resumed on December 8, 2014. During this shake down period, the integrity of new wells and its components were evaluated and necessary maintenance and repairs were conducted.

Three month short term operation will start on January 1, 2015 along with the continued shakedown period, maintenance and monitoring will be conducted during this period. These consist of flow adjustments, weekly system monitoring laboratory sampling, vapor probe monitoring, and in-line sensor maintenance.

All records documenting the Phase III redesign field activities are included in Appendix K-1 through K-5. These subject records consist of As-built drawings, air monitoring logs, well abandonment logs, well installation logs (task lists, boring logs, well completion diagrams), and tailgate safety meeting forms.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Following the 15th year of operation of the Phase I remedy (e.g., multilayer cap, Cap Gas System, soil vapor monitoring probes) and the 8th year of operation of the Phase II remedy (i.e., SVE/IBT System), the Del Amo Waste Pits OU remedies continue to function and remain protective in a manner consistent with the ROD. Provided below are conclusions and recommendations developed based on the results presented herein:

- The cover system and the other associated systems have functioned as designed during 2014, and the required inspection and monitoring frequencies are sufficient in assessing all remedy components.

- The SVE/IBT System and associated components continued to remove on-site COC mass through biodegradation and absorption to carbon (16.4 kg (36.2 lbs) of benzene per calendar day and adsorbing approximately 6.5 kg (14.3 lbs) of benzene per operational day). To date, the SVE/IBT System has removed approximately 60,485 kg (133,346 lbs) of benzene from the Waste Pits OU (approximately 45,745 kg [100,850 lbs] through degradation and approximately 14,740 kg [32,496 lbs] through adsorption to carbon).

- The SVE/IBT system was temporarily shut down during construction of the Phase III redesign (abandonment of 23 wells and installation of nine dual completion wells) as the current SVE/IBT system design was no longer deemed appropriate in addressing residual COC conditions due to SVE well screen intervals being impacted by rising groundwater. As a result of the installation of the new wells, the frequencies of field monitoring of the GCTS System, SVE/IBT System, and lab sample collection, will be modified to once a week for the first quarter in 2015 to perform a system “shake-down” process. Based on the evaluation and observation

of the system operation during the first quarter in 2015, the monitoring frequency will be readjusted for the remaining quarters.

- The frequency of perimeter well monitoring, and full scale monitoring of cluster, vacuum performance, and SVE wells appear appropriate and will continue on the current schedule. Field monitoring of cluster and vacuum performance wells in sub-areas I and II only will be conducted monthly during the first quarter in 2015.

- The concentrations of VOCs detected at the perimeter wells indicate good control of the injected air volume, the cover system is performing as designed, and the soil vapors containing COC concentrations are not migrating beyond the cap boundaries.

- Review of the groundwater laboratory results indicates that the highest benzene concentrations were reported for samples collected from monitoring wells XMW-29 and PZL0020. Benzene concentrations are lower in samples collected from monitoring wells PZL0008, SWL0044, and XP-02. Benzene was not detected with laboratory detection limits (<0.5 μg/L), which is below the MCL of 1 μg/L in samples collected from monitoring wells PZL0018, PZL0022, PZL0024, PZL0025, and SWL0051.

- NAPL was observed at monitoring well PZL0019. Analytical results indicate that the sample was a mixture of mostly aromatic hydrocarbons, primarily benzene, substituted benzenes (ethylbenzene, toluene), PAHs, sulfur, styrene-containing polymers. These analyses are consistent with historical waste pit samples, indicating that the identified material is a historical remnant that recently entered the well and is not associated with a new/unknown source.

- The Mann-Kendall analysis indicated there are six decreasing trends, two stables, and three no trends in the 11 monitoring wells included within the groundwater monitoring program. No wells indicated an increasing trend.

- Overall, the groundwater results and trend analysis are supportive of the following: 1) indicating that natural attenuation is occurring, 2) the dissolved phase VOC plume is not expanding, and 3) that the operable unit is not contributing to the degradation of underlying groundwater.

- The performance standards presented in this report are consistent with past performance standards due to no significant changes between the 2013 - 2014 groundwater results.

- Regularly scheduled maintenance and inspection activities have assisted in the early identification of possible repair issues with limited system operation interruption. Issues requiring action were quickly identified, assessed, and rectified in 2014. The Phase I, II, III remedy components will continue to be closely monitored in 2015 during routine and non-routine inspections. Continued

inspections and monitoring activities for 2015 shall be conducted in accordance with the schedule provided in Table 22.0.

10.0 REFERENCES

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Table 1.0
2014 Cap Gas System Monitoring Results
Del Amo Waste Pits OU

Date	VOCs (ppm)				Temperature (°F)		Flow (scfm)		Lead Vessel Efficiency	System Efficiency
	Influent	Effluent Lead Carbon Vessel	Effluent Secondary Carbon Vessel	Effluent	Influent	Effluent	Influent	Effluent		
1/8/2014	0	0	0	0	67	110	170	167	NA	NA
1/29/2014	2.8	0	0	0	83	110	150	172	100.0%	100.0%
2/12/2014	0	0	0	0	85	114	143	168	NA	NA
2/19/2014	0.1	0.2	0.1	0	71.5	118	162	156	0.0%	100.0%
2/26/2014	0.3	0.3	0.3	0	67	115	165	167	0.0%	100.0%
3/12/2014	0	0	0	0	82	124	155	159	NA	NA
3/26/2014	0.1	0.1	0.1	0.1	78	110	148	177	0.0%	0.0%
4/9/2014	0.3	0.3	0.1	0.1	95	132	153	165	0.0%	66.7%
4/23/2014	0.4	0.3	0.2	0	88.8	115	140	150	25.0%	100.0%
5/20/2014	0.9	1.2	0.2	0.1	82	134	152	132	0.0%	88.9%
5/28/2014	0	0	0	0	86	135	145	156	NA	NA
6/19/2014	0.1	0.1	0.1	0.1	90	127	135	160	0.0%	0.0%

NA: Not Available to calculate vessel efficiencies as inlet concentration was 0.

Table 2.0
2014 SVE-IBT Laboratory Results
Del Amo Waste Pits OU

Date	Sample ID	Benzene (ppmv)	Carbon Dioxide (%)	Oxygen (%)	Nitrogen (%)	STATION
1/29/2014	Inlet	9400 (14000)	20.2 (20.1)	10.2 (10.2)	68.7 (68.6)	1
2/26/2014	Inlet	12000 (12000)	19.1 (18.9)	11.4 (11.6)	68.6 (68.9)	1
3/26/2014	Inlet	17000 (16000)	18.1 (17.1)	12.1 (12.5)	67.9 (68.2)	1
4/23/2014*	Inlet	7500 (35000)	5.54 (21.1)	18.3 (8.65)	76.2 (70.3)	1
1/29/2014	Post Ambient Air	610	0.854	21.2	78	2
2/26/2014	Post Ambient Air	910	1.26	21	77.7	2
3/26/2014	Post Ambient Air	870	0.927	21.2	77.9	2
4/23/2014	Post Ambient Air	4900	3.44	19.5	77	2
1/29/2014	Carbon 1	52	0.827	21.2	78	3
2/26/2014	Carbon 1	1100	1.35	20.9	77.8	3
3/26/2014	Carbon 1	0.015	ND<0.500	21.5	78.2	3
4/23/2014	Carbon 1	2600	3.39	19.6	77	3
1/29/2014	Effluent	ND<0.005	ND<0.500	21.4	78.2	4
2/26/2014	Effluent	ND<0.005	1.63	20.8	77.5	4
3/26/2014	Effluent	0.29	1.12	21.1	77.8	4
4/23/2014	Effluent	ND<0.006	3.46	19.5	77	4

ND: Analyte not detected at or above the reporting limit.
( ): Duplicate sample result.
* The sample results at inlet on April 23 (7500 ppmv benzene, 5.54% CO_2, and 18.3% O_2) were identified as outliers, and these values were excluded in calculating the annual average.

Table 3.0
2014 Cluster Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	A"1	0	20.6	0	1.3
6/25/2014	A"1	NA	17.4	1	0
3/26/2014	A"2	-0.04	20.4	0.4	2
6/25/2014	A"2	NA	20.1	0	0.5
3/26/2014	A"3	0	18.4	1.6	5.5
6/25/2014	A"3	NA	20.1	0	0.9
3/26/2014	B"1	0.22	15.7	25.6	> DL[(1)]
6/25/2014	B"1	NA	12.4	20.4	> DL[(1)]
3/26/2014	B"2	0	18.6	5.8	> DL[(1)]
6/25/2014	B"2	NA	15.9	2.6	> DL[(1)]
3/26/2014	B"3	0.02	18.3	8.2	> DL[(1)]
6/25/2014	B"3	NA	18.6	2	> DL[(1)]
3/26/2014	C"1	-0.2	19.2	1.2	> DL[(1)]
6/25/2014	C"1	NA	18.8	1.4	> DL[(1)]
3/26/2014	C"2	-0.18	16.3	2.8	> DL[(1)]
6/25/2014	C"2	NA	17.6	1.2	160
3/26/2014	C"3	-0.14	12.2	6.8	> DL[(1)]
6/25/2014	C"3	NA	18.4	1.6	> DL[(1)]
3/26/2014	D"1	-0.46	0	14.2	> DL[(1)]
6/25/2014	D"1	NA	1.8	9.6	> DL[(1)]
3/26/2014	D"2	-0.36	12.5	3.2	> DL[(1)]
6/25/2014	D"2	NA	14.5	1.6	55.6
3/26/2014	D"3	0	14.8	2	49.6
6/25/2014	D"3	NA	11.7	2.6	> DL[(1)]
3/26/2014	E"1	0	20.3	0.4	0.7

[(1)]">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available

Table 3.0
2014 Cluster Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	E"2	-0.04	19.3	0.4	0.9
3/26/2014	E"3	0	20.7	0	0.2
3/26/2014	F"1	0	20.9	0	0.4
6/25/2014	F"1	NA	20.9	0	2.5
3/26/2014	F"2	0	19.4	0.6	1.5
6/25/2014	F"2	NA	19.9	0.4	4.7
3/26/2014	F"3	0	19.7	0.6	11.5
6/25/2014	F"3	NA	19.8	0.4	12
3/26/2014	G"1	0	15.7	3.8	0.1
3/26/2014	G"2	-0.02	18.9	0.8	0.1
3/26/2014	G"3	0	15	3.8	0.2
3/26/2014	H"1	0	17.4	3	0.1
6/25/2014	H"1	NA	20.9	0	0
3/26/2014	H"2	-0.04	17.6	2.2	0
6/25/2014	H"2	NA	20.7	0.2	0
3/26/2014	H"3	0	9.9	7.8	0
6/25/2014	H"3	NA	8.9	7.8	4.8
3/26/2014	I"1	-0.1	18.7	0.8	61
6/25/2014	I"1	NA	17.4	1.6	48.3
3/26/2014	I"2	-0.02	19.1	0.6	2.5
6/25/2014	I"2	NA	20.9	0	0
3/26/2014	I"3	-0.04	19.2	0.4	1.9
6/25/2014	I"3	NA	20.9	0	0
3/26/2014	J"1	-0.04	17.7	3	1.6
6/25/2014	J"1	NA	16.7	3.6	4.1
3/26/2014	J"2	-0.04	20.4	0.2	3.9
6/25/2014	J"2	NA	19.9	0.8	5.7
3/26/2014	J"3	-0.08	5.3	11.6	0.9

(1)">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available

Table 3.0
2014 Cluster Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
6/25/2014	J"3	NA	15	4.2	3
3/26/2014	K"1	-0.06	18.6	1.4	122
6/25/2014	K"1	NA	16.5	1.4	59.1
3/26/2014	K"2	-0.08	19.9	0.4	14.1
6/25/2014	K"2	NA	16.7	2.8	0
3/26/2014	K"3	-0.02	20.9	0	> DL[(1)]
6/25/2014	K"3	NA	20.9	0	393
3/26/2014	L"1	0.3	0	27	> DL[(1)]
6/25/2014	L"1	NA	16.5	4.2	> DL[(1)]
3/26/2014	L"2	0.1	7.4	16.8	> DL[(1)]
6/25/2014	L"2	NA	16.5	4.6	> DL[(1)]
3/26/2014	L"3	0.3	0	26	> DL[(1)]
6/25/2014	L"3	NA	20.6	1.2	> DL[(1)]
3/26/2014	M"1	-0.16	14.1	6	361
6/25/2014	M"1	NA	4.3	10.6	0.6
3/26/2014	M"2	-0.24	15.8	4.6	273
6/25/2014	M"2	NA	4.1	12	0.1
3/26/2014	M"3	-0.02	20	1	> DL[(1)]
6/25/2014	M"3	NA	20.2	0	> DL[(1)]

[(1)]">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available

Table 4.0
2014 Vacuum Performance Well Field Monitoring Data Summary
Del Amo Waste Pits OU

Quarter	Location ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	A'	-0.84	17.5	11	>DL[1]
6/25/2014	A'	NA	17.3	0	8.7
3/26/2014	B'	-0.02	6.1	11.6	1.2
6/25/2014	B'	NA	NA	NA	NA
3/26/2014	C'	0.42	2.4	26.8	>DL[1]
6/25/2014	C'	NA	20.7	0.4	12.6
3/26/2014	D'	-0.2	2.4	14.2	>DL[1]
6/25/2014	D'	NA	16.6	2	>DL[1]
3/26/2014	E'	-0.08	7.7	7.6	1.2
6/25/2014	E'	NA	3.2	9.2	4.6
3/26/2014	F'	-0.04	10.6	7.4	0.7
6/25/2014	F'	NA	19.9	0.4	0.3
3/26/2014	G'	-0.1	20.9	0	0
6/25/2014	G'	NA	20.7	0	9
3/26/2014	H'	-0.04	17	3	0.4
6/25/2014	H'	NA	17.5	2.6	1
3/26/2014	I'	-0.08	8.5	2.4	>DL[1]
6/25/2014	I'	NA	5.2	3	>DL[1]
3/26/2014	J'	-0.06	18.3	1.2	5.1
6/25/2014	J'	NA	20.9	0	0.3
3/26/2014	K'	-0.12	10	6.2	1
6/25/2014	K'	NA	6.5	7.8	9.7
3/26/2014	L'	-0.1	20.9	0	1.1
6/25/2014	L'	NA	20.3	0.2	3.5
3/26/2014	M'	-0.01	4.6	16.4	>DL[1]
6/25/2014	M'	NA	14.6	5.6	>DL[1]
3/26/2014	N'	0	6.9	29.8	>DL[1]
6/25/2014	N'	NA	17.9	3.2	>DL[1]

[1]">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available, system shut down during 3rd & 4th Qrtr to prep for redesign field activities.
On June 25th the Vacuum well B' was not monitored due to site access limitations from LADWP.

Table 5.0
2014 SVE Well Field Monitoring Data Summary
Del Amo Waste Pits OU

Date	Location ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	SVE 1	-19	12.3	6.2	>DL[(1)]
6/25/2014	SVE 1	NA	6.3	7	>DL[(1)]
3/26/2014	SVE 2	-6	14.1	21.4	>DL[(1)]
6/25/2014	SVE 2	NA	0	27.2	>DL[(1)]
3/26/2014	SVE 3	3	23.9	21.8	>DL[(1)]
6/25/2014	SVE 3	NA	0	33	>DL[(1)]
3/26/2014	SVE 4	6	0	31.6	>DL[(1)]
6/25/2014	SVE 4	NA	0	34.4	>DL[(1)]
3/26/2014	SVE 5	-2	1	28.4	>DL[(1)]
6/25/2014	SVE 5	NA	0	26.8	>DL[(1)]
3/26/2014	SVE 6	-12	11	5.8	>DL[(1)]
6/25/2014	SVE 6	NA	4.7	6	>DL[(1)]
3/26/2014	SVE 7	-4	0	21.6	>DL[(1)]
6/25/2014	SVE 7	NA	0	22.2	>DL[(1)]
3/26/2014	SVE 8	8	9.9	14.4	>DL[(1)]
6/25/2014	SVE 8	NA	6.5	18.6	>DL[(1)]
3/26/2014	SVE 9	4	20.9	21.8	>DL[(1)]
6/25/2014	SVE 9	NA	0	33.2	>DL[(1)]
3/26/2014	SVE 10	-12	10.3	17.2	>DL[(1)]
6/25/2014	SVE 10	NA	5.5	12.4	>DL[(1)]
3/26/2014	SVE 11	0.2	0	36	>DL[(1)]
6/25/2014	SVE 11	NA	0	36.6	>DL[(1)]

[(1)]">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available due to system shut down for preparations of Phase III re-design field activities

Table 5.0
2014 SVE Well Field Monitoring Data Summary
Del Amo Waste Pits OU

Date	Location ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	SVE 12	-21	2.3	26	>DL[(1)]
6/25/2014	SVE 12	NA	1.2	25.2	>DL[(1)]
3/26/2014	SVE 13	-0.15	3	2.8	>DL[(1)]
6/25/2014	SVE 13	NA	4.8	2.6	>DL[(1)]
3/26/2014	SVE 14	-0.1	4.3	9	104
6/25/2014	SVE 14	NA	1.4	10.2	90
3/26/2014	SVE 15A	-0.1	13.8	4.6	148
6/25/2014	SVE 15A	NA	10	5.8	220
3/26/2014	SVE 15B	-0.1	2.6	17.6	2.1
6/25/2014	SVE 15B	NA	0	18.6	1.9
3/26/2014	SVE 16	-0.1	0	16.2	>DL[(1)]
6/25/2014	SVE 16	NA	0	15.2	>DL[(1)]
3/26/2014	SVE 17	-0.05	0	14.8	14.5
6/25/2014	SVE 17	NA	0	14.6	18
3/26/2014	SVE 18	-0.05	9.7	9	0.4
6/25/2014	SVE 18	NA	8.4	9.8	0.1
3/26/2014	SVE 19	-0.1	0	16.2	244
6/25/2014	SVE 19	NA	0	16.6	254
3/26/2014	SVE 20A	-0.1	0	13	>DL[(1)]
6/25/2014	SVE 20A	NA	0	14.6	>DL[(1)]
3/26/2014	SVE 20B	-0.05	20.9	0.2	35
6/25/2014	SVE 20B	NA	0	12.6	>DL[(1)]
3/26/2014	SVE 21	-0.05	6.3	10.4	75
6/25/2014	SVE 21	NA	5.7	10.2	59

[(1)]">DL": Greater than detection limit of field photo ionization device (PID)
NA: Not Available due to system shut down for preparations of Phase III re-design field activities

Table 6.0
2014 Perimeter Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
1/22/2014	A	0	20.7	0.8	0
2/26/2014	A	0	20.6	0.9	0
3/26/2014	A	0	19.1	1.8	0
4/30/2014	A	-0.02	20.4	0.6	0
5/28/2014	A	-0.02	20.9	0.4	0
6/25/2014	A	NA	20.1	0	0
7/30/2014	A	NA	20.3	0.6	0
8/27/2014	A	NA	20.9	0	0
9/25/2014	A	-0.02	20.9	0.6	0
10/31/2014	A	0	20.4	0.6	0
11/26/2014	A	-0.02	20.4	0.7	0
12/17/2014	A	-0.02	20	0.8	0
1/22/2014	B	0	19.4	2.2	0.3
2/26/2014	B	0	19.7	2.1	0.2
3/26/2014	B	-0.05	17.3	2.4	1.3
1/22/2014	C	0	16.8	2.6	0
2/26/2014	C	0	16.8	2.4	0
3/26/2014	C	0	10	6.8	0.1
1/22/2014	D	-0.05	20.9	0.2	0
2/26/2014	D	-0.05	20.9	0.2	0
3/26/2014	D	-0.02	15.8	4.4	0.3
3/26/2014	E	-0.06	16.5	3	0.2
3/26/2014	F	-0.06	16.9	2.8	0.1
3/26/2014	G	0	18.5	1.6	0.2
1/22/2014	H	-0.05	19.2	1.6	0
2/26/2014	H	-0.05	19.5	1.8	0
3/26/2014	H	-0.26	18.3	2	0

NA: Not Available due to shut down for Phase III re-design field activities.
Pressures monitored from Aug-Dec were in static conditions due to Phase III field activities

Table 6.0
2014 Perimeter Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
4/30/2014	H	0	17.8	2.2	0
5/28/2014	H	-0.02	18.7	1.8	0
6/25/2014	H	-0.26	18.3	2	0
7/30/2014	H	NA	18.3	1.8	0
8/27/2014	H	NA	19.1	1	0
9/25/2014	H	-0.02	18.5	1.8	0
10/31/2014	H	0	18.7	1.8	0
11/26/2014	H	0	17.8	2.1	0
12/17/2014	H	0	16.8	2.4	0
3/26/2014	I	0	19.3	1	0
5/28/2014	I	-0.04	19.4	1.2	0
6/25/2014	I	NA	18.8	1.2	0
7/30/2014	I	NA	19.2	1.2	0
8/27/2014	I	NA	19.4	0.6	0
9/25/2014	I	-0.02	18.9	1.4	0
10/31/2014	I	-0.05	19.7	1.2	0
11/26/2014	I	0	18.5	1.1	0
12/17/2014	I	0	18	1	0
3/26/2014	J	-0.04	18.6	1.6	0
5/28/2014	J	-0.08	19.1	1.8	0
6/25/2014	J	NA	18.4	2	0
7/30/2014	J	NA	18.7	2	0
8/27/2014	J	NA	18.9	1.4	0
9/25/2014	J	-0.04	18.5	2.2	0
10/31/2014	J	-0.1	22.1	2.2	0
11/26/2014	J	-0.05	18.6	1.8	0
12/17/2014	J	-0.05	18	1.8	0

NA: Not Available due to shut down for Phase III re-design field activities.
Pressures monitored from Aug-Dec were in static conditions due to Phase III field activities

Table 6.0
2014 Perimeter Well Field Results
Del Amo Waste Pits OU

Date	Well ID	Pressure (in. water)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)
3/26/2014	K	0	18.9	1.2	0.3
5/28/2014	K	-0.02	19.8	1.2	0
6/25/2014	K	NA	19.7	1.2	0
7/30/2014	K	NA	19.3	1.4	0
8/27/2014	K	NA	20.1	0.6	0
9/25/2014	K	-0.04	19.7	1	0
10/31/2014	K	-0.05	20.9	0.8	0
11/26/2014	K	-0.04	19.4	0.9	0
12/17/2014	K	0	17.7	0.8	0
3/26/2014	L	-0.02	16.2	3.4	0.3
5/28/2014	L	-0.06	16.3	4	0
6/25/2014	L	NA	15.9	4	1
7/30/2014	L	NA	15.7	4.2	0
8/27/2014	L	NA	16.9	2.6	0
9/25/2014	L	0	17	3	0
10/31/2014	L	0	17.3	3.2	0
11/26/2014	L	0	16	3.3	0
12/17/2014	L	0	13.3	3.4	0

NA: Not Available due to shut down for Phase III re-design field activities.
Pressures monitored from Aug-Dec were in static conditions due to Phase III field activities

Table 7.0
2014 SVE/IBT System Operation Efficiency
Del Amo Waste Pits OU

Jan 1 - May 8 / Dec 1 - Dec 31	Time (in hours)
Potential Operation Hours *	912
Actual Hours	776.2
Down Time	135.8
• Carbon Change-Out	53.0
• Monitoring/Sampling	11.5
• System Maintenance	71.3
Operation Efficiency	85%

* Assuming 8 hours/day, Monday - Friday (In addition to this downtime [135.8], the system did not operate during the Phase III redesign field activities [1168 hours]).

Table 8.0
2014 SVE/IBT System Operation Summary
Del Amo Waste Pits OU

Parameter	Original Design	Performance Based on Inline Monitoring Devices
Vapor Injection Rate (CFM)	50	27.7
System Operation Time (hours per day)*	8	8
O2 Injection Rate (CFM)	5	4
O2 Percentage (%)	100%	91%
O2 Utilization 1st Order Rate Constant (1/hr) **	0.0021	0.0021
Extracted Vapor Concentration (ppmv)***	15,000	16,486
Extraction Rate (CFM) ****	60	32.6
Treatment Rate (CFM)	15	8.9
Time for Pore Volume (days)	7.09	12.79
Injected O2 Concentration 1st Order	27%	25%
Benzene Degradation (kg/day)	**20**	**16.4**
Benzene Degradation (kg/year)	7,355	2,591
Benzene Removal (kg/day)	**10**	**6.5**
Benzene Removal (kg/year)	3,626	631
Total Benzene Removed/Degraded (kg/day)	**30**	**23**
Total Benzene Removed/Degraded (kg/year)	10,981	3,222

* Normal operation is 8 hours/day, Monday-Friday, 8:00 am - 4:00 pm.
** 0.0021 of design value was used for oxygen utilization constant.
*** Vapor concentration is an average of the monthly laboratory results without outliers.
**** Extraction rate is derived from the sum of the treatment rate and the recycle rate.

The calculation used for this estimate

Q = (O2 Injection rate + Recycle rate)
$[O_2]$ = (Term1*0.20+Term2*0.91)/{1-Term3*Exp(-k*t_{pv})}
ή = 1-Exp(-k*t_{pv})
f_{bio} = 1-(0.00035/k)

Term1 = (Recycle rate)/Q*(Excess Vapor Extraction rate)/(Treatment rate + Recycle rate)
Term2 =O2 injection rate/Q
Term3 = Recycle rate/(Treatment rate + Recycle rate)
t_{pv} (Time for Pore Volume) = 8505/Q
k = 0.0021

Benzene =16486

Mass Degraded = Q*$[O_2]$* ή* f_{bio}* 5.8864
Mass Treated = Treatment rate *[Benzene]*0.000044148
Mass Total = Mass Degraded + Mass Treated

Table 9.0
2014 SVE/IBT System Carbon Change-Out Summary
Del Amo Waste Pits OU

Date of Change-outs	Operation Period Between Change-outs	Operational Hours Between Change-outs	Fresh Carbon (kg)			Spent Carbon (kg)			Weight Adsorbed (kg)		
			Primary	Secondary	Total	Primary	Secondary	Total	Primary	Secondary	Total
3/4/2014	1/6/2014~2/28/2014	308	907	907	1814	1170	1080	2250	263	172	435
6/12/2014	3/4/2014~5/7/2014	332	907	907	1814	NA	NA	2233	NA	NA	419
1/13/2015	12/2/2014~1/12/2015	198	953	953	1905	1268	1251	2519	315	298	614
Average (Normal Operations)		***279***	***922***	***922***	***1845***	***1219***	***1165***	***2334***	***289***	***235***	***489***
Total (Normal Operations)		***838***	***2767***	***2767***	***5534***	***2438***	***2331***	***7002***	***578***	***471***	***1468***

Note the total operational hour includes a part of 2015 operational hour.
NA: Individual carbon weigh were not reported by vendor

Table 10.0
2014 Groundwater Field Monitoring Data Summary
Del Amo Waste Pits OU

Well ID	Temp (°C)	pH	Cond (µMhos)	Turbidity	D.O. (mg/L)	ORP (mV)	GW Elevation
September 11, 2014							
PZL0018	23.5	6.7	5494	6	0.22	-98.2	-9.82
PZL0019							-9.74
PZL0020	28.1	6.29	5780	7.6	0.15	-85.4	-9.45
PZL0022	24.3	6.43	2400	1.3	0.43	-88.4	-9.65
PZL0024	24.6	6.53	2295	41.3	0.92	-61.6	-9.51
PZL0025	26.3	6.46	3382	7	0.92	0.4	-9.37
SWL0008	24.9	6.78	2458	21	0.21	-116.5	-9.56
SWL0044	25.8	6.48	2328	5	0.28	-106.9	-9.25
SWL0051	25	6.73	2181	26	0.56	42.1	-9.47
XMW29	23.2	6.46	2474	10	0.33	-113.5	-10.17
XP02	24.6	6.81	1324	3.9	0.81	-43.6	-10.44

Table 11.0
2014 Groundwater VOCs (USEPA Method 8260B)
Laboratory Data Summary
Del Amo Waste Pits OU

Date	SAMPLE_ID_MOD	1,1-Dichloroethene	1,2-Dichloroethane	1,2,4-Trimethylbenzene	Benzene	Chlorobenzene	Cyclohexane	c-1,2-Dichloroethene	Ethylbenzene	Isopropylbenzene	Methyl-t-Butyl Ether (MTBE)	Naphthalene	n-Butylbenzene	n-Propylbenzene	o-Xylene	p/m-Xylene	sec-Butylbenzene	Styrene	tert-Butylbenzene	Tetrachloroethene	Tert-Butyl Alcohol (TBA)	Toluene	Trichloroethene
California_MCL		6	0.5	NA	1	NA	NA	6	300	NA	13	NA	NA	NA	NA	NA	NA	100	NA	5	NA	150	5
Federal_MCL		7	5	NA	5	100	NA	70	700	NA	NA	NA	NA	NA	NA	NA	NA	100	NA	5	NA	1000	5
Notification_Level		NA	NA	330	5	NA	NA	NA	NA	770	NA	17	260	260	NA	NA	260	NA	260	NA	12	NA	NA
9/10/2014	PZL0018	ND<1.0	ND<0.50	ND<1.0	ND<0.50	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	1.1	NA	ND<1.0	ND<1.0
9/11/2014	PZL0020	ND<500	ND<250	240 |J	280000 |E	ND<500	ND<5000	ND<500	9800	ND<500	ND<500	ND<5000	ND<500	ND<500	360 |J	470 |J	ND<500	ND<500	ND<500	ND<500	NA	970	ND<500
9/8/2014	PZL0022	ND<1.0	ND<0.50	ND<1.0	ND<0.50	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	NA	ND<1.0	ND<1.0
9/8/2014	PZL0024	ND<1.0	ND<0.50	ND<1.0	ND<0.50	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	NA	ND<1.0	ND<1.0
9/8/2014	PZL0025	ND<1.0	3.5	ND<1.0	ND<0.50	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	0.5 |J	ND<1.0	NA	ND<1.0	ND<1.0
9/9/2014	SWL0008	ND<1.0	3.2	ND<1.0	12	ND<1.0	19	1.9	0.31 |J	3.6	0.66 |J	ND<10	1.3	3.1	ND<1.0	2.4	16	ND<1.0	0.6 |J	ND<1.0	36	0.59 |J	2.1
9/10/2014	SWL0044	ND<1.0	ND<0.50	ND<1.0	2.1	0.26 |J	ND<10	ND<1.0	0.25 |J	1.5	ND<1.0	ND<10	ND<1.0	0.63 |J	ND<1.0	0.53 |J	1.7	ND<1.0	ND<1.0	ND<1.0	NA	ND<1.0	ND<1.0
9/9/2014	SWL0051	ND<1.0	ND<0.50	ND<1.0	ND<0.50	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<10	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	NA	ND<1.0	5.9
9/25/2014	XMW29	ND<250	ND<120	ND<250	36000	ND<250	ND<2500	ND<250	ND<250	ND<250	ND<250	ND<2500	ND<250	ND<250	ND<250	ND<250	ND<250	ND<250	ND<250	ND<250	NA	ND<250	ND<250
9/10/2014	XP-02	1.5	ND<0.50	0.38 |J	2.1	ND<1.0	ND<10	ND<1.0	ND<1.0	2.1	ND<1.0	24	0.23 |J	ND<1.0	0.84 |J	1.1	1.6	1.2	ND<1.0	1.9	NA	0.78 |J	1.3

unit: ug/L
ND: not detected at the indicated reporting limit
NA: not available
E: Concentration exceeds the calibration range.
J: Results were evaluated to the MDL (DL), concentrations >= to the MDL (DL) but < RL (LOQ), if found, are qualified with a "J" flag

Table 12.0
2014 Groundwater Biodegradation Indicators
Del Amo Waste Pits OU

Date	SAMPLE_ID_MOD	Alkalinity, Total (as CaCO3)	Carbon Dioxide	Iron (II)	Manganese	Methane	Sulfate
	California_MCL	NA	NA	NA	NA	NA	NA
	Federal_MCL	NA	NA	NA	NA	NA	NA
	Notification_Level	NA	NA	NA	0.5	NA	NA
9/9/2014	SWL0008	659	250	7.92	0.542	0.619	8.3
9/10/2014	XP-02	530	210	0.209	0.966	0.00269	39

unit: mg/L
NA: not available

Table 13.0
Initial vs. Current Calculated Benzene Concentrations
for SVE Remedial Sub Areas
Del Amo Waste Pits OU

	Sub-Area 1			Sub-Area 2			Sub-Area 3			Sub-Area 4		
	Initial	Current with Historical	Current	Initial	Current with Historical	Current	Initial	Current with Historical	Current	Initial	Current with Historical	Current
Average concentration in groundwater (ug/L)	100,000	149,500	144,300	400,000	365,400	238,600	170,000	146,200	67,800	16,000	4,700	12
Vapor concentration in equilibrium with groundwater parts per million by volume (ppmv)	7,100	10,700	10,300	29,000	26,100	17,000	12,000	10,400	4,800	1,100	340	0.9
60% of vapor concentration in equilibrium with groundwater contingency standard (ppmv)	4,300	6,400	6,180	17,000	15,700	10,200	7,200	6,300	2,900	700	200	0.5
Soil Remediation Goal vapor concentration (ppmv)	510	760	730	2,000	1,800	1,200	840	740	340	78	24	0.06

Initial: Baseline calculations presented in the OM&M Manual (Appendix G, Attachment 1)
Current with Historical: Calculations using the current data (2013-2014) from eleven existing wells and the historical data (1993-1998) from eight abandoned/one-time CPT wells
Current: Calculations using the current data (2013-2014) from eleven existing wells only
Presented values are rounded (See Appendix I, Table 1.0 for calculations)
Groundwater contingency standard: The maximum allowable rebound concentration which is defined as 60% of the vapor concentrations in equilibrium with average groundwater concentration

Table 14.0
2014 Cover System Inspection Summary
Del Amo Waste Pits OU

Cover System				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Erosion	4	4	4	3[5]
Stressed Vegetation (Plant Die-Back)	3[1]	3[1]	2[3]	2[3]
Sediment Build-Up	4	4	4	4
Local Subsidence or Loss of Grade	4	4	4	4
Water Ponding	4	4	4	3[6]
Turf Height	3	4	4	4
Burrowing Animals	3[2]	3[2]	4	4
Weeds or Undesirable Vegetation	4	4	4	4
Evidence of Fires or Vandalism	4	4	4	4
Soil Quality Check	4	4	2[4]	3[4]
Unauthorized Traffic	4	4	4	4
Slope Instability or Sloughing	4	4	4	4
Survey Monuments	4	4	4	4
Vertical Cracking	4	4	4	4
Intrusions	4	4	4	4
Evidence of Waste Pit Materials	4	4	4	4

[1]Vegetation is not fully covering the cap due to drought condition. It may need additional irrigation.
[2]Continue to monitor gopher activity and treat as necessary.
[3]No vegetation at this time due to drought and limited irrigation during phase III field activity.
[4]Soil is too dry and disturded. Need to re-vegetate the cover system probably hydroseeding.
[5]Minor erosion observed due to disturbed surface soil. Need to keep monitoring for potential major erosion.
[6] Vegetating beginning to re-establish with rain.

Conditions/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Repair)
1 = Poor (Needs Immediate Repair)

Table 15.0
2014 Cap Gas Collection and Treatment System Inspection Summary
Del Amo Waste Pits OU

Cap Gas Collection Treatment System				
Inspection Date	**March 28, 2013**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Collection System Valves				
Adequate Free Movement	4	4	4	4
Seals-Complete	4	4	4	4
Signs of Rust/Corrosion	4	4	4	4
Condensate Collection				
Air Moisture Separator	4	4	4	4
Carbon Adsorbers-Vessels				
Exterior Damage	4	4	4	4
FRP Grating and Mesh	4	4	4	4
Blower				
General Motor Maintenance	4	4	4	4
Drive Maintenance	4	4	4	4
Bearing Maintenance	4	4	4	4
Lubrication	4	4	4	4
Structural Maintenance	4	4	4	4

Conditions/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Repair)
1 = Poor (Needs Immediate Repair)

Table 16.0
2014 Surface Water Drainage Inspection Summary
Del Amo Waste Pits OU

Surface Water Drainage				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Washouts or Erosion of Contoured Grade	4	4	4	3[(1)]
Ponding on Contoured Grade	4	4	4	4
Gullies and Ruts on Contoured Grade	4	4	4	4
Plugging of Drainage Culverts	4	4	4	4
Holes and Cracks in Swales or Catch Basin	4	4	4	4
Sediment Build-Up in Swales or Catch Basins	4	4	4	3[(2)]
Surface Cracking of Swales/Catch Basins	4	4	4	4
Spalling of Swales/Catch Basins	4	4	4	4
Structural Failure of Swales/Catch Basins	4	4	4	4

[(1)]Minor sediment wah-out, build up observed.

[(2)]All sediment in V-Ditches were removed. Keep monitoring for potential major erosion/sedimentation issues.

Conditions/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Repair)

1 = Poor (Needs Immediate Repair)

Table 17.0
2014 Subsurface Drainage Inspection Summary
Del Amo Waste Pits OU

Subsurface Drainage				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Holes and Cracks in Swales, Catch Basin	4	4	4	4
Plugging of Drainage Inlets	4	4	4	4
Sediment Build-Up or Debris in Catch Basin	4	4	4	4
Structural Failure of Catch Basin	4	4	4	4

Conditions/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Repair)

1 = Poor (Needs Immediate Repair)

Table 18.0
2014 Security Fence Inspection Summary
Del Amo Waste Pits OU

Security Fence				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2013**	**December 22, 2013**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Perimeter Fence				
Breaks and Holes	4	4	4	4
Settlement Damage	4	4	4	4
Loose Posts/Tension	4	4	4	4
Rust/Corrosion	4	4	4	4
Ruts and Burrows Beneath Fence	4	4	4	4
Vegetation Overgrowth	4	4	4	4
General Signs of Deterioration	4	4	4	4
Vandalism/Animal/ Wind Damage	4	4	4	4
Gates				
Adequate Movement of Hinges and Gates	3[1]	3[1]	3[1]	4
Proper Function of Lock(s)	4	4	3[2]	4

[1] Lubricate hinges on front gate

[2] Replace lock as necessary

Conditions/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Repair)

1 = Poor (Needs Immediate Repair)

Table 19.0
2014 Access Road Inspection Summary
Del Amo Waste Pits OU

Access Road				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Holes and Cracks	4	4	4	4
Vegetation Overgrowth	4	4	4	4
Settlement	4	4	4	4
Excessive Dispersion of Gravel	4	3[(1)]	3[(1)]	3[(1)]
General Signs of Deterioration	4	4	4	4

[(1)] Swept all gravels on the concrete entry way of site (Access Way).

Conditions/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Repair)

1 = Poor (Needs Immediate Repair)

Table 20.0
2014 SVE/IBT System Inspection Summary
Del Amo Waste Pits OU

SVE/IBT System Inspection				
Inspection Date	**March 28, 2014**	**June 19, 2014**	**September 29, 2014**	**December 22, 2014**
Inspection Type	1st Quarter Inspection	2nd Quarter Inspection	3rd Quarter Inspection	4th Quarter Inspection
Inspection Items				
Manifold				
Adequate - Free Movement	4	4	4	4
Seals - Complete	4	4	4	4
Visible Damage	4	4	4	4
Sniff for signs of leaks	4	4	4	4
Condensate Collection				
Air Moisture Separator	4	4	4	4
Additional System Components				
Carbon Adsorber Vessels				
Exterior Damage	4	4	4	4
Vessel Configuration (A-B or B-A)	4 A-B	4 A-B	4 A-B	4 A-B
Blowers				
General Motor Maintenance	4	4	4	4
Drive Maintenance	4	4	4	4
Bearing Maintenance	4	4	4	4
Oxygen Generator				
Signs of Rust/Corrosion	4	4	4	4
Mechanical Functioning	4	4	4	4
Oxygen Purity	4	4	NA[1]	4
System Sensors(*)				
Visible Damage	4	4	4	3[2]
Mechanical Functioning	4	4	3[2]	4
SVE Wellheads(**)				
Tee Flanges	4	4	4	4
Valves	4	4	4	4
Sniff for signs of leaks	4	4	4	4

[1] System is shut off due to preparation for phase III re-design field activities.

[2] The SVE/IBT System started back on with new SVE wells and conveyance piping, currently shake down operation. Keep monitoring gasket of sensor mount.

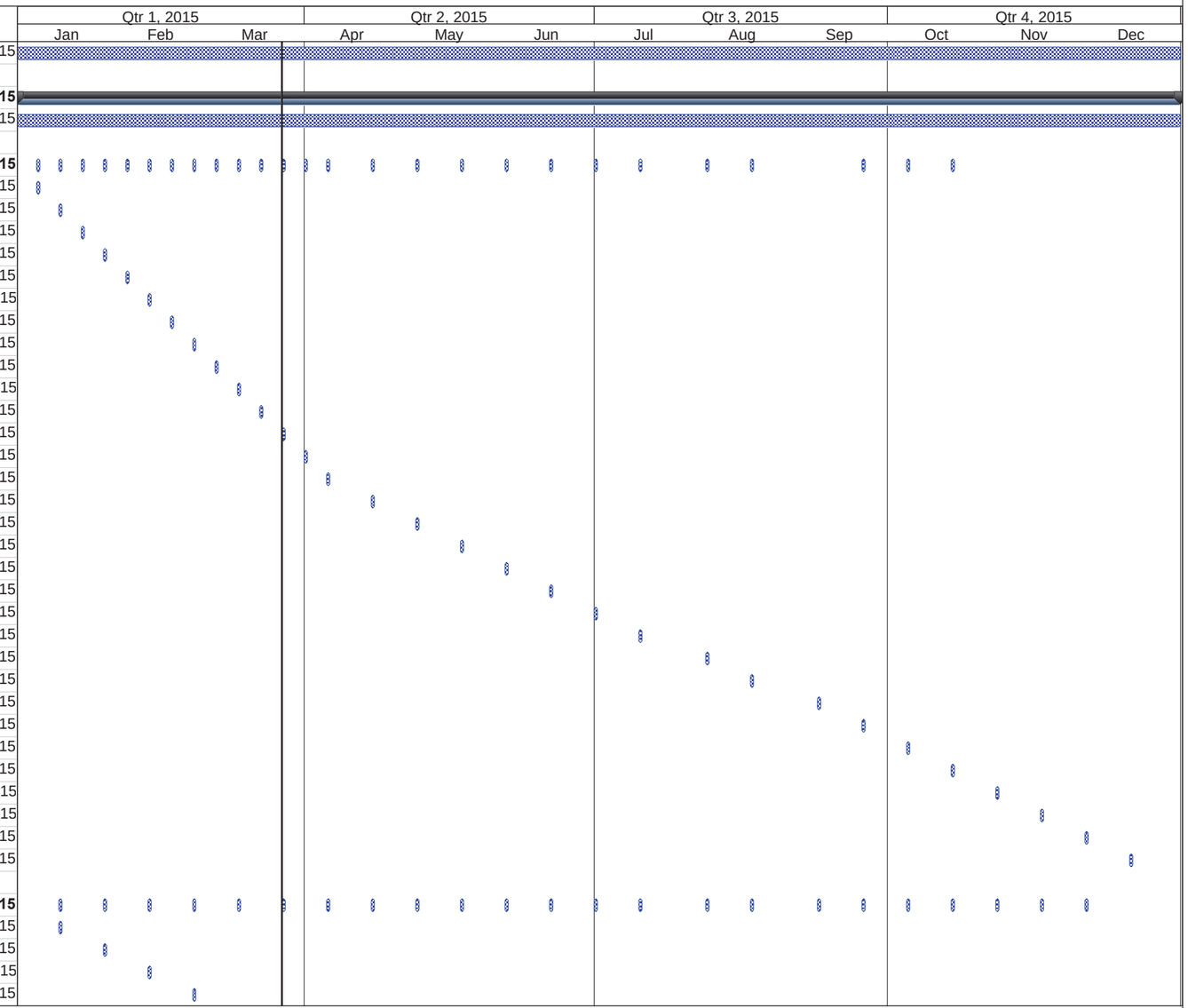
Conditions/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Repair)
1 = Poor (Needs Immediate Repair)

Table 21.0
2014 Generated Waste Summary
Del Amo Waste Pits OU

Waste I.D.	Source	Media	Hazardous or Non-Haz	Waste Code	Volume	Container Type	Date of Generation	Date of Disposal	Transporter
CL-1, CL-2	Condensate - SVE extraction system	Liquid	Hazardous	D018 D001 135	100 gal.	Drums	7/2/2014	8/15/2014	AIS
CG-1, CG-2, CG-3	Cement - Well Abandonment	Soild	Non-Hazardous	NA	1200 lbs.	Drums	8/20/2014	12/3/2014	Belshire
PVC Pipe 1	PVC Pipes - Removal soil vapor extraction/ injection well heads / conveyance piping	Soild	Hazardous - micro/macro encapulation	D018 352	4800 lbs.	Bin	9/8/2014	11/26/2014	Belshire
Soil 1, Soil 2, Soil 3	Solid - Soil vapor extraction / injection wells	Soild	Hazardous	D018 611	52730 lbs	Bins	9/2/2014	11/21/2014 11/26/2014	Belshire

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

ID	Task Name	Duration	Start	Finish
1	Del Amo Pits Superfund Site	261 days	Thu 1/1/15	Thu 12/31/15
2				
3	**I. Project Management of OM&M Activities**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
4	Begin Project Management of OM&M Activities	261 days	Thu 1/1/15	Thu 12/31/15
5				
6	**II. SVE/IBT System Field Monitoring**	**246 days**	**Wed 1/7/15**	**Wed 12/16/15**
7	SVE/IBT System Monitoring 1	1 day	Wed 1/7/15	Wed 1/7/15
8	SVE/IBT System Monitoring 2	1 day	Wed 1/14/15	Wed 1/14/15
9	SVE/IBT System Monitoring 3	1 day	Wed 1/21/15	Wed 1/21/15
10	SVE/IBT System Monitoring 4	1 day	Wed 1/28/15	Wed 1/28/15
11	SVE/IBT System Monitoring 5	1 day	Wed 2/4/15	Wed 2/4/15
12	SVE/IBT System Monitoring 6	1 day	Wed 2/11/15	Wed 2/11/15
13	SVE/IBT System Monitoring 7	1 day	Wed 2/18/15	Wed 2/18/15
14	SVE/IBT System Monitoring 8	1 day	Wed 2/25/15	Wed 2/25/15
15	SVE/IBT System Monitoring 9	1 day	Wed 3/4/15	Wed 3/4/15
16	SVE/IBT System Monitoring 10	1 day	Wed 3/11/15	Wed 3/11/15
17	SVE/IBT System Monitoring 11	1 day	Wed 3/18/15	Wed 3/18/15
18	SVE/IBT System Monitoring 12	1 day	Wed 3/25/15	Wed 3/25/15
19	SVE/IBT System Monitoring 13	1 day	Wed 4/1/15	Wed 4/1/15
20	SVE/IBT System Monitoring 14	1 day	Wed 4/8/15	Wed 4/8/15
21	SVE/IBT System Monitoring 15	1 day	Wed 4/22/15	Wed 4/22/15
22	SVE/IBT System Monitoring 16	1 day	Wed 5/6/15	Wed 5/6/15
23	SVE/IBT System Monitoring 17	1 day	Wed 5/20/15	Wed 5/20/15
24	SVE/IBT System Monitoring 18	1 day	Wed 6/3/15	Wed 6/3/15
25	SVE/IBT System Monitoring 19	1 day	Wed 6/17/15	Wed 6/17/15
26	SVE/IBT System Monitoring 20	1 day	Wed 7/1/15	Wed 7/1/15
27	SVE/IBT System Monitoring 21	1 day	Wed 7/15/15	Wed 7/15/15
28	SVE/IBT System Monitoring 22	1 day	Wed 8/5/15	Wed 8/5/15
29	SVE/IBT System Monitoring 23	1 day	Wed 8/19/15	Wed 8/19/15
30	SVE/IBT System Monitoring 24	1 day	Wed 9/9/15	Wed 9/9/15
31	SVE/IBT System Monitoring 25	1 day	Wed 9/23/15	Wed 9/23/15
32	SVE/IBT System Monitoring 26	1 day	Wed 10/7/15	Wed 10/7/15
33	SVE/IBT System Monitoring 27	1 day	Wed 10/21/15	Wed 10/21/15
34	SVE/IBT System Monitoring 28	1 day	Wed 11/4/15	Wed 11/4/15
35	SVE/IBT System Monitoring 29	1 day	Wed 11/18/15	Wed 11/18/15
36	SVE/IBT System Monitoring 30	1 day	Wed 12/2/15	Wed 12/2/15
37	SVE/IBT System Monitoring 31	1 day	Wed 12/16/15	Wed 12/16/15
38				
39	**III. Bi-Weekly GCTS Field Monitoring**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
40	Bi-Weekly GCTS 1	1 day	Wed 1/14/15	Wed 1/14/15
41	Bi-Weekly GCTS 2	1 day	Wed 1/28/15	Wed 1/28/15
42	Bi-Weekly GCTS 3	1 day	Wed 2/11/15	Wed 2/11/15
43	Bi-Weekly GCTS 4	1 day	Wed 2/25/15	Wed 2/25/15

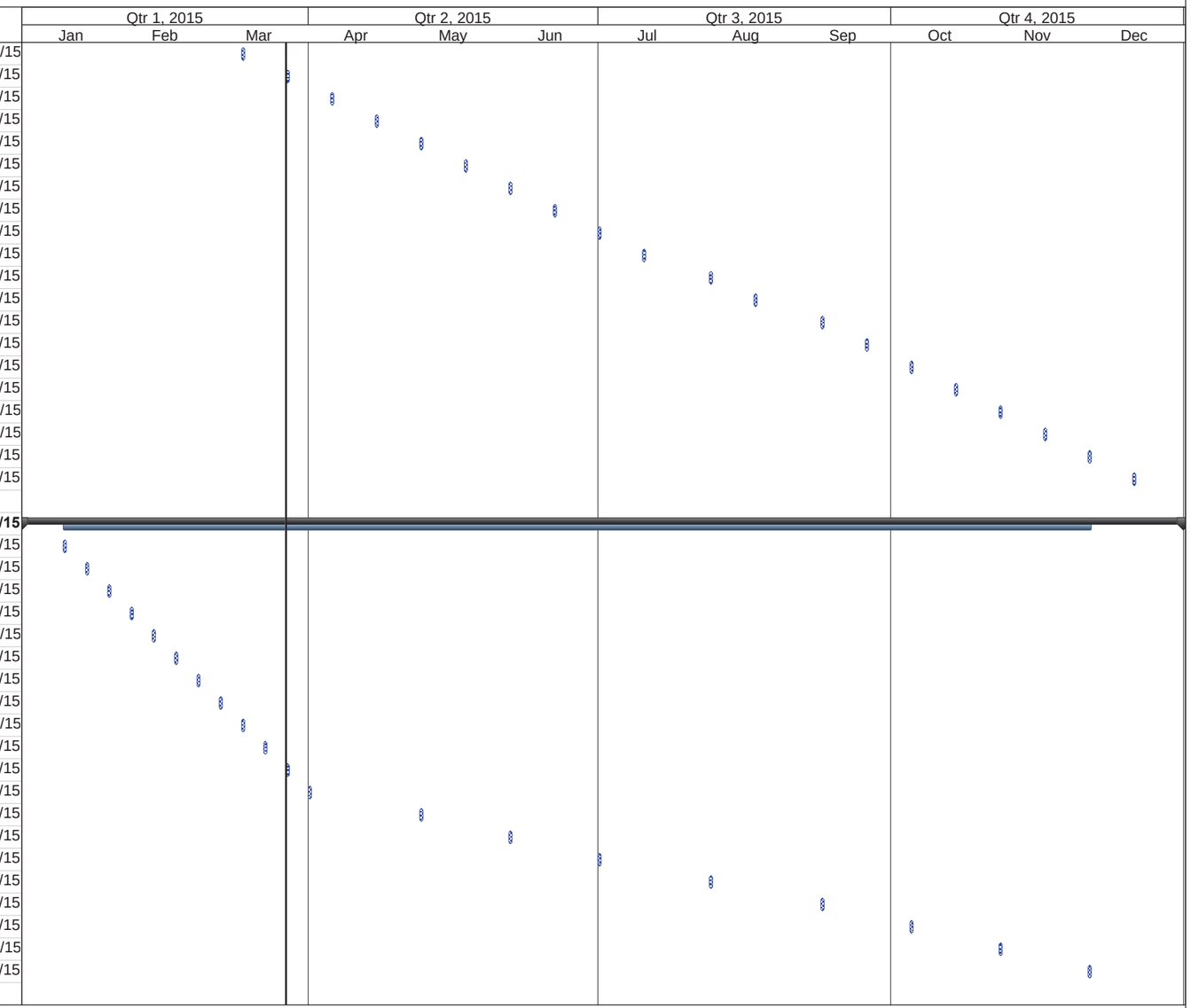


Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

ID	Task Name	Duration	Start	Finish
44	Bi-Weekly GCTS 5	1 day	Wed 3/11/15	Wed 3/11/15
45	Bi-Weekly GCTS 6	1 day	Wed 3/25/15	Wed 3/25/15
46	Bi-Weekly GCTS 7	1 day	Wed 4/8/15	Wed 4/8/15
47	Bi-Weekly GCTS 8	1 day	Wed 4/22/15	Wed 4/22/15
48	Bi-Weekly GCTS 9	1 day	Wed 5/6/15	Wed 5/6/15
49	Bi-Weekly GCTS 10	1 day	Wed 5/20/15	Wed 5/20/15
50	Bi-Weekly GCTS 11	1 day	Wed 6/3/15	Wed 6/3/15
51	Bi-Weekly GCTS 12	1 day	Wed 6/17/15	Wed 6/17/15
52	Bi-Weekly GCTS 13	1 day	Wed 7/1/15	Wed 7/1/15
53	Bi-Weekly GCTS 14	1 day	Wed 7/15/15	Wed 7/15/15
54	Bi-Weekly GCTS 15	1 day	Wed 8/5/15	Wed 8/5/15
55	Bi-Weekly GCTS 16	1 day	Wed 8/19/15	Wed 8/19/15
56	Bi-Weekly GCTS 17	1 day	Wed 9/9/15	Wed 9/9/15
57	Bi-Weekly GCTS 18	1 day	Wed 9/23/15	Wed 9/23/15
58	Bi-Weekly GCTS 19	1 day	Wed 10/7/15	Wed 10/7/15
59	Bi-Weekly GCTS 20	1 day	Wed 10/21/15	Wed 10/21/15
60	Bi-Weekly GCTS 21	1 day	Wed 11/4/15	Wed 11/4/15
61	Bi-Weekly GCTS 22	1 day	Wed 11/18/15	Wed 11/18/15
62	Bi-Weekly GCTS 23	1 day	Wed 12/2/15	Wed 12/2/15
63	Bi-Weekly GCTS 24	1 day	Wed 12/16/15	Wed 12/16/15
64				
65	**IV. SVE/IBT Lab Sampling**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
66	SVE/IBT Lab Sample 1	1 day	Wed 1/14/15	Wed 1/14/15
67	SVE/IBT Lab Sample 2	1 day	Wed 1/21/15	Wed 1/21/15
68	SVE/IBT Lab Sample 3	1 day	Wed 1/28/15	Wed 1/28/15
69	SVE/IBT Lab Sample 4	1 day	Wed 2/4/15	Wed 2/4/15
70	SVE/IBT Lab Sample 5	1 day	Wed 2/11/15	Wed 2/11/15
71	SVE/IBT Lab Sample 6	1 day	Wed 2/18/15	Wed 2/18/15
72	SVE/IBT Lab Sample 7	1 day	Wed 2/25/15	Wed 2/25/15
73	SVE/IBT Lab Sample 8	1 day	Wed 3/4/15	Wed 3/4/15
74	SVE/IBT Lab Sample 9	1 day	Wed 3/11/15	Wed 3/11/15
75	SVE/IBT Lab Sample 10	1 day	Wed 3/18/15	Wed 3/18/15
76	SVE/IBT Lab Sample 11	1 day	Wed 3/25/15	Wed 3/25/15
77	SVE/IBT Lab Sample 12	1 day	Wed 4/1/15	Wed 4/1/15
78	SVE/IBT Lab Sample 13	1 day	Wed 5/6/15	Wed 5/6/15
79	SVE/IBT Lab Sample 14	1 day	Wed 6/3/15	Wed 6/3/15
80	SVE/IBT Lab Sample 15	1 day	Wed 7/1/15	Wed 7/1/15
81	SVE/IBT Lab Sample 16	1 day	Wed 8/5/15	Wed 8/5/15
82	SVE/IBT Lab Sample 17	1 day	Wed 9/9/15	Wed 9/9/15
83	SVE/IBT Lab Sample 18	1 day	Wed 10/7/15	Wed 10/7/15
84	SVE/IBT Lab Sample 19	1 day	Wed 11/4/15	Wed 11/4/15
85	SVE/IBT Lab Sample 20	1 day	Wed 12/2/15	Wed 12/2/15
86				

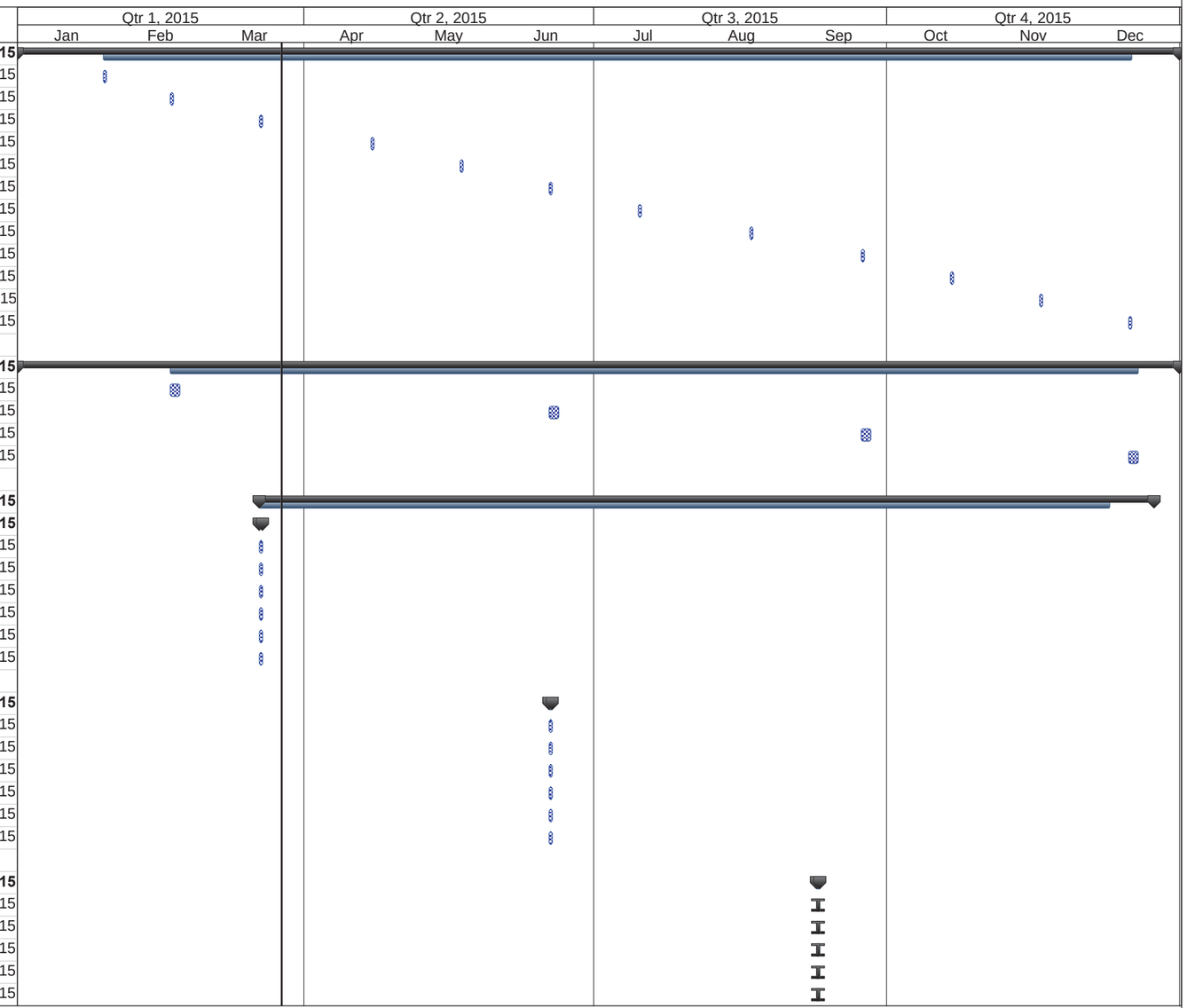


Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

ID	Task Name	Duration	Start	Finish
87	**V. Monthly Perimeter Field Monitoring Wells (Wells A, B, C, D, H)**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
88	Monthly Perimeter Monitoring Wells 1	1 day	Wed 1/28/15	Wed 1/28/15
89	Monthly Perimeter Monitoring Wells 2	1 day	Wed 2/18/15	Wed 2/18/15
90	Monthly Perimeter Monitoring Wells 3	1 day	Wed 3/18/15	Wed 3/18/15
91	Monthly Perimeter Monitoring Wells 4	1 day	Wed 4/22/15	Wed 4/22/15
92	Monthly Perimeter Monitoring Wells 5	1 day	Wed 5/20/15	Wed 5/20/15
93	Monthly Perimeter Monitoring Wells 6	1 day	Wed 6/17/15	Wed 6/17/15
94	Monthly Perimeter Monitoring Wells 7	1 day	Wed 7/15/15	Wed 7/15/15
95	Monthly Perimeter Monitoring Wells 8	1 day	Wed 8/19/15	Wed 8/19/15
96	Monthly Perimeter Monitoring Wells 9	1 day	Wed 9/23/15	Wed 9/23/15
97	Monthly Perimeter Monitoring Wells 10	1 day	Wed 10/21/15	Wed 10/21/15
98	Monthly Perimeter Monitoring Wells 11	1 day	Wed 11/18/15	Wed 11/18/15
99	Monthly Perimeter Monitoring Wells 12	1 day	Wed 12/16/15	Wed 12/16/15
100				
101	**VI. Quarterly Full Scale Field Monitoring**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
102	1st Quarterly Full Scale Monitoring Event	3 days	Wed 2/18/15	Fri 2/20/15
103	2nd Quarterly Full Scale Monitoring Event	3 days	Wed 6/17/15	Fri 6/19/15
104	3rd Quarterly Full Scale Monitoring Event	3 days	Wed 9/23/15	Fri 9/25/15
105	4th Quarterly Full Scale Monitoring Event	3 days	Wed 12/16/15	Fri 12/18/15
106				
107	**VII. Quarterly Inspections**	**201 days**	**Wed 3/18/15**	**Wed 12/23/15**
108	**Ist Quarterly Inspection**	**1 day**	**Wed 3/18/15**	**Wed 3/18/15**
109	Cover System	1 day	Wed 3/18/15	Wed 3/18/15
110	Surface Water Drainage System	1 day	Wed 3/18/15	Wed 3/18/15
111	Subsurface Water Drainage	1 day	Wed 3/18/15	Wed 3/18/15
112	Security Fence	1 day	Wed 3/18/15	Wed 3/18/15
113	Access Road	1 day	Wed 3/18/15	Wed 3/18/15
114	Cap Gas Collection/Treatment	1 day	Wed 3/18/15	Wed 3/18/15
115				
116	**2nd Quarterly Inspection**	**1 day**	**Wed 6/17/15**	**Wed 6/17/15**
117	Cover System	1 day	Wed 6/17/15	Wed 6/17/15
118	Surface Water Drainage System	1 day	Wed 6/17/15	Wed 6/17/15
119	Subsurface Water Drainage	1 day	Wed 6/17/15	Wed 6/17/15
120	Security Fence	1 day	Wed 6/17/15	Wed 6/17/15
121	Access Road	1 day	Wed 6/17/15	Wed 6/17/15
122	Cap Gas Collection/Treatment	1 day	Wed 6/17/15	Wed 6/17/15
123				
124	**3rd Quarterly Inspection**	**1 day**	**Wed 9/9/15**	**Wed 9/9/15**
125	Cover System	1 day	Wed 9/9/15	Wed 9/9/15
126	Surface Water Drainage System	1 day	Wed 9/9/15	Wed 9/9/15
127	Subsurface Water Drainage	1 day	Wed 9/9/15	Wed 9/9/15
128	Security Fence	1 day	Wed 9/9/15	Wed 9/9/15
129	Access Road	1 day	Wed 9/9/15	Wed 9/9/15

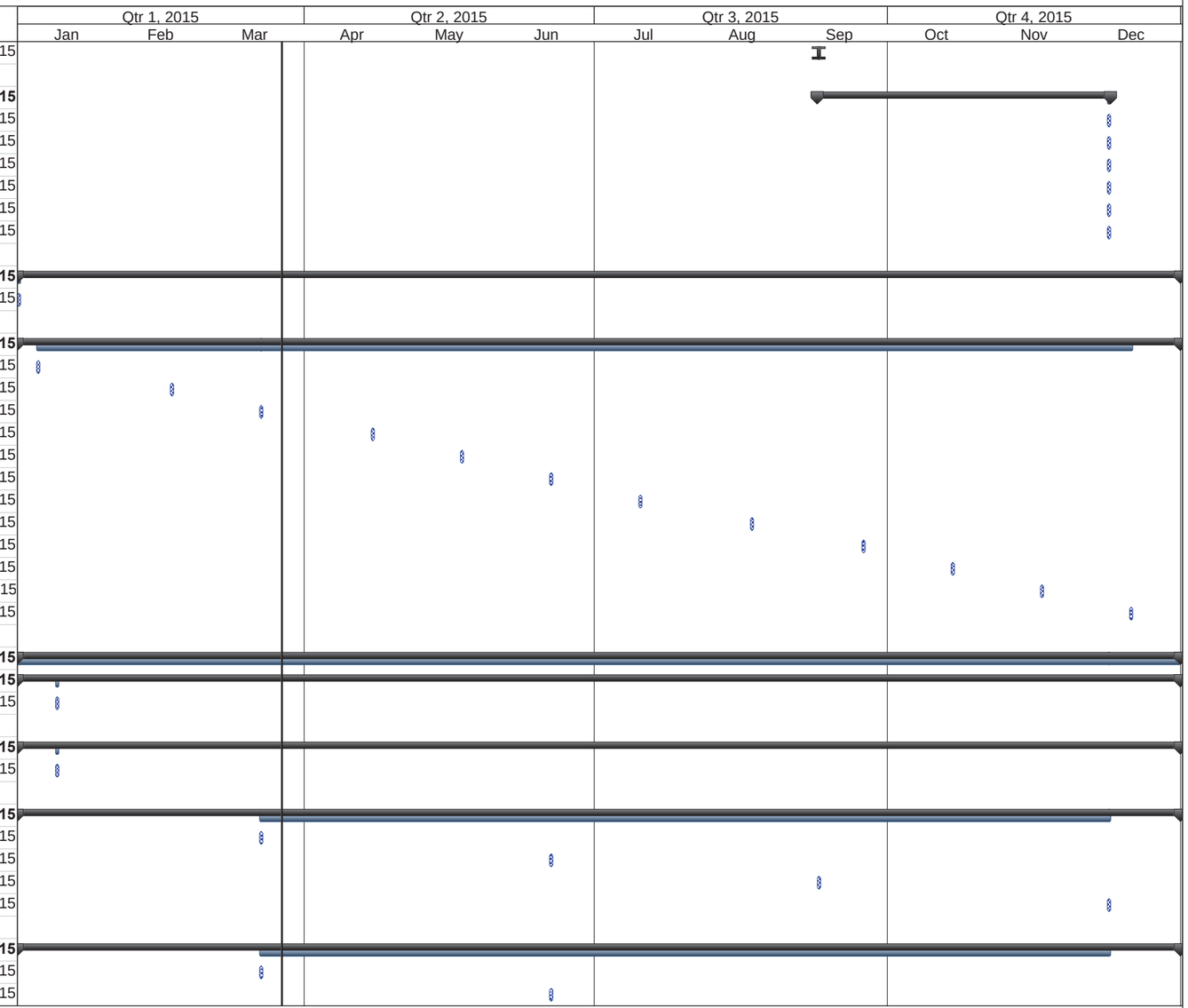


Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

ID	Task Name	Duration	Start	Finish
130	Cap Gas Collection/Treatment	1 day	Wed 9/9/15	Wed 9/9/15
131				
132	**4th Quarterly Inspection**	**66 days**	**Wed 9/9/15**	**Wed 12/9/15**
133	Cover System	1 day	Wed 12/9/15	Wed 12/9/15
134	Surface Water Drainage System	1 day	Wed 12/9/15	Wed 12/9/15
135	Subsurface Water Drainage	1 day	Wed 12/9/15	Wed 12/9/15
136	Security Fence	1 day	Wed 12/9/15	Wed 12/9/15
137	Access Road	1 day	Wed 12/9/15	Wed 12/9/15
138	Cap Gas Collection/Treatment	1 day	Wed 12/9/15	Wed 12/9/15
139				
140	**VIII. Non-Routine Site Inspections - AS NEEDED**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
141		1 day	Thu 1/1/15	Thu 1/1/15
142				
143	**IX. Routine Site/Infrastructure Maintenance**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
144	Monthly Oxygen Generator Inspection & Maintenance 1	1 day	Wed 1/7/15	Wed 1/7/15
145	Monthly Oxygen Generator Inspection & Maintenance 2	1 day	Wed 2/18/15	Wed 2/18/15
146	Monthly Oxygen Generator Inspection & Maintenance 3	1 day	Wed 3/18/15	Wed 3/18/15
147	Monthly Oxygen Generator Inspection & Maintenance 4	1 day	Wed 4/22/15	Wed 4/22/15
148	Monthly Oxygen Generator Inspection & Maintenance 5	1 day	Wed 5/20/15	Wed 5/20/15
149	Monthly Oxygen Generator Inspection & Maintenance 6	1 day	Wed 6/17/15	Wed 6/17/15
150	Monthly Oxygen Generator Inspection & Maintenance 7	1 day	Wed 7/15/15	Wed 7/15/15
151	Monthly Oxygen Generator Inspection & Maintenance 8	1 day	Wed 8/19/15	Wed 8/19/15
152	Monthly Oxygen Generator Inspection & Maintenance 9	1 day	Wed 9/23/15	Wed 9/23/15
153	Monthly Oxygen Generator Inspection & Maintenance 10	1 day	Wed 10/21/15	Wed 10/21/15
154	Monthly Oxygen Generator Inspection & Maintenance 11	1 day	Wed 11/18/15	Wed 11/18/15
155	Monthly Oxygen Generator Inspection & Maintenance 12	1 day	Wed 12/16/15	Wed 12/16/15
156				
157	**X. Non-Routine Site/Infrastructure Maintenance - AS NEEDED**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
158	**Carbon Change-Out SVE/IBT - AS NEEDED**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
159	Carbon Change Out 1	1 day	Tue 1/13/15	Tue 1/13/15
160				
161	**Carbon Change Out GCTS - AS NEEDED**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
162	Carbon Change Out 1	1 day	Tue 1/13/15	Tue 1/13/15
163				
164	**SVE/IBT & GCTS Maintenance**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
165	1st Quarter	1 day	Wed 3/18/15	Wed 3/18/15
166	2nd Quarter	1 day	Wed 6/17/15	Wed 6/17/15
167	3rd Quarter	1 day	Wed 9/9/15	Wed 9/9/15
168	4th Quarter	1 day	Wed 12/9/15	Wed 12/9/15
169				
170	**General Site Maintenance**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
171	1st Quarter	1 day	Wed 3/18/15	Wed 3/18/15
172	2nd Quarter	1 day	Wed 6/17/15	Wed 6/17/15



Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

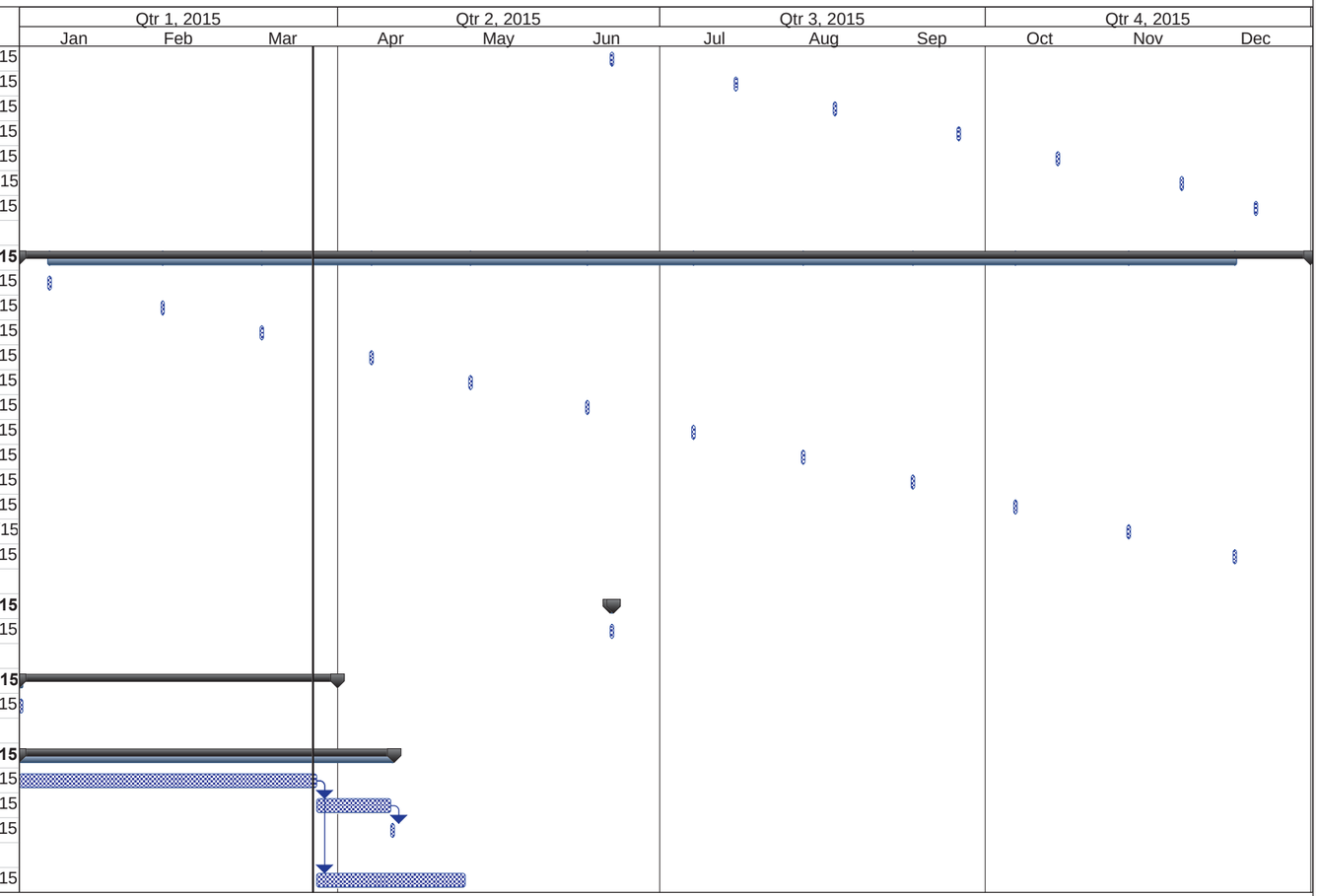
ID	Task Name	Duration	Start	Finish
173	3rd Quarter	1 day	Wed 9/9/15	Wed 9/9/15
174	4th Quarter	1 day	Wed 12/9/15	Wed 12/9/15
175				
176	**Annual Pressure Testing- O2 Lines and Conveyance Piping**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
177	Manifold & Conveyance Piping 1	1 day	Thu 1/1/15	Thu 1/1/15
178				
179	**System Maintenance**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
180	Purging Condensate	1 day	Thu 1/1/15	Thu 1/1/15
181	Flow Adjustment	1 day	Thu 1/1/15	Thu 1/1/15
182				
183				
184	**XI. In-Line SVE/IBT Meter Calibration - AS Needed**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
185	**LEL**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
186	1st Quarter Maintenance	1 day	Wed 3/18/15	Wed 3/18/15
187	2nd Quarter Maintenance	1 day	Wed 6/17/15	Wed 6/17/15
188	3rd Quarter Maintenance	1 day	Wed 9/9/15	Wed 9/9/15
189	4th Quarter Maintenance	1 day	Wed 12/9/15	Wed 12/9/15
190				
191	**O2**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
192	1st Quarterly Maintenance	1 day	Wed 3/18/15	Wed 3/18/15
193	2nd Quarterly Maintenance	1 day	Wed 6/17/15	Wed 6/17/15
194	3rd Quarterly Maintenance	1 day	Wed 9/9/15	Wed 9/9/15
195	4th Quarterly Maintenance	1 day	Wed 12/9/15	Wed 12/9/15
196				
197	**Effluent PID**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
198	1st Quarterly Maintenance	1 day	Wed 3/18/15	Wed 3/18/15
199	2nd Quarterly Maintenance	1 day	Wed 6/17/15	Wed 6/17/15
200	3rd Quarterly Maintenance	1 day	Wed 9/9/15	Wed 9/9/15
201	4th Quarterly Maintenance	1 day	Wed 12/9/15	Wed 12/9/15
202				
203	**XII. In-Line Sensor Manufacturer Maintenance - AS NEEDED**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
204	LEL	1 day	Thu 1/1/15	Thu 1/1/15
205				
206	O2	1 day	Thu 1/1/15	Thu 1/1/15
207				
208	PID	1 day	Thu 1/1/15	Thu 1/1/15
209				
210	**XIII. Monthly Site H&S Inspections**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
211	Monthly Site H&S Inspection 1	1 day	Wed 1/28/15	Wed 1/28/15
212	Monthly Site H&S Inspection 2	1 day	Wed 2/25/15	Wed 2/25/15
213	Monthly Site H&S Inspection 3	1 day	Wed 3/25/15	Wed 3/25/15
214	Monthly Site H&S Inspection 4	1 day	Wed 4/22/15	Wed 4/22/15
215	Monthly Site H&S Inspection 5	1 day	Wed 5/20/15	Wed 5/20/15

Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

Table 22.0
2015 OM&M SCHEDULE OF ACTIVITIES
Del Amo Waste Pits OU

ID	Task Name	Duration	Start	Finish
216	Monthly Site H&S Inspection 6	1 day	Wed 6/17/15	Wed 6/17/15
217	Monthly Site H&S Inspection 7	1 day	Wed 7/22/15	Wed 7/22/15
218	Monthly Site H&S Inspection 8	1 day	Wed 8/19/15	Wed 8/19/15
219	Monthly Site H&S Inspection 9	1 day	Wed 9/23/15	Wed 9/23/15
220	Monthly Site H&S Inspection 10	1 day	Wed 10/21/15	Wed 10/21/15
221	Monthly Site H&S Inspection 11	1 day	Wed 11/25/15	Wed 11/25/15
222	Monthly Site H&S Inspection 12	1 day	Wed 12/16/15	Wed 12/16/15
223				
224	**XIV. Monthly Update**	**261 days**	**Thu 1/1/15**	**Thu 12/31/15**
225	Monthly Update January	1 day	Fri 1/9/15	Fri 1/9/15
226	Monthly Update February	1 day	Tue 2/10/15	Tue 2/10/15
227	Monthly Update March	1 day	Tue 3/10/15	Tue 3/10/15
228	Monthly Update April	1 day	Fri 4/10/15	Fri 4/10/15
229	Monthly Update May	1 day	Fri 5/8/15	Fri 5/8/15
230	Monthly Update June	1 day	Wed 6/10/15	Wed 6/10/15
231	Monthly Update July	1 day	Fri 7/10/15	Fri 7/10/15
232	Monthly Update August	1 day	Mon 8/10/15	Mon 8/10/15
233	Monthly Update September	1 day	Thu 9/10/15	Thu 9/10/15
234	Monthly Update October	1 day	Fri 10/9/15	Fri 10/9/15
235	Monthly Update November	1 day	Tue 11/10/15	Tue 11/10/15
236	Monthly Update December	1 day	Thu 12/10/15	Thu 12/10/15
237				
238	**XV. Survey of Subsidence and Settlement**	**1 day**	**Wed 6/17/15**	**Wed 6/17/15**
239	Conduct Monument Surveys (Once every 5 years)	1 day	Wed 6/17/15	Wed 6/17/15
240				
241	**XVI. Conduct GCTS Confirmation Sampling Event**	**64 days**	**Thu 1/1/15**	**Tue 3/31/15**
242	Conduct Sampling Event (Once every 5 years)	1 day	Thu 1/1/15	Thu 1/1/15
243				
244	**XVII. Preparation of Draft Annual Report**	**76 days**	**Thu 1/1/15**	**Thu 4/16/15**
245	Prepare Draft of Pits Annual Site Report	60 days	Thu 1/1/15	Wed 3/25/15
246	Submit Draft Pits Annual Report for Client Review	15 days	Thu 3/26/15	Wed 4/15/15
247	Submit Draft Pits Annual Site Report To Agency	1 day	Thu 4/16/15	Thu 4/16/15
248				
249	XVIII. Alternative Treatment Unit TM	30 days	Thu 3/26/15	Wed 5/6/15



Project: 97-101 2015 OM&M Schedule
Date: Wed 3/25/15

Task		Rolled Up Milestone		Project Summary		Inactive Summary		Manual Summary	
Milestone		Rolled Up Progress		Group By Summary		Manual Task		Start-only	
Summary		Split		Inactive Task		Duration-only		Finish-only	
Rolled Up Task		External Tasks		Inactive Milestone		Manual Summary Rollup		Progress	

SITE VICINITY MAP

Del Amo Waste Pits OU

Figure 1.0

C2REM An Environmental Management & Development Company
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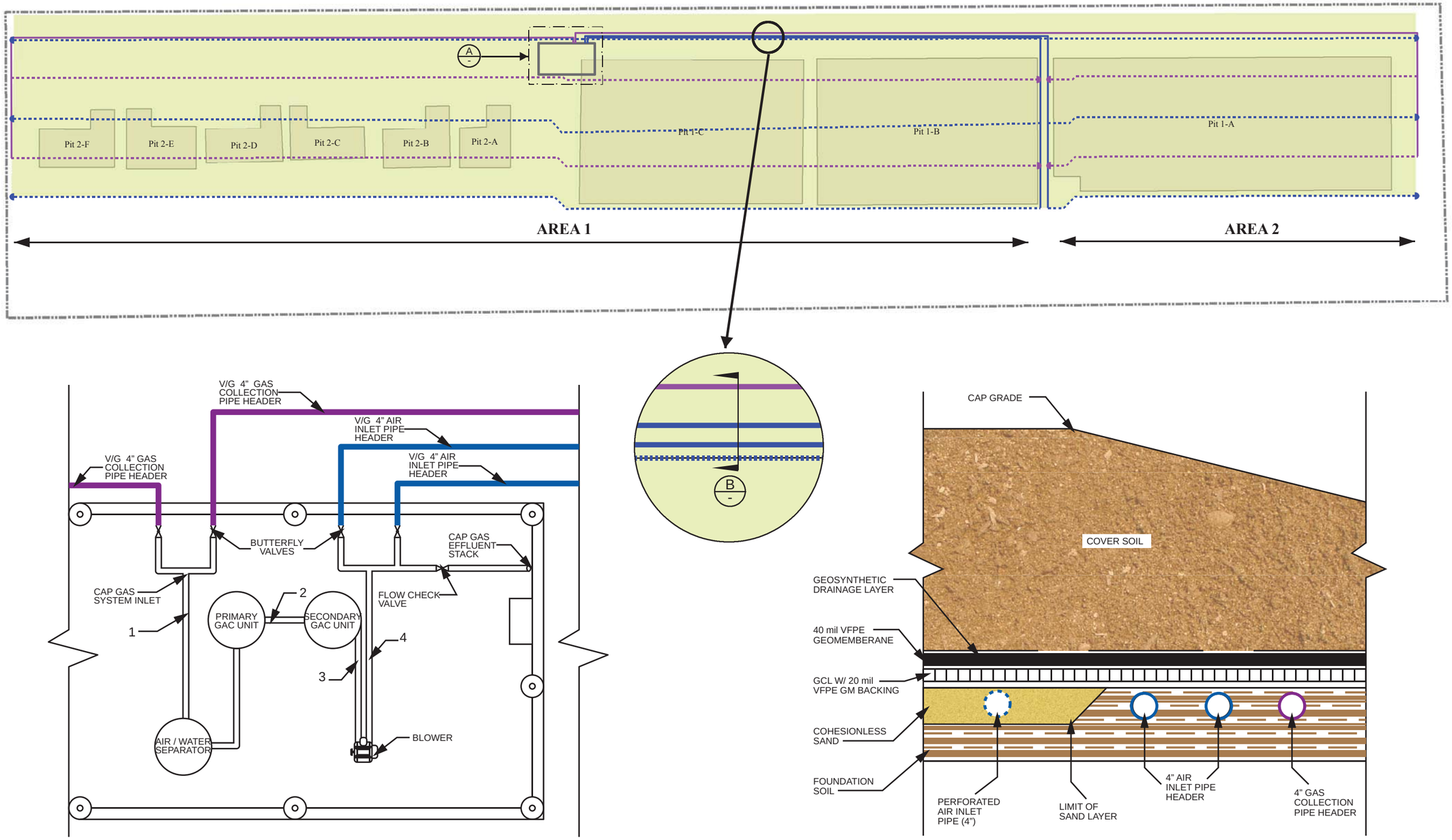
SITE PROPERTY MAP

Del Amo Waste Pits OU

Figure 2.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098



CAP GAS PIPING DIAGRAM (A)
NTS

CAP GAS COLLECTION PIPING CROSS SECTION (B)
NTS - Vertically Exaggerated

Legend:

- 4" Solid Wall Gas Collection Pipe (Header)
- 4" Perforated Gas Collection Pipe
- 4" Solid Wall Air Inlet Pipe (Header)
- 4" Perforated Air Inlet Pipe
- Cap End
- Cap Gas Treatment System Enclosure
- Estimated Extent of Subsurface Impoundment
- Cap
- Del Amo Pits Site

1. System Inluent
2. Effluent of the lead carbon vessel
3. Effluent of the secondary vessel
4. System Effluent

CAP GAS TREATMENT SYSTEM PIPING PLAN

Del Amo Waste Pits OU

Figure 3.0

An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098

Torrance, CA

Figure 4.0
2014 Cap Gas Treatment System Monitoring Results (Influent vs. Effluent)
Del Amo Waste Pits OU

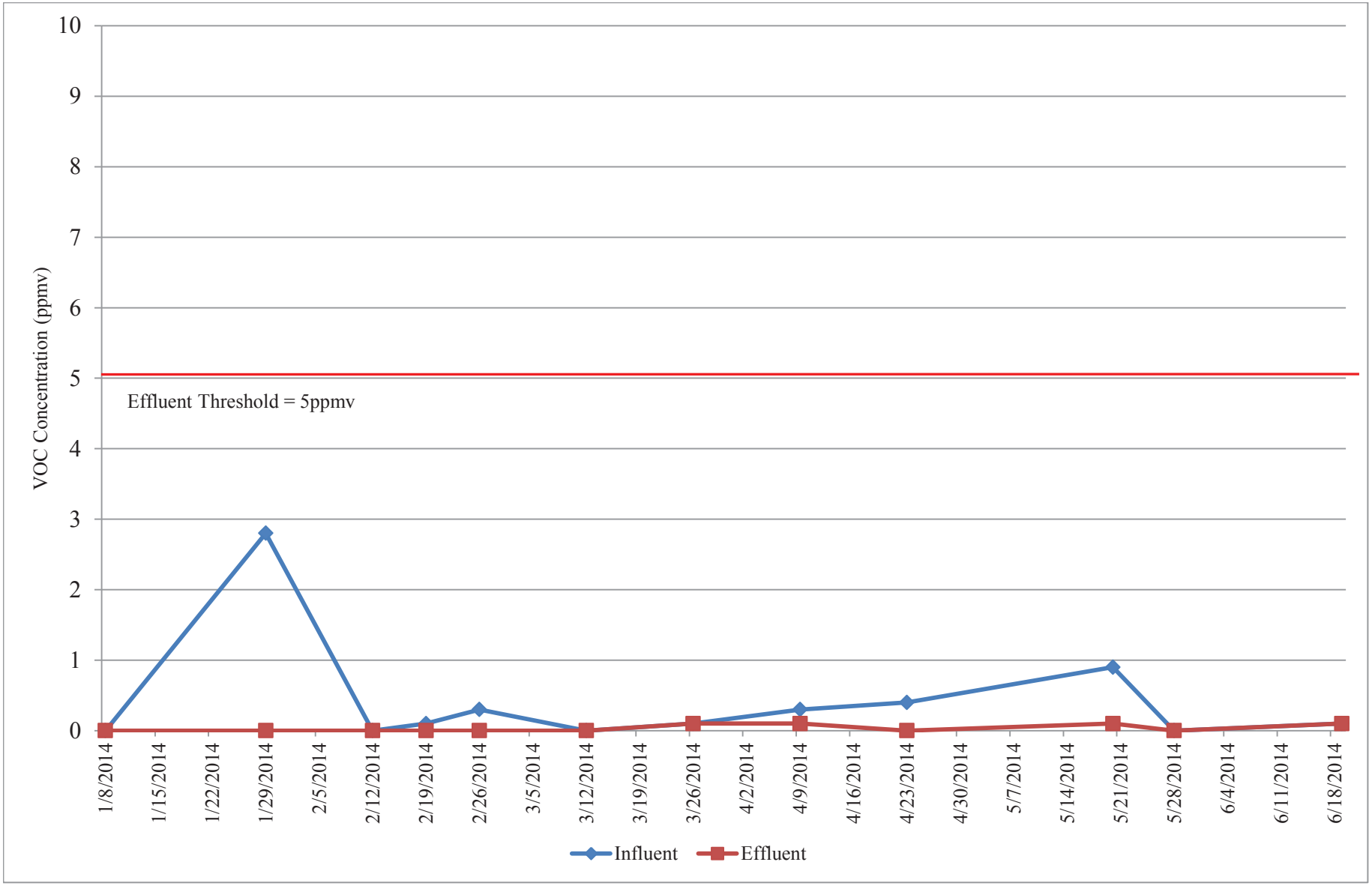
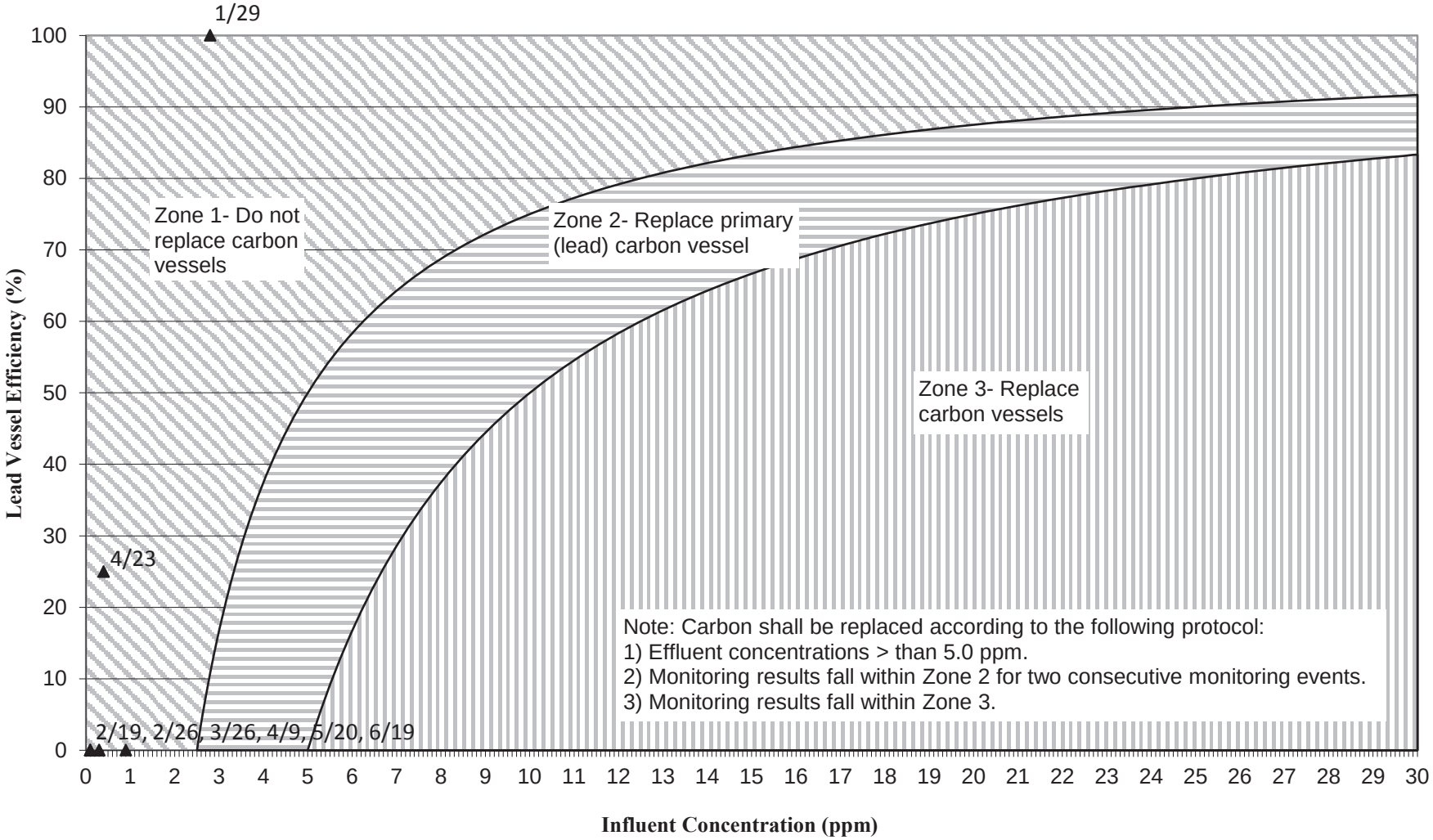
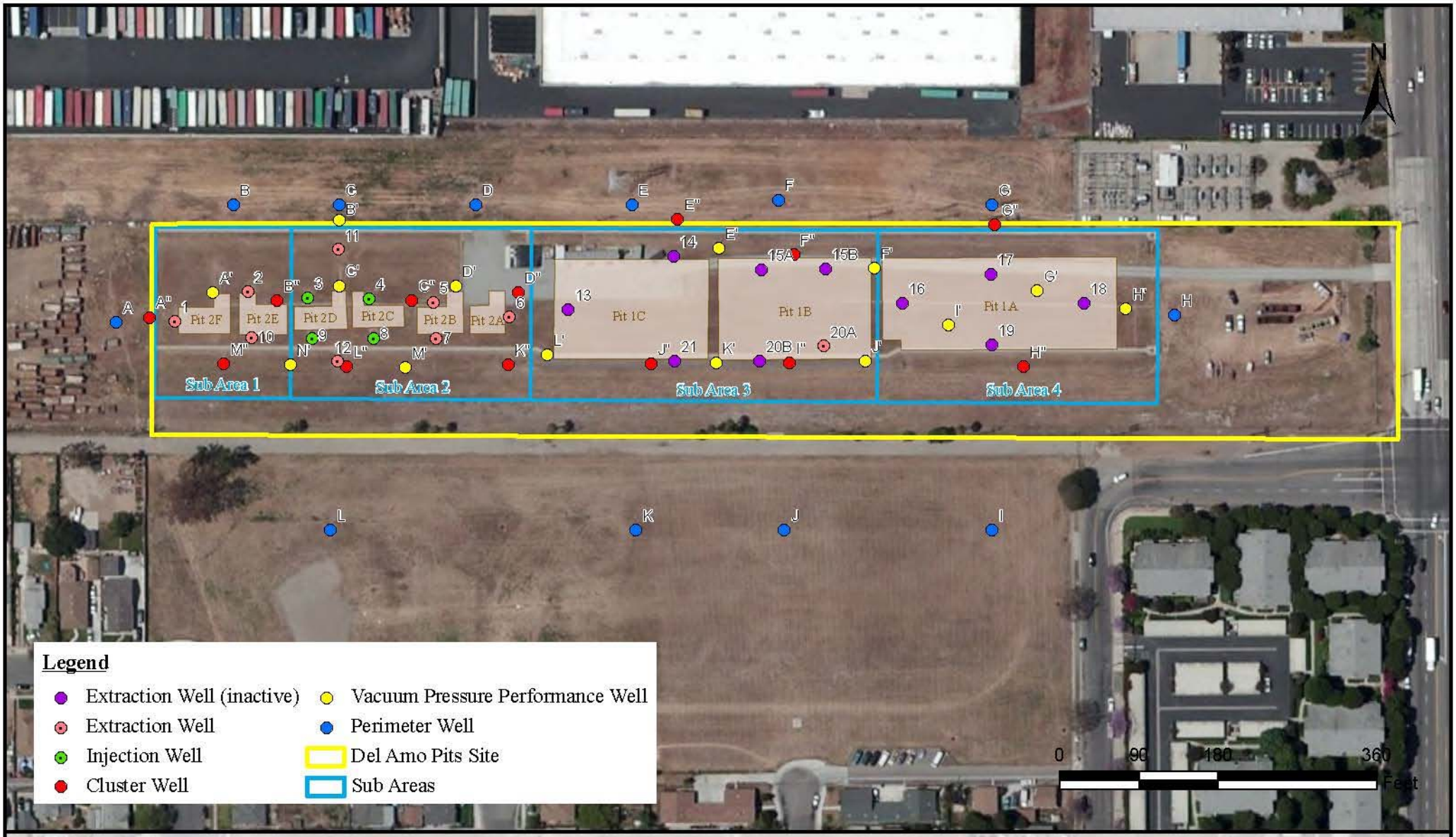


Figure 5.0
2014 Carbon Replacement Protocol
Del Amo Waste Pits



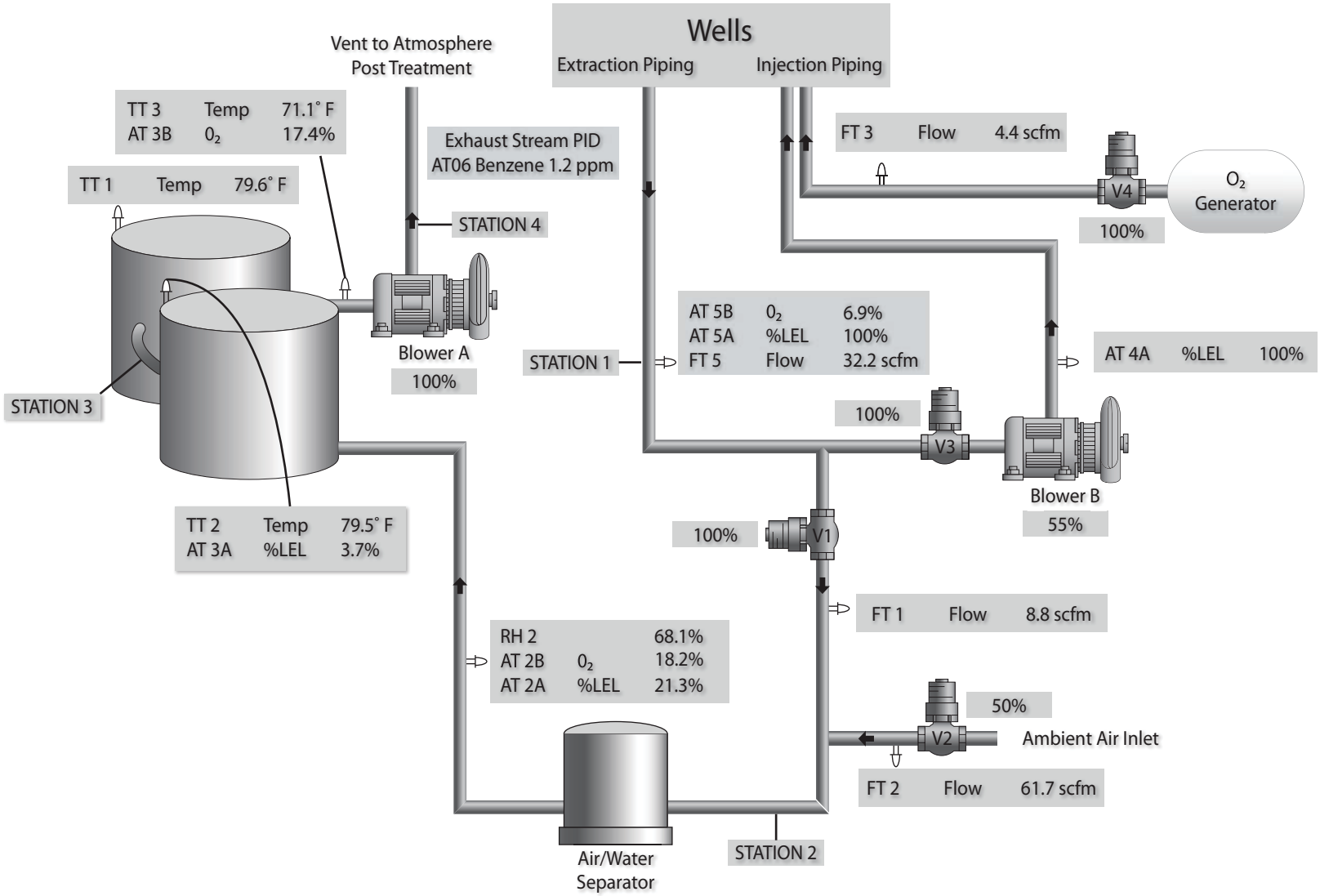


SOIL VAPOR MONITORING WELL LOCATION MAP

Del Amo Waste Pits OU

Figure 6.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098



SVE/IBT SYSTEM

January 6, 2014 - May 7, 2014

Del Amo Waste Pits OU

Figure 7.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA 949.261.8098

Figure 8.0
SVE/IBT System 2014 Laboratory Data Summary for Benzene
Del Amo Waste Pits OU

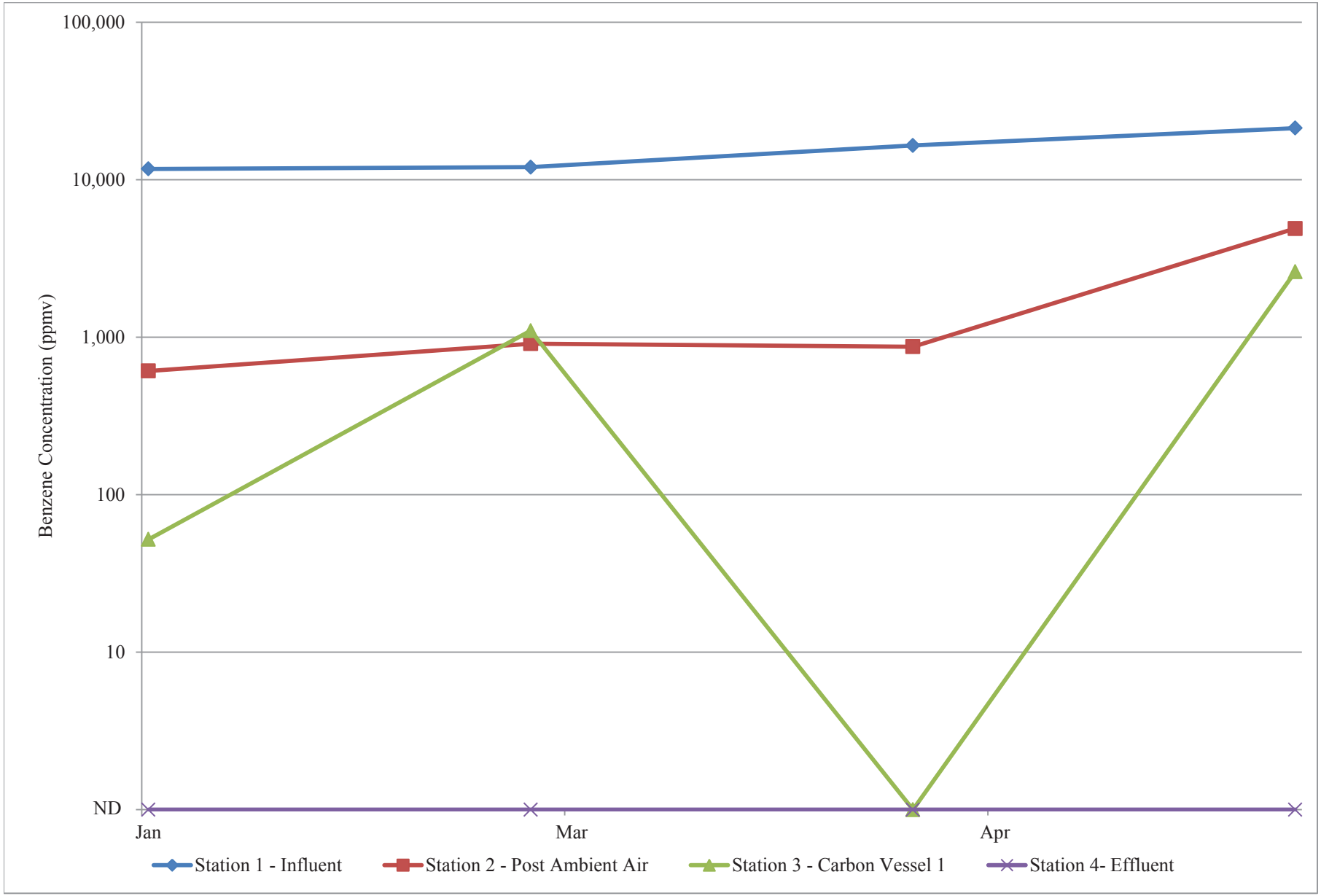


Figure 9.0
2014 Perimeter Well Field Monitoring Results
Del Amo Waste Pits OU

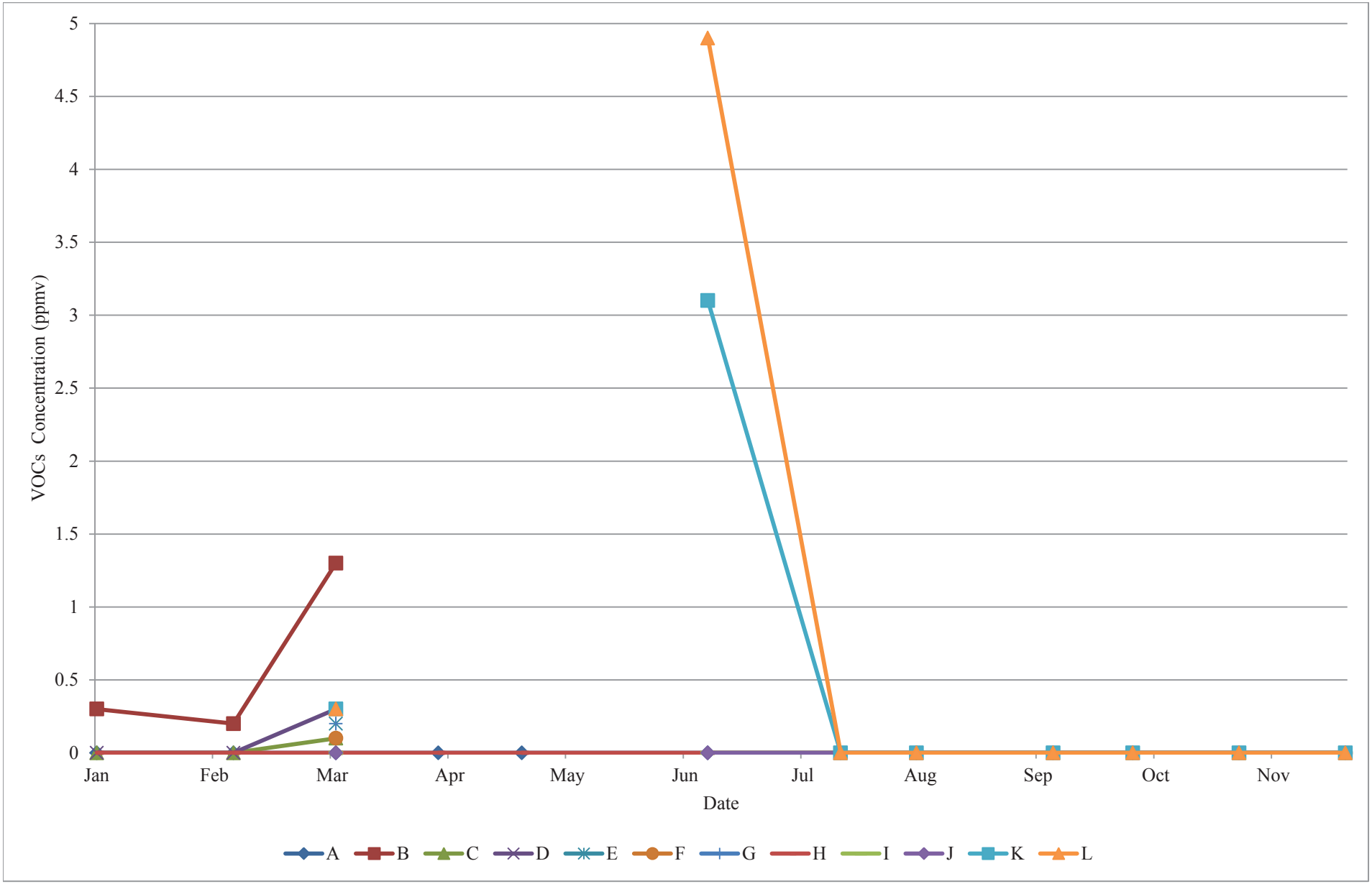
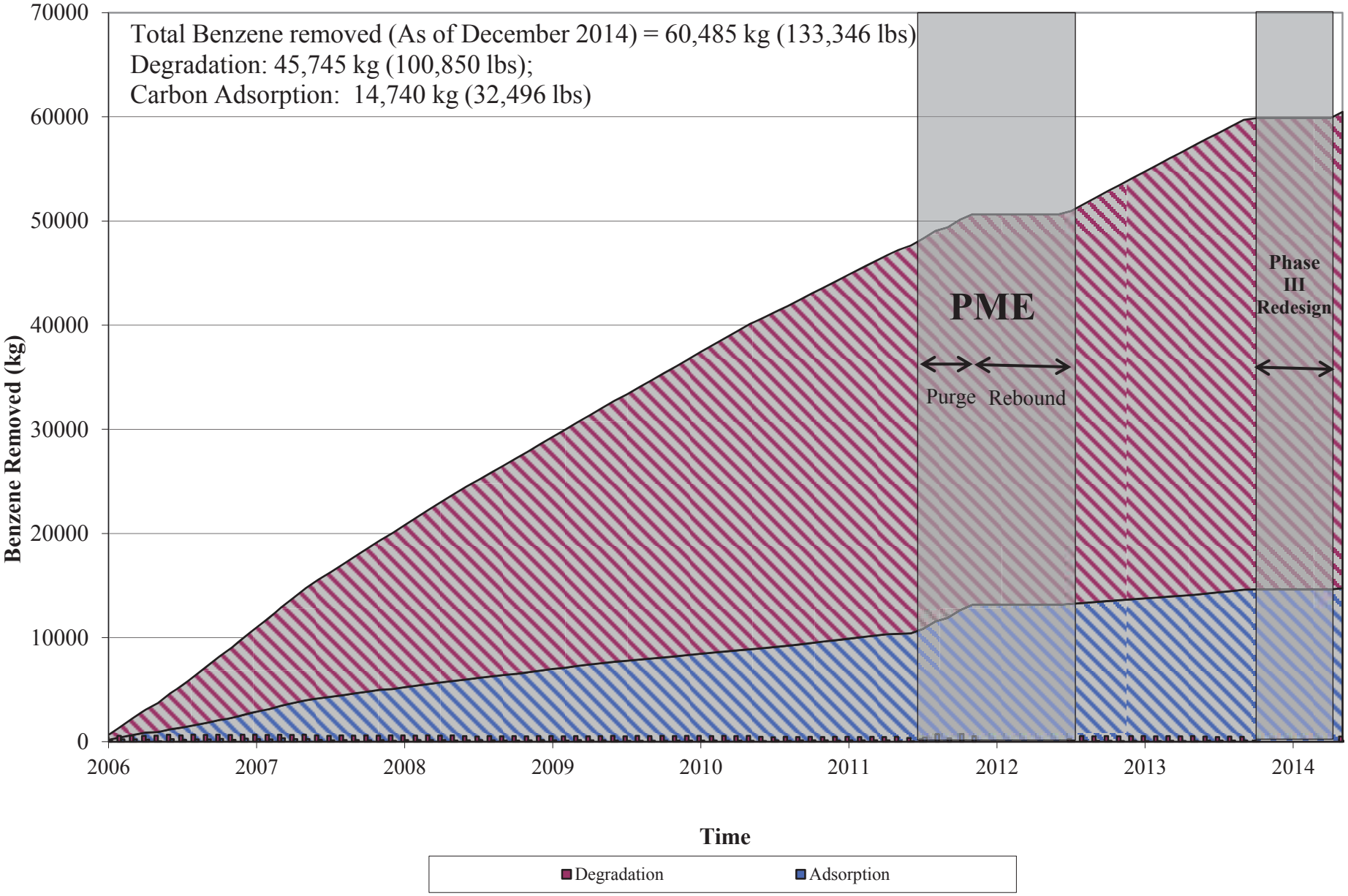
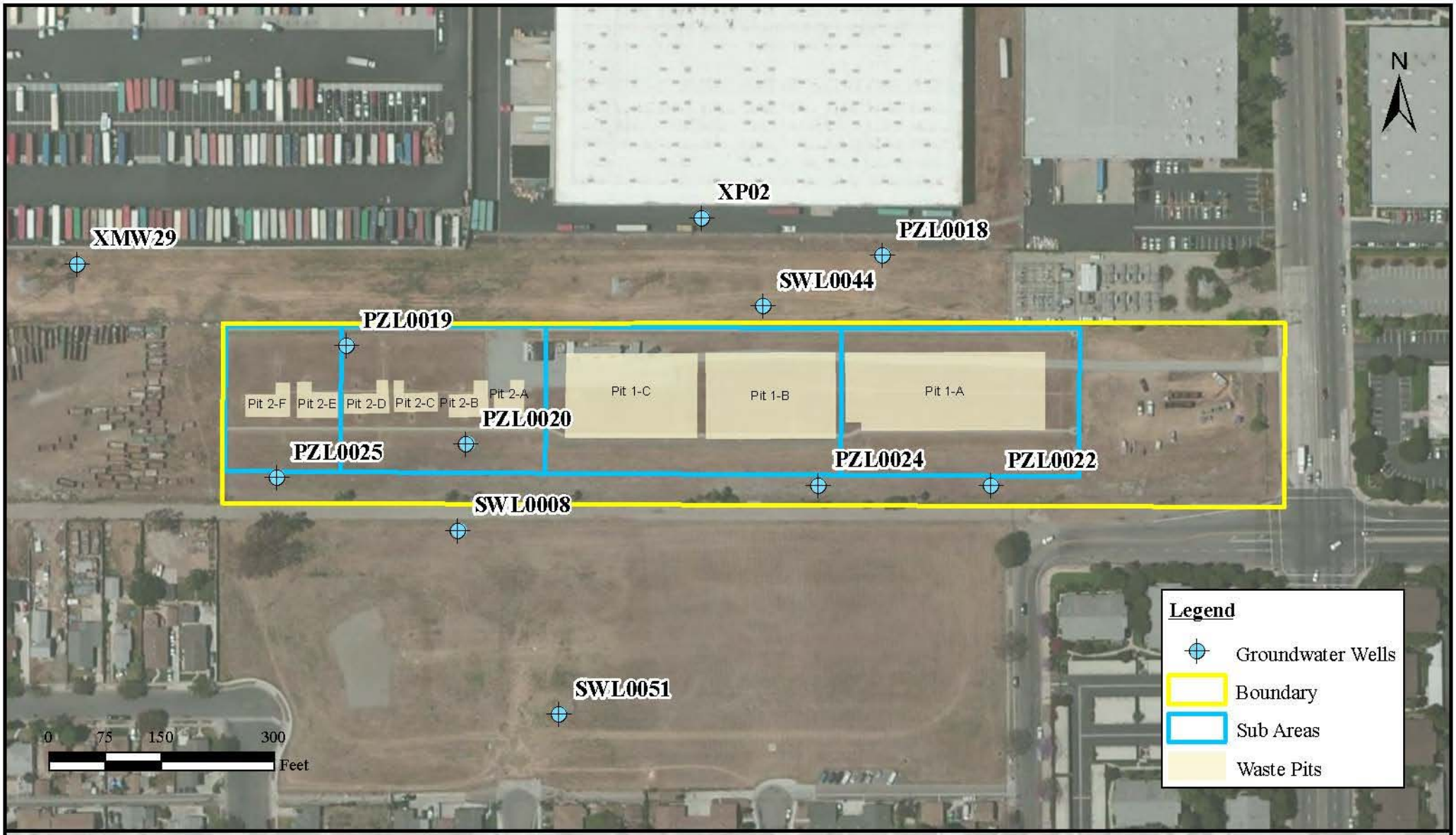


Figure 10.0
SVE/IBT System Operation Total Benzene Removed
Del Amo Waste Pits OU





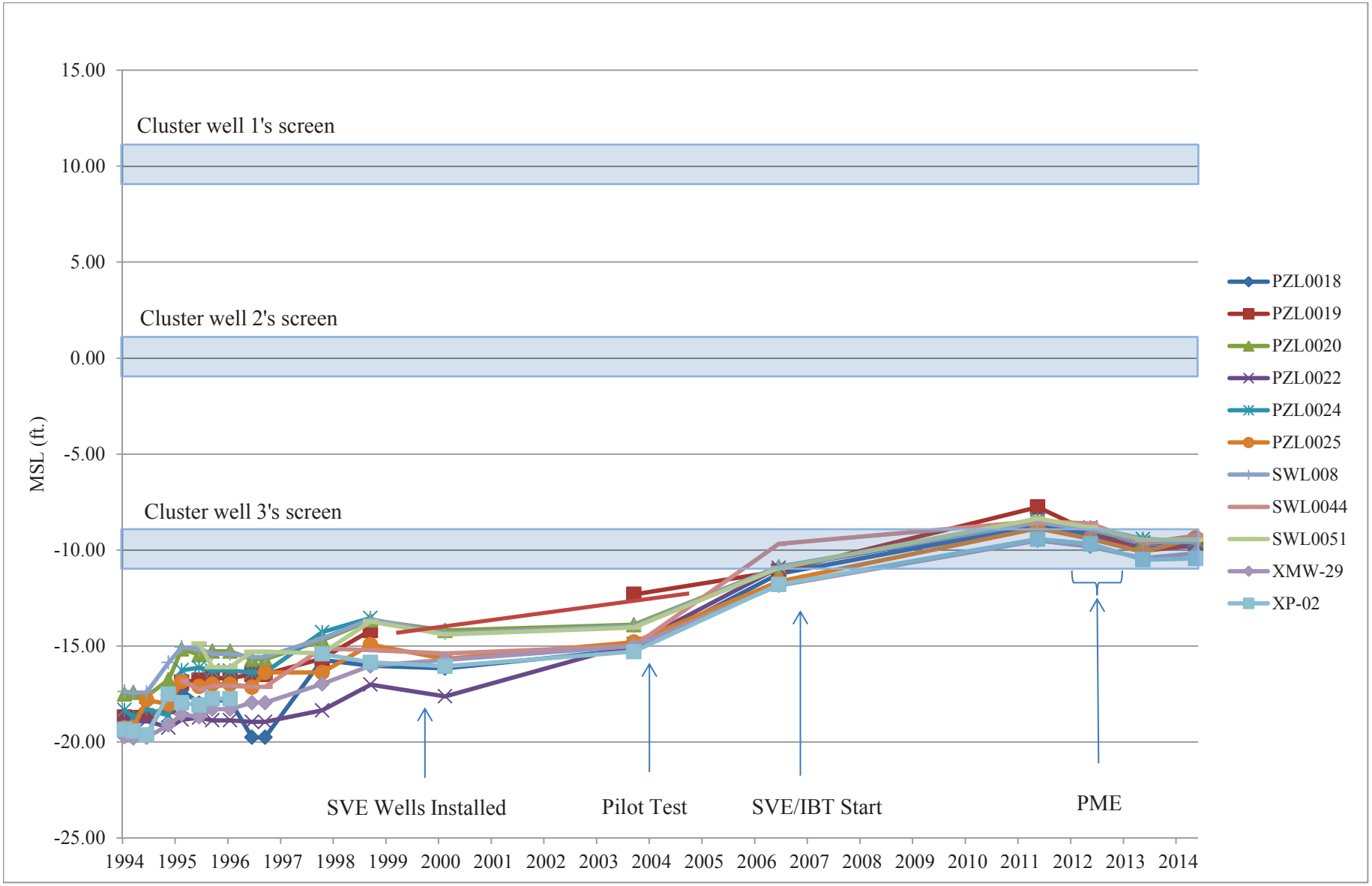
GROUNDWATER MONITORING WELL LOCATION MAP

Del Amo Waste Pits OU

Figure 11.0

C2REM An Environmental Management & Development Company
NEWPORT BEACH, CA 949.261.8098

Figure 12.0
Groundwater Elevations (1994-2014)
Del Amo Waste Pits

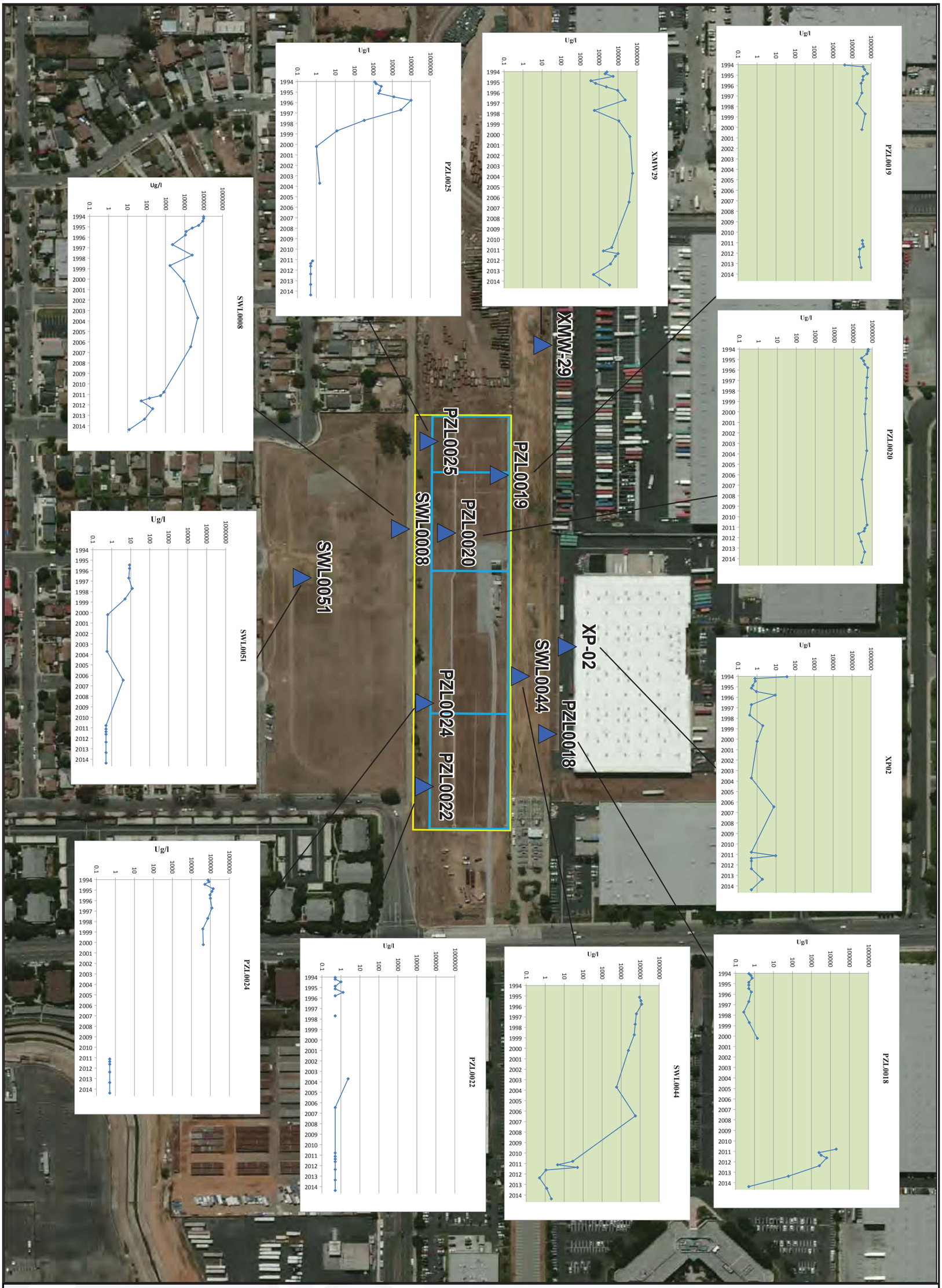


2014 GROUNDWATER ELEVATIONS

Del Amo Waste Pits OU

Figure 13.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098



GROUNDWATER BENZENE CONCENTRATIONS
(1994-2014)

Torrance, CA

Del Amo Waste Pits OU

Figure 14.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098

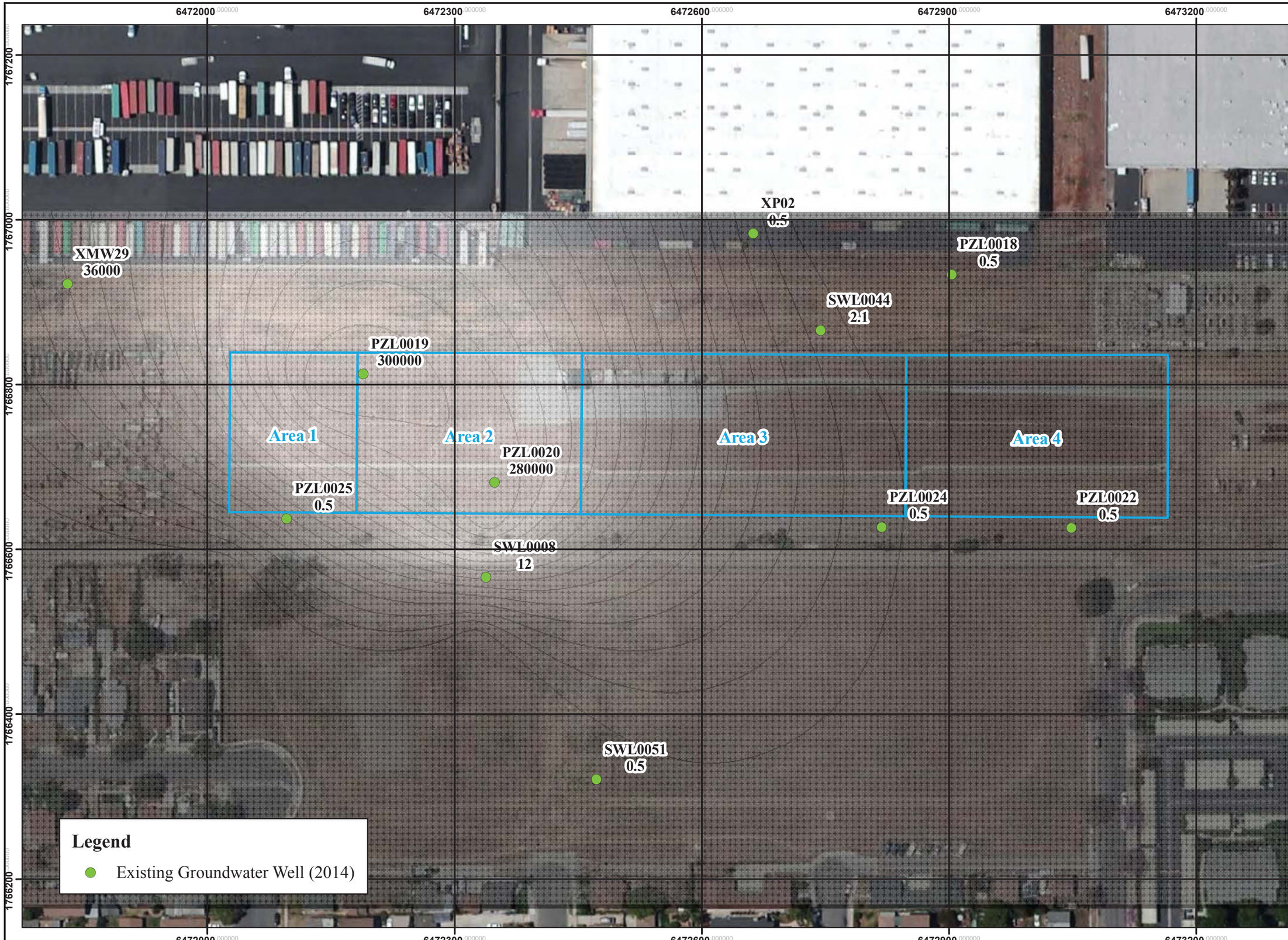


Figure 15.0

Benzene Concentration in Groundwater (µg/l)
11 Existing Groundwater Wells
September 2014
Del Amo Waste Pits OU

Torrance, CA

An Environmental Management & Development Company
NEWPORT BEACH, CA
949 261 8998

Figure 16.0

Benzene Concentration in Groundwater (µg/l)
11 Existing Groundwater Wells (2014) and
8 Abandoned/One-Time Well (1993-1998)
Del Amo Waste Pits OU

REM
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Torrance, CA

SVE WELL ABANDONMENT

Del Amo Waste Pits

Figure 17.0

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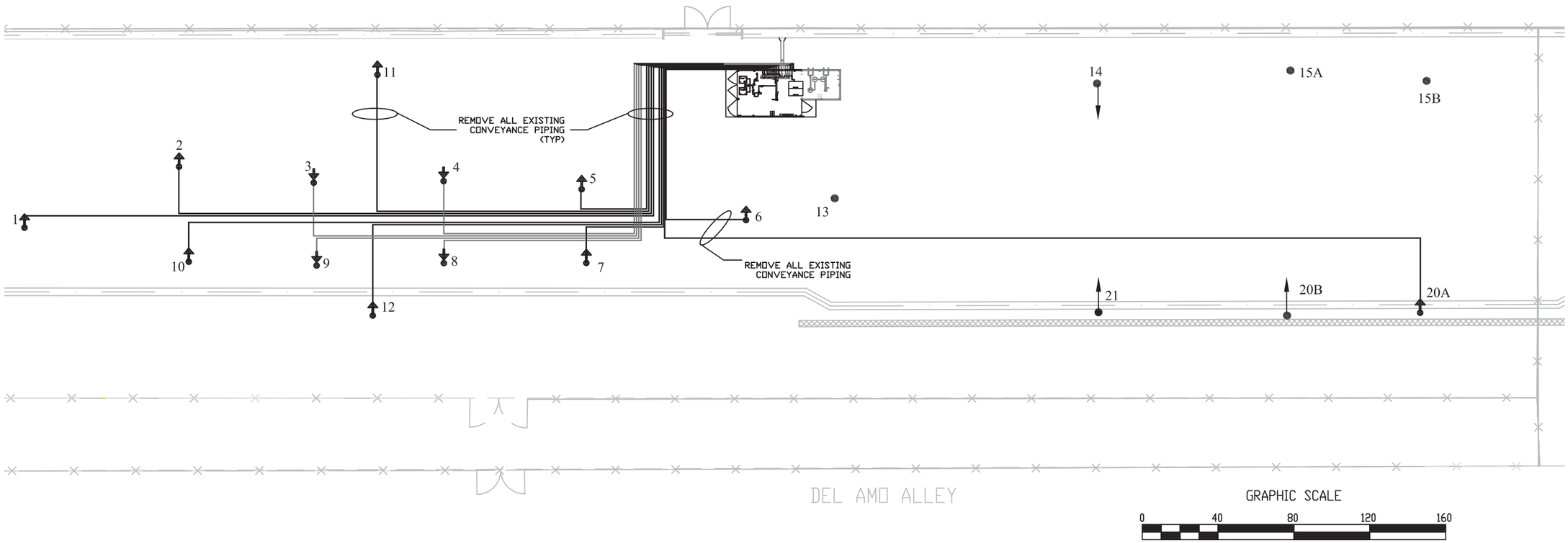
949.261.8098

SVE WELL INSTALLATION

Del Amo Waste Pits

Figure 18.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098



LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION
- SVE WELL IDLE
- SVE WELL ANGLED 30° FROM VERTICAL
- SVE WELL ANGLE DIRECTION

NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONFIGURATIONS, SEE DRAWING A-4.
3. FOR SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN, SEE DRAWING A-3.

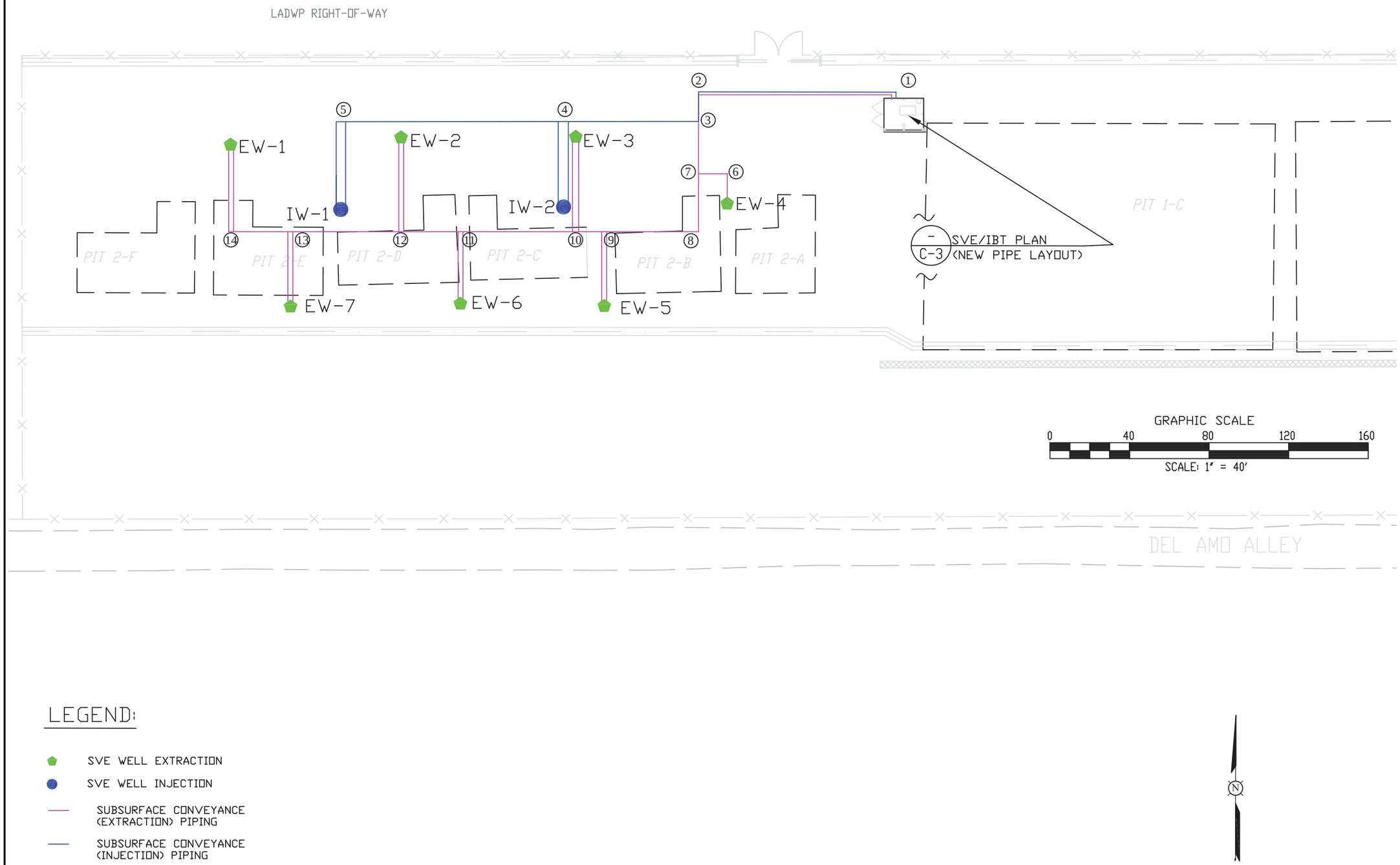
CONVEYANCE PIPING REMOVAL

Del Amo Waste Pits OU

Figure 19.0

An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098

Torrance, CA



CONVEYANCE PIPING INSTALLATION

Del Amo Waste Pits OU

Figure 20.0

C2REM
An Environmental Management & Development Company
NEWPORT BEACH, CA
949.261.8098

Torrance, CA

APPENDIX A

FIELD MONITORING RESULTS

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: S.M
Title: P.E.

Sheet 1 of 1
Date: 1/8/14
Time: 10:45 am

Verified By: C.T.
Title: F.T.

Type of Monitoring Devices: Velocicalc, PID
Weather Conditions: sunny

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(✓) Other Frequency (explain) bi-weekly

Vessel Operation:

(✓) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0
2.	Outlet of Carbon 1	0
3.	Outlet of Carbon 2	0
4.	System Effluent	0

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	67	170.	66
Effluent	110	167	19.

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 1 of 1
Date: 1/29/14
Time: 10:30 AM

Verified By: Seamus McGeough
Title: Project Engineer

Type of Monitoring Devices: PID, Velocicalc.
Weather Conditions: Foggy.

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(X) Other Frequency (explain) Bi-weekly.

Vessel Operation:

(X) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	~~0~~ 2.8
2.	Outlet of Carbon 1	0
3.	Outlet of Carbon 2	0
4.	System Effluent	0

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	83	150	50
Effluent	110	172	29

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: SM
Title: P.C.

Sheet 1 of 1
Date: 2/12/14
Time: 11:00

Verified By: CT
Title: P.T.

Type of Monitoring Devices: PID, velocicalc
Weather Conditions: sunny

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(x) Other Frequency (explain) Bi-weekly

Vessel Operation:

( ) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0
2.	Outlet of Carbon 1	0
3.	Outlet of Carbon 2	0
4.	System Effluent	0

	Temperature (°F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	85	143	25
Effluent	114	168	18

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: S.M.
Title: P.E.

Sheet 1 of 1
Date: 2/19/14
Time: 11:30

Verified By: C.T.
Title: F.T.

Type of Monitoring Devices: PID(3), velocicalc
Weather Conditions: sunny

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(✓) Other Frequency (explain) Follow up monitoring.

Vessel Operation:

( ) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.1
2.	Outlet of Carbon 1	0.2
3.	Outlet of Carbon 2	0.1
4.	System Effluent	0

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	71.5	162	47
Effluent	118	156	17

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: CT
Title: FT

Sheet 1 of 1
Date: 2/26/14
Time: 11:30

Verified By: SM
Title: Pe

Type of Monitoring Devices: PID Velocicalc
Weather Conditions: Cloudy 60°

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly (✓) Semi-Monthly
( ) Other Frequency (explain) _____

Vessel Operation:

(✓) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.3
2.	Outlet of Carbon 1	0.3
3.	Outlet of Carbon 2	0.3
4.	System Effluent	0

	Temperature (°F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	67	165	57.
Effluent	115	167	14

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: SM / SA
Title: P. E.

Sheet 1 of 1
Date: 03/12/2014
Time: 12:00

Verified By: CT
Title: F. T.

Type of Monitoring Devices: pid, RKI, velocicalc
Weather Conditions: 80°, sunny

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(✓) Other Frequency (explain) Bi-weekly

Vessel Operation:

( ) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0
2.	Outlet of Carbon 1	0
3.	Outlet of Carbon 2	0
4.	System Effluent	0

	Temperature (°F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	82	155	15.6
Effluent	124	159	14.1

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 1 of 1
Date: 03/26/2014
Time: _____

Verified By: Seamus McGeough.
Title: Project Engineer.

Type of Monitoring Devices: PID. Velocicalc.
Weather Conditions: Sunny/ Windy

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(X) Other Frequency (explain) Bi-weekly.

Vessel Operation:

(X) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.1
2.	Outlet of Carbon 1	0.1
3.	Outlet of Carbon 2	0.1
4.	System Effluent	0.1

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	78	148	43
Effluent	110	177	26

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 1 of 1
Date: 04/09/2014
Time: 11:35 AM

Verified By: Jan Yusko
Title: Project Manager

Type of Monitoring Devices: PID, Velocicalc.
Weather Conditions: SUNNY, 80°F, SLIGHT BREEZE

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(X) Other Frequency (explain) Bi-weekly.

Vessel Operation:

(X) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.3
2.	Outlet of Carbon 1	0.3
3.	Outlet of Carbon 2	0.1
4.	System Effluent	0.1

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	95	153	17
Effluent	132	165	14

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: SM
Title: P.E

Sheet 1 of 1
Date: 4-23-14
Time: 11:15AM

Verified By: SA
Title: Staff Sci Tech PE

Type of Monitoring Devices: PID, Velocalc
Weather Conditions: 64° SUNNY

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly (✓) Semi-Monthly
( ) Other Frequency (explain) _____

Vessel Operation:

(✓) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.4
2.	Outlet of Carbon 1	0.3
3.	Outlet of Carbon 2	0.2
4.	System Effluent	0

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	88.8	140	33%
Effluent	115	150	20%

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: SM
Title: PE

Sheet 1 of 1
Date: 5/20/2014
Time: 11:15AM

Verified By: CT
Title: FT

Type of Monitoring Devices: PID, Velocalc
Weather Conditions: SUNNY 70

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly (✓) Semi-Monthly
( ) Other Frequency (explain) _____

Vessel Operation:

(✓) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.9
2.	Outlet of Carbon 1	1.2
3.	Outlet of Carbon 2	0.2
4.	System Effluent	0.1

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	82	152	39
Effluent	134	132	14

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: S.A.
Title: P. E.

Sheet 1 of 1
Date: 5/28/14
Time: 11:45 AM

Verified By: C. T.
Title: E.T.

Type of Monitoring Devices: PID, velocical c
Weather Conditions: sunny, warm

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(✓) Other Frequency (explain) bi-monthly

Vessel Operation:

(X) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0
2.	Outlet of Carbon 1	0
3.	Outlet of Carbon 2	0
4.	System Effluent	0

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	86	145	45
Effluent	~~130~~ 135	156	16

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Waste Pits Superfund Site
Gas Collection and Treatment System
Torrance, California

Completed By: S. Mc Cough
Title: PE

Sheet 1 of 1
Date: 6/19/2014
Time: 10:45 AM

Verified By: S. Aizawa
Title: PE, Staff Scientist

Type of Monitoring Devices: PID, Velocicalc.
Weather Conditions: _____

Type of Inspection (check only one):

( ) Daily ( ) Weekly ( ) Monthly ( ) Semi-Monthly
(✓) Other Frequency (explain) Bi Weekly.

Vessel Operation:

(✓) Series, Carbon Vessel 1 to Carbon Vessel 2
( ) Parallel
( ) One Carbon Vessel

Sample Ports:		**VOCs (ppm)**
1.	System Inlet	0.1
2.	Outlet of Carbon 1	0.1
3.	Outlet of Carbon 2	0.1
4.	System Effluent	0.1

	Temperature (^{0}F)	**Air Flow (scfm)**	**Humidity (%)**
Influent	90	135	38
Effluent	127	160	20.7

Comments, Maintenance or Corrective Action (attach additional sheets if required):

Del Amo Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 1/8/~~2013~~14
Time: 11:00
Monitored By: S M
Verified By: CT

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (in. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet	-.26	NA	5.9	22.4	over	35.2	60.0	67.3
Post Dilution	-.28	NA	17.8	3.6	over	80.6	58.7	68.1
Carbon Vessel 1	-.50	NA	18.3	3.4	0	85.1	52.2	73.0
Effluent	-.60 (@C2: before the blower)	NA	18.3	3.4	0	90.2	0.8	154.5

Station	In-line Sensors									
	LEL C_3H_8 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	17.0	AT06	1.2	NA		NA	
Carbon Vessel 1	AT3A	-1.0	NA		NA		NA		NA	
Post Dilution	AT2A	29.0	AT2B	17.0	NA		NA		RH2	79.0
Inlet	AT5A	104.0	AT5B	5.0	NA		FT5	34.0	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	4.0	12.0
Dilution Rate	FT2	NA	

Note:

Del Amo
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 1/29/14
Time:
Monitored By: Seamus McGeough
Verified By: Shinta Aizawa

Station	Magnehelic Pressure (in. H2O)	RKI Eagle LEL (%)	RKI Eagle Oxygen (%)	RKI Eagle Carbon Dioxide (%)	PID VOC (ppm)	Velocicalc Flow Rate (scfm)	Velocicalc Humidity (%)	Velocicalc Temperature
Inlet	-22	11.0 V 100	4.9	25.6	Over.	31	73	66
Post Dilution	-24	16.8 ~~5~~ 6	19.7	1.8	Over	87	68	69
Carbon Vessel 1	-48	11.2 4	19.2	2.2	Over.	86.5	62	73
Effluent	-59 (@C2: before the blower)	0	18.8	1.4	0	98.5	1.5	155

Station	In-line Sensors LEL C_3H_8 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	~~6~~ 18.1	AT06	0.4	NA		NA	
Carbon Vessel 1	AT3A	6	NA		NA		NA		NA	
Post Dilution	AT2A	20	AT2B	~~20~~ 18.7	NA		NA		RH2	92
Inlet	AT5A	104	AT5B	5.8	NA		FT5	NA	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	NA	7.4
Dilution Rate	FT2	NA	

Note:

Del A[illegible] Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 2/12/14
Time: 11:00 AM

Monitored By: S.M.

Verified By: CT

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (in. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet	-28	100 ~~0~~ 9.5 ✓	6.5 ~~19.2~~	21.4 ~~0~~	~~0~~ 15K over	32.7	30	78
Post Dilution	-28	11.2 4	18.9	2.0	15K over	78	24	83
Carbon Vessel 1	-50	2.8 ~~0~~ 1	18.8	2.0	15000 over	8L7	22	84
Effluent	-60 (@C2: before the blower)	0	18.2	2.0	0	88	11	161

Station	In-line Sensors									
	LEL C_6H_6 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	17	AT06	0.3	NA		NA	
Carbon Vessel 1	AT3A	5	NA		NA		NA		NA	
Post Dilution	AT2A	22	AT2B	18	NA		NA		RH2	49
Inlet	AT5A	104	AT5B	7	NA		FT5	28	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	NA	133
Dilution Rate	FT2	NA	

Note:

Del Amo Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 2/26/14
Time: 10:30

Monitored By: S. M Verified By: C.T

Station	Magnehelic Pressure (In. H2O)	RKI Eagle LEL (%)	RKI Eagle Oxygen (%)	RKI Eagle Carbon Dioxide (%)	PID VOC (ppm)	Velocicalc Flow Rate (scfm)	Velocicalc Humidity (%)	Velocicalc Temperature
Inlet	-30	10.0 V(100)	7.2	22.2	15K over	26.6	84.7	65.4
Post Dilution	-30	3 (8.4)	19.8	1.2	15K over.	82.9	54.2	72.9
Carbon Vessel 1	-54	3 (8.4)	19.8	1.4	484	74.9	48.0	72.8
Effluent	-60 (@C2: before the blower)	0	17.6	1.6	0	117	1.9	157.6

Station	In-line Sensors LEL C_6H_6 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	18	AT06	1.5	NA		NA	
Carbon Vessel 1	AT3A	5	NA		NA		NA		NA	
Post Dilution	AT2A	18	AT2B	19	NA		NA		RH2	77
Inlet	AT5A	104	AT5B	8	NA		FT5	26	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	N/A	14.8
Dilution Rate	FT2	N/A.	

Note:

Del A.__ Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 3/12/14
Time: 10:30

Monitored By: SM/SA Verified By: CT

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (in. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet *	-28	12 V (100)	8.7	19.4	Over	23	36	75
Post Dilution	-30	5 (14)	20.3	1.2	Over.	71	24.5	80
Carbon Vessel 1	-54	0	~~20.3~~ 20.0	1.4	0.1	79	~~78~~ 28	78
Effluent	-60 (@C2: before the blower)	0	20.0	1.6	0	85	0.8	165

Station	In-line Sensors									
	LEL C_6H_6 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	18.3	AT06	0.2	NA		NA	
Carbon Vessel 1	AT3A	0	NA		NA		NA		NA	
Post Dilution	AT2A	17	AT2B	19.1	NA		NA		RH2	49
Inlet	AT5A	104	AT5B	8.1	NA		FT5	22	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	NA	5.0
Dilution Rate	FT2	NA	

Note: ~~[illegible]~~ *Inlet sample was taken from the station 4 (re-circulated vapor stream) due to the broken port for the pump long box.

Del Amo Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 03/26/2014.
Time: 11:00
Monitored By: Seamus McGeough Verified By: Shinta Aizawa

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (in. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet	-30	16.5 V (1.0)	7.2	23.0	Over	25	50	68.5
Post Dilution	-30	6 (16.5)	20.0	1.2	Over	70	52	68
Carbon Vessel 1	-54	1 (2.8)	20.0	1.4	0	79.	47	72
Effluent	-61 (@C2: before the blower)	0	19.8	1.4	0	86	1.9	154

Station	In-line Sensors									
	LEL C_3H_8 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	18.5	AT06	0.8	NA		NA	
Carbon Vessel 1	AT3A	2	NA		NA		NA		NA	
Post Dilution	AT2A	18	AT2B	19.4	NA		NA		RH2	75
Inlet	AT5A	104	AT5B	9.1	NA		FT5	23	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	NA	5.0
Dilution Rate	FT2	NA	

Note:

Del Amerits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 04/09/2014
Time: 12:00 PM

Monitored By: Ian Yusko

Verified By: Shinta Aizawa

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (in. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet	-28	15.5 ✓(100)	7.5	21.2	15000 OVER	24	17	88
Post Dilution	-30	4 (11.2)	19.9	1.2	15000 OVER	75	18	89
Carbon Vessel 1	-53	Ø	19.8	1.2	151	84	19	90
Effluent	-59 (@C2: before the blower)	Ø	19.3	1.0	Ø	82	1.3	175

Station	In-line Sensors									
	LEL C_6H_6 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	18.4	AT06	0.3	NA		NA	
Carbon Vessel 1	AT3A	2	NA		NA		NA		NA	
Post Dilution	AT2A	15	AT2B	19.1	NA		NA		RH2	43
Inlet	AT5A	104	AT5B	8.1	NA		FT5	23	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	NA	5
Dilution Rate	FT2	NA	

Note:

Del [illegible] Pits
SVE/IBT Enclosure Monitoring Form
Torrance, CA

Date: 4/23/14
Time: 12:00

Monitored By: SM Verified By: SA

Station	Magnehelic	RKI Eagle			PID	Velocicalc		
	Pressure (In. H2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOC (ppm)	Flow Rate (scfm)	Humidity (%)	Temperature
Inlet	-24	13.5 V (100)	2.5	25.0	15 over	43.5	45	76.
Post Dilution	-26	16 (44.8)	17.5	3.6	15k over.	79	45	75
Carbon Vessel 1	-50	11 (30.8)	17.5	3.6	15k over.	83	43	77
Effluent	-56 (@C2: before the blower)	0	17.7	3.4	0	89.2	2.8	162

Station	In-line Sensors									
	LEL C_6H_6 (%)		Oxygen (%)		VOCs (ppm)		Flow Rate (scfm)		Humidity (%)	
Effluent	NA		AT3B	16	AT06	1.4	NA		NA	
Carbon Vessel 1	AT3A	12	NA		NA		NA		NA	
Post Dilution	AT2A	29	AT2B	16	NA		NA		RH2	68
Inlet	AT5A	104	AT5B	5	NA		FT5	43	NA	

Station	In-line Sensors		Velocicalc (scfm)
Treatment Rate	FT1	11	15
Dilution Rate	FT2	54	

Note:

SVE/IBT
SVE Well Monitoring Form
Del Amo Pits

Date: 3/26/14~3/28/14

Monitored By: SA/SM/CT

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
1	-19	6.5V	12.3	8.2	Over	
2	-6	6.5V	14.1	21.4	Over	
3	+3	6.0V	23.9	21.8	over	
4	+6	13.0V	0	31.6	Over	
5	-2	16.5V	1.0	28.4	Over	
6	-12	10V	11	5.8	Over	
7	-4	24.5V	0	21.6	Over	
8	+8	6.5V	9.9	14.4	Over	
9	+4	9.5V	20.9	21.8	Over	
10	-12	31V	10.3	17.2	Over.	
11	+0.20	4	0	36.0	Over.	
12	~~[illegible]~~ -21	65	2.3	26	Over	
13	-0.15	94	3.0	2.8	Over	
14	-0.10	0	4.3	9.0	104	
15A	-0.10	~~0~~ 1.	~~+~~13.8	4.6	148	
15B	-0.10	0	2.6	17.6	2.1	
16	-0.10	3	0	16.2	Over	
17	-0.05	0	0	14.8	14.5	
18	-0.05	0	9.7	9.0	0.4	
19	-0.10	0	0	16.2	244	
20A	-0.10	2	0	13.0	Over	
20B	-0.05	0	20.9	0.2	35	
21	-0.05	0	~~9.5~~ 6.3	10.4	75	

SVE/IBT
Cluster Well Monitoring Form
Del Amo Pits

Date: 3/26/14 ~ 3/28/14

Monitored By: SA/SM/CT

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A"1	0	0	20.6	0	1.3	
A"2	-0.04	0	20.4	0.4	2.0	
A"3	0	0	18.4	1.6	5.5	
B"1	0.22	13	15.7	25.6	over	
B"2	0	19	18.6	5.8	over	
B"3	0.02	27	18.3	8.2	over	
C"1	-0.2	4	19.2	1.2	Over.	
C"2	-0.18	~~0~~ 3	~~19.1~~ 16.3	~~0.8~~ 28	~~141~~ over	
C"3	-0.14	16	~~18.5~~ 12.2	~~1.2~~ 6.8	~~over 346~~ over.	
D"1	-0.46	7.5v	0.	~~0.~~ 14.2	over	
D"2	-0.36	61 v	12.5	3.2	over	
D"3	0	0	14.8	2.0	49.6	
E"1	0	0	20.3	0.4	0.7	
E"2	-0.04	0	19.3	0.4	0.9	
E"3	0	0	20.7	0	0.2	
F"1	0	0	20.9	0	0.4	
F"2	0	0	19.4	0.6	1.5	
F"3	0	0	19.7	0.6	11.5	
G"1	0	0	15.7	3.8	0.1	
G"2	-0.02	0	18.9	0.8	0.1	
G"3	0	0	15.0	3.8	0.2	
H"1	0	0	17.4	3.0	0.1	
H"2	-0.04	0	17.6	2.2	0	
H"3	0	0	9.9	7.8	0	
I"1	-0.1	0	18.7	0.8	61	
I"2	-0.02	0	19.1	0.6	2.5	
I"3	-0.04	0	19.2	0.4	1.9	
J"1	-0.04	0	17.7	3.0	1.6	
J"2	-0.04	0	20.4	0.2	3.9	
J"3	-0.08	0	5.3	11.6	0.9	
K"1	-0.06	0	18.6	1.4	12.2	
K"2	-0.08	0	19.9	0.4	14.1	
K"3	-0.02	0	20.9	0	over	
L"1	0.3	45.5v	0	27.0	over	
L"2	0.1	28.5 v	7.4	16.8	over	
L"3	0.3	35.0 v	0	26.0	over	
M"1	-0.16	0	14.1	6.0	361 → (PID 2) - over → (PID 3)	
M"2	-0.24	0	15.8	4.6	~~160~~ → 273	
M"3	-0.02	3	20.0	1.0	over	

SVE/IBT
Vacuum Performance Well Monitoring Form
Del Amo Pits

Date: 3/26/14 ~ 3/28/14
Monitored By: SA/SM/CT

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A'	-0.84	9	17.5	11.0	over	
B'	-0.02	0	6.1	11.6	1.2	
C'	0.42	55 V	2.4	26.8	over	
D'	-0.2	~~0~~13V	~~18.5~~24	~~1.0~~14.2	~~173~~ over	
E'	-.08	0	7.7	7.6	1.2	
F'	-0.04	0	10.6	7.4	0.7	
G'	-0.1	0	20.9	0	0	
H'	-0.04	0	17.0	3.0	0.4	
I'	-0.08	20 V	8.5	2.4	over	
J'	-0.06	0	18.3	1.2	5.1	
K'	-0.12	0	10.0	6.2	1.0	
L'	-0.1	0	20.9	0	1.1	
M'	-0.01	8.0 V	4.6	16.4	over	
N'	0	43 V	6.9	29.8	over	

SVE/IBT
Full Scale Monitoring Form
Del Amo Pits

Monitored by: S.M / C.T
Date: 6/25/14

Well ID	Pressure (in. H20)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
1	NA	7.5V	~~8.4~~ 6.3	7.0	Over	
2		13V	0	27.2	over	
3		10.5V	0	33.0	Over	
4		14V	0	34.4	over	
5		23V	0	26.8	Over	
6		10.5V	4.7	6.0	Over	
7		27V	0	22.2	Over	
8		5.0V	6.5	18.6	Over	
9		11.0V	0	33.2	Over	
10		15.5V	5.5	12.4	over	
11		5.0V	0	36.6	over	
12		86	1.2	25.7	over	
13		77	4.8	2.6	Over	
14		0	1.4	10.2	90	
15A		0	10	5.8	220	
15B		0	0	18.6	1.9	
16		2	0	15.2	Over.	
17		0	0	14.6	18	
18		0	8.4	9.8	0.1	
19		0	0	16.6	254	
20A		2	0	14.6	Over	
20B		8	0	12.6	Over.	
21		0	~~6.4~~ 5.7	10.2	59	

* Pressures were not monitored as system has been off since.

Date: 6/25/14

Monitored By: S. M. / C. T.

SVE/IBT
Cluster Well Monitoring Form
Del Amo Pits

Well ID	Pressure (In. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A"1	NA	0	17.4	1.0	0	
A"2	NA	0	20.1	0	0.5	
A"3	NA	0	20.1	0	0.9	
B"1	NA	20	12.4	20.4	over	
B"2	NA	3	NA	2.6	NA	over(LOS) 15.9 (O_2)
B"3	NA	6	18.6	2.0	over	
C"1	NA	2	18.8	1.4	over	
C"2	NA	0	17.6	1.2	160	
C"3	NA	2	18.4	1.6	over	
D"1	NA	SV	1.8	9.6	over	
D"2	NA	0	14.5	1.6	55.6	
D"3	NA	58	11.7	2.6	over	
E"1	NA					
E"2	NA					
E"3	NA					
F"1	NA	0	20.9	0	2.5	
F"2	NA	0	19.9	0.4	4.7	
F"3	NA	0	19.8	0.4	12.0	
G"1	NA					
G"2	NA					
G"3	NA					
H"1	NA	0	20.9	0	0	
H"2	NA	0	20.7	0.2	0	
H"3	NA	0	8.9	7.8	4.8*	
I"1	NA	0	17.4	1.6	48.3	
I"2	NA	0	20.9	0	0	
I"3	NA	0	20.9	0	0	
J"1	NA	0	16.7	3.6	4.1	
J"2	NA	0	19.9	0.8	5.7	
J"3	NA	0	15.0	4.2	3.0	
K"1	NA	0	16.5	1.4	59.1	
K"2	NA	0	16.7	2.8	0	
K"3	NA	0	20.9	0	393	
L"1	NA	16	16.5	4.2	over	
L"2	NA	45	16.5	4.6	over	
L"3	NA	7	20.6	1.2	over	
M"1	NA	1	4.3	10.6	0.6	
M"2	NA	1	4.1	12.0	0.1	
M"3	NA	0	20.2	0	over	

SVE/IBT
Vacuum Performance Well Monitoring Form
Del Amo Pits

Date: 6/29/14

Monitored By: S.M. / C.T.

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A'	NA	0	17.3	0	8.7	
B'	NA					
C'	NA	1	20.7	0.4	12.6	
D'	NA	3	16.6	2.0	over	
E'	NA	0	3.2	9.2	4.6	
F'	NA	0	19.9	0.4	0.3	
G'	NA	0	20.7	0	0.0	
H'	NA	0	17.5	2.6	1.0	
I'	NA	2.8	5.2	3.0	over	
J'	NA	0	20.9	0	0.3	
K'	NA	0	6.5	7.8	2.7	
L'	NA	0	20.3	0.2	3.5	
M'	NA	37	14.6	5.6	over	
N'	NA	16	17.9	3.2	over	

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 01/22/14

Monitored By: Seamus McGeough
Shinta Aizawa

Well ID	Pressure (In. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	0	0	20.7	0.8	0	
B	0	0	19.4	2.2	0.3	
C	0	0	16.8	2.6	0	
D	-0.05	0	20.9	0.2	0	
E	~~-0.05~~					
F						
G						
H	-0.05	0	19.2	1.6	0	
I						
J						
K						
L						

Perimeter Well Monitoring Form

Monitored by: SM / CT

Date: 2/26/2014

Weather: Sunny 70

Well ID	P (in. H20)	LEL methane (%)	O2 (%)	CO2 (%)	VOCs (ppm)
A	0	0	20.6	0.9	0
B	0	0	19.7	2.1	0.2
C	0	0	16.8	2.4	0
D	-0.05	0	20.9	0.2	0
E					
F					
G					
H	-0.05	0	19.5	1.8	0
I					
J					
K					
L					

Note:

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 3/26/14~3/28/14

Monitored By: SA/SM/CT

Well ID	Pressure (In. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	-0	0	19.1	1.8	~~3.5~~	Remonitored = 0.
B	-0.05	0	17.3	2.4	1.3	
C	0	0	10.0	8.8	~~2.7~~ 0.1	
D	-0.02	0	15.8	4.4	0.3	
E	-0.06	0	16.5	3.0	0.2	
F	-0.06	0	16.9	2.8	0.1	
G	0	0	18.5	1.6	0.2	
H	-0.26	0	18.3	2.0	0	Water in the well box
I	0	0	19.3	1.0	0	
J	-0.04	0	18.6	1.6	0	
K	0	0	18.5	1.2	0.3	
L	-0.02	0	16.2	3.4	0.3	

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 04/30/14

Monitored By: Shinta / Seamus

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	-0.02	0	20.4	0.6	~~0.5~~ 0.	
B	NA	→	→	→	→	
C	NA	→	→	→	→	
D	NA	→	→	→	→	
E						
F						
G						
H	0	0	17.8	2.2	0	Water in well box
I						
J						
K						
L						

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 5/28/2014

Monitored By: Shinta / Clara

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	-0.02	0	20.9	0.4	0	
B	~~[illegible]~~					
C						
D						
E						
F						
G						
H	-0.02	0	18.7	1.4	0	
I	-0.04	0	19.4	1.2	0	
J	-0.08	0	19.1	1.8	0	
K	-0.02	0	19.8	1.2	0	
L	~~[illegible]~~	0	16.3	4.0	0	Spiders in well box

↑ -0.06

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 6/25/14

Monitored By: S.M. / C.T.

Well ID	Pressure (In. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	NA	0	20.1	0	0	
B						
C						
D						
E						
F						
G						
H	NA	0	18.9	1.2	0	
I	NA	0	18.8	1.2	0	
J	NA	0	18.4	2.0	0	
K	NA	0	18.7	1.2	0.0	resample on Friday
L	NA	0	15.2	4.4	10.0	resample on Friday
L	NA	0	16.3	4.0	4.9	6/26/14
K	NA		20.4	1.2	3.1	6/26/14

Perimeter Well Monitoring Form

Monitored by: SM & J L

Date: 7/30/2014

Weather: SUNNY 85°+

Well ID	P (in. H20)	LEL methane (%)	O2 (%)	CO2 (%)	VOCs (ppm)
A	N/A	0	20.3	0.6	0
B					
C					
D					
E					
F					
G					
H	N/A	0	18.3	1.8	0
I	NA	0	19.2	1.2	0
J	NA	0	18.7	2.0	0
K	NA	0	19.3	1.4	0
L	NA	0	15.7	4.2	0

Note: System is turned off.

Perimeter Well Monitoring Form

Monitored by: SM

Date: 8/27/2014

Weather: Sunny 95°F

Well ID	P (in. H20)	LEL methane (%)	O2 (%)	CO2 (%)	VOCs (ppm)
A	NA	0	20.9	0	0
B					
C					
D					
E					
F					
G					
H	NA	0	19.1	1.0	0
I	NA	0	19.4	0.6	0
J	NA	0	18.9	1.4	0
K	NA	0	20.1	0.6	0
L	NA	1	16.9	2.6	0

Note: System is still turned off

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 9/25/14

Monitored By: Shinta Aizawa

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	-0.02	0	20.9	0.6	0	
B						
C						
D						
E						
F						
G						
H	-0.02	0	18.5	1.8	0	
I	-0.02	0	18.9	1.4	0	
J	-0.04	0	18.5	2.2	0	
K	-0.04	0	19.7	1.0	0	
L	0	0	17.0	3.0	0	

Perimeter Well Monitoring Form

Monitored by: SM, WW

Date: 10/31/14

Weather: CLOUDY - MILD

Well ID	P (in. H20)	LEL methane (%)	O2 (%)	CO2 (%)	VOCs (ppm)
A	0.0	0.0	20.4	0.6	0.0
B					
C					
D					
E					
F					
G					
H	0.0	0.0	18.7	1.8	0.0
I	-0.05	0.0	19.7	1.2	0.0
J	-0.10	0.0	22.1	2.2	0.0
K	-0.05	0.0	20.9	0.8	0.0
L	0.0	0.0	17.3	3.2	0.0

Note:

Perimeter Well Monitoring Form

Monitored by: SM & BW

Date: 11/26 - 2014.

Weather: SUNNY & 75°F

Well ID	P (in. H20)	LEL methane (%)	O2 (%)	CO2 (%)	VOCs (ppm)
A	-0.02	0	20.4	0.7	0
B					
C					
D					
E					
F					
G					
H	0	0	17.8	2.1	0
I	0	0	18.5	1.1	0
J	-0.05	0	18.6	1.8	0
K	-0.04	0	19.4	0.9	0
L	0	0	16.0	3.3	0

Note:

SVE/IBT
Perimeter Well Monitoring Form
Del Amo Pits

Date: 12/17/14

Monitored By: SM/SA

Well ID	Pressure (in. H_2O)	LEL (%)	Oxygen (%)	Carbon Dioxide (%)	VOCs (ppm)	Note
A	-0.02	0	20.0	0.8	0	
B						
C						
D						
E						
F						
G						
H	0	0	16.8	2.4	0	Water in well box
I	0	0	18.0	1.0	0	Water/sediment in well box
J	-0.05	0	18.0	1.8	0	Sediment in well box
K	0	~~17.0~~ 0	17.7	0.8	0	Water in well box
L	0	0	13.3	3.4	0	~~Water in~~

APPENDIX B

FIELD DAILY REPORTS
(VIA CD-ROM)

APPENDIX C

SVE/IBT LABORATORY RESULTS
(VIA CD-ROM)

APPENDIX D

IN-LINE SENSOR DATA
(VIA CD ROM)

APPENDIX E

CARBON REACTIVATION REPORT/CERTIFICATION

EVOQUA
WATER TECHNOLOGIES

Evoqua Water Technologies - Red Bluff
11711 Reading Road
Red Bluff, CA 96080

Telephone: (530) 527-2664
Facsimile: (530) 527-2109

March 20, 2015

,

This is to certify the following spent carbon received at Evoqua Water Technologies Carbon Reactivation facility was reactivated in accordance with applicable regulations:

Site Address:	Del Amo Waste Pits, 20245 S.
Profile Number:	W140113AC
Manifest Document Number:	21152
Date Of Receipt:	July 18, 2014
Container Quantity - Type:	8 - Bag
Reactivation Date:	03-20-2015

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations, I verify the information contained above is true, accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification this information is true, accurate and complete.

Evoqua Water Technologies
EPA ID No. CAR000058784

Sincerely,

Bret Meyer
Plant Manager

CN# 10557
CT# 21152
202100

eVOQUA WATER TECHNOLOGIES

NON-HAZARDOUS MANIFEST

CONSIGNEE (TO):	SHIPPER (FROM):
eVOQUA WATER TECHNOLOGIES	1 Shell URS
☐ 2523 Mutahar Street Parker, AZ 85344	2 DelAmo Waste Pits
☑ 11711 Reading Road Red Bluff, CA 96080	20245 S. Vermont Av Torrance, CA. 90248
☐ 5375 S. Boyle Ave. Los Angeles, CA 90058	

JOB #: 3 50949688

NO. SHIPPING UNITS	TYPE*	DESCRIPTION	WEIGHT
4 03	5 TP BA	Spent Carbon - Non-Hazardous Waste	6 4,000
04	BA	Not DOT Regulated Material	4,000
		Circle One: AQUA VAPOR	
		Total of	8,000lb
		Profile # 7 W140113AO	

CUSTOMER INFORMATION:

DATE:	PRINT NAME:	SIGNATURE:
8 06/12/14	9 Shinta Aizawa	10

TRANSPORTER:

NAME OF CARRIER #1:	DATE:	SIGNATURE:
EVOQUA WATER	11 6/12/14	12
NAME OF CARRIER #2:	DATE:	SIGNATURE:
13 KENNIE C. KNOWLES	14 7/17/14	15
RECEIVED BY (FULL NAME):	DATE:	SIGNATURE:
16 Fay Youngblood	17 07-18-14	18

1.) Name of Generator
2.) Generator site address
3.) Given job number
4.) Number of units being picked up
5.) Type of unit being picked up
6.) Total weight
7.) Profile number, MANDATORY
8.) Date of service and/or pick up performed
9.) Name of person signing for Generator
10.) Signature of person in box 9
11.) Same as box 8
12.) Signature of driver for Transporter #1
13.) Name of carrier transporting to Plant
14.) Date the load was picked up to go to the Plant
15.) Driver's signature for Transporter #2
16.) Full name of Receiving person
17.) Date received to Plant
18.) Signature of Receiving person

NON-HAZARDOUS MANIFEST

WHITE: THE PLANT YELLOW: TRANSPORTER #2 PINK: FILE GOLD: GENERATOR

California Carbon Co., Inc.

2825 E. Grant St., Wilmington, CA 90744 (562)436-1962 Fax: (562)437-1217
e-mail: CCarbon2@aol.com

CERTIFICATE OF REACTIVATION

DATE: March 25, 2015

CUSTOMER: Baker Corporation
5500 Rawlings Ave.
South Gate, CA 90280

CUSTOMER'S REFERENCE: PROFILE # 012-353-B
REF : C2Rem

MATERIAL RECEVIED: January – December 2014
4 Supersacks Non-Hazardous Carbon
Received via customers truck

MATERIAL REACTIVATED: Calendar Year 2014

WE HEREBY CERTIFY THAT THE MATERIAL REFERRED TO IN THIS REACTIVATION REPORT HAS BEEN REACTIVATED TO A MINIMUM OF 55% CTC, TESTED AS PER ASTM D3467, STANDARD TEST METHOD FOR CARBON TETRACHLORIDE ACTIVITY OF ACTIVATED CARBON. THIS IS THE INDUSTRY STANDARD FOR TESTING THE ADSORPTIVE CAPABILITY OF ACTIVATED CARBON. THE ACTIVATED CARBON WAS REACTIVATED AT CALIFORNIA CARBON'S FACILITY IN WILMINGTON, CALIFORNIA, AND PLACED INTO OUR REACTIVATED VAPOR CARBON POOL FOR SALE.

CERTIFIED BY:

Richard Liu
Vice President

APPENDIX F

GROUNDWATER
LABORATORY RESULTS
(VIA CD ROM)

APPENDIX G

GROUNDWATER FIELD
DATA SHEETS

Well Construction and Previous GW Levels
Groundwater Monitoring and Aquifer Compliance Plan
Del Amo Superfund Site

MASTER COPY

HSU	Date	Time	Well ID	Analytical Suite: 8260B VOC	Analytical Suite: Bio	Analytical Suite: dup	Screen (ft btoc): Top	Screen (ft btoc): Bottom	Casing Diameter	Total Depth (ft btoc)	Measured Water Level (ft btoc)	Depth to Product (ft btoc)	Product Thickness (ft)	Date Sampled	Sample ID	Comments
	9/2	1120	PZL0001	X			50.00	60.00	4.0	57.47	35.11	—	—	9/4	GWS 2408	
	9/2	1414	PZL0006	X			49.00	69.00	2.0	N/A	43.92	—	—	9/8	GWS2409	
	9/2	1130	PZL0007	X			47.00	62.00	4.0	60.72	29.08	—	—	9/8	GWS2410	
	9/3	0800	PZL0009	X			54.00	69.00	2.0	N/A	49.98	—	—	9/10	GWS2411	
	9/25	0810	PZL0010	X		X	49.50	69.50	2.0	67.39	44.51	—	—	9/25	GWS2412	DUPLICATE - GWS2493. DED. PUMP NOT WORKING
	9/3	1425	PZL0011	X			35.00	55.00	2.0	52.80	32.87	—	—	9/11	GWS2413	NO DED. PUMP
	9/2	1450	PZL0012	X	X		37.20	57.20	2.0	N/A	38.22	—	—	9/5	GWS2414	
	9/3	1300	PZL0013	X	X		41.00	61.00	2.0	N/A	40.91	—	—	9/11	GWS2415	
	9/25	1240	PZL0014	X	X		51.00	66.00	2.0	65.27	44.12			9/25	GWS2416	DED. PUMP NOT WORKING. + MS/MSD
	9/3	0900	PZL0016	X			47.00	67.00	2.0	63.64	47.08	—	—	9/10	GWS2417	NO DED. PUMP
	9/3	1000	PZL0018	X			48.00	68.00	2.0	66.90	44.22	—	—	9/10	GWS2418	
	9/3	1020	PZL0019	X	X		46.70	66.70	2.0	69.30	50.80	67.65	1.65	9/12	ND500002	~~SHEED PRODUCT 9/12. NO GW SAMPLE~~ BLACK, SYRUP-Y PRODUCT @ BOTTOM OF WELL
	9/3	1110	PZL0020	X			47.00	67.00	2.0	N/A	46.53	—	—	9/11	GWS2420	
	9/2	0820	PZL0022	X			42.00	61.70	2.0	N/A	44.16	—	—	9/8	GWS2421	
	9/2	0830	PZL0024	X			44.40	64.40	4.0	66.04	46.14	—	—	9/8	GWS2422	DED. PUMP NOT WORKING
	9/2	0850	PZL0025	X			43.50	63.50	2.0	67.00	48.07	—	—	9/8	GWS2423	DED. PUMP NOT WORKING
	9/3	0810	PZL0026	X	X		33.00	53.00	2.0	52.02	37.18	—	—	9/10	GWS2424	
	9/2	1250	SWL0002	X		X	52.00	77.00	4.0	79.02	49.81	—	—	9/8	GWS2425	DUPLICATE - GWS 2494. DED. PUMP NOT WORKING
	9/3	0835	SWL0003	X		X	50.00	77.00	4.0	80.71	50.84	—	—	9/11	GWS2426	DUPLICATE - GWS2495. NO DED. PUMP
	9/3	1340	SWL0004	X	X		53.00	80.00	4.0	78.92	51.86	—	—	9/12	GWS2427	
	9/2	0940	SWL0005	X			38.60	61.50	4.0	60.80	38.54	—	—	9/5	GWS2428	
	9/2	1235	SWL0006	X	X		43.50	59.50	4.0	59.18	37.08	—	—	9/8	GWS2429	DED. PUMP NOT WORKING
	9/2	1440	SWL0007	X			50.40	71.20	4.0	71.29	50.03	—	—	9/8	GWS2430	
Water Table Aquifer	9/3	0740	SWL0008	X	X		41.40	62.00	4.0	62.49	42.06	—	—	9/9	GWS2431	DED. PUMP NOT WORKING
	9/2	0950	SWL0009	X			37.30	58.30	4.0	55.32	29.99	—	—	9/4	GWS2432	
	9/2	1210	SWL0016	X			40.80	62.00	4.0	61.82	42.78	—	—	9/25	GWS2433	
	9/25	1510	SWL0017	X		X	47.00	68.50	4.0	69.41	46.04	—	—	9/25	GWS2434	DUPLICATE - GWS2496. + MS/MSD
	9/2	1000	SWL0021	X	X	X	46.50	62.10	4.0	61.70	39.19	—	—	9/9	GWS2435	DUPLICATE - GWS 2497
	9/2	1155	SWL0024	X	X		45.00	61.50	4.0	60.72	37.80	—	—	9/4	GWS2436	DED. PUMP NOT WORKING
	9/2	1020	SWL0028	X			34.00	54.80	4.0	55.89	31.63	—	—	9/8	GWS2437	NEEDS NEW FLUSH MOUNT LID
	9/2	1110	SWL0038	X	X		49.50	70.50	4.0	70.64	47.20	—	—	9/8	GWS2438	DED. PUMP NOT WORKING

Well Construction and Previous GW Levels
Groundwater Monitoring and Aquifer Compliance Plan
Del Amo Superfund Site

HSU	Date	Time	Well ID	Analytical Suite			Screen (ft btoc)		Casing Diameter	Total Depth (ft btoc)	Measured Water Level (ft btoc)	Depth to Product (ft btoc)	Product Thickness (ft)	Date Sampled	Sample ID	Comments
				8260B VOC	Bio	dup	Top	Bottom								
	9/2	1035	SWL0042	X			34.30	55.00	4.0	54.44	35.55	—	—	9/9	GWS2439	
	9/2	0905	SWL0044	X			45.50	65.00	4.0	64.30	47.15	—	—	9/10	GWS2440	
	9/2	1500	SWL0046	X	X		37.80	57.80	4.0	57.37	36.59	—	—	9/8	GWS2441	
	9/2	0850	SWL0051	X			35.00	55.00	4.0	56.72	37.81	—	—	9/9	GWS2442	DED. PUMP NOT WORKING
	9/2	1135	SWL0057	X			38.50	58.50	4.0	58.11	37.45	—	—	9/4	GWS2443	BROKEN WELL LID/TABS
	9/3	0855	SWL0059	X			37.00	41.00	4.0	65.77	51.79	—	—	9/10	GWS2444	NO DED. PUMP; BROKEN LID
	9/3	1240	SWL0068	X	X		0.00	0.00	4.0	47.62	30.49	—	—	9/11	GWS2445	NO DED. PUMP, WATERRA METHOD
	9/2	1010	XGW-07A	X			47.00	57.00	4.0	57.35	34.78	—	—	9/4	GWS2446	
	9/3	1330	XMW-01HD	X			40.00	60.00	4.0	59.56	39.84	—	—	9/11	GWS2447	NO DED. PUMP, WATERRA METHOD +MS/MSD
	9/3	1310	XMW-02HD	X			40.00	60.00	4.0	59.73	39.55	—	—	9/10	GWS2448	
	9/2	1410	XMW-03HD	X			40.00	60.00	4.0	68.95	38.96	—	—	9/9	GWS2449	
	9/3	1320	XMW-04HD	X		X	51.00	61.00	4.0	61.24	40.30	—	—	9/11	GWS2450	DUPLICATE-GWS2500
	9/3	0930	XMW-14	X			58.00	73.00	4.0	72.85	53.38	—	—	9/11	GWS2451	
	9/2	1240	XMW-21	X	X		54.00	70.00	4.0	67.55	46.82	—	—	9/5	GWS2452	
	9/2	1540	XMW-27	X			59.00	75.00	4.0	70.09	50.82	—	—	9/8	GWS2453	
	9/3	1235	XMW-28	X	X		54.00	71.00	4.0	69.88	50.27	—	—	9/11	GWS2454	
	9/3	1010	XMW-29	X			57.00	73.00	4.0	73.01	49.20	—	—	9/10	GWS2455	NO DED. PUMP
	9/2	0945	SWL0010	X			100.00	116.50	4.0	119.54	33.73	—	—	9/4	GWS2457	
	9/4	0810	SWL0019	X			73.10	89.60	4.0	89.94	35.70			9/4	GWS2458	
	9/2	1150	SWL0023	X			88.50	103.80	4.0	102.25	39.17	—	—	9/4	GWS2459	
	9/3	1000	SWL0029	X			83.00	88.00	4.0	88.83	52.70	—	—	9/9	GWS2460	
	9/3	1350	SWL0032	X			79.00	89.00	4.0	—	53.74	51.41	2.33	—	—	PRODUCT - NO SAMPLE
	9/2	1200	SWL0037	X	X		82.00	98.50	4.0	98.35	43.42	—	—	9/25	GWS2462	
	9/3	1125	SWL0041	X			77.00	92.75	4.0	94.56	44.93	—	—	9/11	GWS2463	
	9/25	1000	SWL0047	X	X		82.00	92.00	4.0	99.50	46.40	—	—	9/25	GWS2464	BROKEN LID - OILY DEBRIS + METAL SCRAPS
Middle Bellflower B Sand	9/25	1600	SWL0048	X	X		83.00	93.00	4.0	92.63	47.21	—	—	9/25	GWS2465	
	9/3	1110	SWL0050	X	X	X	72.50	82.00	4.0	83.98	48.20	—	—	9/11	GWS2466	DUPLICATE-GWS2498
	9/3	1420	SWL0052	X			78.30	93.70	4.0	93.24	34.29	—	—	9/5	GWS2467	
	9/2	1145	SWL0056	X			75.00	85.00	4.0	83.70	39.97	—	—	9/4	GWS2468	
	9/3	1345	SWL0060	X			90.00	93.00	4.0	111.75	35.84	—	—	9/10	GWS2469	
	9/2	1300	XG-01WC	X	X		80.00	90.00	4.0	90.05	37.86	—	—	9/5	GWS2470	

Well Construction and Previous GW Levels
Groundwater Monitoring and Aquifer Compliance Plan
Del Amo Superfund Site

HSU	Date	Time	Well ID	Analytical Suite: 8260B VOC	Analytical Suite: Bio*	Analytical Suite: dup	Screen (ft btoc): Top	Screen (ft btoc): Bottom	Casing Diameter	Total Depth (ft btoc)	Measured Water Level (ft btoc)	Depth to Product (ft btoc)	Product Thickness (ft)	Date Sampled	Sample ID	Comments
	9/2	1245	XG-02WC	X			82.00	92.00	4.0	91.15	45.00	–	–	9/4	GWS2471	
	9/25	1300	XP-02	X	X		55.50	75.50	4.0	75.90	45.78	–	–	9/25	GWS2456	
	9/2	1015	XGW-07C	X			86.30	90.90	4.0	90.82	36.53	–	–	9/4	GWS2472	
	9/2	0930	XP-03	X		X	85.00	95.00	4.0	93.42	40.27	–	–	9/5	GWS2473	DUPLICATE – GWS 2501
Middle Bellflower C Sand	9/2	1430	SWL0013	X			131.80	147.60	4.0	145.68	43.11	–	–	9/9	GWS2474	
	9/25	1400	SWL0018	X			122.00	139.00	4.0	138.10	45.06	–	–	9/25	GWS2475	
	9/3	0945	SWL0030	X			104.00	119.80	4.0	119.27	52.63	–	–	9/9	GWS2476	
	9/2	1230	SWL0035	X			121.00	136.00	4.0	135.34	42.49	–	–	9/25	GWS2477	
	9/3	1115	SWL0040	X			118.50	135.00	4.0	136.90	44.76	–	–	9/10	GWS2478	
	9/2	1345	SWL0053	X			118.30	127.80	4.0	129.64	33.85	–	–	9/5	GWS2479	
	9/2	1320	SWL0054	X			120.20	129.70	4.0	129.40	50.31	–	–	9/9	GWS2480	
	9/2	0840	SWL0055	X			120.30	129.80	4.0	131.68	47.99	–	–	9/8	GWS2481	
	9/3	0830	SWL0058	X			118.10	127.70	4.0	130.04	51.22	–	–	9/5	GWS2482	
	9/2	1250	SWL0061	X			115.00	120.00	4.0	134.60	51.14	–	–	9/9	GWS2483	
	9/3	1250	SWL0064	X			114.20	129.20	4.0	130.05	49.97	–	–	9/5	GWS2484	+ MS/MSD. BROKEN BOLTS
	9/3	0900	SWL0065	X		X	115.00	130.00	4.0	133.14	46.60	–	–	9/11	GWS2485	DUPLICATE – GWS 2499
	9/3	0940	XBF-06	X			115.00	125.00	4.0	124.08	52.27	–	–	9/10	GWS2486	
	9/3	1120	XBF-13	X			117.00	137.00	4.0	135.23	40.57	–	–	9/10	GWS2487	
Gage Aquifer	9/4	0800	SWL0020	GAUGE ONLY			180.60	196.40	4.5	193.58	37.67	–	–	–	–	
	9/2	1420	SWL0022	X			179.50	195.30	4.5	194.09	45.62	–	–	9/5	GWS 2488	
	9/2	0955	SWL0025	X			195.00	210.80	4.5	208.75	35.77	–	–	9/4	GWS 2489	
	9/2	1025	SWL0026	GAUGE ONLY			159.80	175.50	4.5	175.54	~~37~~35.72	–	–	–	–	
	9/2	1220	SWL0036	X			178.00	194.00	5.0	194.19	45.70	–	–	9/25	GWS2490	
	9/3	0850	SWL0063	X			172.70	187.00	4.0	194.70	51.11	–	–	9/10	GWS2491	BROKEN BOLTS
	9/2	1300	SWL0066	X			172.00	187.00	4.0	190.21	52.53	–	–	9/9	GWS2492	

number of gauged wells	87	BIO*	
number of wells sampled for VOCs	85	Carbon Dioxide by SM4500	Manganese by USEPA 6010B
number of wells sampled for BIO	21	Methane by RSK175K	Ferrous Iron by SM3500-FeB
number duplicates	9	Nitrate by USEPA 300.0	Total Alkalinity by SM2320B
number field blanks	9	Sulfate by USEPA 300.0	
number equipment blanks	9		

Wells that were to be sampled by C2REM - now in coordinated event

9/9	0715	SWL0015	X						57.03	34.75	–	–	9/9	GWS 2502	+ MS/MSD DED. PUMP NOT WORKING
													9/25	IWS 0278	PURGE WATER/WASTE CHARAC.

APPENDIX H

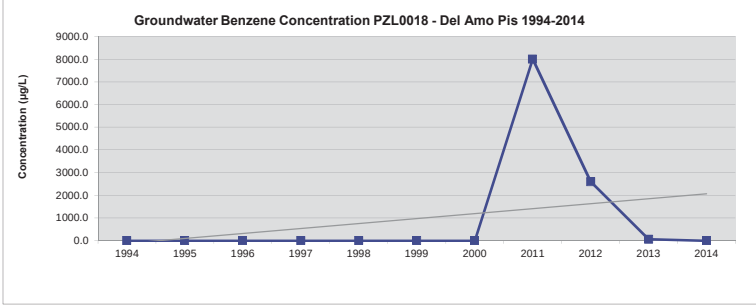
GROUNDWATER
MANN-KENDALL ANALYSIS

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0018 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**0.63**
1995	**0.50**
1996	**0.68**
1997	**0.50**
1998	**0.27**
1999	**0.53**
2000	**1.40**
2011	**8000.00**
2012	**2600.00**
2013	**61.00**
2014	**0.50**

n=number of time periods
n= **11**



Subtract each earlier year from each later year

year J:	1994	1995	1996	1997	1998	1999	2000	2011	2012	2013	2014		
year K:	0.6	0.5	0.7	0.5	0.3	0.5	1.4	8000.0	2600.0	61.0	0.5	# +	# -
1994 0.6		-0.13	0.05	-0.13	-0.36	-0.10	0.77	7999.37	2599.37	60.37	-0.13	5.00	5.00
1995 0.5			0.18	0.00	-0.23	0.03	0.90	7999.50	2599.50	60.50	0.00	6.00	1.00
1996 0.7				-0.18	-0.41	-0.15	0.72	7999.32	2599.32	60.32	-0.18	4.00	4.00
1997 0.5					-0.23	0.03	0.90	7999.50	2599.50	60.50	0.00	5.00	1.00
1998 0.3						0.26	1.13	7999.73	2599.73	60.73	0.23	6.00	0.00
1999 0.5							0.87	7999.47	2599.47	60.47	-0.03	4.00	1.00
2000 1.4								7998.60	2598.60	59.60	-0.90	3.00	1.00
2011 8000.0									-5400.00	-7939.00	-7999.50	0.00	3.00
2012 2600.0										-2539.00	-2599.50	0.00	2.00
2013 61.0											-60.50	0.00	1.00
2014 0.5													
# ties (diff=0):	0	0	0	1	0	0	0	0	0	0	2	33.00	19.00
# ties (diff=0):													

S= 33.00 minus 19.00
S= 14.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	33.00
# Negative diffs	19.00
S	14.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	165	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	1.01	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	2.42	
Interpretation	**NO TREND**	

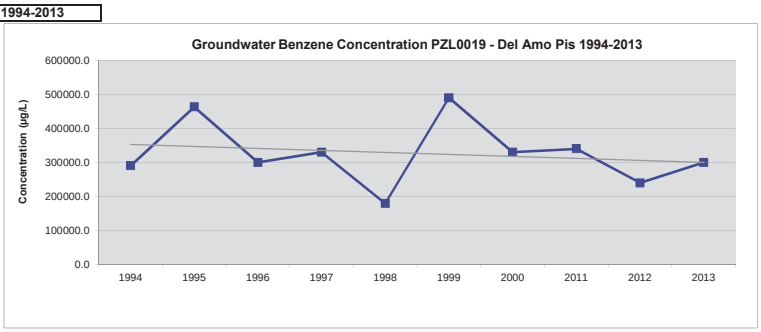
Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0019 - Del Amo Pis 1994-2013**

y-axis title:	Concentration (µg/L)
1994	**290333.33**
1995	**463333.33**
1996	**300000.00**
1997	**330000.00**
1998	**180000.00**
1999	**490000.00**
2000	**330000.00**
2011	**340000.00**
2012	**240000.00**
2013	**300000.00**



n=number of time periods
n= **10**

Subtract each earlier year from each later year

	year J:	1994	1995	1996	1997	1998	1999	2000	2011	2012	2013		
year K:		290333.3	463333.3	300000.0	330000.0	180000.0	490000.0	330000.0	340000.0	240000.0	300000.0	# +	# -
1994	290333.3		173000.00	9666.67	39666.67	-110333.33	199666.67	39666.67	49666.67	-50333.33	9666.67	7.00	2.00
1995	463333.3			-163333.33	-133333.33	-283333.33	26666.67	-133333.33	-123333.33	-223333.33	-163333.33	1.00	7.00
1996	300000.0				30000.00	-120000.00	190000.00	30000.00	40000.00	-60000.00	0.00	4.00	2.00
1997	330000.0					-150000.00	160000.00	0.00	10000.00	-90000.00	-30000.00	2.00	3.00
1998	180000.0						310000.00	150000.00	160000.00	60000.00	120000.00	5.00	0.00
1999	490000.0							-160000.00	-150000.00	-250000.00	-190000.00	0.00	4.00
2000	330000.0								10000.00	-90000.00	-30000.00	1.00	2.00
2011	340000.0									-100000.00	-40000.00	0.00	2.00
2012	240000.0										60000.00	1.00	0.00
2013	300000.0												
	# ties (diff=0):	0	0	0	0	0	0	1	0	0	1	21.00	22.00

S= 21.00 minus 22.00
S= -1.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	21.00
# Negative diffs	22.00
S	-1.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	125	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	0.00	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	0.27	
Interpretation	**STABLE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

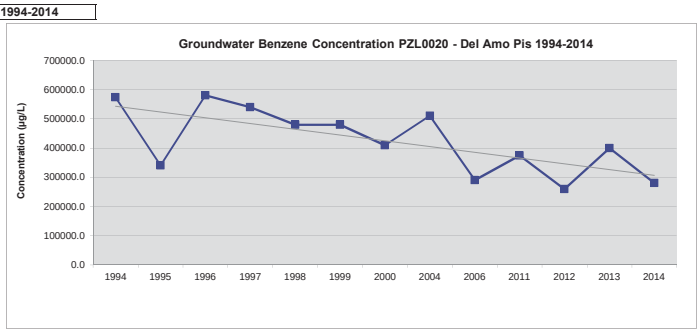
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0020 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**573333.33**
1995	**340000.00**
1996	**580000.00**
1997	**540000.00**
1998	**480000.00**
1999	**480000.00**
2000	**410000.00**
2004	**510000.00**
2006	**290000.00**
2011	**375000.00**
2012	**260000.00**
2013	**400000.00**
2014	**280000.00**

n=number of time periods
n= **13**



Subtract each earlier year from each later year

year J:		1994	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2014		
year K:		573333.3	340000.0	580000.0	540000.0	480000.0	480000.0	410000.0	510000.0	290000.0	375000.0	260000.0	400000.0	280000.0	# +	# -
1994	573333.3		-233333.33	6666.67	-33333.33	-93333.33	-93333.33	-163333.33	-63333.33	-283333.33	-198333.33	-313333.33	-173333.33	-293333.33	1.00	11.00
1995	340000.0			240000.00	200000.00	140000.00	140000.00	70000.00	170000.00	-50000.00	35000.00	-80000.00	60000.00	-60000.00	8.00	3.00
1996	580000.0				-40000.00	-100000.00	-100000.00	-170000.00	-70000.00	-290000.00	-205000.00	-320000.00	-180000.00	-300000.00	0.00	10.00
1997	540000.0					-60000.00	-60000.00	-130000.00	-30000.00	-250000.00	-165000.00	-280000.00	-140000.00	-260000.00	0.00	9.00
1998	480000.0						0.00	-70000.00	30000.00	-190000.00	-105000.00	-220000.00	-80000.00	-200000.00	1.00	6.00
1999	480000.0							-70000.00	30000.00	-190000.00	-105000.00	-220000.00	-80000.00	-200000.00	1.00	6.00
2000	410000.0								100000.00	-120000.00	-35000.00	-150000.00	-10000.00	-130000.00	1.00	5.00
2004	510000.0									-220000.00	-135000.00	-250000.00	-110000.00	-230000.00	0.00	5.00
2006	290000.0										85000.00	-30000.00	110000.00	-10000.00	2.00	2.00
2011	375000.0											-115000.00	25000.00	-95000.00	1.00	2.00
2012	260000.0												140000.00	20000.00	2.00	0.00
2013	400000.0													-120000.00	0.00	1.00
2014	280000.0															
# ties (diff=0):		0	0	0	0	0	1	0	0	0	0	0	0	0	17.00	60.00

S= 17.00 minus 60.00
S= -43.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	17.00
# Negative diffs	60.00
S	-43.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	268.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-2.56	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	0.25	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

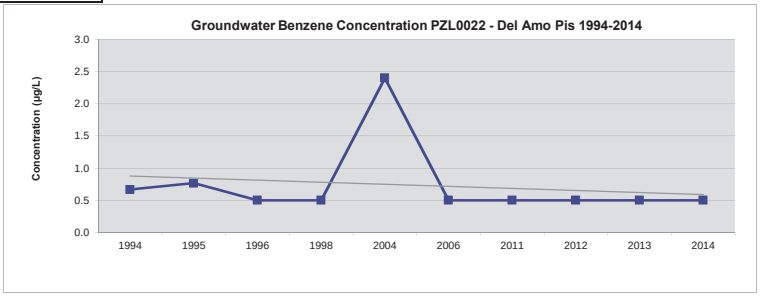
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0022 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**0.67**
1995	**0.77**
1996	**0.50**
1998	**0.50**
2004	**2.40**
2006	**0.50**
2011	**0.50**
2012	**0.50**
2013	**0.50**
2014	**0.50**

n=number of time periods
n= **10**



Subtract each earlier year from each later year

year K:	year J:	1994	1995	1996	1998	2004	2006	2011	2012	2013	2014	# +	# -
		0.7	0.8	0.5	0.5	2.4	0.5	0.5	0.5	0.5	0.5		
1994	0.7		0.10	-0.17	-0.17	1.73	-0.17	-0.17	-0.17	-0.17	-0.17	2.00	7.00
1995	0.8			-0.27	-0.27	1.63	-0.27	-0.27	-0.27	-0.27	-0.27	1.00	7.00
1996	0.5				0.00	1.90	0.00	0.00	0.00	0.00	0.00	1.00	0.00
1998	0.5					1.90	0.00	0.00	0.00	0.00	0.00	1.00	0.00
2004	2.4						-1.90	-1.90	-1.90	-1.90	-1.90	0.00	5.00
2006	0.5							0.00	0.00	0.00	0.00	0.00	0.00
2011	0.5								0.00	0.00	0.00	0.00	0.00
2012	0.5									0.00	0.00	0.00	0.00
2013	0.5										0.00	0.00	0.00
2014	0.5												
	# ties (diff=0):	0	0	0	1	0	2	3	4	5	6	5.00	19.00

S= 5.00 minus 19.00
S= -14.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	5.00
# Negative diffs	19.00
S	-14.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	125	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-1.16	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	0.77	
Interpretation	**STABLE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

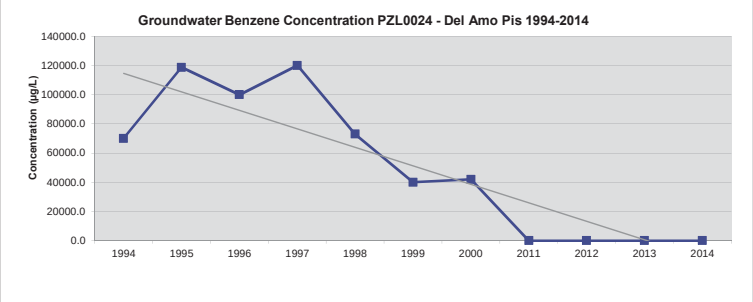
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0024 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**70000.00**
1995	**118666.67**
1996	**100000.00**
1997	**120000.00**
1998	**73000.00**
1999	**40000.00**
2000	**42000.00**
2011	**0.50**
2012	**0.50**
2013	**0.50**
2014	**0.50**

n=number of time periods
n= **11**



Subtract each earlier year from each later year

	year J:	1994	1995	1996	1997	1998	1999	2000	2011	2012	2013	2014		
year K:		70000.0	118666.7	100000.0	120000.0	73000.0	40000.0	42000.0	0.5	0.5	0.5	0.5	# +	# -
1994	70000.0		48666.67	30000.00	50000.00	3000.00	-30000.00	-28000.00	-69999.50	-69999.50	-69999.50	-69999.50	4.00	6.00
1995	118666.7			-18666.67	1333.33	-45666.67	-78666.67	-76666.67	-118666.17	-118666.17	-118666.17	-118666.17	1.00	8.00
1996	100000.0				20000.00	-27000.00	-60000.00	-58000.00	-99999.50	-99999.50	-99999.50	-99999.50	1.00	7.00
1997	120000.0					-47000.00	-80000.00	-78000.00	-119999.50	-119999.50	-119999.50	-119999.50	0.00	7.00
1998	73000.0						-33000.00	-31000.00	-72999.50	-72999.50	-72999.50	-72999.50	0.00	6.00
1999	40000.0							2000.00	-39999.50	-39999.50	-39999.50	-39999.50	1.00	4.00
2000	42000.0								-41999.50	-41999.50	-41999.50	-41999.50	0.00	4.00
2011	0.5									0.00	0.00	0.00	0.00	0.00
2012	0.5										0.00	0.00	0.00	0.00
2013	0.5											0.00	0.00	0.00
2014	0.5													
	# ties (diff=0):	0	0	0	0	0	0	0	0	1	2	3	7.00	42.00
	# ties (diff=0):													

S= 7.00 minus 42.00
S= **-35.00**

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	7.00
# Negative diffs	42.00
S	-35.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	165	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-2.65	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	0.90	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

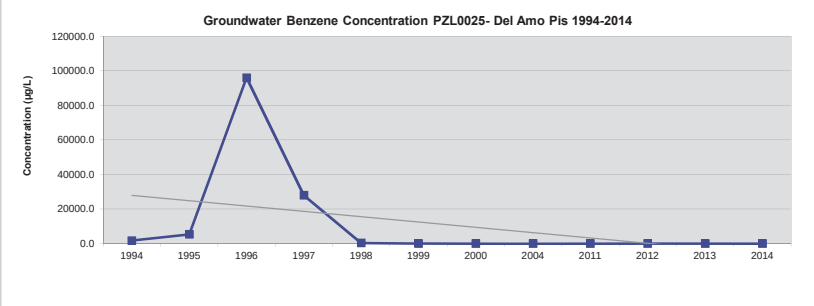
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration PZL0025- Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**1733.33**
1995	**5366.67**
1996	**96000.00**
1997	**28000.00**
1998	**330.00**
1999	**12.00**
2000	**1.00**
2004	**1.50**
2011	**0.54**
2012	**0.50**
2013	**0.50**
2014	**0.50**

n=number of time periods
n= **12**



Subtract each earlier year from each later year

	year J:	1994	1995	1996	1997	1998	1999	2000	2004	2011	2012	2013	2014		
year K:		1733.3	5366.7	96000.0	28000.0	330.0	12.0	1.0	1.5	0.5	0.5	0.5	0.5	# +	# -
1994	1733.3		3633.33	94266.67	26266.67	-1403.33	-1721.33	-1732.33	-1731.83	-1732.79	-1732.83	-1732.83	-1732.83	3.00	8.00
1995	5366.7			90633.33	22633.33	-5036.67	-5354.67	-5365.67	-5365.17	-5366.12	-5366.17	-5366.17	-5366.17	2.00	8.00
1996	96000.0				-68000.00	-95670.00	-95988.00	-95999.00	-95998.50	-95999.46	-95999.50	-95999.50	-95999.50	0.00	9.00
1997	28000.0					-27670.00	-27988.00	-27999.00	-27998.50	-27999.46	-27999.50	-27999.50	-27999.50	0.00	8.00
1998	330.0						-318.00	-329.00	-328.50	-329.46	-329.50	-329.50	-329.50	0.00	7.00
1999	12.0							-11.00	-10.50	-11.46	-11.50	-11.50	-11.50	0.00	6.00
2000	1.0								0.50	-0.46	-0.50	-0.50	-0.50	1.00	4.00
2004	1.5									-0.96	-1.00	-1.00	-1.00	0.00	4.00
2011	0.5										-0.04	-0.04	-0.04	0.00	3.00
2012	0.5											0.00	0.00	0.00	0.00
2013	0.5												0.00	0.00	0.00
2014	0.5														
	# ties (diff=0):	0	0	0	0	0	0	0	0	0	0	1	2	6.00	57.00

S= 6.00 minus 57.00
S= -51.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	6.00
# Negative diffs	57.00
S	-51.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	212.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-3.43	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	2.44	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

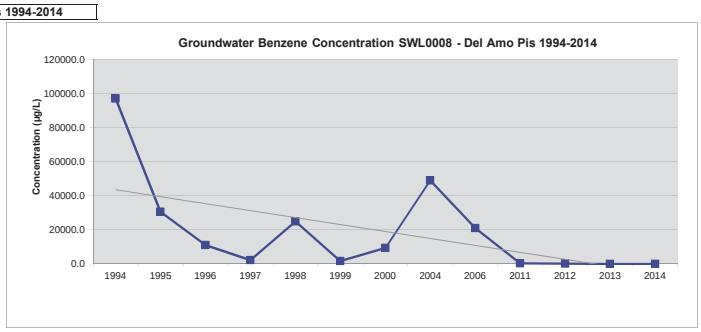
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration SWL0008 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**97000.00**
1995	**30666.67**
1996	**11000.00**
1997	**2300.00**
1998	**25000.00**
1999	**1700.00**
2000	**9300.00**
2004	**49000.00**
2006	**21000.00**
2011	**335.50**
2012	**220.00**
2013	**77.00**
2014	**12.00**

n=number of time periods
n= **13**



Subtract each earlier year from each later year

year J:		1994	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2014		
year K:		97000.0	30666.7	11000.0	2300.0	25000.0	1700.0	9300.0	49000.0	21000.0	335.5	220.0	77.0	12.0	# +	# -
1994	97000.0		-66333.33	-86000.00	-94700.00	-72000.00	-95300.00	-87700.00	-48000.00	-76000.00	-96664.50	-96780.00	-96923.00	-96988.00	0.00	12.00
1995	30666.7			-19666.67	-28366.67	-5666.67	-28966.67	-21366.67	18333.33	-9666.67	-30331.17	-30446.67	-30589.67	-30654.67	1.00	10.00
1996	11000.0				-8700.00	14000.00	-9300.00	-1700.00	38000.00	10000.00	-10664.50	-10780.00	-10923.00	-10988.00	3.00	7.00
1997	2300.0					22700.00	-600.00	7000.00	46700.00	18700.00	-1964.50	-2080.00	-2223.00	-2288.00	4.00	5.00
1998	25000.0						-23300.00	-15700.00	24000.00	-4000.00	-24664.50	-24780.00	-24923.00	-24988.00	1.00	7.00
1999	1700.0							7600.00	47300.00	19300.00	-1364.50	-1480.00	-1623.00	-1688.00	3.00	4.00
2000	9300.0								39700.00	11700.00	-8964.50	-9080.00	-9223.00	-9288.00	2.00	4.00
2004	49000.0									-28000.00	-48664.50	-48780.00	-48923.00	-48988.00	0.00	5.00
2006	21000.0										-20664.50	-20780.00	-20923.00	-20988.00	0.00	4.00
2011	335.5											-115.50	-258.50	-323.50	0.00	3.00
2012	220.0												-143.00	-208.00	0.00	2.00
2013	77.0													-65.00	0.00	1.00
2014	12.0															
# ties (diff=0):		0	0	0	0	0	0	0	0	0	0	0	0	0	14.00	63.00

S= 14.00 minus 63.00
S= -49.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	14.00
# Negative diffs	63.00
S	-49.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	268.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-2.93	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	1.41	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

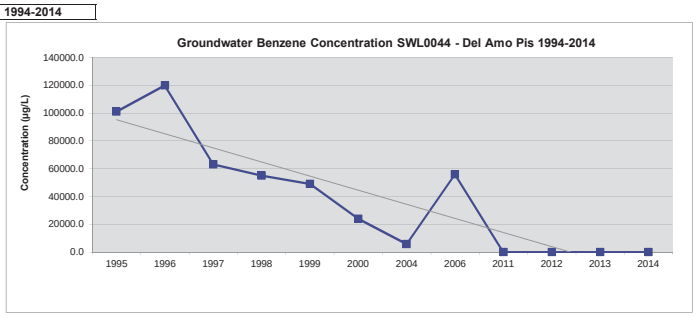
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration SWL0044 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1995	**101000.00**
1996	**120000.00**
1997	**63000.00**
1998	**55000.00**
1999	**49000.00**
2000	**24000.00**
2004	**5700.00**
2006	**56000.00**
2011	**20.90**
2012	**0.50**
2013	**1.20**
2014	**2.10**

n=number of time periods
n= **12**



Subtract each earlier year from each later year

	year J:	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2014		
year K:		101000.0	120000.0	63000.0	55000.0	49000.0	24000.0	5700.0	56000.0	20.9	0.5	1.2	2.1	# +	# -
1995	101000.0		19000.00	-38000.00	-46000.00	-52000.00	-77000.00	-95300.00	-45000.00	-100979.10	-100999.50	-100998.80	-100997.90	1.00	10.00
1996	120000.0			-57000.00	-65000.00	-71000.00	-96000.00	-114300.00	-64000.00	-119979.10	-119999.50	-119998.80	-119997.90	0.00	10.00
1997	63000.0				-8000.00	-14000.00	-39000.00	-57300.00	-7000.00	-62979.10	-62999.50	-62998.80	-62997.90	0.00	9.00
1998	55000.0					-6000.00	-31000.00	-49300.00	1000.00	-54979.10	-54999.50	-54998.80	-54997.90	1.00	7.00
1999	49000.0						-25000.00	-43300.00	7000.00	-48979.10	-48999.50	-48998.80	-48997.90	1.00	6.00
2000	24000.0							-18300.00	32000.00	-23979.10	-23999.50	-23998.80	-23997.90	1.00	5.00
2004	5700.0								50300.00	-5679.10	-5699.50	-5698.80	-5697.90	1.00	4.00
2006	56000.0									-55979.10	-55999.50	-55998.80	-55997.90	0.00	4.00
2011	20.9										-20.40	-19.70	-18.80	0.00	3.00
2012	0.5											0.70	1.60	2.00	0.00
2013	1.2												0.90	1.00	0.00
2014	2.1														
# ties (diff=0):		0	0	0	0	0	0	0	0	0	0	0	0	8.00	58.00

S= 8.00 minus 58.00
S= -50.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	8.00
# Negative diffs	58.00
S	-50.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	212.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-3.36	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	1.01	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

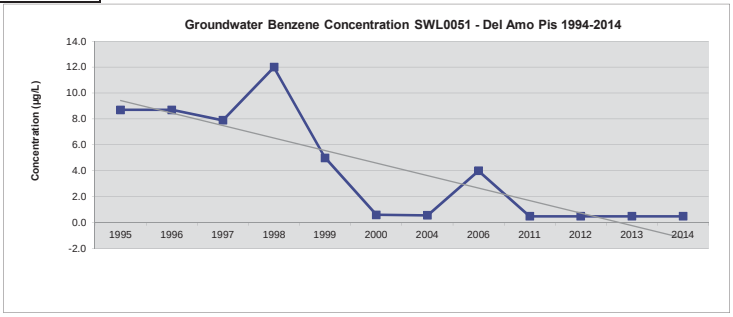
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration SWL0051 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1995	**8.70**
1996	**8.70**
1997	**7.90**
1998	**12.00**
1999	**5.00**
2000	**0.61**
2004	**0.57**
2006	**4.00**
2011	**0.50**
2012	**0.50**
2013	**0.50**
2014	**0.50**

n=number of time periods
n= **12**



Subtract each earlier year from each later year

	year J:	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2014		
year K:		8.7	8.7	7.9	12.0	5.0	0.6	0.6	4.0	0.5	0.5	0.5	0.5	# +	# -
1995	8.7		0.00	-0.80	3.30	-3.70	-8.09	-8.13	-4.70	-8.20	-8.20	-8.20	-8.20	1.00	9.00
1996	8.7			-0.80	3.30	-3.70	-8.09	-8.13	-4.70	-8.20	-8.20	-8.20	-8.20	1.00	9.00
1997	7.9				4.10	-2.90	-7.29	-7.33	-3.90	-7.40	-7.40	-7.40	-7.40	1.00	8.00
1998	12.0					-7.00	-11.39	-11.43	-8.00	-11.50	-11.50	-11.50	-11.50	0.00	8.00
1999	5.0						-4.39	-4.43	-1.00	-4.50	-4.50	-4.50	-4.50	0.00	7.00
2000	0.6							-0.04	3.39	-0.11	-0.11	-0.11	-0.11	1.00	5.00
2004	0.6								3.43	-0.07	-0.07	-0.07	-0.07	1.00	4.00
2006	4.0									-3.50	-3.50	-3.50	-3.50	0.00	4.00
2011	0.5										0.00	0.00	0.00	0.00	0.00
2012	0.5											0.00	0.00	0.00	0.00
2013	0.5												0.00	0.00	0.00
2014	0.5														
# ties (diff=0):		0	1	0	0	0	0	0	0	0	1	2	3	5.00	54.00

S= 5.00 minus 54.00
S= -49.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	5.00
# Negative diffs	54.00
S	-49.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	212.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-3.29	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	0.98	
Interpretation	**SIG. DECREASE**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

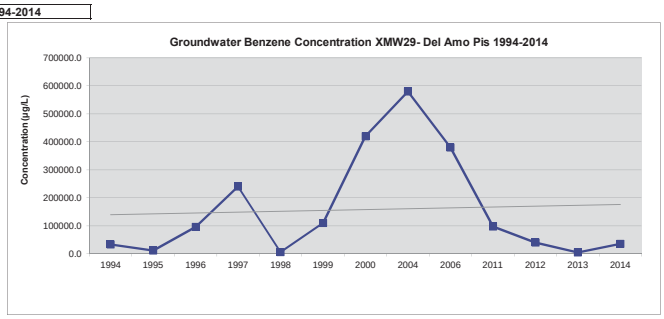
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration XMW29- Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**34000.00**
1995	**11433.33**
1996	**96000.00**
1997	**240000.00**
1998	**5700.00**
1999	**110000.00**
2000	**420000.00**
2004	**580000.00**
2006	**380000.00**
2011	**97500.00**
2012	**40000.00**
2013	**5100.00**
2014	**36000.00**

n=number of time periods
n= **13**



Subtract each earlier year from each later year

	year J:	1994	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2013		
year K:		34000.0	11433.3	96000.0	240000.0	5700.0	110000.0	420000.0	580000.0	380000.0	97500.0	40000.0	5100.0	36000.0	# +	# -
1994	34000.0		-22566.67	62000.00	206000.00	-28300.00	76000.00	386000.00	546000.00	346000.00	63500.00	6000.00	-28900.00	2000.00	9.00	3.00
1995	11433.3			84566.67	228566.67	-5733.33	98566.67	408566.67	568566.67	368566.67	86066.67	28566.67	-6333.33	24566.67	9.00	2.00
1996	96000.0				144000.00	-90300.00	14000.00	324000.00	484000.00	284000.00	1500.00	-56000.00	-90900.00	-60000.00	6.00	4.00
1997	240000.0					-234300.00	-130000.00	180000.00	340000.00	140000.00	-142500.00	-200000.00	-234900.00	-204000.00	3.00	6.00
1998	5700.0						104300.00	414300.00	574300.00	374300.00	91800.00	34300.00	-600.00	30300.00	7.00	1.00
1999	110000.0							310000.00	470000.00	270000.00	-12500.00	-70000.00	-104900.00	-74000.00	3.00	4.00
2000	420000.0								160000.00	-40000.00	-322500.00	-380000.00	-414900.00	-384000.00	1.00	5.00
2004	580000.0									-200000.00	-482500.00	-540000.00	-574900.00	-544000.00	0.00	5.00
2006	380000.0										-282500.00	-340000.00	-374900.00	-344000.00	0.00	4.00
2011	97500.0											-57500.00	-92400.00	-61500.00	0.00	3.00
2012	40000.0												-34900.00	-4000.00	0.00	2.00
2013	5100.0													30900.00	1.00	0.00
2014	36000.0															
	# ties (diff=0):	0	0	0	0	0	0	0	0	0	0	0	0	0	38.00	39.00

S= 38.00 minus 39.00
S= **-1.00**

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	38.00
# Negative diffs	39.00
S	-1.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	268.6666667	=(n(n-1))(2n+5)/18 This formula may be conservative in the presence of tied values.
Z_S	0.00	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	1.14	
Interpretation	**NO TREND**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

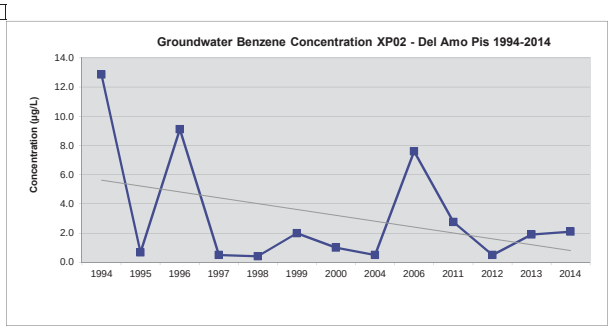
	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

Appendix H
Mann-Kendall 1994-2014
Del Amo Waste Pits

Graph Title: **Groundwater Benzene Concentration XP02 - Del Amo Pis 1994-2014**

y-axis title:	Concentration (µg/L)
1994	**12.86**
1995	**0.67**
1996	**9.10**
1997	**0.50**
1998	**0.41**
1999	**2.00**
2000	**1.00**
2004	**0.50**
2006	**7.60**
2011	**2.75**
2012	**0.50**
2013	**1.90**
2014	**2.10**

n=number of time periods
n= **13**



Subtract each earlier year from each later year

year J:		1994	1995	1996	1997	1998	1999	2000	2004	2006	2011	2012	2013	2014		
year K:		12.9	0.7	9.1	0.5	0.4	2.0	1.0	0.5	7.6	2.8	0.5	1.9	2.1	# +	# -
1994	12.9		-12.19	-3.76	-12.36	-12.45	-10.86	-11.86	-12.36	-5.26	-10.11	-12.36	-10.96	-10.76	0.00	12.00
1995	0.7			8.43	-0.17	-0.26	1.33	0.33	-0.17	6.93	2.08	-0.17	1.23	1.43	7.00	4.00
1996	9.1				-8.60	-8.69	-7.10	-8.10	-8.60	-1.50	-6.35	-8.60	-7.20	-7.00	0.00	10.00
1997	0.5					-0.09	1.50	0.50	0.00	7.10	2.25	0.00	1.40	1.60	6.00	1.00
1998	0.4						1.59	0.59	0.09	7.19	2.34	0.09	1.49	1.69	8.00	0.00
1999	2.0							-1.00	-1.50	5.60	0.75	-1.50	-0.10	0.10	3.00	4.00
2000	1.0								-0.50	6.60	1.75	-0.50	0.90	1.10	4.00	2.00
2004	0.5									7.10	2.25	0.00	1.40	1.60	4.00	0.00
2006	7.6										-4.85	-7.10	-5.70	-5.50	0.00	4.00
2011	2.8											-2.25	-0.85	-0.65	0.00	3.00
2012	0.5												1.40	1.60	2.00	0.00
2013	1.9													0.20	1.00	0.00
2014	2.1															
# ties (diff=0):		0	0	0	0	0	0	0	1	0	0	2	0	0	34.00	40.00

S= 34.00 minus 40.00
S= -6.00

If n>=10, then use the variance calculation to estimate probability.
If n<10, then use the table, below. Note: a significant p value is not possible with fewer than 4 time periods.
n>=5 is required to reach p<.05.

# Positive diffs	34.00
# Negative diffs	40.00
S	-6.00

Evaluation (Normal Approximation, N>=10)

Variance(S)	268.6666667	=(n(n-1))(2n+5)/18) This formula may be conservative in the presence of tied values.
Z_S	-0.31	
$Z_{crit,.05}$	1.96	(two-tailed. For one-tailed test use 1.65)
$Z_{crit,.1}$	1.64	
CV	1.20	
Interpretation	**NO TREND**	

Evaluation (Lookup Table for Fewer Than 10 Years)
If S>=S-crit, then reject H0

	S-crit (p<.05)	
# Years	1-tailed	2-tailed
4	6	
5	8	10
6	11	13
7	13	15
8	16	18
9	18	20
10	21	23

APPENDIX I

GROUNDWATER AVERAGE
AND PERFORMANCE STANDARDS
(VIA CD-ROM)

APPENDIX J

INSPECTION FORMS

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Completed By: SM

Title: PE

Sheet 1 of 11

Date: 3/3/2014

Time: 11AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Item Description		Condition/Remarks
1.	Erosion	4
2.	Stressed Vegetation (Plant Die-Back)	3
3.	Sediment Build-Up	4
4.	Local Subsidence or Loss of Grade	4
5.	Water Ponding	4
6.	Turf Height	3
7.	Burrowing Animals	3
8.	Weeds or Undesirable Vegetation	4
9.	Evidence of Fires or Vandalism	4
10.	Soil Quality Check	4
11.	Unauthorized Traffic	4
12.	Slope Instability or Sloughing	4
13.	Survey Monuments	4
14.	Vertical Cracking	4
15.	Intrusions	4
16.	Evidence of Waste Pit Materials	4

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Sheet 2 of 11
Date: 3/8/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Vegetation is sparse due to drought conditions
Signs of gopher activity. Set bait.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Completed By: SM

Title: P.e

Sheet 3 of 11

Date: 3/3/14

Time: 11AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Collection System Valves	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Signs of Rust/Corrosion	4
Condensate Collection [3]	
4. Air Moisture Separator	4
Carbon Adsorbers	
5. Vessels	4
- Exterior Damage	3
- FRP Grating and Mesh	4
Heavy Equipment	
6. Blower	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
- Lubrication	4
- Structural Maintenance	4

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Sheet 4 of 11

Date: 3/3/14

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

CLEAN RUSTED AREA.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

(3) Initial condensate collected from the air moisture separator must be characterized to determine methods of appropriate disposal.

DEL AMO WASTE PITS OU

SURFACE WATER DRAINAGE INSPECTION FORM

Completed By: SM

Title: PE

Sheet 5 of 11

Date: 3/3/14

Time: 1147

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain)_____

Item Description	Condition*/Remarks
SURFACE-WATER DRAINAGE SYSTEMS	
1. Washouts or Erosion of Contoured Grade	4
2. Ponding on Contoured Grade	4
3. Gullies and Ruts on Contoured Grade	4
4. Plugging of Drainage Culverts	4
5. Holes and Cracks in Swales or Catch Basins	4
6. Sediment Build-Up in Swales or Catch Basin	4
7. Surface Cracking of Swales/Catch Basins	4
8. Spalling of Swales/Catch Basins	4
9. Structural Failure of Swales/Catch Basins	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.

DEL AMO WASTE PITS OU

SUBSURFACE WATER DRAINAGE INSPECTION FORM

Completed By: SM

Title: Re

Sheet 6 of 11

Date: 3/3/14

Time: 11AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
SUBSURFACE DRAINAGE SYSTEMS	
1. Holes and Cracks in Swales, Catch Basin	4
2. Plugging of Drainage Inlets	4
3. Sediment Build-Up or Debris in Catch Basin	4
4. Structural Failure of Catch Basin	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Completed By: SM

Title: PE

Sheet 7 of 11

Date: 3/3/14

Time: 11 AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Perimeter Fence	
1. Breaks and Holes	4
2. Settlement Damage	4
3. Loose Posts/Tension	4
4. Rust/Corrosion	4
5. Ruts and Burrows Beneath Fence	4
6. Vegetation Overgrowth	4
7. General Signs of Deterioration	4
8. Vandalism/Animal/Wind Damage	4
Gates	
9. Adequate Movement of Hinges and Gates	3
10. Proper Function of Lock(s)	4

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Sheet 8 of 11
Date: 3/3/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

ACCESS ROAD INSPECTION FORM

Completed By: SM

Title: PE

Sheet 9 of 11

Date: 3/3/14

Time: 11 AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Access Road	
1. Holes and Cracks	4
2. Vegetation Overgrowth	4
3. Settlement	4
4. Excessive Dispersion of Gravel	4
5. General Signs of Deterioration	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

SVE/IBT SYSTEM INSPECTION FORM

Completed By: SM

Title: PE

Sheet 10 of 11

Date: 3/3/14

Time: 11AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] (✓) After Heavy Rain[2]

( ) Other (explain) _____

Manifold	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Visible Damage	4
4. Sniff for signs of leaks	4
Condensate Collection[3]	
5. Air Moisture Separator	4
Additional System Components	
6. Carbon Adsorber Vessels	
- Exterior Damage	4
- Vessel Configuration (A-B or B-A)	4
7. Blowers	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
8. Oxygen Generator	
- Signs of Rust/Corrosion	4
- Mechanical Functioning	4
- Oxygen Purity	4

DEL AMO WASTE PITS OU
SVE/IBT SYSTEM INSPECTION FORM

Sheet 11 of 11
Date: 3/3/14

9. System Sensors
   - Visible Damage 4
   - Mechanical Functioning 4

10. SVE Wellheads[4]
   - Tee Flanges 4
   - Valves 4
   - Sniff for signs of leaks 4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.
(3) Condensate collected from (1) moisture separator (2) conveyance piping, and (3) from the carbon absorber vessels must be characterized to determine methods of appropriate disposal.
(4) Tee flanges monitored for leaks using a PID.

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer.

Sheet 1 of 11

Date: 3/28/2014.

Time: 2:00 PM.

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description		Condition/Remarks
1.	Erosion	4
2.	Stressed Vegetation (Plant Die-Back)	3.
3.	Sediment Build-Up	4
4.	Local Subsidence or Loss of Grade	4
5.	Water Ponding	4
6.	Turf Height	3
7.	Burrowing Animals	3
8.	Weeds or Undesirable Vegetation	4
9.	Evidence of Fires or Vandalism	4
10.	Soil Quality Check	4
11.	Unauthorized Traffic	4
12.	Slope Instability or Sloughing	4
13.	Survey Monuments	4
14.	Vertical Cracking	4
15.	Intrusions	4
16.	Evidence of Waste Pit Materials	4

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Sheet 2 of 11
Date: 3/28/2014

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Vegetation is not fully covering the cap due to drought condition. It may need additional irrigation. CONTINUE TO MONITOR GOPHER ACTIVITY AND TREAT as Necessary.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 3 of 11

Date: 3/28/14.

Time: 2:05 PM.

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

	Condition/Remarks
Collection System Valves	
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Signs of Rust/Corrosion	4
Condensate Collection[3]	
4. Air Moisture Separator	4
Carbon Adsorbers	
5. Vessels	4
- Exterior Damage	4
- FRP Grating and Mesh	4
Heavy Equipment	
6. Blower	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
- Lubrication	4
- Structural Maintenance	4

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Sheet 4 of 11

Date: 3/28/14

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None. at this moment.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

(3) Initial condensate collected from the air moisture separator must be characterized to determine methods of appropriate disposal.

DEL AMO WASTE PITS OU

SURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa
Title: Project Engineer.

Sheet 5 of 11
Date: 3/28/14
Time: 2:10 PM.

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain)_____

Item Description	Condition*/Remarks
SURFACE-WATER DRAINAGE SYSTEMS	
1. Washouts or Erosion of Contoured Grade	4
2. Ponding on Contoured Grade	4
3. Gullies and Ruts on Contoured Grade	4
4. Plugging of Drainage Culverts	4
5. Holes and Cracks in Swales or Catch Basins	4
6. Sediment Build-Up in Swales or Catch Basin	4
7. Surface Cracking of Swales/Catch Basins	4
8. Spalling of Swales/Catch Basins	4
9. Structural Failure of Swales/Catch Basins	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.

DEL AMO WASTE PITS OU

SUBSURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Arata

Title: Project Engineer

Sheet 6 of 11

Date: 3/28/14

Time: 2:15 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
SUBSURFACE DRAINAGE SYSTEMS	
1. Holes and Cracks in Swales, Catch Basin	4
2. Plugging of Drainage Inlets	4
3. Sediment Build-Up or Debris in Catch Basin	4
4. Structural Failure of Catch Basin	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Completed By: Shinta Arizawa
Title: Project Engineer

Sheet 7 of 11
Date: 3/28/14
Time: 2:25 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Perimeter Fence	
1. Breaks and Holes	4
2. Settlement Damage	4
3. Loose Posts/Tension	4
4. Rust/Corrosion	4
5. Ruts and Burrows Beneath Fence	4
6. Vegetation Overgrowth	4
7. General Signs of Deterioration	4
8. Vandalism/Animal/Wind Damage	4
Gates	
9. Adequate Movement of Hinges and Gates	3
10. Proper Function of Lock(s)	4

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Sheet 8 of 11
Date: 3/28/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

LUBRICATE HINGES ON FRONT GATE

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

ACCESS ROAD INSPECTION FORM

Completed By: Shinta Arawa

Title: Project Engineer

Sheet 9 of 11

Date: 3/28/14

Time: 2:25 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Access Road	
1. Holes and Cracks	4
2. Vegetation Overgrowth	4
3. Settlement	4
4. Excessive Dispersion of Gravel	4
5. General Signs of Deterioration	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

SVE/IBT SYSTEM INSPECTION FORM

Completed By: Shinta Arzaki

Title: Project Engineer

Sheet 10 of 11

Date: 3/28/14

Time: 2:05 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

		Condition/Remarks
Manifold		
1.	Adequate-Free Movement	4
2.	Seals - Complete	4
3.	Visible Damage	4
4.	Sniff for signs of leaks	4
Condensate Collection [3]		
5.	Air Moisture Separator	4
Additional System Components		
6.	Carbon Adsorber Vessels	
	- Exterior Damage	4
	- Vessel Configuration (A-B or B-A)	4 (A-B)
7.	Blowers	
	- General Motor Maintenance	4
	- Drive Maintenance	4
	- Bearing Maintenance	4
8.	Oxygen Generator	
	- Signs of Rust/Corrosion	4
	- Mechanical Functioning	4
	- Oxygen Purity	4

DEL AMO WASTE PITS OU
SVE/IBT SYSTEM INSPECTION FORM

Sheet 11 of 11
Date: 3/28/14

9.	System Sensors	
	- Visible Damage	4
	- Mechanical Functioning	4
10.	SVE Wellheads[4]	
	- Tee Flanges	4
	- Valves	4
	- Sniff for signs of leaks	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.
(3) Condensate collected from (1) moisture separator (2) conveyance piping, and (3) from the carbon absorber vessels must be characterized to determine methods of appropriate disposal.
(4) Tee flanges monitored for leaks using a PID.

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Completed By: Shinta Arana

Title: Project Engineer

Sheet 1 of 11

Date: 6/19/14

Time: 9:00AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description		Condition/Remarks
1.	Erosion	4
2.	Stressed Vegetation (Plant Die-Back)	3
3.	Sediment Build-Up	4
4.	Local Subsidence or Loss of Grade	4
5.	Water Ponding	4
6.	Turf Height	4
7.	Burrowing Animals	3
8.	Weeds or Undesirable Vegetation	4
9.	Evidence of Fires or Vandalism	4
10.	Soil Quality Check	4
11.	Unauthorized Traffic	4
12.	Slope Instability or Sloughing	4
13.	Survey Monuments	4
14.	Vertical Cracking	4
15.	Intrusions	4
16.	Evidence of Waste Pit Materials	4

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Sheet 2 of 11
Date: 6/19/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

DROUGHT CONDITIONS have stressed vegetation.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Completed By: Shinta Arizawa

Title: Project Engineer

Sheet 3 of 11

Date: 6/19/14

Time: 11:30AM

Type of Inspection (check only one):

(✓) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

	Condition/Remarks
Collection System Valves	
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Signs of Rust/Corrosion	4
Condensate Collection [3]	
4. Air Moisture Separator	4
Carbon Adsorbers	
5. Vessels	
- Exterior Damage	4
- FRP Grating and Mesh	4
Heavy Equipment	
6. Blower	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
- Lubrication	4
- Structural Maintenance	4

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Sheet 4 of 11

Date: 6/19/14

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

(3) Initial condensate collected from the air moisture separator must be characterized to determine methods of appropriate disposal.

DEL AMO WASTE PITS OU

SURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 5 of 11
Date: 6/19/14
Time: 11:50AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]
( ) Other (explain)_____

Item Description	Condition*/Remarks
SURFACE-WATER DRAINAGE SYSTEMS	
1. Washouts or Erosion of Contoured Grade	4
2. Ponding on Contoured Grade	4
3. Gullies and Ruts on Contoured Grade	4
4. Plugging of Drainage Culverts	4
5. Holes and Cracks in Swales or Catch Basins	4
6. Sediment Build-Up in Swales or Catch Basin	4
7. Surface Cracking of Swales/Catch Basins	4
8. Spalling of Swales/Catch Basins	4
9. Structural Failure of Swales/Catch Basins	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.

DEL AMO WASTE PITS OU

SUBSURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer.

Sheet 6 of 11

Date: 6/19/14

Time: 12:00

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
SUBSURFACE DRAINAGE SYSTEMS	
1. Holes and Cracks in Swales, Catch Basin	4
2. Plugging of Drainage Inlets	4
3. Sediment Build-Up or Debris in Catch Basin	4
4. Structural Failure of Catch Basin	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None at this moment

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 7 of 11
Date: 6/19/14
Time: 9:10 AM

Type of Inspection (check only one):

(✓) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Perimeter Fence	
1. Breaks and Holes	4
2. Settlement Damage	4
3. Loose Posts/Tension	4
4. Rust/Corrosion	4
5. Ruts and Burrows Beneath Fence	4
6. Vegetation Overgrowth	4
7. General Signs of Deterioration	4
8. Vandalism/Animal/Wind Damage	4
Gates	
9. Adequate Movement of Hinges and Gates	3
10. Proper Function of Lock(s)	4

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Sheet 8 of 11
Date: 6/19/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Keep HINGES LUBRICATED

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

ACCESS ROAD INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer.

Sheet 9 of 11

Date: 8/19/14

Time: 9:15 AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Access Road	
1. Holes and Cracks	4
2. Vegetation Overgrowth	4
3. Settlement	4
4. Excessive Dispersion of Gravel	3
5. General Signs of Deterioration	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

* Swept all gravels on the concrete entryway of site.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

SVE/IBT SYSTEM INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 10 of 11

Date: 6/19/14

Time: 11:45AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Manifold	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Visible Damage	
4. Sniff for signs of leaks	4
Condensate Collection[3]	
5. Air Moisture Separator	4
Additional System Components	
6. Carbon Adsorber Vessels	
- Exterior Damage	4
- Vessel Configuration (A-B or B-A)	4 (A-B)
7. Blowers	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
8. Oxygen Generator	
- Signs of Rust/Corrosion	4
- Mechanical Functioning	4
- Oxygen Purity	4

DEL AMO WASTE PITS OU
SVE/IBT SYSTEM INSPECTION FORM

Sheet 11 of 11
Date: 6/19/14

9.	System Sensors	
	- Visible Damage	4
	- Mechanical Functioning	4
10.	SVE Wellheads[4]	
	- Tee Flanges	4
	- Valves	4
	- Sniff for signs of leaks	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

The system is off due to preparation for Phase III Redesign field activities.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.
(3) Condensate collected from (1) moisture separator (2) conveyance piping, and (3) from the carbon absorber vessels must be characterized to determine methods of appropriate disposal.
(4) Tee flanges monitored for leaks using a PID.

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 1 of 11

Date: 9/29/14

Time: 3:00 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description		Condition/Remarks
1.	Erosion	4
2.	Stressed Vegetation (Plant Die-Back)	2
3.	Sediment Build-Up	4
4.	Local Subsidence or Loss of Grade	4
5.	Water Ponding	4
6.	Turf Height	4
7.	Burrowing Animals	4
8.	Weeds or Undesirable Vegetation	4
9.	Evidence of Fires or Vandalism	4
10.	Soil Quality Check	2
11.	Unauthorized Traffic	4
12.	Slope Instability or Sloughing	4
13.	Survey Monuments	4
14.	Vertical Cracking	4
15.	Intrusions	4
16.	Evidence of Waste Pit Materials	4

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Sheet 2 of 11
Date: 9/29/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

No vegetation at this time due to drought and limited irrigation during phase II field activity.

Soil is too dry and disturbed, ~~Need~~

Need to re-vegetate the cover system. probably hydroseeding.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 3 of 11

Date: 9/29/14

Time: 3:05 PM

Type of Inspection (check only one):

(✓) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

	Condition/Remarks
Collection System Valves	
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Signs of Rust/Corrosion	4
Condensate Collection [3]	
4. Air Moisture Separator	4
Carbon Adsorbers	
5. Vessels	
- Exterior Damage	4
- FRP Grating and Mesh	4
Heavy Equipment	
6. Blower	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
- Lubrication	4
- Structural Maintenance	4

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Sheet 4 of 11

Date: 9/29/14

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

(3) Initial condensate collected from the air moisture separator must be characterized to determine methods of appropriate disposal.

DEL AMO WASTE PITS OU

SURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 5 of 11
Date: 9/29/14
Time: 3:30 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain)_____

Item Description	Condition*/Remarks
SURFACE-WATER DRAINAGE SYSTEMS	
1. Washouts or Erosion of Contoured Grade	4
2. Ponding on Contoured Grade	4
3. Gullies and Ruts on Contoured Grade	4
4. Plugging of Drainage Culverts	4
5. Holes and Cracks in Swales or Catch Basins	4
6. Sediment Build-Up in Swales or Catch Basin	4
7. Surface Cracking of Swales/Catch Basins	4
8. Spalling of Swales/Catch Basins	4
9. Structural Failure of Swales/Catch Basins	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.

DEL AMO WASTE PITS OU

SUBSURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 6 of 11

Date: 9/29/14

Time: 3:30 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
SUBSURFACE DRAINAGE SYSTEMS	
1. Holes and Cracks in Swales, Catch Basin	4
2. Plugging of Drainage Inlets	4
3. Sediment Build-Up or Debris in Catch Basin	4
4. Structural Failure of Catch Basin	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Completed By: Shinta Arizawa
Title: Project Engineer

Sheet 7 of 11
Date: 9/29/14
Time: 3:40 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Perimeter Fence	
1. Breaks and Holes	4
2. Settlement Damage	4
3. Loose Posts/Tension	4
4. Rust/Corrosion	4
5. Ruts and Burrows Beneath Fence	4
6. Vegetation Overgrowth	4
7. General Signs of Deterioration	4
8. Vandalism/Animal/Wind Damage	4
Gates	
9. Adequate Movement of Hinges and Gates	~~4~~ 3
10. Proper Function of Lock(s)	3

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Sheet 8 of 11
Date: 9/29/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Lubricate HINGES. / Replace Lock as Necessary

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

ACCESS ROAD INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 9 of 11

Date: 9/29/14

Time: 3:40 PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Access Road	
1. Holes and Cracks	4
2. Vegetation Overgrowth	4
3. Settlement	4
4. Excessive Dispersion of Gravel	3
5. General Signs of Deterioration	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Swept gravels on the entryway.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

SVE/IBT SYSTEM INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 10 of 11

Date: 9/29/14

Time: 3:15PM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Manifold	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Visible Damage	4
4. Sniff for signs of leaks	4
Condensate Collection[3]	
5. Air Moisture Separator	4
Additional System Components	
6. Carbon Adsorber Vessels	
- Exterior Damage	4
- Vessel Configuration (A-B or B-A)	4 (A-B)
7. Blowers	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
8. Oxygen Generator	
- Signs of Rust/Corrosion	4
- Mechanical Functioning	4
- Oxygen Purity	N/A. (system off)

DEL AMO WASTE PITS OU
SVE/IBT SYSTEM INSPECTION FORM

Sheet 11 of 11
Date: _____

9.	System Sensors	
	- Visible Damage	4
	- Mechanical Functioning	3
10.	SVE Wellheads[4]	
	- Tee Flanges	4
	- Valves	4
	- Sniff for signs of leaks	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

System is currently off due to Phase III field activities.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.
(3) Condensate collected from (1) moisture separator (2) conveyance piping, and (3) from the carbon absorber vessels must be characterized to determine methods of appropriate disposal.
(4) Tee flanges monitored for leaks using a PID.

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Completed By: Shinta Arzawa

Title: Project Engineer

Sheet 1 of 11

Date: 12/22/14

Time: 10:00AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description		Condition/Remarks
1.	Erosion	3
2.	Stressed Vegetation (Plant Die-Back)	2
3.	Sediment Build-Up	4
4.	Local Subsidence or Loss of Grade	4
5.	Water Ponding	3
6.	Turf Height	4
7.	Burrowing Animals	4
8.	Weeds or Undesirable Vegetation	4
9.	Evidence of Fires or Vandalism	4
10.	Soil Quality Check	3
11.	Unauthorized Traffic	4
12.	Slope Instability or Sloughing	4
13.	Survey Monuments	4
14.	Vertical Cracking	4
15.	Intrusions	4
16.	Evidence of Waste Pit Materials	4

DEL AMO WASTE PITS OU

COVER SYSTEM INSPECTION FORM

Sheet 2 of 11
Date: 12/22/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

minor erosion observed due to disturbed surface soil.
Need to keep monitoring for potential major erosion.
Vegetation begeing to reestablish with RAIN

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 3 of 11

Date: 12/22/14

Time: 10:35AM

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Collection System Valves	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Signs of Rust/Corrosion	4
Condensate Collection[3]	
4. Air Moisture Separator	4
Carbon Adsorbers	
5. Vessels	
- Exterior Damage	4
- FRP Grating and Mesh	4
Heavy Equipment	
6. Blower	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
- Lubrication	4
- Structural Maintenance	4

DEL AMO WASTE PITS OU

CAP GAS COLLECTION AND TREATMENT INSPECTION FORM

Sheet 4 of 11

Date: 12/22/14

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

(3) Initial condensate collected from the air moisture separator must be characterized to determine methods of appropriate disposal.

DEL AMO WASTE PITS OU

SURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Arawa
Title: Project Engineer

Sheet 5 of 11
Date: 12/22/14
Time: 10:10 AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain)_____

Item Description	Condition*/Remarks
SURFACE-WATER DRAINAGE SYSTEMS	
1. Washouts or Erosion of Contoured Grade	3
2. Ponding on Contoured Grade	4
3. Gullies and Ruts on Contoured Grade	4
4. Plugging of Drainage Culverts	4
5. Holes and Cracks in Swales or Catch Basins	4
6. Sediment Build-Up in Swales or Catch Basin	~~4~~ 3
7. Surface Cracking of Swales/Catch Basins	4
8. Spalling of Swales/Catch Basins	4
9. Structural Failure of Swales/Catch Basins	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

Minor sediment washout, buildup observed.
All sediment in V-ditches were removed.
Keep monitoring for potential major erosion/sedimentation issues.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.

DEL AMO WASTE PITS OU

SUBSURFACE WATER DRAINAGE INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 6 of 11

Date: 12/22/14

Time: 10:10AM

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
SUBSURFACE DRAINAGE SYSTEMS	
1. Holes and Cracks in Swales, Catch Basin	4
2. Plugging of Drainage Inlets	4
3. Sediment Build-Up or Debris in Catch Basin	4
4. Structural Failure of Catch Basin	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Completed By: Shinta Aizawa
Title: Project Engineer

Sheet 7 of 11
Date: 12/22/14
Time: 10:20 Am

Type of Inspection (check only one):

(X) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Perimeter Fence	
1. Breaks and Holes	4
2. Settlement Damage	4
3. Loose Posts/Tension	4
4. Rust/Corrosion	4
5. Ruts and Burrows Beneath Fence	4
6. Vegetation Overgrowth	4
7. General Signs of Deterioration	4
8. Vandalism/Animal/Wind Damage	4
Gates	
9. Adequate Movement of Hinges and Gates	4
10. Proper Function of Lock(s)	4

DEL AMO WASTE PITS OU

SECURITY FENCE INSPECTION FORM

Sheet 8 of 11
Date: 12/22/14

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

None.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the Waste Pits OU.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

ACCESS ROAD INSPECTION FORM

Completed By: Shinta Aizawa

Title: Project Engineer

Sheet 9 of 11

Date: 12/22/14

Time: 10:25

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Item Description	Condition/Remarks
Access Road	
1. Holes and Cracks	4
2. Vegetation Overgrowth	4
3. Settlement	4
4. Excessive Dispersion of Gravel	3
5. General Signs of Deterioration	4

Condition/Remarks Key:

4 = Satisfactory

3 = Slight (Continue Observing)

2 = Moderate (Needs Scheduled Maintenance/Repair)

1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

All gravels on the entryway were swept back to gravel way (Access Road).

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.

(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24-hour period.

DEL AMO WASTE PITS OU

SVE/IBT SYSTEM INSPECTION FORM

Completed By: Shinta Arzawa

Title: Project Engineer

Sheet 10 of 11

Date: 12/22/14

Time: 10:40 Am.

Type of Inspection (check only one):

( ) Quarterly ( ) After Seismic Event[1] ( ) After Heavy Rain[2]

( ) Other (explain) _____

Manifold	Condition/Remarks
1. Adequate-Free Movement	4
2. Seals - Complete	4
3. Visible Damage	4
4. Sniff for signs of leaks	4
Condensate Collection [3]	
5. Air Moisture Separator	4
Additional System Components	
6. Carbon Adsorber Vessels	
- Exterior Damage	4
- Vessel Configuration (A-B or B-A)	4 (A-B)
7. Blowers	
- General Motor Maintenance	4
- Drive Maintenance	4
- Bearing Maintenance	4
8. Oxygen Generator	
- Signs of Rust/Corrosion	4
- Mechanical Functioning	4
- Oxygen Purity	4

DEL AMO WASTE PITS OU
SVE/IBT SYSTEM INSPECTION FORM

Sheet 11 of 11
Date: 12/22/14

9.	System Sensors	
	- Visible Damage	3
	- Mechanical Functioning	4
10.	SVE Wellheads[4]	
	- Tee Flanges	4
	- Valves	4
	- Sniff for signs of leaks	4

Condition/Remarks Key:
4 = Satisfactory
3 = Slight (Continue Observing)
2 = Moderate (Needs Scheduled Maintenance/Repair)
1 = Poor (Needs Immediate Maintenance/Repair)

Recommendations for maintenance or repair (attach additional sheets as needed):

The SVE-IBT System started back on with new SVE wells and conveyance piping, currently shake down operation.
Keep monitoring gasket of sensor mount.

(1) Refer to Table 3.3-2 of the OM&M Plan for frequency based on magnitude and distance from the site.
(2) For heavy rains exceeding 1.0 inches (per USEPA's letter dated December 6, 1999) within a 24 hour period.
(3) Condensate collected from (1) moisture separator (2) conveyance piping, and (3) from the carbon absorber vessels must be characterized to determine methods of appropriate disposal.
(4) Tee flanges monitored for leaks using a PID.

APPENDIX K

PHASE III FIELD DOCUMENTS

APPENDIX K-1

AS-BUILT DRAWINGS

ENGINEERING DRAWINGS FOR THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

UNILATERAL ADMINISTRATIVE ORDER, DOCKET NO. 99-08

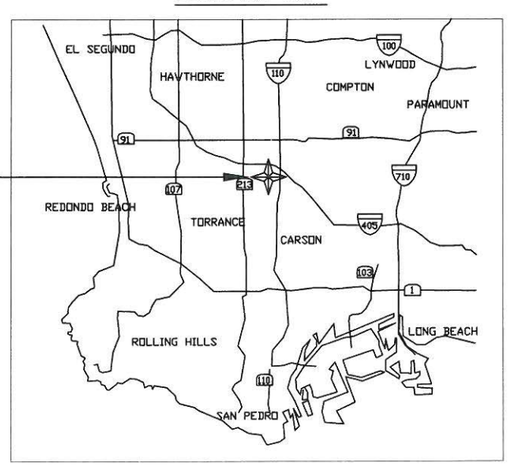
DEL AMO WASTE PITS OPERABLE UNIT

SVE/IBT REMEDIAL PHASE III AS-BUILT DRAWINGS

20245 S. VERMONT AVENUE
TORRANCE, CALIFORNIA 90502

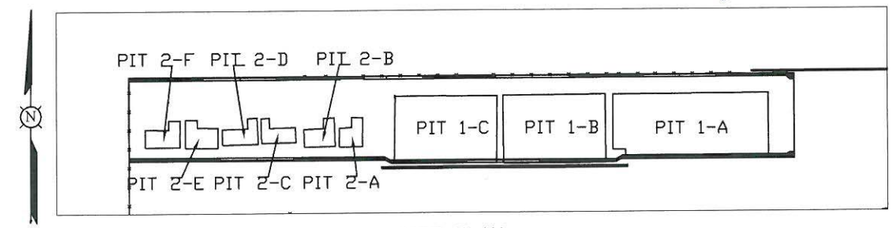
DEL AMO SUPERFUND SITE SEE VICINITY MAP

LOCATION MAP



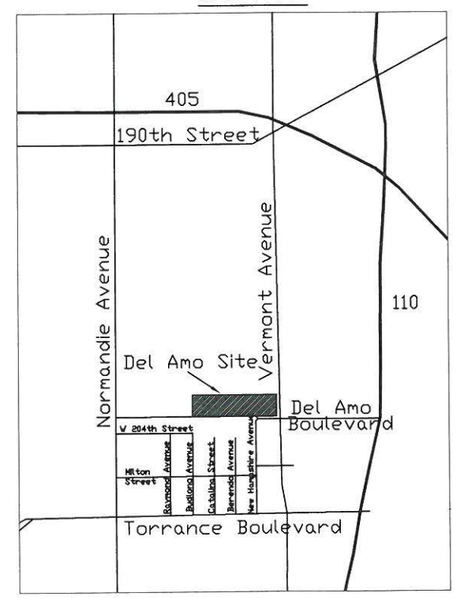
PROJECT SITE SEE KEY MAP

VICINITY MAP



SITE PLAN

DRAWING LIST	DRAWING TITLE
G-1	TITLE SHEET AND DRAWING LIST
G-2	LEGEND, ABBREVIATIONS AND GENERAL NOTES
A-1	EXISTING SVE WELL LOCATION & ABANDONMENT PLAN
A-2	SVE/IBT ABANDONMENT PLAN (PIPE LAYOUT)
A-3	SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN
A-4 (1 OF 2)	SVE/IBT EXISTING EXTRACTION WELLS
A-4 (2 OF 2)	SVE/IBT WELL ABANDONMENT CONSTRUCTION DETAILS
C-1	SVE WELL LOCATION PLAN
C-2	SVE/IBT PLAN (PIPE LAYOUT)
C-3 (1 OF 2)	SVE/IBT PLAN (NEW PIPE LAYOUT)
C-3 (2 OF 2)	SVE/IBT CONVEYANCE PIPING DETAILS
C-4 (1 OF 2)	SVE/IBT EXTRACTION & INJECTION WELLS
C-4 (2 OF 2)	SVE/IBT WELL CONSTRUCTION DETAILS
I-1	PROCESS AND INSTRUMENTATION DIAGRAM



KEY MAP

In Association with
Development Resource Consultants, Inc.
Civil Engineering/Land Surveying/Land Planning
22342 SE Brand Street, Suite 8
Newport Beach, CA 92660
Phone: 949.261.8098
Fax: 949.261.8097
LAWRENCE M. GATES R.C.E. 45715 DATE

REGISTERED PROFESSIONAL ENGINEER LAWRENCE M. GATES No. 45715 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

NO.:	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: TITLE SHEET AND DRAWING LIST

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER:	G-1
OF	1 of 1 SHEETS
SCALE: N.T.S.	

ABBREVIATIONS

A	ANALYZER
AMP	AMPERES
APPROX	APPROXIMATELY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
CJ	CONSTRUCTION JOINT
CONC	CONCRETE
DC	DIRECT CURRENT
DWG	DRAWING
E	EAST
EL	ELEVATION (HEIGHT)
ELEC	ELECTRICAL
F	FLOW
FA	FLAME ARRESTOR
FG	FINISH GRADE
FS	FINISH SURFACE
FT OR '	FEET
GCL	GEOSYNTHETIC CLAY LINER
GCTS	GAS COLLECTION AND TREATMENT SYSTEM
GM	GEOMEMBRANE
HP	HORSE POWER
I	INDICATOR
IN OR "	INCH
LB	POUND
M	MOISTURE MONITORING PORT
mAmp	MILLIAMP
MIL	GEOMEMBRANE THICKNESS IN THOUSANDTHS OF AN INCH
MW	MONITORING WELL
N	NORTH
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
No.	NUMBER
NTS	NOT TO SCALE
O2	OXYGEN
PVC	POLYVINYL CHLORIDE
P	PRESSURE
REF	REFERENCE
S	SOUTH
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SE	SEWER
SL	SLOPE
SVE	SOIL VAPOR EXTRACTION
_T	TRANSMITTER
T	TEMPERATURE
TOC	TOP OF CONCRETE
TYP	TYPICAL
V	VAPOR
VFD	VARIABLE FREQUENCY DRIVE
VFPE	VERY FLEXIBLE POLYETHYLENE LINER

LEGEND

DETAIL OR ASSEMBLY NUMBER
REF
DRAWING NUMBER
DRAWING ON WHICH DETAIL IS SHOWN

AUTOMATED VALVE
BALL VALVE
GATE VALVE
BACK FLOW DEVICE
BACK FLOW DEVICE
EXISTING MONITORING WELL, VENT
BUTTERFLY VALVE
MONUMENT/BENCH MARK
A REVISION TRIANGLE AND AS-BUILT NUMBER ON FACE OF DRAWING

DECRIPTION

PROPERTY LINE
CENTERLINE
FOUNDATION OF STRUCTURE
FENCE LINE
FOUNDATION OF STRUCTURE
GEOSYNTHETIC DRAINAGE LAYER
40 MIL VFPE GEOMEMBRANE
GEOSYNTHETIC CLAY LINER W/ 20 MIL VFPE GEOMEMBRANE BACKING
COHESIONLESS SAND
VEGETATIVE COVER
WOVEN GEOTEXTILE
MARKER BED LAYER
GRADE
LIMIT OF PIT
GABION BASKET RETAINING WALL
CONCRETE
GROUND SURFACE
GROUND SURFACE

351.00 / FG — FINISH GRADE ELEVATION
352.00 / FS — FINISH SURFACE ELEVATION
353.00 / FL — FLOW LINE ELEVATION

NOTES:

1. ALL WORKED PERFORMED UNDER THIS CONTRACT SHALL BE IN COMPLIANCE WITH THE SITE-WIDE OPERATIONS, MAINTENANCE, AND MONITORING MANUAL, DEL AMO WASTE PITS BY C2 REM, JANUARY 2007, INCLUDING ALL APPROPRIATE JSAs AND THE SITE-SPECIFIC HEALTH AND SAFETY MANUAL BY C2 REM, JANUARY 2006
2. DATA EVALUATION FOR THE DEL AMO WASTE PITS OPERABLE UNIT- 1. TORRANCE, CALIFORNIA BY GEOSYNTEC CONSULTANTS, DAMES & MOORE, INC., AND PARSONS ENGINEERING SCIENCE, INC., DATED OCTOBER 16, 1998 IS A PART OF THE CONSTRUCTION DOCUMENTS.
3. DRAFT PREFINAL DESIGN REPORT ADDENDUM IS A PART OF THIS CONSTRUCTION DOCUMENT BY GEOSYNTEC CONSULTANTS, DAMES & MOORE, INC., AND PARSONS ENGINEERING SCIENCE, INC., DATED FEBRUARY 19, 1999.
4. DEL AMO WASTE PITS OPERABLE UNIT, SVE/IBT SYSTEM FINAL DESIGN REPORT BY C2 REM, DATED JANUARY 2006 IS PART OF THE CONSTRUCTION DOCUMENTS.
5. DEL AMO WASTE PITS OPERABLE UNIT, SVE/IBT REMEDIAL DESIGN SPECIFICATIONS AND AS-BUILT DRAWINGS ARE PART OF THIS CONSTRUCTION DOCUMENT.
6. PERFORMANCE MONITORING EVENT REPORT OF FINDINGS IS A PART OF THIS CONSTRUCTION DOCUMENT BY C2REM DATED FEBRUARY 2014.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE INVESTIGATION OF THE EXISTING CONDITIONS AND FOR THE FIELD VERIFICATION OF EXISTING UNDERGROUND UTILITIES WITHIN THE PROPOSED WORK AREA, IF UNDERGROUND UTILITIES ARE ENCOUNTERED DURING EXCAVATION, THE SUBCONTRACTOR SHALL IMMEDIATELY NOTIFY CONSTRUCTION MANAGER PRIOR TO CONTINUING THE WORK IN THE IMMEDIATE VICINITY.
8. THE CONTRACTOR SHALL PROTECT EXISTING UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES INCLUDING MONITORING WELLS AND ANY EXISTING IMPROVEMENTS AND EQUIPMENT WITHIN THE PROJECT LIMITS. ANY EXISTING CONSTRUCTION DAMAGED BY SUBCONTRACTOR OPERATIONS SHALL BE REPAIRED OR REPLACED AT THE SUBCONTRACTORS EXPENSE.
9. ALL UNDERGROUND UTILITIES SHALL BE PROPERLY PROTECTED DURING CONSTRUCTION FROM HEAVY EQUIPMENT BY THE USE OF SUITABLE TIMBER MAT OR STEEL MATTING.
10. DIMENSIONS, ELEVATIONS, AND LOCATION OF EXISTING UTILITIES ARE TO BE FIELD VERIFIED BY CONTRACTOR PRIOR TO START OF CONSTRUCTION.
11. STRAIGHT GRADE BETWEEN SPOT ELEVATIONS SHOWN UNLESS OTHERWISE INDICATED ON THE PLANS.
12. FINISHED SURFACES SHALL BE SLOPED UNIFORMLY FROM HIGH POINTS, RIDGE LINES, AND AROUND FOUNDATIONS TO FLOW LINES AND AREA DRAINS UNLESS INDICATED OTHERWISE.
13. TEMPORARY EROSION CONTROL SHALL BE IMPLEMENTED WHERE APPROPRIATE.
14. THE GEOTECHNICAL ENGINEER SHALL PROVIDE SUFFICIENT INSPECTIONS DURING THE EXCAVATION OF THE NATURAL GROUND AND PLACEMENT AND COMPACTION OF THE FILL TO BE SATISFIED THAT THE WORK IS BEING PERFORMED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS AND APPLICABLE CODE REQUIREMENTS.
15. EXCAVATION, EMBANKMENT, AND BACKFILL WORK AREAS SHALL BE CONTINUALLY AND EFFECTIVELY DRAINED. WATER SHALL NOT BE PERMITTED TO ACCUMULATE IN EXCAVATION OR FOUNDATION AREAS. THE SUBCONTRACTOR SHALL PROVIDE SUITABLE DIKES, DRAINS, OR SHALL PROVIDE PUMPING EQUIPMENT AS REQUIRED TO DIVERT WATER FLOW AWAY FROM THE WORK AREAS.
16. THE CONTACTOR SHALL PROVIDE ADEQUATE QUALITY CONTROL PERSONNEL TO VERIFY THAT ALL WORK IS COMPLETED IN ACCORDANCE WITH THE PLANS AND APPLICABLE SPECIFICATIONS.
17. THE SUBCONTRACTOR SHALL IMMEDIATELY NOTIFY CONSTRUCTION MANAGER FOR PROVISIONS OF THE APPROPRIATE MEANS OF DECOMMISSIONING UNDERGROUND UTILITIES ENCOUNTERED IN THE FIELD.
18. TOPOGRAPHIC INFORMATION MAY DEVIATE FROM THAT SHOWN ON THESE DRAWINGS. ALL ELEVATIONS AND GRADES SHOWN ARE TO BE VERIFIED BY THE SUBCONTRACTOR IN THE FIELD PRIOR TO COMMENCEMENT OF WORK.
19. THE CONTRACTOR SHALL, AT ALL TIMES, BE RESPONSIBLE FOR COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS PERTAINING TO HEALTH AND SAFETY AND FOR THE SAFE PROSECUTION OF THE WORK AND THE PROTECTION OF ITS EMPLOYEES AND THE PUBLIC.

In Association with
C2REM
drc
Development Resource Consultants, Inc.
Civil Engineering/Land Surveying/Land Planning
2382 W Bristol Street, Suite B
Newport Beach, CA 92660
Phone: 949.261.8998
Fax: 949.261.8997
LAWRENCE M. GATES R.C.E. 45715 DATE 4/6/15

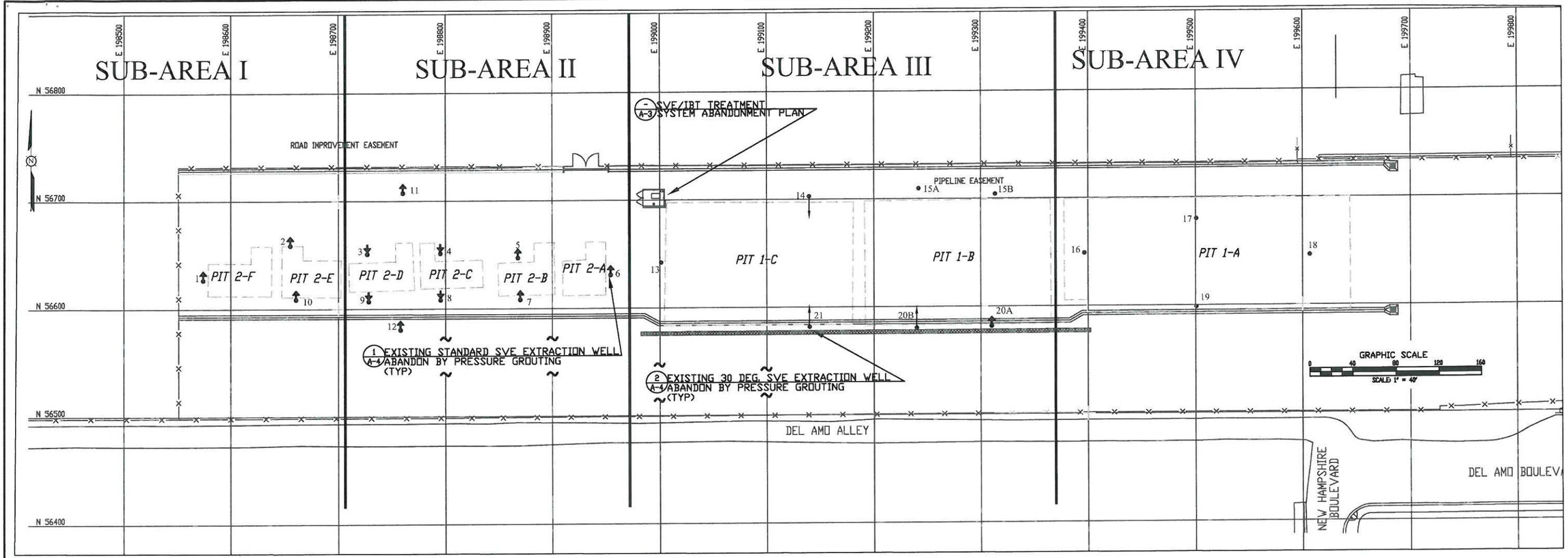
REGISTERED PROFESSIONAL ENGINEER LAWRENCE MITCHELL GATES No. 45715 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

NO.:	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: LEGEND, ABBREVIATIONS AND GENERAL NOTES

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: G-2 OF 1 of 1 SHEETS	
SCALE: N.T.S.	



LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION
- SVE WELL IDLE
- SVE WELL ANGLED 30° FROM VERTICAL
- SVE WELL ANGLE DIRECTION

NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONFIGURATIONS, SEE DRAWING A-4.
3. FOR SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN, SEE DRAWING A-3.
4. WELL ABONDONMENT FOR INJECTION WELLS SIMILAR TO EXTRACTION WELLS.

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LAWRENCE M. GATES R.C.E. 45715

3/16/15
DATE

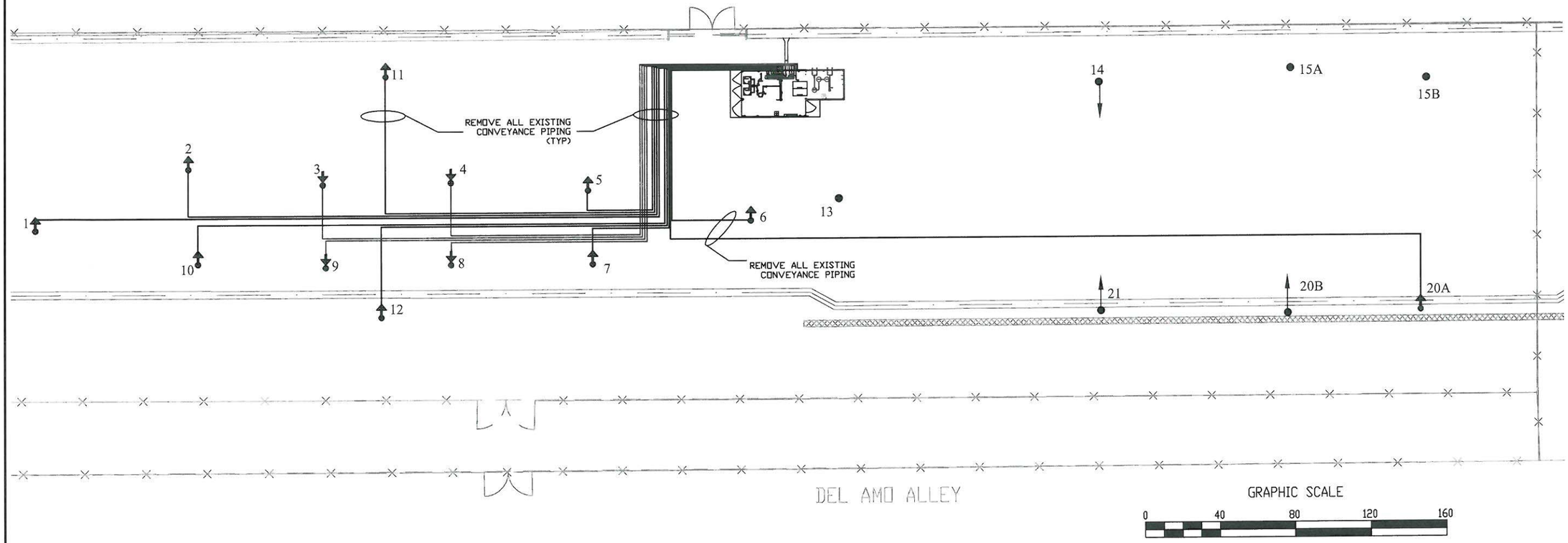
REGISTERED PROFESSIONAL ENGINEER

NO.	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS
TORRANCE, CA

DRAWING NAME: EXISTING SVE WELL LOCATION & ABANDONMENT PLAN

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER:	A-1
OF 1 of 1 SHEETS	
SCALE: N.T.S.	



LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION
- SVE WELL IDLE
- SVE WELL ANGLED 30° FROM VERTICAL
- SVE WELL ANGLE DIRECTION

NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONFIGURATIONS, SEE DRAWING A-4.
3. FOR SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN, SEE DRAWING A-3.

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LAWRENCE N. GATES R.C.E. 45715
DATE 4/6/15

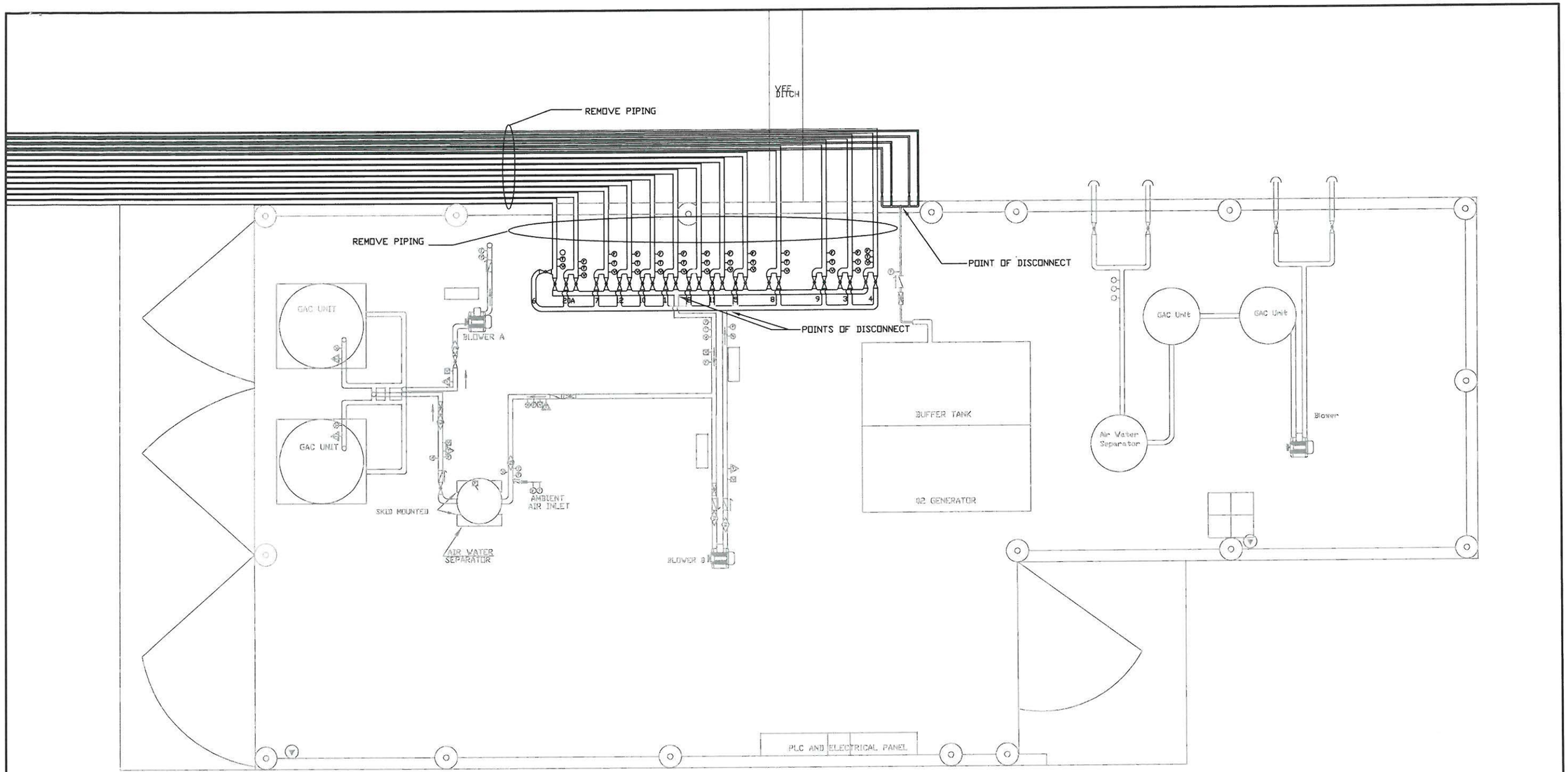
REGISTERED PROFESSIONAL ENGINEER

NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

PROJECT: DEL AMO WASTE PITS
TORRANCE, CA

DRAWING NAME: SVE/IBT ABANDONMENT PLAN (PIPE LAYOUT)

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER:	A-2
OF 1 of 1 SHEETS	
SCALE: N.T.S.	



GRAPHIC SCALE

0 5 10

NOTES:

1. REMOVE ALL PIPING OUTWARD OF DISCONNECTING POINTS.

2. PROTECT DISCONNECTION PIPING ELEMENT FOR FUTURE RECONNECTION.

3. SALVAGE ALL INSTRUMENTS AND VALVES FOR POSSIBLE RE-USE.

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LAWRENCE M. GATES
R.C.E. 45715
DATE

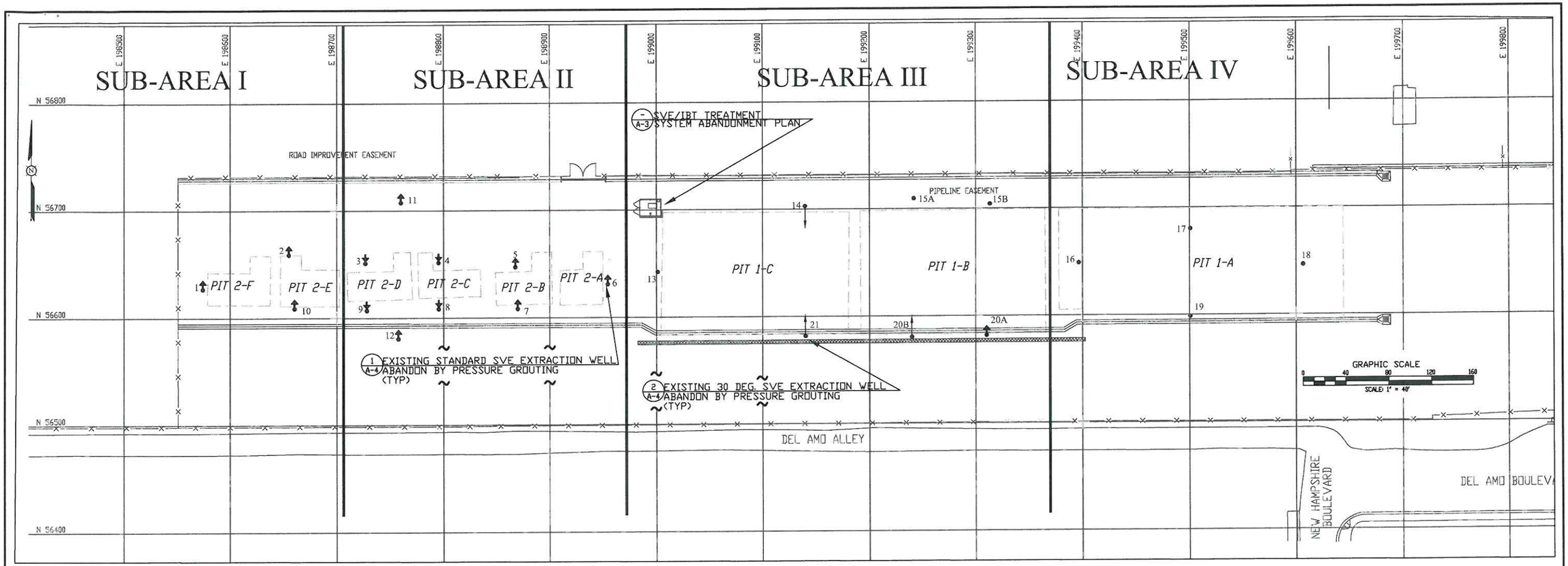
REGISTERED PROFESSIONAL ENGINEER

NO.:	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN

ISSUE: REDESIGN
DATE: 3/4/2015
CHECKED: EB DRAWN: WW
DRAWING FILE:
PROJECT NO.: 97-101
SHEET NUMBER: A-3
OF 1 of 1 SHEETS
SCALE: N.T.S.



LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION
- SVE WELL IDLE
- SVE WELL ANGLED 30° FROM VERTICAL
- SVE WELL ANGLE DIRECTION

NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONFIGURATIONS, SEE DRAWING A-4.
3. FOR SVE/IBT TREATMENT SYSTEM ABANDONMENT PLAN, SEE DRAWING A-3.
4. WELL ABONDONMENT FOR INJECTION WELLS SIMILAR TO EXTRACTION WELLS.

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LAWRENCE M. GATES
R.C.E. 45715
DATE 4/6/15
REGISTERED PROFESSIONAL ENGINEER

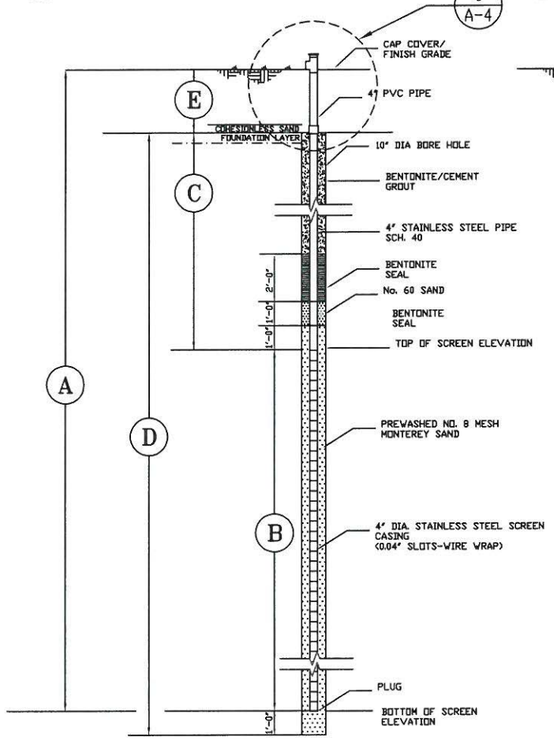
NO.	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

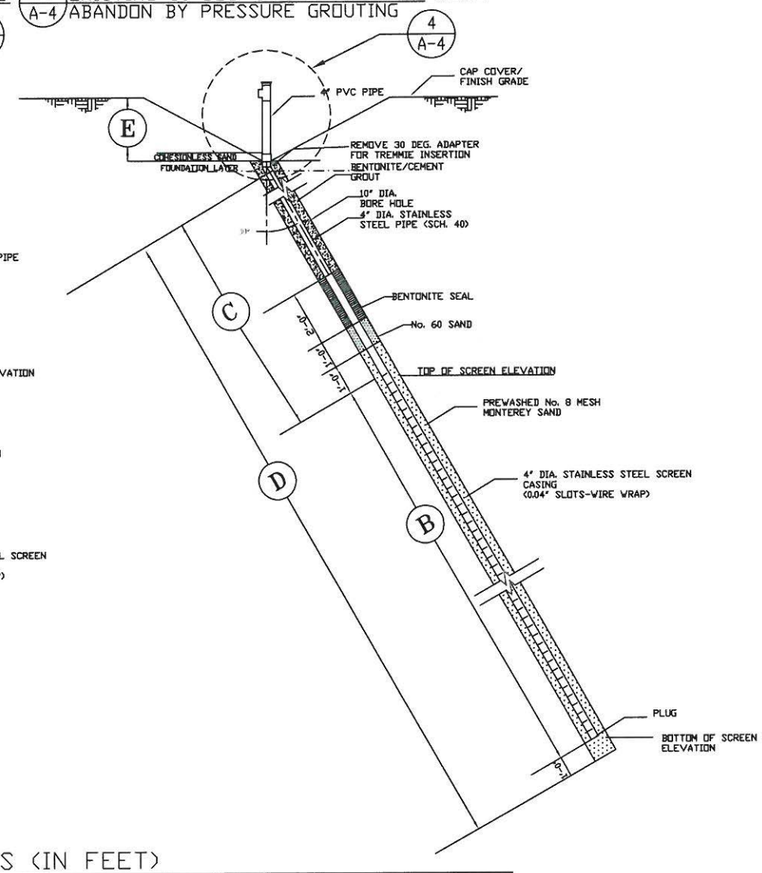
DRAWING NAME: SVE/IBT EXISTING EXTRACTION WELLS

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: A-4 OF 1 of 2 SHEETS	
SCALE: N.T.S.	

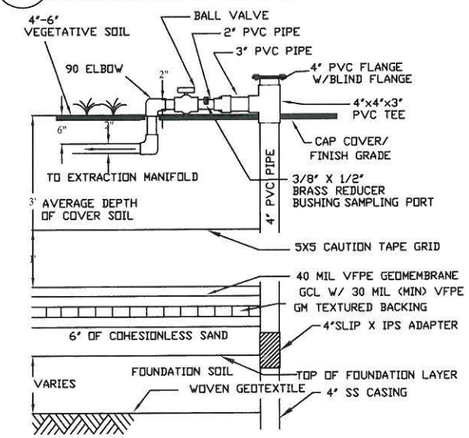
1 A-4 EXISTING STANDARD SVE EXTRACTION WELL ABANDON BY PRESSURE GROUTING



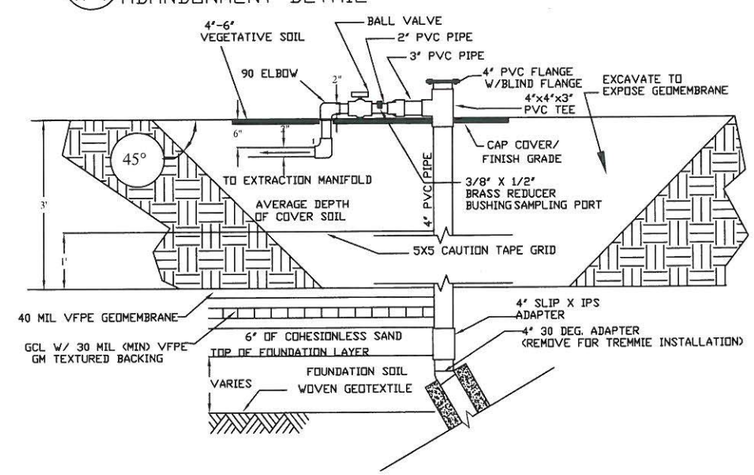
2 A-4 EXISTING 30 DEG. SVE EXTRACTION WELL ABANDON BY PRESSURE GROUTING



3 A-4 EXISTING SVE WELLHEAD EXTRACTION (STANDARD) ABANDONMENT DETAIL



4 A-4 EXISTING SVE WELLHEAD EXTRACTION (30°) ABANDONMENT DETAIL



SVE WELL SPECIFICATIONS (IN FEET)

Well No.	Angle	Adjacent Pit(s)	Cap Cover/Finish Grade Elevation (msl)	Top of Foundation Layer Elevation (msl)	Top of Screen Elevation (msl)	Bottom of Screen Elevation (msl)	Dimension (feet)					Casing Volume ($ft.^3$)	Annulus Volume ($ft.^3$)	Annulus Grout Volume ($ft.^3$)	Total Grout Volume ($ft.^3$)
							A	B	C	D	E				
1	Vertical	2-F	43.66	40.16	15	-10	56.7	28	25.2	54.2	3.5	59.38	85.14	25.54	84.92
2	Vertical	2-E	42.53	39.03	17	-9	52.5	27	22	50	3.5	54.98	28.27	16.49	71.47
3	Vertical	2-D	42.13	38.63	13	-8	50.1	21	25.6	47.6	3.5	52.46	21.99	15.74	68.20
4	Vertical	2-C	41.61	38.11	11	-9	50.6	20	27.1	48.1	3.5	52.99	20.94	15.90	68.88
5	Vertical	2-B	41.13	37.63	12	-8	49.1	20	25.6	46.6	3.5	51.42	20.94	15.43	66.84
6	Vertical	2-A	41.13	37.63	12	-8	49.1	20	25.6	46.6	3.5	51.42	20.94	15.43	66.84
7	Vertical	2-B	41.02	37.5	12	-8	49	20	25.5	46.5	3.5	51.31	20.94	15.39	66.71
8	Vertical	2-C	41.55	38.05	11	-8	50.6	20	27.1	48.1	3.5	52.99	20.94	15.90	68.88
9	Vertical	2-D	42.09	38.59	13	-8	50.1	21	25.6	47.6	3.5	52.46	21.99	15.74	68.20
10	Vertical	2-E	42.64	39.14	17	-9	52.6	27	22.1	50.1	3.5	55.08	28.27	16.52	71.61
11	Vertical	2-D	40.78	37.28	12	-9	49.8	21	25.3	47.3	3.5	52.15	21.99	15.65	67.80
12	Vertical	2-D/2-C	39.5	NA	12	-9	49.5	22	27.5	50.5	0	51.84	23.04	15.55	67.39
13	Vertical	1-C	40.79	37.29	22	-8	NA	35.8	17.7	54.6	3.5	52.36	37.49	15.71	68.07
14	30°	1-C	39.11	35.61	22	-9	NA	35.8	15.7	52.6	3.5	52.36	37.49	15.71	68.07
15A	Vertical	1-B	38.75	35.25	22	-10	NA	37	15.3	53.4	3.5	52.36	38.75	15.71	68.07
15B	Vertical	1-B	38.4	34.9	22	-10	NA	37	14.9	52.9	3.5	52.36	38.75	15.71	68.07
16	Vertical	1-A	39	35.5	20	-11	51	32	15.5	48.5	3.5	53.41	33.51	16.02	69.43
17	Vertical	1-A	37.35	33.85	20	-12	49.4	32	13.9	46.9	3.5	51.73	33.51	15.52	67.25
18	Vertical	1-A	38.09	34.59	20	-12	50.1	32	14.6	47.6	3.5	52.46	33.51	15.74	68.20
19	Vertical	1-A	38.25	34.69	20	-12	50.3	32	14.7	47.7	3.6	52.67	33.51	15.80	68.48
20A	Vertical	1-B	39.01	35.38	22	-8	NA	37	15.5	53.5	3.6	52.36	38.75	15.71	68.07
20B	30°	1-B	39.39	35.72	22	-8	NA	37	15.8	53.9	3.7	52.36	38.75	15.71	68.07
21	30°	1-C	39.7	36.03	22	-8	NA	35.8	16.2	53.1	3.7	52.36	37.49	15.71	68.07

Casing Volume = pi*(casing radius)^2*(casing depth)
Casing Depth = A (or D for 14, 20B, and 21)
Annulus Volume = (pi*(annulus radius)^2* - pi*(casing radius)^2)*(annulus depth)
Annulus Depth = B + 1

NOTES:

1. FOR STANDARD WELLS, CONTRACTOR SHALL REMOVE ALL ABOVE GROUND PIPING FROM THE WELL COLUMN TEE AND INSTALL CAP OR PLUG PRIOR TO INSERTION OF TREMMIE PIPE.
2. FOR 30 DEG. EXTRACTION WELLS, CONTRACTOR SHALL DISASSEMBLE AND REMOVE WELL HEAD MATERIALS PRIOR TO EXCAVATION. THEN HAND EXCAVATE TO EXPOSE WELL CASING TO HDPE GEOMEMBRANE.
3. FOR 30 DEG. EXTRACTION WELLS, VFPE GEOMEBRANE TO BE CUT TO ENABLE CONTINUED EXCAVATION TO 30 DEG. ADAPTER.
4. FOR 30 DEG. EXTRACTION WELLS, REMOVE 30 DEG. ADAPTER TO ALLOW INSERTION OF TREMMIE PIPE.
5. CONTRACTOR SHALL INSTALL TREMMIE PIPE EQUIPPED WITH NORMAL 4" DIAMETER K-PACKER ASSEMBLY INTO WELL CASING.
6. TREMMIE PIPE TO BE INSERTED TO WITHIN 1.5' OF BOTTOM OF WELL.
7. CONTRACTOR TO CONFIRM TOTAL WELL DEPTH AND GROUT VOLUME REQUIREMENTS.
8. CONTRACTOR SHALL PUMP GROUT THROUGH TREMMIE PIPE UNTIL COLUMN IS FILLED. THE TREMMIE PIPE WILL THEN BE REMOVED FROM THE WELL CASING. A K-PACKER ASSEMBLY WILL THEN BE INSTALLED AT THE TOP OF THE WELL CASING AND ADDITIONAL GROUT WILL BE PUMPED INTO THE WELL UNTIL A PRESSURE OF 15 PSI IS ACHIEVED. THE PRESSURE SHALL BE MAINTAINED AT 15 PSI FOR A MINIMUM OF 30 MINUTES.
9. GROUT SHALL CONSIST OF PORTLAND TYPE I/II CEMENT AND WATER AT A RATIO OF APPROXIMATELY 100 POUNDS CEMENT TO 9 GALLONS OF WATER.

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Development Resource Consultants, Inc.
LAWRENCE W. GATES R.C.E. 45715
DATE 4/16/15

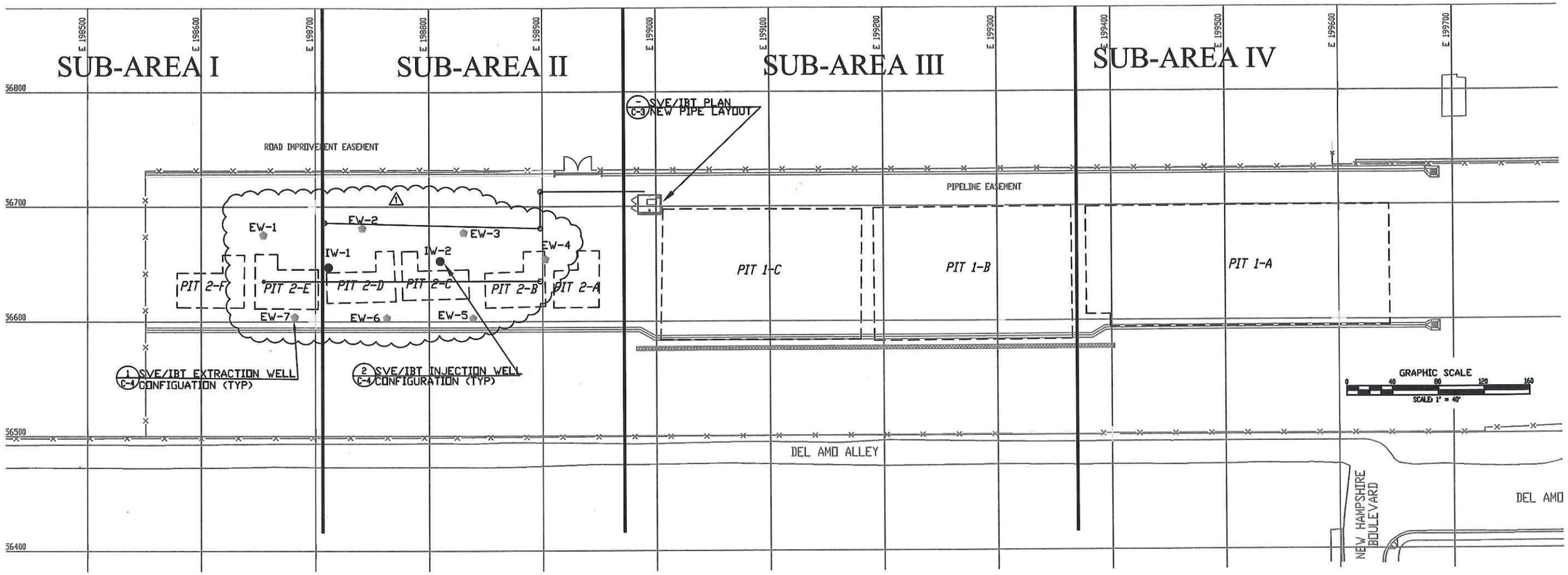
REGISTERED PROFESSIONAL ENGINEER

NO.:	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE/IBT WELL ABANDONMENT CONSTRUCTION DETAILS

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.:	97-101
SHEET NUMBER:	A-4
OF 2 of 2 SHEETS	
SCALE: N.T.S.	



AS-BUILT EXTRACTION/INJECTION WELL DETAILS FINAL LOCATIONS **

Well ID	LOCAL X	LOCAL Y	X (Easting)	Y (Northing)	Elevation ft MSL	Depth ft BGS	Screen Interval ft	Top of Screen ft MSL	Bottom of Screen ft MSL
EW-1A	198654.7	56675.73	6472409.92	1766776.87	42.6	46	5	12.6	7.6
EW-1B	198654.7	56675.73	6472409.92	1766776.87	42.6	46	5	2.6	-2.4
EW-2A	198746.61	56674.94	6472501.82	1766775.78	42.1	46	5	12.1	7.1
EW-2B	198746.61	56674.94	6472501.82	1766775.78	42.1	46	5	2.1	-2.9
EW-3A	198830.5	56674.68	6472579.31	1766776.03	41.2	46	5	12.2	7.2
EW-3B	198830.5	56674.68	6472579.31	1766776.03	41.2	46	5	1.2	-3.8
EW-4A	198902.4	56654.68	6472657.55	1766755.00	41.2	46	5	13.7	8.7
EW-4B	198902.4	56654.68	6472657.55	1766755.00	41.2	46	5	1.2	-3.8
EW-5A	198839.05	56601.8	6472594.03	1766702.33	41.7	46	5	12.7	7.7
EW-5B	198839.05	56601.8	6472594.03	1766702.33	41.7	46	5	1.7	-3.3
EW-6A	198761.54	56602.69	6472516.51	1766703.47	41.2	45.5	5	11.7	6.7
EW-6B	198761.54	56602.69	6472516.51	1766703.47	41.2	45.5	5	1.7	-3.3
EW-7A	198682.93	56604.84	6472437.91	1766705.89	43.4	46.5	5	12.9	7.9
EW-7B	198682.93	56604.84	6472437.91	1766705.89	43.4	46.5	5	2.9	-2.1
IW-1A	198708.77	56647.75	6472463.89	1766748.71	43.2	47.5	5	11.7	6.7
IW-1B	198708.77	56647.75	6472463.89	1766748.71	43.2	47.5	5	1.7	-3.3
IW-2A	198809.8	56652.76	6472564.94	1766753.39	41.9	45.5	5	14.4	9.4
IW-2B	198809.8	56652.76	6472564.94	1766753.39	41.9	45.5	5	2.4	-2.6

** LOCAL COORDIATES WERE REVISED DURING SURVEY STAKING TO REFLECT PROPOSED WELL LOCATIONS AND FINAL LOCAL COORDINATES ARE AS-BUILT

LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION

NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONSTRUCTION DETAILS, SEE DRAWING C-4 (SHEET 2 OF 2).
3. FOR SVE/IBT TREATMENT SYSTEM PIPING DETAILS, SEE DRAWING C-3.
4. ALL WELL LOCATIONS APPROXIMATE, TO BE SURVEYED PRIOR TO CONSTRUCTION.

1 SURVEYED FINAL LOCATIONS
2 RELOCATED TO AVOID OBSTRUCTION
3 RELOCATED TO AVOID PIPING

In Association with
C2REM
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Phone: 949.261.8066
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Development Resource Consultants, Inc.
Civil Engineering/Land Surveying/Land Planning
LAWRENCE M. CATES R.C.E. 45715 DATE

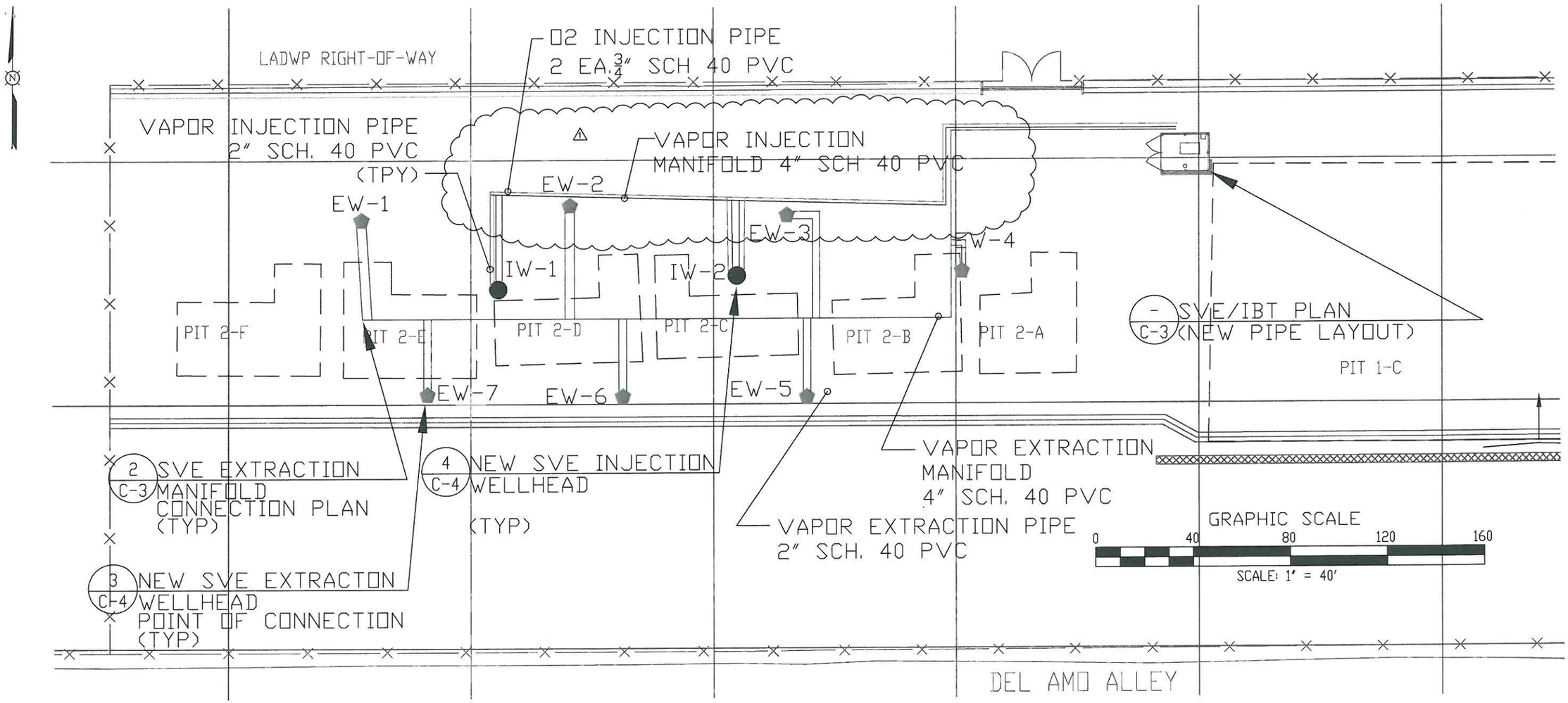
REGISTERED PROFESSIONAL ENGINEER LAWRENCE M. CATES No. 45715 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

NO.:	REVISION:	DATE:
1	AS-BUILT	3/11/2015
2	MOVED TO AVOID OBSTRUCTION	3/11/2015
3	MOVED TO AVOID PIPING	3/11/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE WELL LOCATION PLAN

ISSUE: REDESIGN
DATE: 3/4/2015
CHECKED: DB DRAWN: WW
DRAWING FILE:
PROJECT NO.: 97-101
SHEET NUMBER: C-1
OF 1 of 1 SHEETS
SCALE: N.T.S.



NOTES:

1. FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES, SEE DRAWING G-2.
2. FOR EXTRACTION AND INJECTION WELLHEAD CONSTRUCTION DETAILS, SEE DRAWING C-4 (SHEET 2 OF 2).
3. FOR SVE/IBT TREATMENT SYSTEM PIPING DETAILS, SEE DRAWING C-3.
4. ALL WELL LOCATIONS APPROXIMATE, TO BE SURVEYED PRIOR TO CONSTRUCTION.
5. 4" EXTRACTION MANIFOLD SHALL BE INSTALLED WITH NOMINAL 0.5° SLOPE WEST TO EAST.

LEGEND:

- SVE WELL EXTRACTION
- SVE WELL INJECTION
- SUBSURFACE CONVEYANCE (EXTRACTION) PIPING
- SUBSURFACE CONVEYANCE (COLLECTION) PIPING
- SUBSURFACE O2 PIPING (3/4" SCH.40 PVC)

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In Association with
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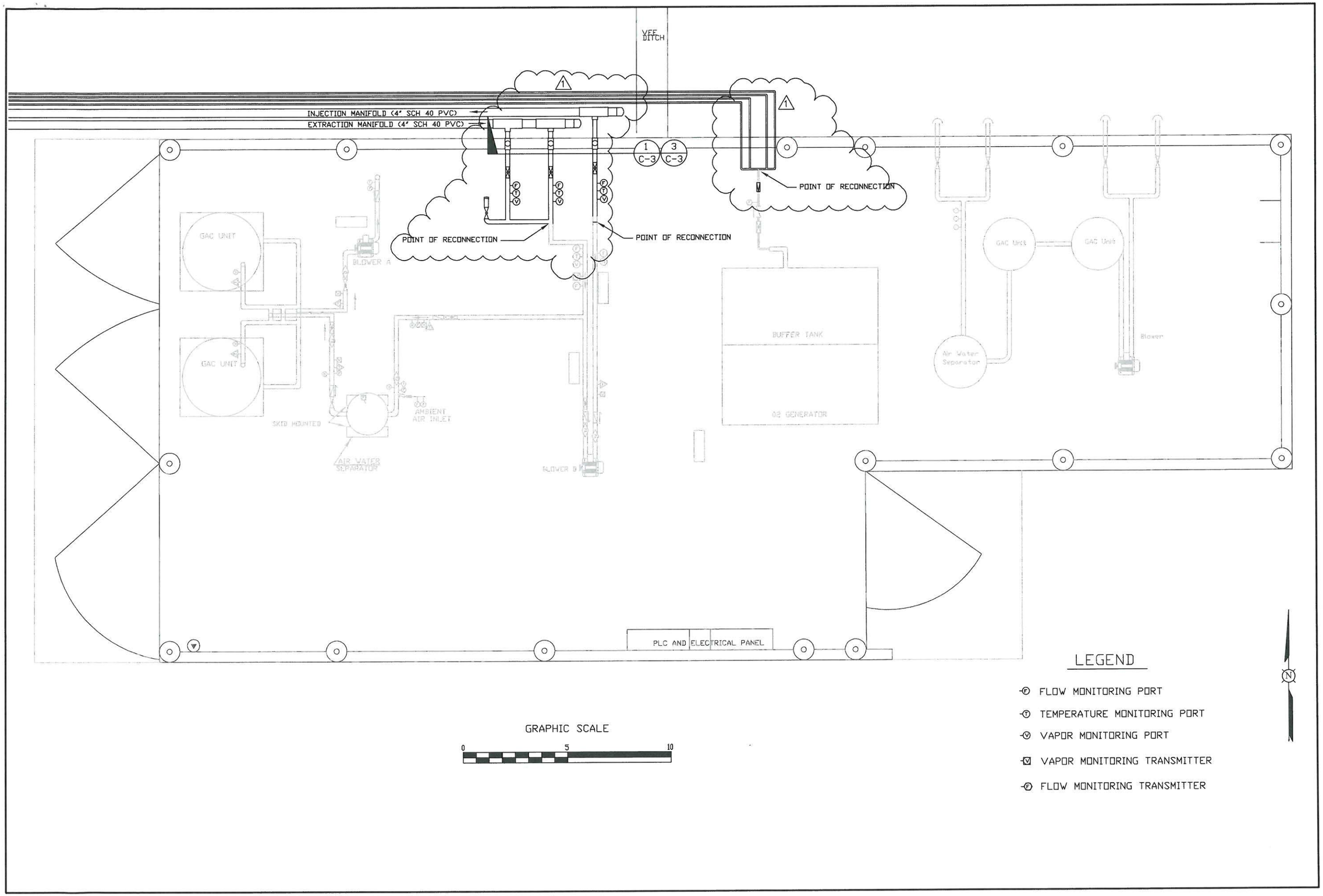
Civil Engineering/Land Surveying/Land Planning
LAWRENCE M. GATES R.C.E. 45715

NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE/IBT PLAN (PIPE LAYOUT)

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: C-2 OF 1 of 1 SHEETS	
SCALE: N.T.S.	



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LAWRENCE M. GATES
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4/6/15
DATE

REGISTERED PROFESSIONAL ENGINEER
LAWRENCE MITCHELL GATES
No. 45715
Exp. 12-31
CIVIL
STATE OF CALIFORNIA

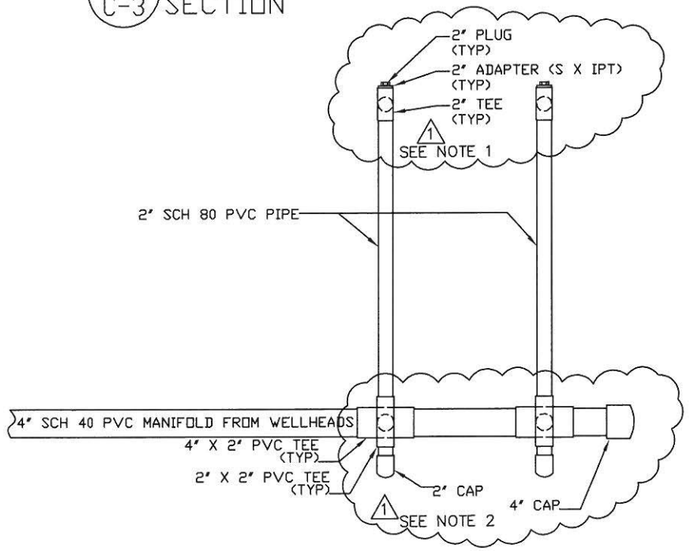
NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

PROJECT:
DEL AMO WASTE PITS
TORRANCE, CA

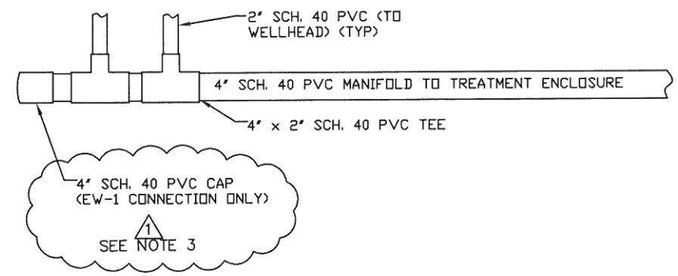
DRAWING NAME:
SVE/IBT PLAN (NEW PIPE LAYOUT)

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: C-3 OF 1 of 2 SHEETS	
SCALE: N.T.S.	

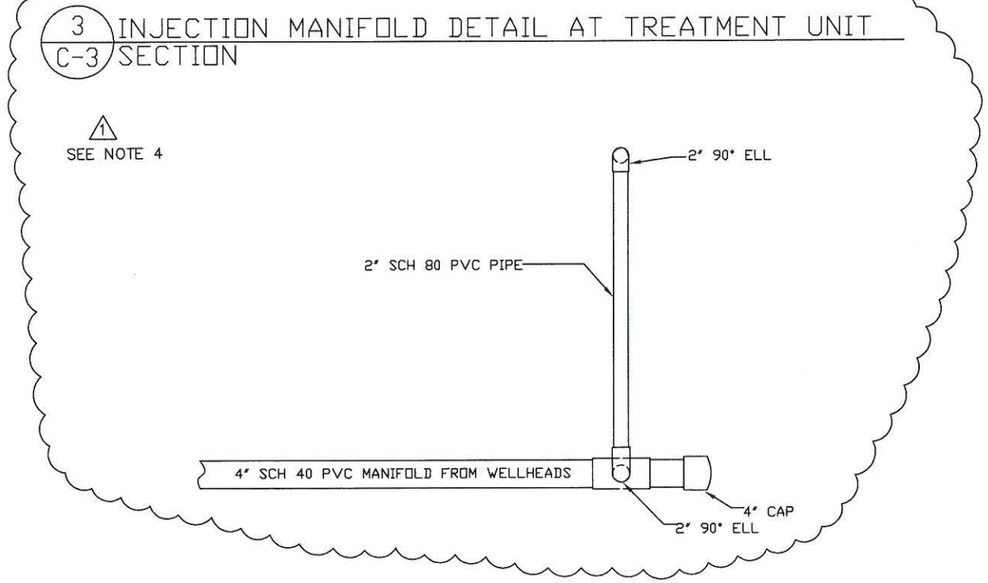
1 / C-3 EXTRACTION MANIFOLD DETAIL AT TREATMENT UNIT SECTION



2 / C-3 SVE/IBT MANIFOLD CONNECTION PLAN (TYP)



3 / C-3 INJECTION MANIFOLD DETAIL AT TREATMENT UNIT SECTION



NOTES:

1. PIPING MODIFIED DUE TO SPACE CONSTRAINTS AND HEIGHTH LIMITITATIONS

2. PIPING MODIFIED DUE TO OBSTRUCTION AND SPACE CONSTRAINTS

3. PIPING AS-BUILT FOR LOCATION EW-1 ONLY

4. PIPING MODIFICATION DUE TO SPACE CONSTRAINTS

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4/6/15 DATE

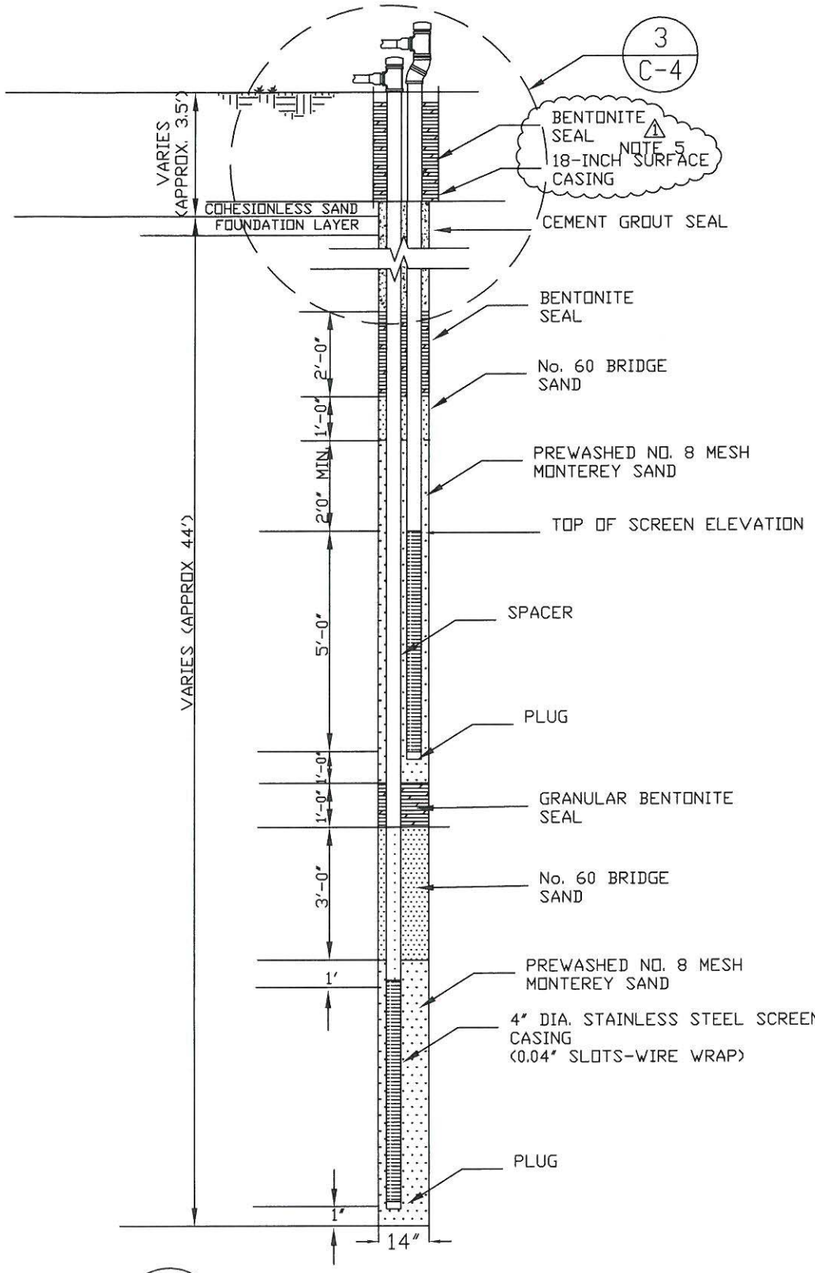
REGISTERED PROFESSIONAL ENGINEER LAWRENCE M. GATES No. 45715 Exp. 12-31 CIVIL STATE OF CALIFORNIA

NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

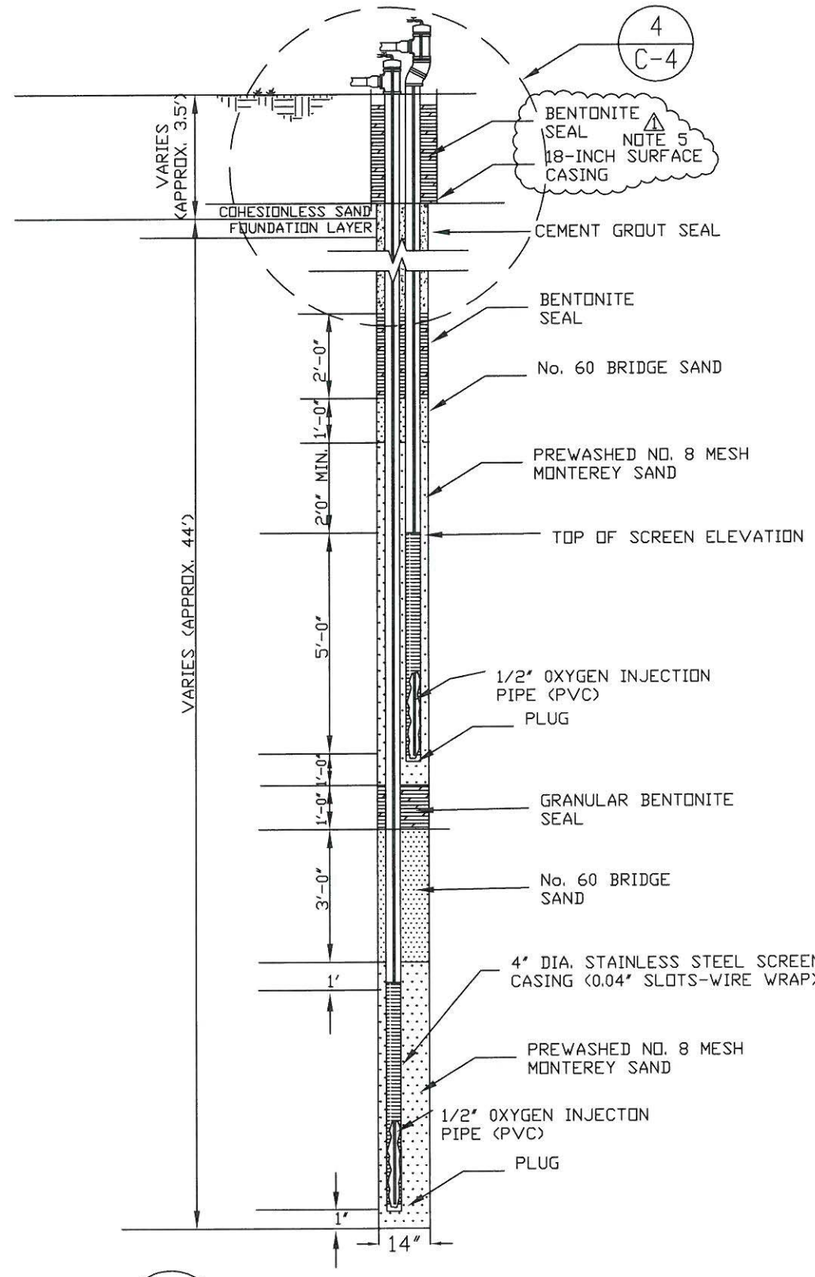
PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE/IBT CONVEYANCE PIPING DETAILS

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: C-3 OF 2 of 2 SHEETS	
SCALE: N.T.S.	



1 / C-4 NEW SVE/IBT EXTRACTION WELL CONFIGURATION



2 / C-4 NEW SVE/IBT INJECTION WELL CONFIGURATION

NOTES:

1. AT EACH WELL LOCATION, PRIOR TO DRILLING, CONTRACTOR SHALL REMOVE CAP COVER MATERIAL DOWN TO LINER. CONTRACTOR TO CUT CAP LINER AND INSTALL AN 18-INCH DIAMETER SURFACE CASING AND BOND TO VFPE GEOMEMBRANE AS SHOWN ON THE DRAWINGS. EXERCISE EXTREME CARE IN SETTING SURFACE CASING PLUMB. UPON COMPLETION, CONTRACTOR TO PLACE TEMPORARY CAP OVER SURFACE CASING AND REPLACE CAP COVER MATERIAL TO GRADE.

2. DRILLING CONTRACTOR TO EXPOSE TEMPORARY SURFACE CASING COVER AND DRILL NOMINAL 14-INCH DIAMETER BORE THROUGH THE 18-INCH SURFACE CASING TO DESIGN DEPTH USING HOLLOW STEM AUGER DRILL RIG.

3. CONTRACTOR TO INSTALL DEEP WELL CASING STRING THROUGH AUGERS, ADD FILTER SAND TO A DEPTH OF 1-FOOT ABOVE THE TOP OF THE WELL SCREEN AND SET A 4-FOOT THICK INTERIM SEAL CONSISTING OF No. 8 GRANULAR BENTONITE HYDRATED IN 2-FOOT LIFTS.

4. CONTRACTOR TO REMOVE THE AUGERS FROM THE BORING AND INSTALL THE SECOND WELL CASING STRING. 1-INCH DIAMETER SPACERS SHALL BE INSTALLED ON THE SECOND WELL STRING AT THE BOTTOM OF THE SCREEN, THE TOP OF THE SCREEN AND AT APPROXIMATE 10-FEET ABOVE THE TOP OF THE WELL CASING. FILTER SAND SHALL BE PLACED OPPOSITE THE WELL SCREEN FROM THE TOP OF THE INTERIM SEAL TO 1-FOOT ABOVE THE TOP OF THE WELL SCREEN. A 2-FOOT THICK No. 60 BRIDGE SAND SHALL BE PLACED ON TOP OF THE FILTER SAND AND A 1-FOOT THICK No. 8 GRANULAR BENTONITE SEAL SHALL BE PLACED ABOVE THE BRIDGE SAND. THE REMAINDER OF THE WELL BORING AND THE ANNULUS BETWEEN THE SURFACE SEAL SHALL BE FILLED WITH A CEMENT ANNULAR SEAL CONSISTING OF TYPE I/II PORTLAND CEMENT MIXED WITH 6.5 GALLONS OF WATER

5. DESIGN MODIFIED TO FILL SURFACE CASING WITH HYDRATED BENTONINTE IN LIEU OF CONCRETE

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DATE: 11/21/15

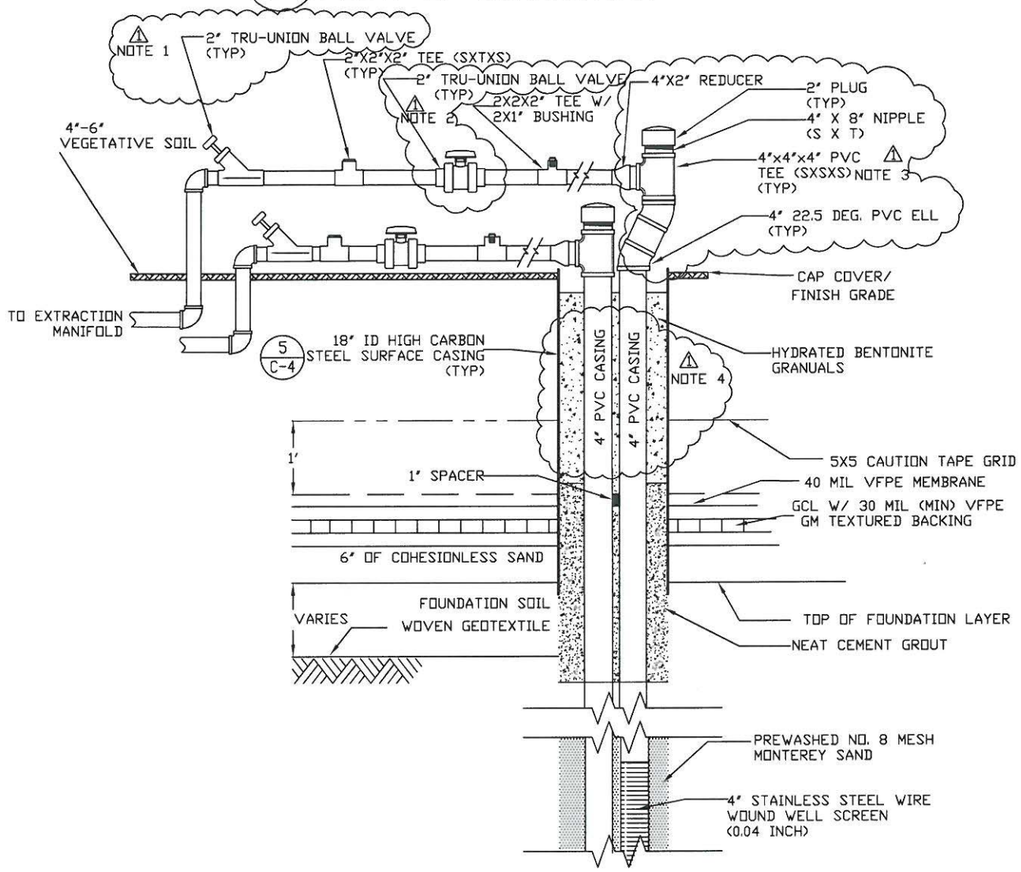
NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

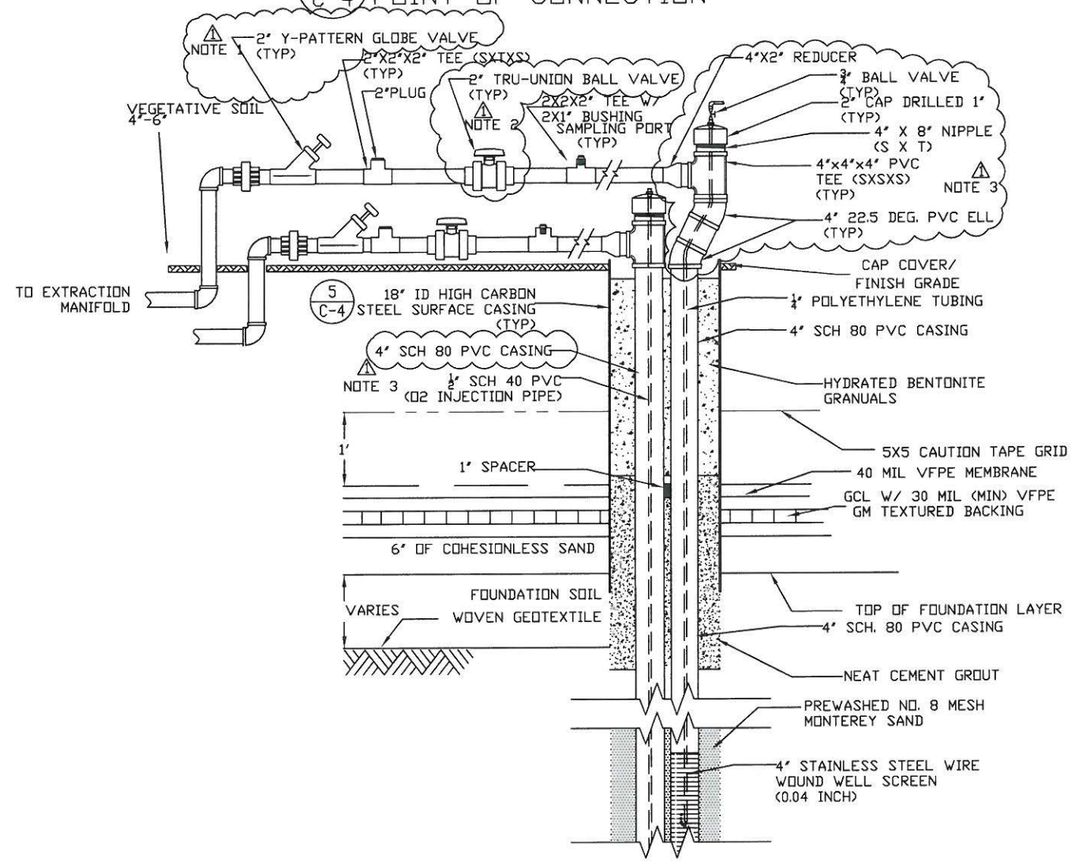
DRAWING NAME: SVE/IBT EXTRACTION & INJECTION WELLS

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: C-4 OF 1 of 2 SHEETS	
SCALE: N.T.S.	

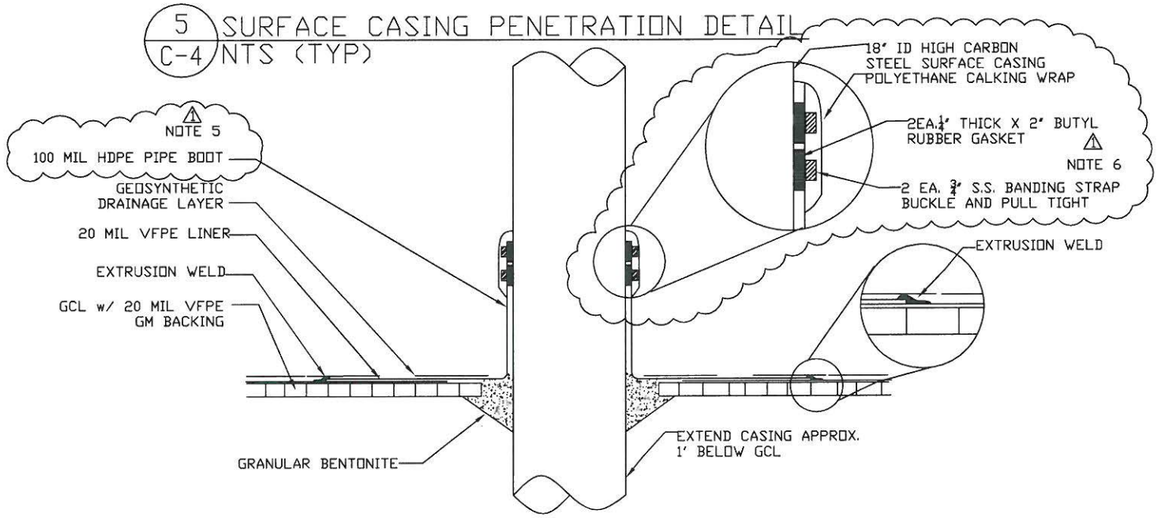
3 / C-4 NEW SVE EXTRACTION WELLHEAD POINT OF CONNECTION



4 / C-4 NEW SVE INJECTION WELLHEAD POINT OF CONNECTION



5 / C-4 SURFACE CASING PENETRATION DETAIL NTS (TYP)



NOTES:

1. FLOW CONTROL VALVE MODIFIED TO Y-PATTERN GLOBE VALVE
2. FULL UNION BALL VALVE ADDED TO ALLOW PURGING
3. PIPING MODIFIED DUE TO SPACE CONSTRAINTS
4. CASING DESIGN MODIFIED TO SCH. 80 PVC
5. BOOT DESIGN MODIFIED TO ALLOW FOR FACTORY FABRICATION
6. SURFACE CASING SEAL UPGRADED TO DUAL SEAL DESIGN

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3/4/15
DATE

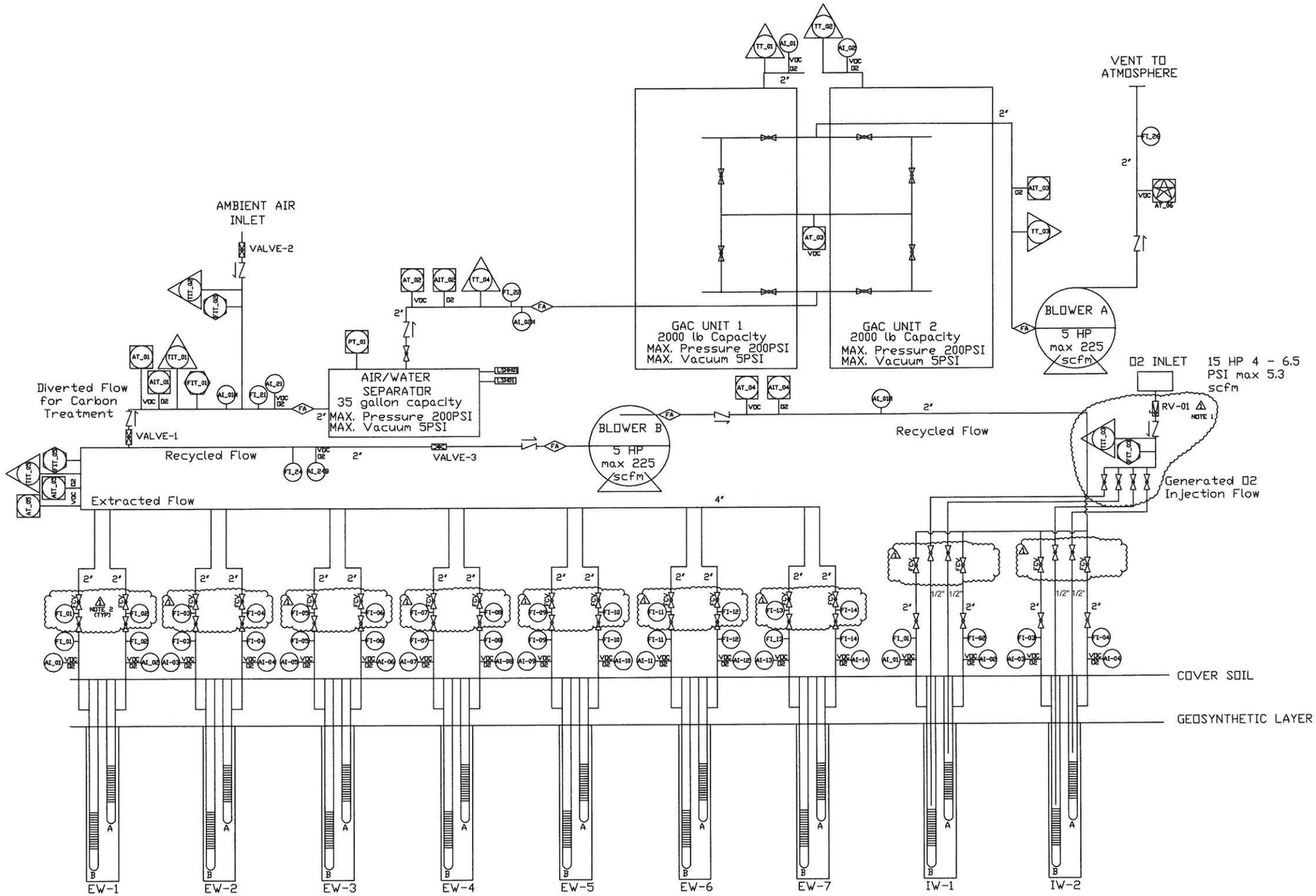
REGISTERED PROFESSIONAL ENGINEER LAWRENCE MITCHELL GATES No. 45715 Exp. 12-31-15 CIVIL STATE OF CALIFORNIA

NO.:	REVISION:	DATE:
1	AS-BUILT	3/4/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: SVE/IBT WELL CONSTRUCTION DETAILS

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER: C-4 OF 2 of 2 SHEETS	
SCALE: N.T.S.	



NOTES:

1. DIAGRAM MODIFIED TO REFLECT CHANGES ON C-4 SHEET 2

2. DIAGRAM MODIFIED TO REFLECT CHANGES ON 3 SHEET 1

LEGEND

- FLOW MONITORING PORT
- VOC AND O2 MONITORING PORT
- MOISTURE MONITORING PORT
- FLOW AUTOLOG TRANSMITTER
- TEMPERATURE AUTOLOG TRANSMITTER
- TEMPERATURE AUTOLOG TRANSMITTER
- VOC AUTOLOG TRANSMITTER
- O2 AUTOLOG TRANSMITTER
- PRESSURE AUTOLOG TRANSMITTER
- PID AUTOLOG TRANSMITTER
- BALL VALVE
- FLOW CONTROL VALVE
- ROTOMETER/VALVE
- FLAME ARRESTOR
- BACKFLOW DEVICE
- BLOWER
- EXTRACTION LINE
- INJECTION LINE
- AUTOMATED VALVE
- EW SOIL VAPOR EXTRACTION WELL

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LAWRENCE W. GATES R.C.E. 45715 DATE

NO.:	REVISION:	DATE:
1	AS-BUILT	3/16/2015

PROJECT: DEL AMO WASTE PITS TORRANCE, CA

DRAWING NAME: PROCESS AND INSTRUMENTATION DIAGRAM

ISSUE:	REDESIGN
DATE:	3/4/2015
CHECKED: EB	DRAWN: WW
DRAWING FILE:	
PROJECT NO.: 97-101	
SHEET NUMBER:	1-1
OF 1 of 1 SHEETS	
SCALE: N.T.S.	

APPENDIX K-2

AIR MONITOIRNG LOGS
(VIA CD ROM)

APPENDIX K-3

WELL ABANDONMENT LOGS
(VIA CD ROM)

APPENDIX K-4

WELL INSTALLATION LOGS
(VIA CD ROM)

APPENDIX K-5

FIELD DAILY REPORTS
(VIA CD ROM)