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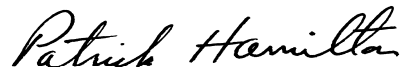
ALAMITOS GENERATING STATION

SAMPLING AND ANALYSIS PLAN Wastewater Basin Closure Project

Southern California Edison Company

January 2013

Prepared By:

A handwritten signature in black ink that reads "Patrick Hamilton". The signature is written in a cursive, flowing style.

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Table of Contents

1. Introduction	4
1.1. Closure Agreement	4
1.1.1. Wastewater Basins	5
1.1.2. Hydrogeology	5
1.1.3. Groundwater Gradient	6
2. Evaluation Monitoring Program	7
3. Field Procedures	8
3.1. Well-Head Inspection	8
3.2. Water Level Measurements	8
3.2.1. Water Level Sounder Calibration and Maintenance.....	9
3.2.2. Water Level Measurements	9
3.3. Field Parameter Instrument Calibration	10
3.3.1. Temperature Measurements.....	10
3.3.2. pH Probe	10
3.3.3. Electrical Conductivity Probe.....	11
3.3.4. Luminescent Dissolved Oxygen Probe.....	11
3.3.5. Turbidity Measurements	12
3.4. Groundwater Well Purging	12
3.4.1. Dedicated Pumps	13
3.4.2. Purge Parameters	13
3.4.3. Management of Purge Water	14
3.5. Groundwater Sampling and Preservation	14
3.5.1. Flow Rate	14
3.5.2. Constituents of Concern	14
3.5.3. Sample Containers	15
3.5.4. Order of Sampling	15
3.5.5. Health and Safety	15
3.5.6. Labeling and Handling	15
3.6. QA/QC Samples	16
3.6.1. Trip Blank	16
3.6.2. Field Blank.....	17
3.6.3. Duplicate Samples	17
3.7. Sample Custody, Shipment, and Documentation	17
3.7.1. Chain of Custody	17

3.7.2.	Documentation.....	18
4.	Analytical Laboratory.....	19
4.1.	Project Laboratories.....	19
4.2.	Analyses Performed.....	19
4.3.	Laboratory QA/QC	19
4.4.	Laboratory Narratives	20
5.	Reporting.....	20
5.1.	Quarterly Groundwater Monitoring Reports.....	20
5.2.	Annual Groundwater Monitoring Report.....	21

List of Tables

Table 1:	Description of Monitoring Wells
Table 2:	Monitoring Well Sampling Schedule
Table 3:	Constituents of Concern
Table 4:	Sample Containers, Preservatives, and Holding Time Requirements

List of Figures

Figure 1:	Geographic Location Map
Figure 2:	Geographic Location Map (Expanded scale)
Figure 3:	Site Facilities Map
Figure 4:	Typical Groundwater Gradient

Appendix 1: Field Forms

Appendix 2: Monitoring Well Boring Logs

1. Introduction

1.1. Closure Agreement

In 1996, Southern California Edison Company (Edison) implemented a Water Quality Monitoring Program in response to a Final Judgment pursuant to Stipulation, handed down by the Superior Court of California, Los Angeles County, Number BC 121219 on February 1, 1995. The Stipulation alleged that Edison had stored hazardous wastes in unpermitted surface impoundments at ten of their generating stations in southern California. Edison agreed to close these surface impoundments and perform an integrity test on any associated sump according to Title 22, California Code of Regulations, Chapter 15.

A Detection Monitoring Program (pursuant to 22 CCR 66265.98) began at the Alamitos facility in 1996. The purpose of the program was to demonstrate if any environmental contamination had resulted from the operation of the four wastewater retention basins at the site. New monitoring wells were added to the existing wells at the site to measure groundwater gradients and collect groundwater quality samples both upgradient and downgradient of the retention basins. In addition to the groundwater sampling, soil samples were retrieved from beneath the liners of each basin. The analytical results of the soil and groundwater samples indicated that the liner beneath the retention basins had released wastewater.

The DTSC has required an Evaluation Monitoring Program (pursuant to 22 CCR 66265.99) be implemented at the Alamitos facility (Figures 1 and 2). Since 1996, this monitoring program has required additional groundwater sampling points to define the nature and extent of contamination. The Evaluation Monitoring procedures include quarterly groundwater sampling and analysis for the Constituents of Concern, as well as annual sampling for analytes included in Appendix IX of Chapter 14, in Title 22. The initial list of constituents was chosen at the inception of the Closure Project from analytical tests of effluents to the retention basins. This list has been modified over time, based on the presence or absence of various constituents. One constituent, 1,4-dioxane, was added to the list through consistent detection during the annual Appendix IX sampling. No other Appendix IX analytes have been detected since inception of monitoring.

This document replaces the existing approved Project Sampling and Analysis Plan (SAP) dated August 2000. This revised SAP for the Alamitos facility supersedes any other SAP for the facility where groundwater sampling is performed for the Edison Closure Project.

1.1.1. Wastewater Basins

The Alamitos site contains four basins: North, Central, Boiler Chemical Cleaning (BCCB), and South (Figure 3). The North and Central retention basins were installed in the 1960's. The South Basin was constructed in the mid-1960, probably 1965. The retention basins were originally constructed with a single asphaltic concrete liner. In the 1980's, a single layer of a synthetic liner (HDPE) was installed at each of the retention basins using the existing asphalt liner as a base. The BCCB was originally constructed in 1977 of asphaltic lining. The basin was retrofitted in late 1989 with a double liner of HDPE and a leachate collection system.

The retention basins are used to collect and store non-hazardous wastewater from the facility. The wastewater, containing minor amounts of oil, grease, and suspended solids, is systematically discharged to the ocean under the provisions of an NPDES permit. The BCCB was used to temporarily hold (for less than 30 days) non-hazardous acidic cleaning solutions from the removal of corrosion and mineral deposits from the boiler tubes. This cleaning process is no longer used at the facility. The BCCB is out of service and no longer used as a retention basin.

1.1.2. Hydrogeology

The site is directly underlain by Holocene alluvial deposits of the Bellflower Aquitard and Pleistocene continental and marine deposits of the San Pedro formation. The Holocene deposits consist of discontinuous beds of sand, silt, clay, and gravel which are commonly unconsolidated. The San Pedro Formation consists of a series of aquifers and aquitard composed of unconsolidated and semi-consolidated sand, silt, clay, and gravel sediments. The San Pedro Formation has a maximum thickness of approximately 2,000 feet in this area.

The Bellflower aquitard is the uppermost hydrologic unit beneath the basin. The Bellflower aquitard is described as being composed of continental flood plain and marsh deposits that overlie coarser channel deposits of the Artesia (Recent) Aquifer, the uppermost fresh water aquifer. The Bellflower aquitard consists of silty clay and clayey silt underlain by interbedded silty sand, silt, clay, and gravel. The basal portion of the aquitard is reported as composed of gravel and in hydraulic communication with the underlying Artesia (Recent) Aquifer. The aquitard layer has a reported thickness of about fifty feet. In comparison, the forty-three monitoring wells at the retention basin site generally range in depth from approximately 25 to 30 feet. Thus, these monitoring wells are screened in the Bellflower aquitard.

The materials encountered by the forty-three monitoring wells show the non-continuous nature of the sediment layers. A section derived from the well bore-hole logs (presented in previous reports), illustrates the lithologic formations below the retention basins. The section indicates the lithology is a complex of interfingered deposits of sand, silty sand, silty clay, and clay. The lower 15 feet is dominated by layers of the following deposits: gray sand; plastic, gray clay; and plastic, dark gray silty clay. The sand and silty clay are distinguished by the presence of organic material in the form of roots. The silty clay layer appears to trend through the entire section.

The upper 15 feet of the section is a very complex layering of deposits of sand, silty sand, sandy silt, clay, and fill material. The colors vary between tan, brown, and gray. Some layers contain gravel while others have a high content of organic material.

1.1.3. Groundwater Gradient

From the inception of the project (1996) through the 2003 monitoring year, the groundwater gradient beneath the site was controlled by an extraction well operated by the LACFCD as part of the Alamitos Barrier Project, developed to prevent sea water intrusion into fresh water aquifers in a regional area which includes the site. This extraction well is located near the northeast corner of the South Basin. The LACFCD personnel stated the extraction well was constantly pumping during the seven year period at an average rate of 135 gpm. They indicated the only down time for the pumping operation was for short periods, seven to ten days, during well maintenance.

When the extraction well was pumping, it established a consistent influence on the groundwater surface in the shallow aquifer below the basins. The water table beneath the basins has varied from twelve to eighteen feet below the ground surface since 1995. The calculated slope of the gradient was different over the site depending on the permeability of the sediments and proximity to the extraction well. The area beneath the North and Central basins contained materials of very low permeability, resulting in a groundwater slope ranging from 0.006 to 0.008 foot per foot. Closer to the extraction well, the slope increased to about 0.03 foot per foot beneath the BCCB. The gradient below the South Basin ranged from 0.007 to 0.009 foot per foot towards the extraction well.

In January 2004, the extraction well was found to be inactive. An inquiry to the LACFCD determined that the well had been shut down on December 31, 2003 and would most likely not be activated in the future. Without the applied stress on the groundwater caused by the extraction well, the measured gradient in

the aquitard during the subsequent several sampling events showed some variations. The depression in the groundwater surface at the extraction well was no longer present. However, the plotted water level data displayed a slight depression in the area of well AW-10 on the northwest side of the South Basin. This area is directly west of the extraction well. This depression had been observed in the past while the extraction well was being serviced. The gradient pattern shifted in to a more easterly direction with a flatter slope. Gradient reversals were also observed during the March and June sampling events in 2005. Here, the gradients were in a westerly direction with a slope of 0.001 foot per foot. The analytical groundwater sample data indicates any gradient reversal had a short duration since the data did not reflect any changes in groundwater chemistry.

After about eighteen months, the groundwater gradient stabilized to a consistent configuration which has remained to the present. This configuration shows a slight difference between the pattern beneath the North, Central, and BCCB basins and that beneath the South Basin. The groundwater beneath the three northern basins flows to the east with a slope of 0.003 foot per foot. At several sampling events a low ridge was observed on the data between the BCCB and South basins. A typical groundwater gradient plot is shown on Figure 4.

The gradient pattern beneath the South Basin is dominated by a depression in the groundwater surface centering at well AW-27. This is located on the east side of the basin. This depression has created an eastward gradient across the South Basin with a slope as high as of 0.015 foot per foot. Over the past few years, a seasonal phenomenon has occurred with the gradient pattern for the South Basin. The gradient at the June and September (summer) sampling events showed the depression in the gradient contours at well AW-27. However, the depression shifts westward to the area of wells AW-10 and AW-43 at the December and March (winter) sampling events. This “winter” depression has the same configuration as that observed when the county extraction well was shut down during maintenance activities. The “winter” depression is shallower than the “summer” depression measured at well AW-27. The analytical groundwater data does not show any changes to the groundwater chemistry related to the shift in the location of the depression.

2. Evaluation Monitoring Program

The DTSC has required Evaluation Monitoring at the Alamitos facility because of the detection of groundwater quality deterioration beneath the retention basins. The following describes the presently installed groundwater monitoring systems at the facility. This includes the number of monitoring wells

at each basin in addition to a description of the well designs. Boring logs for all monitoring wells are contained in Appendix 2.

Forty-five wells are used at the facility as part of the groundwater monitoring system for the four retention basins. Groundwater samples are collected at forty of the wells with the remaining five wells used only for groundwater level measurements. The location of each well is shown on Figure 3. A dedicated, air-driven bladder pump has been installed in each sampling well. Table 1 list the following data for each well: well use, measuring point elevation, well depth, diameter of the casing, perforated interval, and the depth to the pump intake. The lengths are measured from the ground surface.

The site has been in Evaluation Monitoring for several years. The goal of this monitoring is to gather the data necessary to evaluate for closure purposes. Therefore, beginning in the 2010 sampling year, the monitoring well sampling schedule was altered to meet this goal. Table 2 shows the sampling schedule for each station well as to which well will be sampled quarterly, semi-annually, and annually. Attention has been given to monitoring the position of plumes in the groundwater where present. The schedule shows that groundwater samples will be collected at all sampling wells at one quarter each year. Table 2 also shows the division of the monitoring wells by retention basin and designates the background well for each basin.

3. Field Procedures

3.1. Well-Head Inspection

All monitoring wells will be inspected at the beginning of the sampling event. The inspection will record any damage to well protective posts and casing. The sampler will check for any problems with the monitoring well casing conditions and will record the presence of any standing surface water at the well head. If any damage is observed, it is noted on the Daily Report (Appendix 1) and the Edison Project Manager is informed. Repairs will be scheduled and performed within one month.

3.2. Water Level Measurements

At the beginning of each monitoring event, depth to groundwater at each of the nine project monitoring wells will be measured using a Solinst, flat tape, water level indicator (or equivalent). The meter is equipped with a reel-rolled, polypropylene tape graduated to units of 0.01-foot. The terminal probe senses the resistivity change that occurs when the probe breaks the phreatic surface.

When the resistance change is detected, a high-pitched tone sounds and a small red light illuminates. Depth-at-tone is recorded to a surveyed, scribed mark on each wellhead casing, measured to the nearest 0.01-foot.

3.2.1. Water Level Sounder Calibration and Maintenance

On an annual basis, the sounder's graduated tape will be checked for accuracy. The tape will be compared to a steel surveyor's tape to ensure the sounder's tape has not stretched and is yielding accurate depths. If a difference of 0.04-foot in 50 feet is detected, the sounder will be replaced. This calibration will be performed before the first quarter sampling event each year. The calibration will be recorded on the Calibration Log (Appendix 1) for the first quarter sampling event.

The tape will be visually inspected for kinks, breaks, or worn sections during each use. If damage, such as breaks in the tape or exposed wiring, has occurred, the instrument will be repaired or replaced. If the tone or light does not operate when the meter is activated and the self-test button is pressed, the battery will be replaced with a new 9-volt battery. If the self-test button does not function after the battery is replaced, the meter will be returned to the manufacturer for servicing.

3.2.2. Water Level Measurements

Water level measurements will be recorded on the attached Water Level Measurements form. Detailed field procedures are as follows:

1. Record the pertinent header information on the field form, if not already completed;
2. At each well location, record the time of measurement;
3. Remove the protective well cap;
4. Switch-on the Solinst meter and check the tone using the small button on the front of the reel;
 - a. Lower the probe into the well until the tone and light indicates water has been encountered.
 - b. Hold the tape as close as possible to the top of the well casing and record the depth reading from the bottom up (from the nearest foot marker within the well plus the fraction indicated at the top of the well casing).
 - c. Measure twice. Depth-to-water measurements must be within 0.01-foot to satisfy QC requirements.
5. Record the data on the Water Level Measurements form; and,

6. Rinse the Solinst probe, tape, and probe sleeve with deionized water.

3.3. Field Parameter Instrument Calibration

Field equipment to measure groundwater parameters including pH, temperature, electrical conductivity (EC), dissolved oxygen, and turbidity will be required for the monitoring program. Required equipment will be calibrated at the beginning of each sampling event. The calibration frequency depends on the type and stability of equipment, the intended use of the equipment, and manufacturer recommendations. Detailed calibration procedures for field equipment are available from the specific manufacturers' instruction manuals.

Three probes will be connected to two HACH HQd40 portable meters (or equivalent) to measure four field parameters. Proper maintenance, calibration, and operation of the three parameter probes are the responsibility of the sampler. The meters and probes will be maintained, calibrated, and operated according to manufacturer guidelines and recommendations. The operation manual for the meters and probes shall be onsite during all sampling events.

The pH and EC probes will be calibrated daily while in use, per the manufacturer's manual. Temperature is factory calibrated and records indicating factory calibration within the manufacturer recommended specifications will be maintained. All other instrument calibrations will be recorded on a Calibration Log form maintained for each sampling event.

Turbidity measurements will be made with a Hach Model 2100P Portable Turbidity Meter (or equivalent). This meter will measure from 0.01 to 1000 Nephelometric Turbidity Units (NTU) in automatic range mode with automatic decimal point placement. Turbidity measurements are made in the automatic range mode to allow the instrument to use its entire range for the measurement. This mode is recommended by the manufacturer.

3.3.1. Temperature Measurements

The pH and EC probes connected to the HACH portable meter contains a temperature thermister. The temperature input is used by the probes for automatic temperature compensation (ATC) with the measurements. To measure temperature, connect the pH sensor to the meter. Temperature is measured in degrees centigrade and is continuously displayed on the liquid crystal display (LCD) on the Hach meter.

3.3.2. pH Probe

A HACH pH101 gel-filled probe will be calibrated using a 3-point slope with the following ready-to-use commercial buffer solutions: 4, 7, and 10 standard units (SU). These values bracket the anticipated pH value of target groundwater samples. Calibration procedures are described in detail in the Hach

pHC101 manual, a copy of which will be maintained with the field equipment. Calibrations will be performed at the beginning of each sampling day and again if unusual results are detected during a field event. All calibration data and measurements will be recorded on Calibration Logs.

All pH electrodes will deteriorate with age, typically after six months of normal use. Age deterioration is characterized by a slower speed of response. A deteriorating probe will continually drift and the meter will not indicate a stable reading. The meter may also detect a deteriorated probe during the electrode calibration process. This would trigger an error message that the electrode has lost efficiency. To prevent these potential problems, the pH electrode will be replaced annually. The Calibration Log will indicate when a new electrode is being introduced into the system.

3.3.3. Electrical Conductivity Probe

A HACH CDC401 probe will be used to measure temperature-compensated electrical conductivity values. Calibration procedures for the CDC401 probe are described in detail in the Hach manual, a copy of which will be maintained with the field equipment. The manufacturer requires a 1-point calibration using a ready-to-use calibrations standard of 1,000 uS/ cm. Calibrations will be performed at the beginning of each sampling day and again if unusual results are detected during a field event. All calibration data and measurements will be recorded on Calibration Logs.

The single most important requirement of accurate and reproducible results in conductivity measurements is a clean sensor. After use, the sensor will be cleaned in an Alconox solution and rinsed in distilled or deionized water. The electrode will be stored in deionized water.

3.3.4. Luminescent Dissolved Oxygen Probe

A HACH LDO10103 probe will be used to measure dissolved oxygen values. Calibration procedures for the LDO10103 probe are described in detail in the Hach manual, a copy of which will be maintained with the field equipment. The readings are shown in both milligrams per liter and percent saturation.

The meter automatically compensates the readings for temperature.

The altitude and salinity compensation factors are set during the purging process. The altitude compensation is set in increments of 100 meters. Since all of the wells are near sea level, this factor will remain at the default value of 1. The salinity compensation value will be determined from the electrical conductivity probe described in Section 3.2.3 as the purge water. This value will be reset as the purging operation continues.

In order to have accurate and stable measurements, it is necessary that the surface of the membrane be in good condition. If any dirt is observed on the membrane, it will be carefully rinsed with distilled or deionized water. If any imperfections exist or damage is evident, the membrane will be replaced.

3.3.5. Turbidity Measurements

Turbidity measurements will be made with a HACH Model 2100P Portable Turbidity Meter. This meter will measure from 0.01 to 1000 NTU (Nephelometric Turbidity Units) in automatic range mode with automatic decimal point placement. Turbidity measurements are made in the automatic range mode to allow the instrument to use its entire range for the measurement. This mode is recommended by the manufacturer. The procedures for calibration and operation are described in the manual, a copy of which will be maintained with the field equipment.

Calibration of the 2100P is based on formazin, the primary standard for turbidity. The instrument's electronic and optical designs provide long term stability and minimize the need for frequent calibration. As recommended by the manufacturer, the instrument will be calibrated before the quarterly sampling event or every three months. Standard solutions of formazin, supplied by HACH, will be used for a three point calibration. These solutions are prepared in vials ready to be placed in the instrument. The calibration process will be recorded on the Calibration Log at the first quarterly sampling event.

A calibration check will be made at the beginning of each sampling day using the Gelex Secondary Standards supplied with the instrument. Immediately following the formazin calibration, the three secondary standards will be measured in the turbidity meter. The values will be recorded for later comparison. If the daily readings are not within five percent of these established values, the instrument will be recalibrated with the formazin primary standard.

3.4. Groundwater Well Purging

The United States Environmental Protection Agency (EPA) has developed guidance for long term (over 2 years) groundwater monitoring. The guidance is contained in technical document number EPA/540/S-95/504. The EPA recommends that a low-flow, minimal drawdown technique should be used for all purging and sampling operations with a dedicated pump. The goal of the technique is to minimize the well drawdown to less than 0.3 foot by using flow rates of 0.1 to 0.5 liter per minute. This allows the pump to remove a sample from the same discrete horizon each sampling event. They also strongly recommend the use of an in-line, flow-through cell that continuously measures the purge parameters. These parameters indicate when the purge water is stabilized and a sample can be collected. Dedicated sampling pumps have been installed in all project monitoring wells.

The following sections describe the sampling pumps, the flow-through cell used to measure purge parameters, and the criteria used to determine when the purging operation is complete.

3.4.1. Dedicated Pumps

The project wells will be purged using a dedicated, air driven bladder pump, the Solinst Integra Bladder Pump. The Integra pumps are manufactured with 316 stainless steel and have Teflon check balls and a Teflon bladder. The pump body has a diameter of 1.66 inches, is about 2 feet in length, and has a volume of 200 milliliters. Compressed air is supplied to the pump by use of a control unit through tubing. The unit controls the number of drive/vent cycles per minute which regulates the flow rate from the pump. The compressed air is contained in tanks supplied by the laboratory. The design and operation of the pump are shown on the manufacturer's manual, a copy of which will be maintained with the field equipment.

The initial purge rate at all wells will be 0.4 liter per minute. This will be performed by allowing two drive/vent cycles per minute for a volume of 400 milliliters. The rate will be determined using a stop watch and measuring the flow into a graduated cylinder. The depth to water in the well will be monitored every minute for the first four minutes to ensure no drawdown is occurring. If the drawdown is less than 0.3-foot, the purge rate will continue at 0.4 liter per minute. However, the flow rate will be reduced if excessive drawdown is measured. The flow rate will be reduced at increments of 0.1 liter per minute until the drawdown stabilizes. The flow rate and depth to water will be measured every four minutes after the initial four minutes. During the purging operation, the depth to water will be recorded on the Field Parameter form (Appendix 1) every four minutes.

3.4.2. Purge Parameters

Groundwater from the monitoring wells will continue to be purged until five water parameters are determined to be stable. The parameters are temperature, pH, electrical conductivity, dissolved oxygen, and turbidity. Four of the five purge parameters will be measured as the groundwater passes through a flow-through cell. This cell is designed to be used in conjunction with low-flow (less than 1 gallon per minute) pumps. The cell is constructed of a clear acrylic material to allow observation of the purge water. The three sensors that measure four water parameters are inserted into orifices cut into the acrylic material and connected with compression fittings.

As water is pumped from the well through the cell, the system simultaneously measures the four water parameters: temperature, temperature-compensated pH, EC, and dissolved oxygen.

The fifth purge parameter, turbidity, requires the collection of a small sample of purge water from the cell discharge. This sample is placed in a third instrument as described in Section 3.2.5.

Groundwater purging will continue until the five purge parameters have become stable or for a minimum 12 minutes. Parameter readings will be recorded on the Field Parameter form every four minutes until the values are stable. The criteria for determining stability for each parameter are as follows: temperature ($\pm 1^{\circ}\text{C}$), pH (± 0.1 units), EC (± 10 percent), turbidity (± 3 percent), and dissolved oxygen (± 10 percent).

3.4.3. Management of Purge Water

Monitoring well purge water has been completely characterized in accordance with Title 22 hazardous waste characterization regulations. Analytical data of purged water indicates it is not hazardous. As a result, purge water is disposed of via the generating station combined discharge point which is permitted under the NPDES program.

Should future analytical data on well water samples indicate a change in water chemistry, waste characterization will be re-evaluated. If purge water is believed to exhibit any hazardous characteristic, it will be contained in DOT approved 55-gallon drums for offsite disposal. Disposal will be to a permitted hazardous waste treatment, storage, and disposal facility. Any manifests generated by the transportation of purge water to offsite disposal will be attached to the associated monitoring report.

3.5. Groundwater Sampling and Preservation

3.5.1. Flow Rate

Collection of groundwater samples will occur immediately after the completion of the purging operation. The flow rate used during the purging operation will continue to be utilized while the samples are collected.

3.5.2. Constituents of Concern

The quarterly groundwater samples collected will be analyzed for the Constituents of Concern contained on Table 2. The regulations require that the monitoring points affected by a release be analyzed for all constituents contained in Appendix IX to Title 22 Chapter 14 on an annual basis to determine whether additional hazardous constituents are present. This complete list of constituents has been analyzed for twelve years on an annual basis. The annual Appendix IX analyses have only detected one additional constituent, the Semi-Volatile Organic Compound (SVOC) 1,4-dioxane. In 2013, the DTSC approved a petition to discontinue the sampling for the remainder of compounds on the Appendix IX list.

3.5.3. Sample Containers

The required sample containers for specific analysis are listed on Table 3. The table also presents the required preservation and maximum holding time period. Care will be taken not to allow the sample container to contact the discharge hose at any time. Once opened, a sample container must be promptly used for storage of a particular sample. Unused but open containers are to be considered contaminated and will be discarded. Because of the potential for introduction of contamination, they cannot be re-closed and saved for later use. Likewise, any unused containers that appear contaminated upon receipt will be discarded. The following specific guidelines for filling water sample containers will be used. The analyses to be performed on the samples will be specified by Edison on the chain of custody form to the laboratory.

Samples for the general mineral analysis are collected in liter and half-pint polyethylene containers. Water samples for total metal analysis are collected in pint polyethylene containers and are preserved with nitric acid in the laboratory upon delivery. Samples for VOCs are collected in three, amber, 40 milliliter vials equipped with Teflon backed septum screw caps. The vials will be supplied by the laboratory preserved with HCl. The VOC samples will have no headspace or bubbles. The sample to be analyzed for the semi-volatile compound, 1,4-dioxane, will be collected in a quart, amber, glass container.

3.5.4. Order of Sampling

To prevent the loss of any VOC, the sample containers will be filled in the following order:

1. 40 milliliter amber vials for volatile organic compounds
2. Quart, amber glass containers for semi-volatile compounds
3. Quart, plastic container for total metal analysis
4. Half pint and liter, plastic containers for the general mineral parameters

3.5.5. Health and Safety

The sampler will maintain a safe work area during the sampling procedures. All equipment and materials will be arranged to prevent accidents. Safety glasses and disposable latex gloves will be worn by the sampler during sample collection.

3.5.6. Labeling and Handling

Table 3 summarizes container types and container preparation for the constituents of concern. Sample container preparation and sample transport are the responsibility of the Professional Geologist (Geologist) performing the

sampling. The Geologist is also responsible for correct sample collection and sample handling, i.e., labeling, packaging, storage prior to the transport to the laboratory, and custody procedures.

The following procedure will be used for all sample handling, packaging, and shipping activities:

1. The Geologist will read and fully understand the monitoring requirements in Section 3.5 to insure that the correct analyses are identified for the laboratory and that sufficient sample containers, properly prepared and in sufficient numbers, are available.
2. An ice chest containing wet ice will be on site before sampling begins. Ice will be added to the ice chests containing samples as needed. Water from melted ice must be drained from the ice chest frequently.
3. Collect samples in appropriate containers: see Table 3.
4. Print clearly in waterproof ink on the sample labels the sample identification data and the preservative, if any, that has been added to each container. Information entered on each label will include the following:
 - Sample identification number
 - Project location (station name)
 - Date
 - Time (military format)
 - Preservatives added, if any
 - Analysis required
 - Any special instructions or remarks/pertinent observations
 - Initials of sampler

3.6. QA/QC Samples

The groundwater sampling QA/QC methods will be implemented by the use of duplicate samples and various types of blanks. Each method is described below.

3.6.1. Trip Blank

A trip blank is a 40 milliliter vial filled by the analytical laboratory with reagent grade deionized water. The trip blank is intended to check for VOC contamination from the following different sources: sample containers provided, ASTM Type II reagent grade water (DI Water) being supplied by the laboratory,

handling and transit of sample containers or introduced by the laboratory once the samples arrive at the facility. The vial is not opened by the field personnel.

Trip blanks will not be labeled as such. They will be assigned an identification number that will not identify the trip blank as a QA sample.

All of the VOC sample vials from a sampling day will be placed in a common ice chest. The trip blank will be placed in the ice chest with the daily VOC samples. The trip blank will be analyzed for VOC (EPA 8260B) content each day.

3.6.2. Field Blank

Field Blanks are prepared by pouring deionized water, supplied by the laboratory, into a clean 40 milliliter vial while collecting groundwater samples from the monitoring wells. Field blanks provide similar information as the trip blanks, but also added information regarding potential sources of contamination such as exhaust or other ambient condition.

Two field blanks will be filled during the sampling day. These will be prepared at two different locations at the station. Field blanks will not be labeled as such. They will be assigned an identification number that will not identify them as a QA sample. The two blanks will be placed in the ice chest with the daily VOC samples and the trip blank. They will be analyzed for VOC parameters (EPA 8260B).

3.6.3. Duplicate Samples

Duplicate samples will be collected in the same manner as the routine groundwater samples in the same type of containers. This procedure will involve the collection of a second, distinct, sample set immediately after the routine groundwater sample is collected. Duplicate samples will be prepared, preserved, handled, stored, and transported to the laboratory according to procedures used for groundwater samples. Duplicate samples will not be labeled as such. They will be assigned an identification number on the Field Parameter form that will not identify the sample as a field duplicate sample. The laboratory shall not be informed which sample is a duplicate.

One duplicate sample will be collected each sampling day. The sample will be analyzed for the complete Constituent of Concern list as the other groundwater samples.

3.7. Sample Custody, Shipment, and Documentation

3.7.1. Chain of Custody

Sample identification documents must be carefully prepared so that Chain of Custody can be maintained and sample disposition can be controlled. Samples collected during a sampling event must be traceable from the time the samples

are collected until the derived data are used in the final report. The identification document is the Chain of Custody form.

The Geologist is personally responsible for the care and custody of the samples collected until they are properly transferred to the laboratory. The Geologist must complete the adhesive sample labels, described in the Section 3.5.6, and secure them to the sample containers. Labels are completed in waterproof ink. The information on these labels will correspond to the Chain of Custody form that shows the number of containers per sample set and the contents of the sample containers. The original record will accompany the sample shipping container, ice chests, during transport.

During most sampling days, the groundwater samples will be transported to the laboratory by the Geologist, within 12 hours of collecting the samples. When transferring samples, the individuals relinquishing and receiving will sign, date, and record the time on the Chain of Custody form. This record documents sample custody transfer from the Geologist to the laboratory custodian.

A designated laboratory custodian accepts custody of the transported samples and verifies that the information on the Sample Identification Number matches that on the Chain of Custody records. Pertinent information such as time, date, and sample condition are entered on the record.

The laboratory custodian uses the Sample Identification Number and assigns a unique laboratory number to each sample and insures that all containers of that sample are transferred to the proper analyst or stored in the appropriate secure area. Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted, no longer suitable for analysis, or otherwise directed by Edison.

When sample analyses have been completed, the unused portion of the sample must be disposed of properly. The laboratory retains all identifying tags, data sheets, and laboratory records as part of the permanent documentation and appropriately disposes of sample containers and remaining sample material.

3.7.2. Documentation

The Geologist will assign and maintain identification numbers for all sampling and complete all appropriate field data forms which include: Chain of Custody, Water Level Measurements, Calibration Log, Field Parameters, and Daily Report forms. These activities will provide a daily log of significant events, observations, and measurements taken during the sampling day. The Geologist will be familiar with the required documentation before any field work is initiated. An example of the field forms is provided in Appendix 1. These documents contain information such as personnel present, site conditions, sampling procedures, measurement procedures, calibration records, and data.

During a sampling event, the Daily Report will be initially dated and signed by the Geologist. Information will be added to this form throughout the sampling day. The first phase of an event is to obtain water level data and inspect well head integrity. This data is placed on the Water Level Measurements form and Daily Report. Calibration operations of field equipment are documented on the Calibration Log. A Field Parameters form will be generated for each well that is sampled and contains all data pertinent to that well. This includes transferring the water level data. All field measurements will be recorded on the appropriate form. The field forms will be signed and dated by the Geologist. A copy of all forms generated during a sampling event will be included in either the quarterly or annual groundwater monitoring reports submitted to DTSC.

4. Analytical Laboratory

4.1. Project Laboratories

All analyses of the groundwater samples will be performed by Weck Laboratories, Inc. located in the City of Industry. Weck Laboratories has been performing all analytical testing for the Closure Project since inception. They are certified by the State of California to perform all of the chemistry tests required for the project.

4.2. Analyses Performed

The laboratory will perform the following analyses on the collected groundwater samples at each quarterly event.

- SM 2540C – total dissolved solids
- EPA 9045C – pH
- EPA 200.8 – metals by ICP
- EPA 300.0 – Chloride
- EPA 8260B – volatile organic compounds
- EPA 8270M – 1,4-dioxane

Table 3 lists each parameter, the associated EPA test method, and the practical quantitation limit (PQL) for each. The PQL values used by the laboratory are equal to or less than the PQL values given in Title 22 and the Detection Level for Reporting (DLR) for the State of California Department of Health Services.

4.3. Laboratory QA/QC

The Weck Laboratories Quality Assurance Program can be reviewed on their web page at www.wecklabs.com. The program is design to continually

monitor the reliability of test results, ensure that analytical results are within acceptable limits, and provide guidelines for the implementation of corrective action when necessary. The manual is based on the standards developed by the National Environmental Laboratory Accreditation Conference and any applicable state or EPA regulations or requirements.

The program describes several QC testing controls that are used in the laboratory. Matrix Spikes (MS) will be performed at a frequency of one in twenty samples per matrix type per sample extracted or preparation method. An exception is for analytes for which spiking solutions are not available such as total dissolved solids and pH. Matrix Spike Duplicates (MSDs) will be analyzed at a minimum of one in twenty samples per matrix type per sample extracted or preparation method. Surrogate compounds are added to all samples, standards, and blanks, for all organic chromatography methods except when the matrix precludes its use or when a surrogate is not available. Method Blanks will be performed at a frequency of one per batch of samples per matrix type per samples extraction of preparation method.

4.4. Laboratory Narratives

When the groundwater samples are received by the laboratory custodian, he will describe the conditions of the samples and ice chests by completing the section of the Chain of Custody form titled “Sample Conditions” (see Appendix 1 for example). The temperature of each ice chest will be entered in this section.

5. Reporting

5.1. Quarterly Groundwater Monitoring Reports

Sampling reports for the first (March), second (June), and third (September) quarterly events will be submitted to the DTSC within 60 days of the completion of the sampling event. The fourth quarter event (December) will be included in the Annual Report described in Section 5.2. The report will have a professional format and will be prepared, stamped, and signed by a California Professional Geologist

At a minimum, the report will contain the following information.

1. The report will identify the sampling event was for the purpose of either Detection or Evaluation Monitoring for waste water retention basins and describe any significant findings.
2. The report will reference this Sampling and Analysis Plan (SAP), describe and explain any deviations from the SAP, describe the corrective actions to avoid the deviations from reoccurring, and describe any recent changes to the monitoring program allowed by the SAP and approved by DTSC.

3. The report will contain a narrative summarizing and interpreting the results of the monitoring event, including the following:
 - Analysis of water level data and presentation of potentiometric maps, including a determination of groundwater flow rate and direction below the basins.
 - A report on the results of quality assurance/quality control sampling and analysis.
 - Summary of results presented in tables on the water chemistry and water level data. The analytical data tables will include all data from the project inception in 1996 for comparison.
 - Isoconcentration plots will be prepared for specific constituents of concern.
 - Copies of laboratory reports and quality control package.
4. The report will contain all field forms generated during the sampling event to document all activities which occurred.
5. The report will include a section which will track any outstanding issues such as repairs or maintenance items and will be reported until the issue is resolved.

5.2. Annual Groundwater Monitoring Report

By March 1 of each year, an annual report will be submitted to the DTSC that describes the activities of the previous sampling year. Because of the timing, the data derived from the fourth quarterly sampling event will be incorporated in the Annual Report. The annual report will have a professional format and will be prepared, stamped, and signed by a California Professional Geologist.

At a minimum, the report will contain all discussion presented for the quarterly report described above with the following added information.

1. The report will contain an executive summary of all groundwater data collected during the years sampling events. All significant findings will be discussed.
2. The report will contain comprehensive analytical tables of all data related to water quality monitoring beneath the basins.
3. The report will contain a narrative summarizing and interpreting the results of the water quality monitoring program to date. This will include a complete discussion of the groundwater gradient, the time-series plots, and isoconcentration plots of specific constituent of concern.

4. Time-series plots of laboratory analytical data will be presented in the report. The following format will be used for the time-series graphs:
 - Every monitoring parameter or constituent of concern will be shown on a separate graph with the data from as many wells as can be legibly displayed. As much data as possible will be included on each graph.
 - When plotting concentration data for multiple wells, it is expected that much of the data will over plot for values near the mean of the data set. To assist in the interpretation, each well will be given a different symbol and color.
 - If more than one graph is required for each parameter then:
 - to facilitate comparison between upgradient and downgradient data, each graph will show data from the background monitoring points;
 - downgradient wells will be grouped by location or by other significant characteristics; and
 - all graphs for a parameter will be at the same scale.
5. Isoconcentration plots will be presented for all detected plumes.

Description of Monitoring Wells Alamitos Generating Station

Table 1

Well No.	Northing	Easting	Elevation Top of Casing (feet)	Well Depth (feet)	Well Diameter (inches)	Perforated Interval (feet)	Depth to Pump Intake (feet) (Measured from top of casing)	Well Use
AW-1	-741.625	1395.322	12.79	25	4	10-25	24	Water Level -- Sampling
AW-2	-820.089	1312.825	13.33	35	2	20-35	32	Water Level -- Sampling
AW-3	-824.918	1368.482	13.78	30	2	20-30	24	Water Level -- Sampling
AW-4	-57.544	1364.332	13.47	25	4	5-25	18	Water Level -- Sampling
AW-5	-297.556	1251.897	13.54	25	4	10-25	24	Water Level -- Sampling
AW-6	-250.643	1366.286	13.44	25	4	10-25	20	Water Level -- Sampling
AW-7	-364.666	1151.218	13.81	24	4	9-24	20	Water Level -- Sampling
AW-8	-574.609	1369.19	13.50	25	4	10-25	24	Water Level -- Sampling
AW-9	-586.294	1273.37	13.22	25	4	10-25	24	Water Level -- Sampling
AW-10	-1088.06	1225.507	12.79	30	4	15-30	20	Water Level -- Sampling
AW-11	-1068.064	1395.698	12.25	30	4	15-30	27	Water Level -- Sampling
AW-12	-1298.525	1395.997	11.49	30	4	15-30	27	Water Level -- Sampling
AW-13	83.187	1048.851	14.16	25	4	5-25		Water Level
AW-14	83.95	850.784	14.02	25	4	5-25		Water Level
AW-15	-1757.131	1052.98	13.51	25	4	5-25		Water Level
AW-16	-228.992	1389.865	13.31	24	4	9-24	20	Water Level -- Sampling
AW-17	-299.088	1388.591	12.98	24	4	9-24	23	Water Level -- Sampling
AW-18	-301.162	1321.471	13.29	24	4	9-24	20	Water Level -- Sampling
AW-19	-329.732	1295.547	13.45	24	4	9-24	23	Water Level -- Sampling
AW-20	-442.371	1368.449	12.34	24	4	9-24	20	Water Level -- Sampling
AW-21	-502.366	1368.435	12.70	24	4	9-24	20	Water Level -- Sampling
AW-22	-607.312	1395.787	12.67	24	4	9-24	24	Water Level -- Sampling
AW-23	-681.49	1239.961	17.22	28	4	13-28	23	Water Level -- Sampling

Description of Monitoring Wells Alamitos Generating Station

Table 1

Well No.	Northing	Easting	Elevation Top of Casing (feet)	Well Depth (feet)	Well Diameter (inches)	Perforated Interval (feet)	Depth to Pump Intake (feet) (Measured from top of casing)	Well Use
AW-24	-682.349	1328.215	17.14	28	4	13-28	27	Water Level -- Sampling
AW-25	-868.053	1367.239	13.44	24	4	9-24	20	Water Level -- Sampling
AW-26	-1000.127	1384.037	12.18	24	4	9-24	23	Water Level -- Sampling
AW-27	-1132.335	1395.711	11.88	24	4	9-24	24	Water Level -- Sampling
AW-28	-284.173	1400.246	13.29	24	4	9-24	23	Water Level -- Sampling
AW-29	-328.852	1400.728	13.26	24	4	9-24	23	Water Level -- Sampling
AW-30	-378.297	1356.209	12.90	24	4	9-24	23	Water Level -- Sampling
AW-31	-414.769	1385.013	12.77	24	4	9-24	23	Water Level -- Sampling
AW-32	-464.173	1395.461	12.52	24	4	9-24	23	Water Level -- Sampling
AW-33	-494.863	1393.605	12.31	24	4	9-24	23	Water Level -- Sampling
AW-34	-527.645	1387.909	12.36	24	4	9-24	23	Water Level -- Sampling
AW-35	-827.949	1396.295	12.13	24	4	9-24	23	Water Level -- Sampling
AW-36	-895.896	1396.891	11.77	24	4	9-24	23	Water Level -- Sampling
AW-37	-944.574	1371.772	10.79	24	4	9-24	23	Water Level -- Sampling
AW-38	-1008.474	1398.758	10.43	24	4	9-24	23	Water Level -- Sampling
AW-39	-1418.37	1270.099	13.08	24	4	9-24	23	Water Level -- Sampling
AW-40	1151.55	-161.01	11.96	30	4	15-30	22	Water Level -- Sampling
AW-41	1135.47	-568.99	11.34	29	4	15-29	22	Water Level -- Sampling
AW-42	1223.33	-766.71	11.35	33	4	12-27	27	Water Level -- Sampling
AW-43	1267.14	-922.74	11.57	26	4	16-26	20	Water Level -- Sampling
503X	-637.854	841.635	9.86	98	2	16-94		Water Level
503Y	-989.15	1440.098	20.64	86	2	50-80		Water Level

Monitoring Well Sampling Schedule Alamitos Generating Station

Table 2

Well No.	March	June	September	December
North Basin				
AW-40 (background)	X	X	X	X
AW-4			X	
AW-5			X	
AW-6	X	X	X	X
AW-16			X	
AW-17	X	X	X	X
AW-18	X	X	X	X
AW-19	X		X	
AW-28			X	
AW-29			X	
AW-30	X	X	X	X
Central Basin				
AW-7 (background)	X	X	X	X
AW-8			X	
AW-9	X	X	X	X
AW-20	X	X	X	X
AW-21	X	X	X	X
AW-22			X	
AW-31			X	
AW-32	X		X	
AW-33			X	
AW-34	X	X	X	X
BCCB				
AW-41 (background)	X	X	X	X
AW-42 (background)	X		X	
AW-1	X	X	X	X
AW-2	X		X	
AW-3	X	X	X	X
AW-23	X	X	X	X
AW-24			X	
AW-25	X	X	X	X
AW-35			X	
AW-36	X	X	X	X
AW-37	X	X	X	X
AW-43	X		X	
South Basin				
AW-10 (background)	X	X	X	X
AW-11	X	X	X	X
AW-12	X	X	X	X
AW-26			X	
AW-27	X	X	X	X
AW-38			X	
AW-39	X	X	X	X

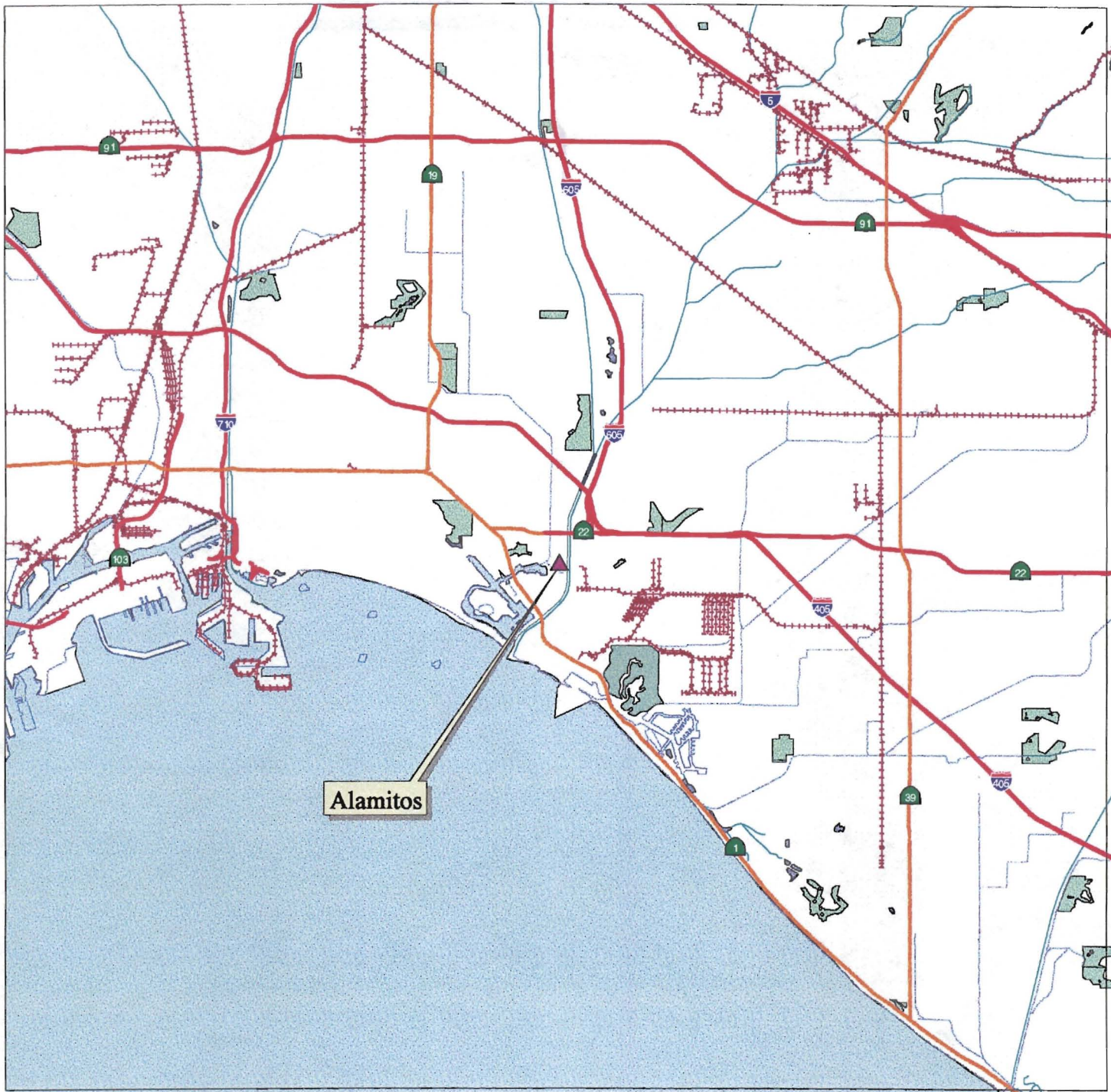
Table 3

**Constituents of Concern
Alamitos Generating Station
Evaluation Monitoring**

Monitoring Parameter	EPA Method	Practical Quantitation Limit
General Mineral		
pH	EPA 9045C	Units
TDS	SM2540C	10 mg/l
Chloride	EPA 300.0	0.5 mg/l
Metals		
Antimony	EPA 200.8	2.5 ug/l
Arsenic	EPA 200.8	2 ug/l
Barium	EPA 200.8	2.5 ug/l
Beryllium	EPA 200.8	0.5 ug/l
Cadmium	EPA 200.8	0.5 ug/l
Total Chromium	EPA 200.8	1 ug/l
Cobalt	EPA 200.8	0.5 ug/l
Copper	EPA 200.8	2.5 ug/l
Lead	EPA 200.8	1 ug/l
Molybdenum	EPA 200.8	0.5 ug/l
Nickel	EPA 200.8	4 ug/l
Selenium	EPA 200.8	2 ug/l
Silver	EPA 200.8	1 ug/l
Thallium	EPA 200.8	1 ug/l
Vanadium	EPA 200.8	2.5 ug/l
Zinc	EPA 200.8	10 ug/l
Volatile Organic Compounds		
	EPA 8260B	Varies
Semi-Volatile Organic Compounds		
1,4-dioxane	EPA 8270M	0.5 ug/l

Table 4**Sample Containers, Preservatives, and Holding Time Requirements**

Analysis	Sample Size	Container Type	Preservative	Maximum Holding Time
pH and TDS	250 ml	Plastic	Cool, 4 degrees C	4 hours
General Mineral	1 liter	Plastic	Cool, 4 degrees C	24 hours
Volatile Organic Compounds	3 - 40 ml vials	Amber Glass	Cool, 4 degrees C, HCl	14 days
Semi-Volatile Organic Compounds	1 liter	Amber Glass	Cool, 4 degrees C	7 days
Metals	250 ml	Plastic	Cool, 4 degrees C, HNO ₃	6 months



Target Property

Target Property: Alamosa Generation Facility

Source: Thomas Bros. Street Data

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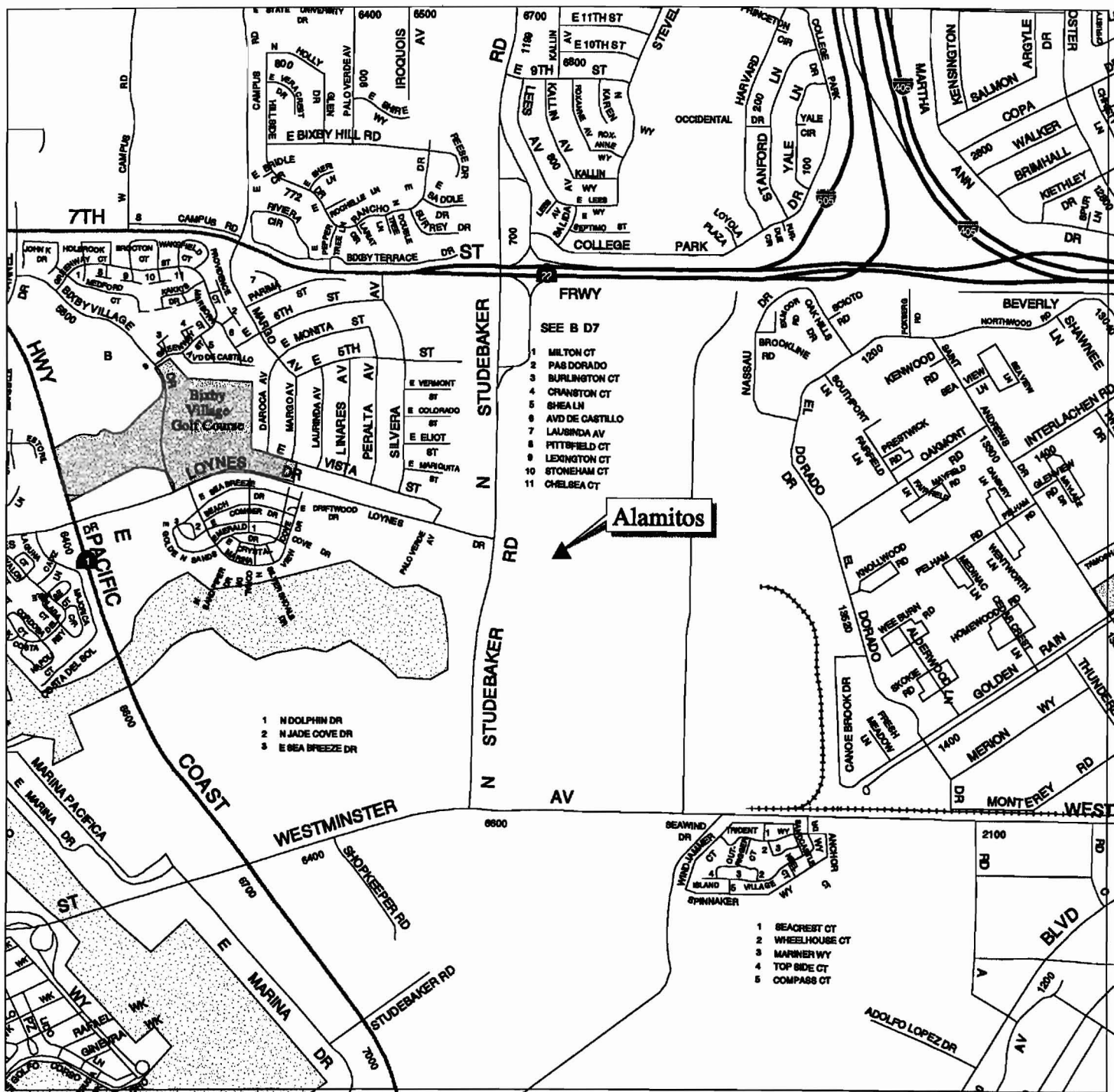
Thomas Bros. Maps®

Map Number:	gs010823404
Issued For:	D. Chupa
Projection:	Nad83/UTM/Zone 11
Approved By:	D. Chupa
Checked By:	D. Chupa/Jim Schaeffe
Project Lead:	Pat Turner
Supervisor:	Greta Bellis
Created By:	Jim Schaeffe
Date:	11/07/01

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FIGURE 1



0.4 0 0.4 0.8 1.2 Miles

▲ Target Property

Target Property: Alamitos Generation Facility

Source: Thomas Bros. Street Data

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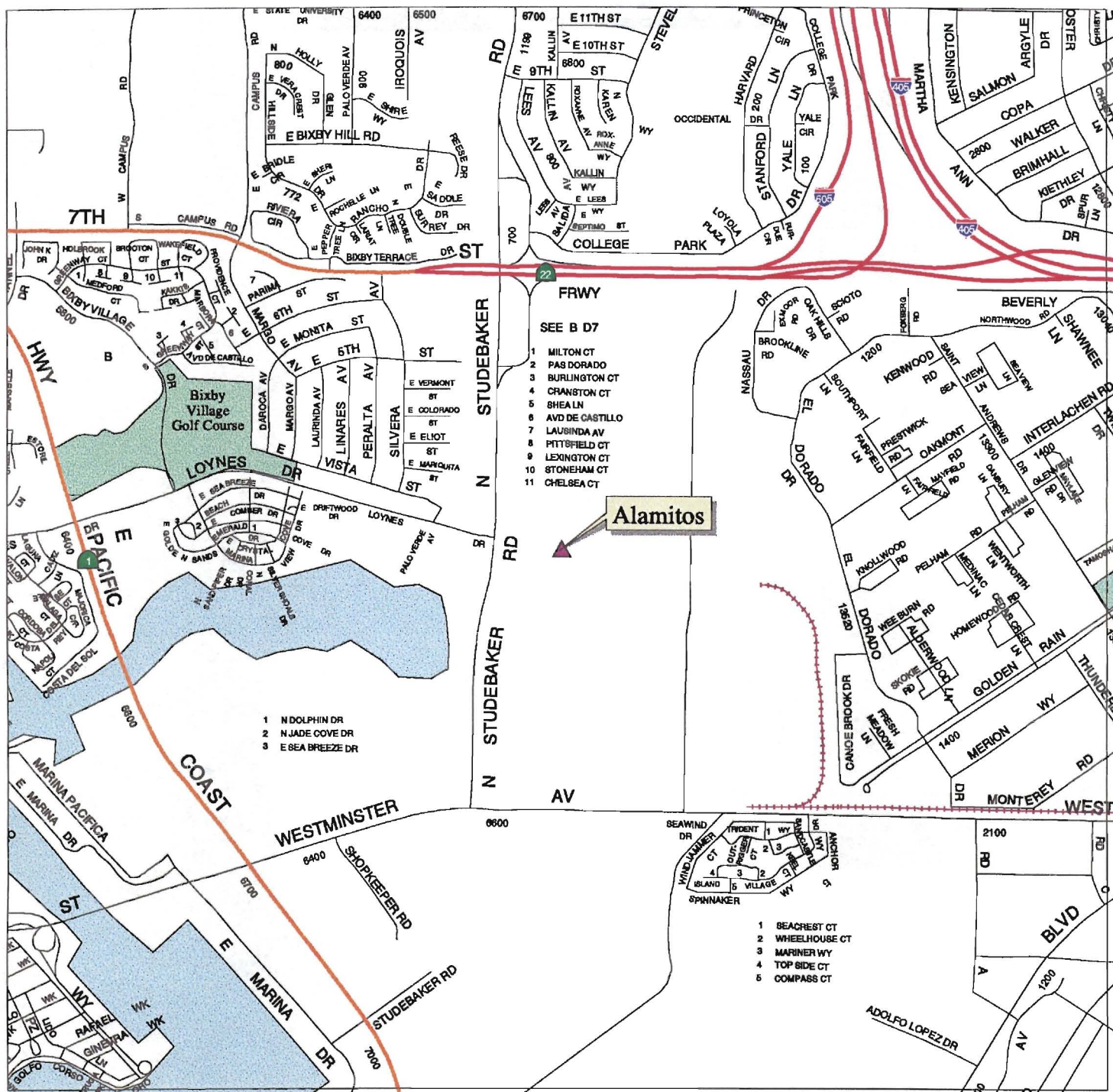
Thomas Bros. Maps

Map Number:	g010823404
Issued For:	D. Chupe
Projection:	Nad83/UTM/Zone 11
Approved By:	D. Chupe
Checked By:	D. Chupe/Jim Schaeffe
Project Lead:	Pat Turner
Supervisor:	Greta Bellis
Created By:	Jim Schaeffe
Date:	11/07/01

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FIGURE 2



0.4 0 0.4 0.8 1.2 Miles



Target Property

Target Property: Alamitos Generation Facility

Source: Thomas Bros. Street Data

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FIGURE 2

Location of Groundwater Monitoring Wells
Alamitos Generating Station

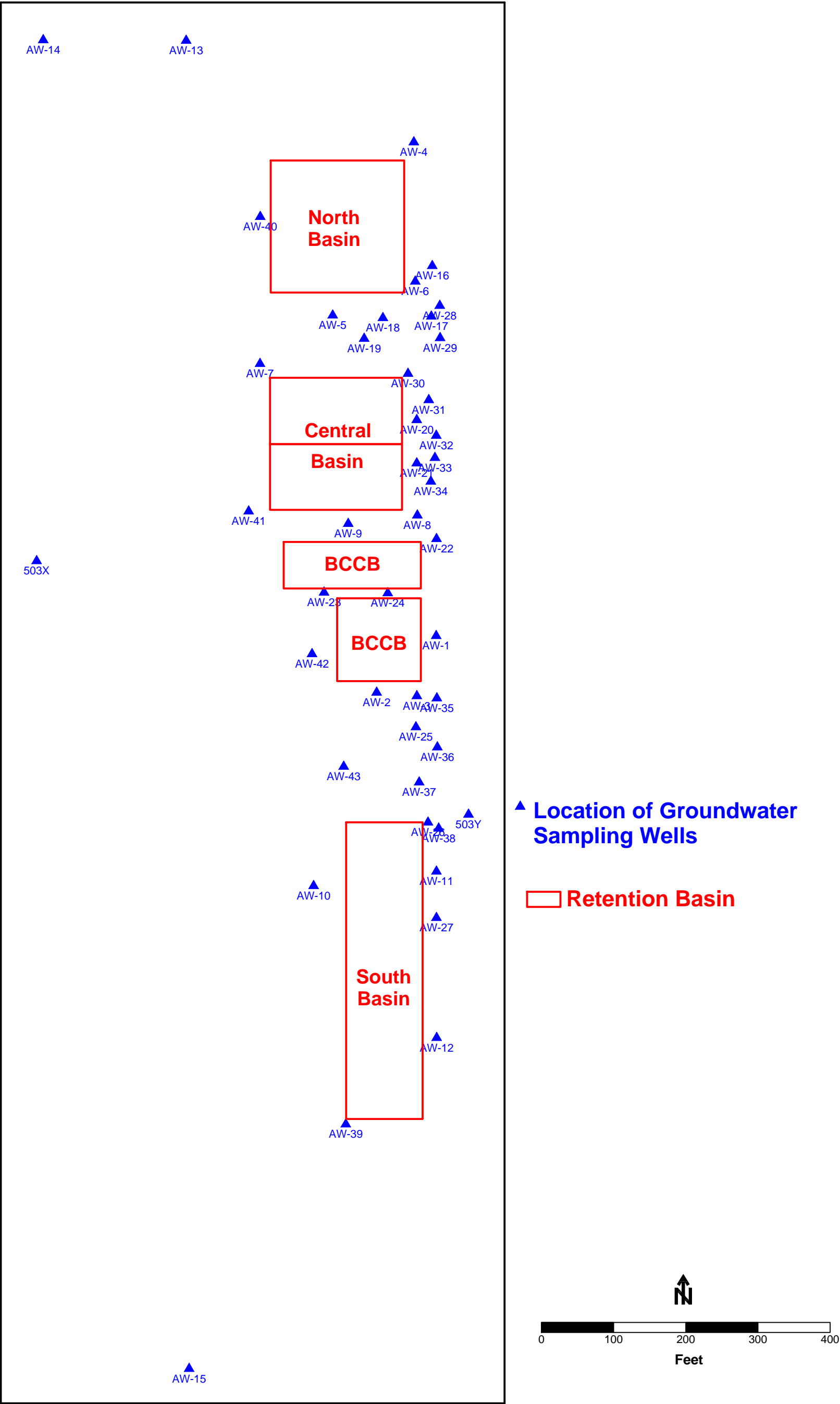


Figure 3

Groundwater Gradient -- 9/4/12
Alamitos Generating Station

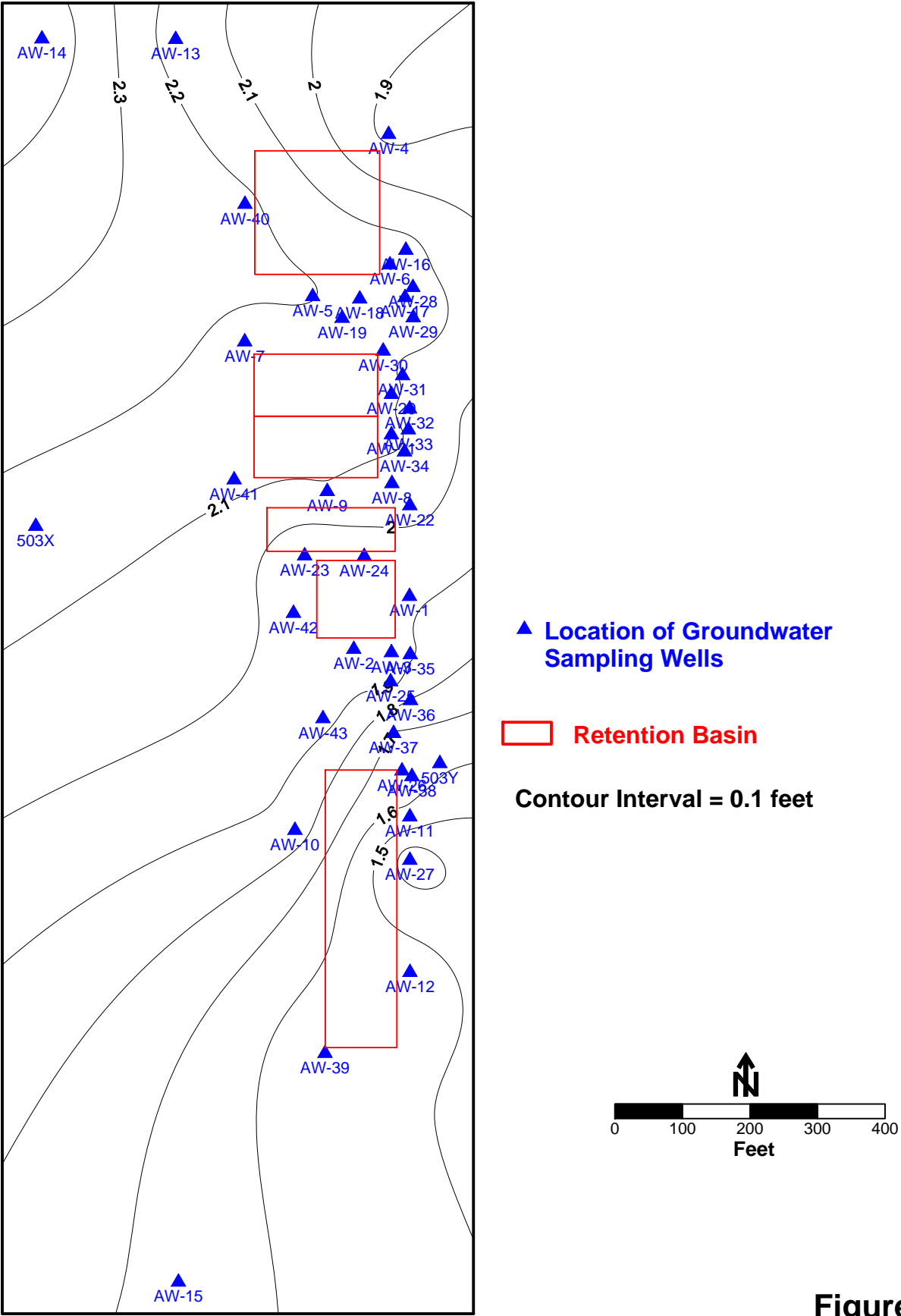


Figure 4

Appendix 1: Field Forms

Daily Report

Water Level Measurements

Calibration Log

Field Parameters

Chain of Custody

Daily Report

Date: _____

I have read and completely understand the approved procedures in the SAP.

Weather: _____

Equipment Used: _____

Visitors: _____

☐

Completed Water Level Measurements

Well Head Integrity: _____

Sampling Completed

Well No.	Time	Well No.	Time	Well No.	Time	Well No.	Time	Well No.	Time

Special Conditions/Problems: _____

Required Maintenance: _____

I have completed the sampling event using the approved procedures described in the SAP.

Water Level Measurements

Page 1 of 3

Date: _____

Project: Alamitos Generating Station

Performed by: _____

Measuring Device: Solinst

Well No.	Time	Measuring Point Elevation	Depth of Water	Depth to Bottom
AW-14		14.02 feet		25 feet
AW-13		14.16 feet		25 feet
AW-4		13.47 feet		25 feet
AW-16		13.31 feet		24 feet
AW-6		13.44 feet		25 feet
AW-7		13.81 feet		24 feet
AW-5		13.54 feet		24 feet
AW-19		13.45 feet		25 feet
AW-18		13.29 feet		24 feet
AW-29		13.26 feet		25 feet
AW-17		12.98 feet		24 feet
AW-28		13.29 feet		25 feet
AW-30		12.90 feet		25 feet
503Y		20.64 feet		86 feet
AW-31		12.77 feet		25 feet
AW-20		12.34 feet		24 feet
AW-32		12.52 feet		25 feet

Comments: _____

Water Level Measurements

Page 2 of 3

Date: _____

Project: Alamitos Generating Station

Performed by: _____

Measuring Device: Solinst

Well No.	Time	Measuring Point Elevation	Depth of Water	Depth to Bottom
AW-33		12.31 feet		24 feet
AW-21		12.70 feet		24 feet
AW-34		12.36 feet		25 feet
AW-9		13.22 feet		25 feet
AW-8		13.50 feet		24 feet
AW-22		12.67 feet		25 feet
AW-1		12.79 feet		25 feet
AW-35		12.13 feet		25 feet
AW-36		11.77 feet		25 feet
AW-38		10.43 feet		25 feet
AW-11		12.55 feet		30 feet
AW-27		11.88 feet		24 feet
AW-12		11.49 feet		30 feet
AW-15		13.51 feet		25 feet
AW-39		13.08 feet		25 feet
AW-10		12.79 feet		30 feet
AW-26		12.18 feet		24 feet

Comments: _____

Water Level Measurements

Page 3 of 3

Date: _____

Project: Alamitos Generating Station

Performed by: _____

Measuring Device: Solinst

Well No.	Time	Measuring Point Elevation	Depth of Water	Depth to Bottom
AW-37		10.79 feet		24 feet
AW-25		13.44 feet		24 feet
AW-3		13.78 feet		30 feet
AW-2		13.33 feet		35 feet
AW-23		17.22 feet		28 feet
AW-24		17.14 feet		28 feet
503X		9.86 feet		98 feet
AW-43		11.57 feet		26 feet
AW-42		11.35 feet		33 feet
AW-41		11.34 feet		29 feet
AW-40		11.96 feet		30 feet

Comments: _____

This task was completed using procedures described in the SAP. _____

(Signature)

Field Parameters

Well No.:

Date: _____

Time: _____

Samples Collected By: _____

Field Conditions/Notes: _____

☐

All Sampling Equipment has been Decontaminated

Well Condition: _____

Parameters Sampled For: _____

Sample appearance (Color, Smell, etc): _____

Depth to Water: _____

Depth to Bottom: _____

Casing Size: _____

Method of Purge: **Bladder Pump**

Purge Rate: _____ Volume Purged: _____

Sampling Rate: _____

Sampling Method: **Bladder Pump**

Purge Data

Time	Temp	pH	EC	Turb.	DTW	D.O.

Filtered (Y/N): _____

If Yes Specify Method: _____

Preservatives (Y/N): **Y**

If Yes Specify: **HCl**

QA/QC Sample Taken (Y/N): _____

If Yes Specify: _____

Sample No.:

Name of Analytical Laboratory: _____

This task was completed using procedures described in the Project SAP.

Appendix 2: Monitoring Well Boring Logs

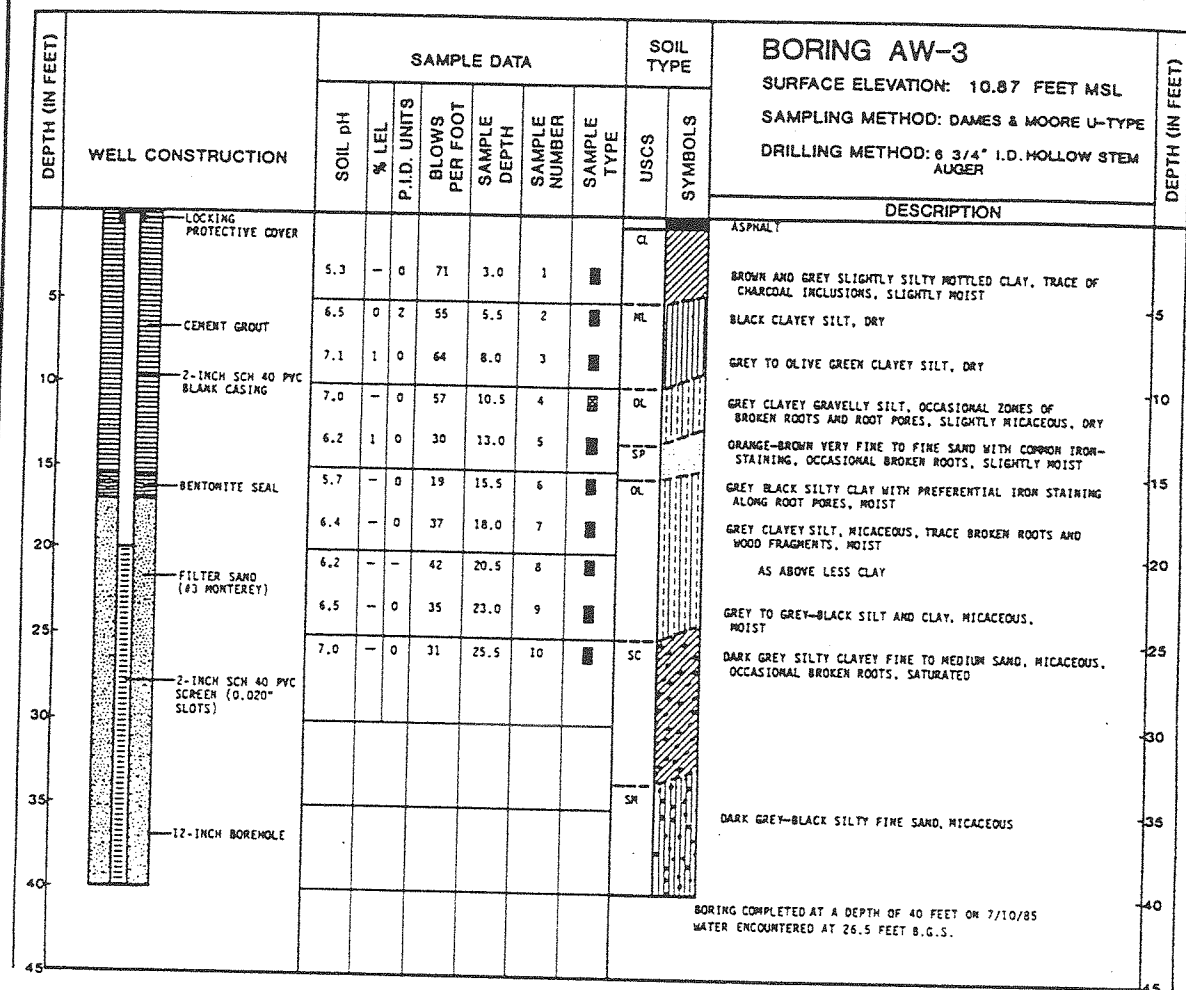


Client: Alamitos Generating Station				Boring/Well: AW-1			
Project: Groundwater Quality Monitoring Program				Well Construction Data			
Date Started: DEC 14 95		Date Completed: DEC 14 95		Screen: 0.02-inch slot		From: 10 To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 8 To: 30	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite		From: 6 To: 8	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 6	
Boring Depth (feet)/ Diameter: 30.0 / 10-inch		Measuring Point Elevation (feet): 12.28		Casing Size: 4-inch PVC			
Initial GW Level (feet): 14.50		GW Level (feet): 16.02		Time/Date: 0652 5/31/96		Protective Casing: 10-inch sch. 80 PVC	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, gravel			0	
5	5 12 18					5	Cement Seal
	7 15 24						
5	3 7 13		<u>Sandy Silt</u> , tan-brown mottled, dry, fine grained pH = 9.67			5	4" PVC blank casing
	7 10 15		pH = 9.44				Bentonite Seal
	2 5 8		<u>Sand</u> , tan, dry, fine grained pH = 8.32				
10	3 8 14		pH = 7.63			10	
	5 11 13		<u>Clayey Silt</u> , grey, moist, roots pH = 7.53				Lone Star #3 Gravel Pack, calculated and used 10 cu.ft.
	3 6 9		<u>Sand</u> , grey, saturated, medium grained pH = 7.03				Method of placement: slowly poured as augers were removed
15	3 5 9		pH = 7.48			15	
Continued Next Page							

Project: Groundwater Quality Monitoring Program					Boring/Well: AW-1		
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silty Clay</u> , dark grey, wet, plastic				
	4 8 12		pH = 7.59				
	2 5 9		pH = 7.53				
	7 14 19		pH = 7.47				4" PVC screen casing
20						20	
	6 11 16		pH = 7.61				
	5 11 16		pH = 7.58				
	3 5 9		<u>Sand</u> , grey, saturated, medium grained Saturated sand began to enter the augers as the center bit was being removed				
25						25	Bottom Cap
			<u>Silty Clay</u> , grey, wet, plastic				
30			Total Depth of Drill Hole = 30 feet			30	
35						35	

DEPTH (IN FEET)	WELL CONSTRUCTION	SAMPLE DATA							SOIL TYPE		DEPTH (IN FEET)
		SOIL pH	% LEL	P.I.D. UNITS	BLOWS PER FOOT	SAMPLE DEPTH	SAMPLE NUMBER	SAMPLE TYPE	USCS	SYMBOLS	
	LOCKING PROTECTIVE CAP										
5	CEMENT GROUT	5.7	2	5	43	3.0	1		OL	ASPHALT	
	2" SCH 40 PWC BLANK CASING	6.1	1	100	40	5.5	2		SC	GREY GREEN MOTTLED CLAY WITH TRACE SILT AND BLACK CHARCOAL INCLUSIONS, SLIGHTLY MOIST	5
10		7.2	1	35	21	8.0	3			GREY GREEN SILTY CLAYEY VERY FINE TO FINE SAND WITH COMMON MICA FLAKES AND CHARCOAL INCLUSIONS, MICACEOUS, SLIGHT HYDROCARBON ODOOR	
	BENTONITE SEAL	7.5	35	60	19	10.5	4		ML	GREY VERY FINE SAND AND SILT WITH ABUNDANT CLAY NODULES, TRACE OF ROOT FRAGMENTS, SLIGHT HYDROCARBON ODOOR, VERY SLIGHTLY MOIST	10
15		5.8	6	11	14	13.0	5			GREY CLAYEY SILT, MICACEOUS, SLIGHTLY MOIST	
		6.2	5	3	34	15.5	6		SP	AS ABOVE WITH SLIGHT TO MODERATE HYDROCARBON ODOOR	15
20		6.8	10	-	21	18.0	7		ML	GREY FINE SAND WITH TRACE SILT, OCCASIONAL PREFERENTIAL IRON STAINING ALONG ROOT PORES, SLIGHT TO MODERATE HYDROCARBON ODOOR	
		6.8	19	-	23	20.5	8			GREY CLAYEY SILT, MICACEOUS, SLIGHTLY MOIST	20
25		6.1	5	5	16	23.0	9		CL	AS ABOVE WITH SOME GRAVEL AND ROOT FRAGMENTS	
	2" SCH 40 PWC SCREEN (0.020" SLOTS)	6.7	9	1	22	25.5	10		SM	GREY SILTY CLAY, MICACEOUS, SLIGHTLY MOIST	25
30		-	-	-	26	28.0	11		SP	GREY FINE TO MEDIUM SILTY SAND, MICACEOUS, SOME ROOT FRAGMENTS, MOIST	
	FILTER SAND (#3 MONTEREY)									GREY COARSE TO VERY COARSE SAND, TRACE MICACEOUS, SATURATED	30
35									SC	GREY SILTY FINE TO MEDIUM SAND, GRADES TO SILTY CLAY	35
40	12-INCH BOREHOLE									DARK GREY SILTY CLAY	40
45										BORING COMPLETED AT A DEPTH OF 40 FEET ON 7/9/85 WATER ENCOUNTERED AT 26.5 FEET B.G.S.	45

LOG OF BORING



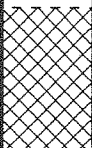
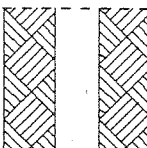
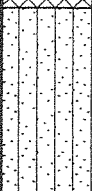
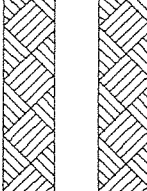
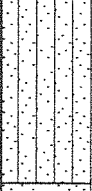
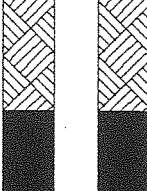
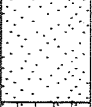

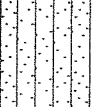
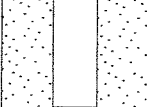
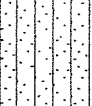
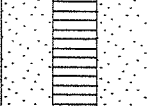
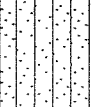
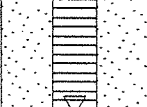
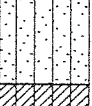
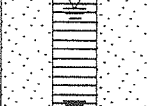
LOG OF BORING



Client: Alamitos Generating Station				Well Number: AW-4	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: DEC 10 93		Date Completed: DEC 10 93		Screen: 0.02-inch slot From: 5 - To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 4 - To: 25	
Drilling Co.: Continental Drilling		Driller: E. Boyer		Seal: Bentonite From: 3 - To: 4	
Method: Hollow Stem Auger		Equipment: Simco		Grout: Cement From: 0 - To: 3	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 13.09		Casing Size: 4-inch, flush-threaded	
Initial GW Level (feet):		GW Level (feet): 12.35		Time/Date: 0830 3/16/94	
				Protective Casing: 10-inch sch 180 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , tan, fine to medium grained				
			<u>Sandy Silt</u> , brown, moist, silt balls off the augers Layers of rounded gravel				Cement Seal 4" PVC blank casing Bentonite Seal
5						5	
			<u>Clayey Silt</u> , grey, moist, sheets on the auger Layers of sand, grey medium to coarse grained Difficult drilling due to the clay				Lone Star #3 Gravel Pack, calculated and used 10 cu.ft. Method of placement: slowly poured as augers were removed
10						10	
							4" PVC screen casing
15						15	
20						20	
25						25	
			Total Depth of Drill Hole				Bottom Cap

Client: Alamitos Generating Station						Boring/Well: AW-5	
Project: Groundwater Quality Monitoring Program						Well Construction Data	
Date Started: DEC 7 95		Date Completed: DEC 7 95		Screen: 0.02-inch slot		From: 10 To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 8 To: 26	
Drilling Co.: Osyssey		Driller: R. Loftis		Seal: Bentonite		From: 6 To: 8	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 6	
Boring Depth (feet)/ Diameter: 26.0 / 10-inch		Measuring Point Elevation (feet): 13.08		Casing Size: 4-inch PVC			
Initial GW Level (feet): 12.95		GW Level (feet): 14.47		Time/Date: 0644 5/31/96		Protective Casing: 10-inch sch. 80 PVC	

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Asphalt and Road Base</u>			0	
			<u>Silty Sand</u> , brown, dry, medium grained				
	5 15 26						Cement Seal
5	12 24 35		0.1' layer of clay, brown, plastic			5	4" PVC blank casing
	4 8 15						Bentonite Seal
	8 14 20		<u>Sand</u> , tan, dry, fine grained, roots pH = 10.29				
	2 4 7		<u>Silty Sand</u> , brown, dry, gravel, roots pH = 9.43 pH = 7.85				
10	5 10 14		Color change to tan and became moist pH = 7.48			10	Lone Star #3 Gravel Pack, calculated 10 and used 9.5 cu.ft.
	3 6 11		0.2' layer of sand, brown mottled pH = 7.15				Method of placement: slowly poured as augers were removed
	4 8 14		<u>Silty Clay</u> , dark grey, moist, roots, some gravel slightly plastic pH = 7.45				
15						15	


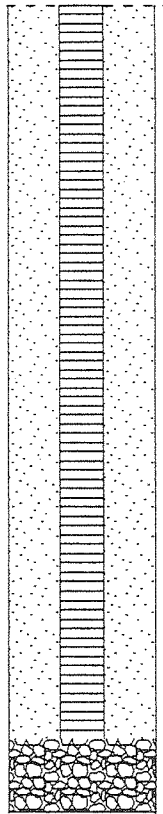

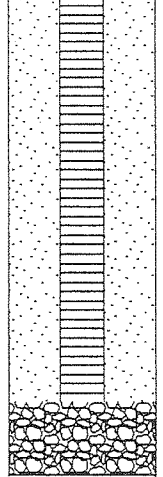
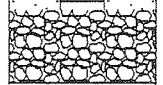
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Project: Groundwater Quality Monitoring Program					Boring/Well: AW-5		
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 5 10						
	7 13 21						
	2 5 8						
20	4 9 14		Large root fiber			20	4" PVC screen casing
	1 5 9						
	6 17 28		<u>Sand</u> , grey, saturated, medium grained				
25			<u>Clay</u> , grey, wet, plastic			25	Bottom Cap
			Total Depth of Drill Hole = 26 feet				
30						30	
35						35	



Client: Alamitos Generating Station				Boring/Well: AW-6			
Project: Groundwater Quality Monitoring Program				Well Construction Data			
Date Started: DEC 11 95		Date Completed: DEC 11 95		Screen: 0.02-inch slot		From: 10 To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 8 To: 25	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite		From: 6 To: 8	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 6	
Boring Depth (feet)/ Diameter: 26.0 / 10-inch		Measuring Point Elevation (feet): 13.19		Casing Size: 4-inch PVC			
Initial GW Level (feet): 13.16		GW Level (feet): 14.80		Time/Date: 0646 5/31/96		Protective Casing: 10-inch sch. 80 PVC	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Asphalt and Road Base</u>			0	
6	11		<u>Silty Sand</u> , brown, dry, gravel				Cement Seal
8	19		<u>Sand</u> , grey, moist, medium grained				
5	34		pH = 9.69			5	4" PVC blank casing
8	16		pH = 8.86				
8	19		<u>Sandy Silt</u> , dark grey, moist, gravel, roots				Bentonite Seal
8	34		<u>Sand</u> , grey, moist, fine grained, roots pebbly gravel				
			pH = 9.13				
5	13		pH = 8.82				
5	21						
10	8		<u>Clay</u> , dark grey, moist, plastic (pH=8.16)			10	Lone Star #3 Gravel Pack, calculated and used 9 cu.ft.
	16						
	22		<u>Silty Sand</u> , mottled grey, moist, fine grained				Method of placement: slowly poured as augers were removed
	5		pH = 7.98				
	10		pH = 7.75				
	18						
	5						
	10						
	18						
15	4		<u>Silty Clay</u> , dark grey, moist, plastic, roots			15	
	9						
	15						

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Project: Groundwater Quality Monitoring Program						Boring/Well: AW-6	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 8 14		<u>Silty Clay</u> , dark grey, moist, plastic, roots				4" PVC screen casing
			pH = 7.81				
			pH = 7.47				
	5 13 22						
			pH = 7.67				
	7 17 28						
20			<u>Sand</u> , grey, saturated, medium grained			20	
	4 8 12						
			pH = 7.38				
	4 9 15		Saturated sand began to enter the augers as the center bit was being removed				
25						25	Bottom Cap
			Total Depth of Drill Hole = 26 feet				
30						30	
35						35	



Client: Alamitos Generating Station				Boring/Well: AW-7			
Project: Groundwater Quality Monitoring Program				Well Construction Data			
Date Started: DEC 6 95		Date Completed: DEC 6 95		Screen: 0.02-inch slot		From: 9 To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 To: 24	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite		From: 5 To: 7	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 5	
Boring Depth (feet)/ Diameter: 27.0 / 10-incj		Measuring Point Elevation (feet): 13.33		Casing Size: 4-inch PVC			
Initial GW Level (feet): 13.02		GW Level (feet): 13.98		Time/Date: 0642 5/31/96		Protective Casing: 10-inch sch. 80 PVC	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Asphalt and Road Base</u>			0	
3	6		<u>Silty Sand</u> , dark brown, dry, medium grained				
4	7						Cement Seal
5	2					5	
	4						Bentonite Seal
	8						
	2						4" PVC blank casing
	5						
	10						
	1		<u>Sand</u> , tan, moist, fine grained				
	2		minor, thin, silt layers				
	4		0.2' layer with shell fragments				
			pH=9.25				
			pH=9.88				
10	3					10	
	6						
	10						
			<u>Sandy Silt</u> , dark brown, moist, plastic, roots				
	2						
	4						
	7		<u>Silty Sand</u> , tan, moist, fine grained				
			pH=9.47				
			pH=9.82				
	3						
	6						
	10		<u>Clay</u> , dark brown, wet, gravel				
			high content of organic material (roots)				
			pH=8.86				
15	1					15	
	3						
	7						
Continued Next Page							

Project: Groundwater Quality Monitoring Program					Boring/Well: AW-7		
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silty Sand</u> , brown, saturated, fine grained high content of organic material (roots)				
	3 7 13	X	Saturated sand began to enter the augers as the center bit was being removed				
20						20	4" PVC screen casing
	7 14 24	X	<u>Clay</u> , grey, wet, plastic, thin sand layers				
	8 12 20	X	Removed bottom plug and redrilled when the clay was encountered				
	6 14 21	X					
25	7 13 19	X				25	Bottom Cap
			<u>Sand</u> , mottled tan-grey, saturated, medium grained				Bentonite
			Total Depth of Drill Hole = 27 feet				
30						30	
35						35	



Client: Alamitos Generating Station				Boring/Well: AW-8			
Project: Groundwater Quality Monitoring Program				Well Construction Data			
Date Started: DEC 13 95		Date Completed: DEC 13 95		Screen: 0.02-inch slot		From: 10 To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 8 To: 25	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite		From: 6 To: 8	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 6	
Boring Depth (feet)/ Diameter: 27.0 / 10-inch		Measuring Point Elevation (feet): 13.00		Casing Size: 4-inch PVC			
Initial GW Level (feet): 13.00		GW Level (feet): 15.29		Time/Date: 0648 5/31/96		Protective Casing: 10-inch sch. 80 PVC	

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, fine grained			0	
	6 13 20		Pods of brown silt				Cement Seal
5	6 13 21					5	4" PVC blank casing
	3 7 14						Bentonite Seal
	10 19 29		Color change to tan with gravel				
10	2 5 9		No gravel			10	Lone Star #3 Gravel Pack, calculated and used 9 cu.ft.
	4 8 13		Color change to grey with roots				Method of placement: slowly poured as augers were removed
	2 3 5		Saturated conditions				
	3 7 11		Color change to tan				
15						15	

Continued Next Page

Project: Groundwater Quality Monitoring Program					Boring/Well: AW-8	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Well Construction Details
3	8		<u>Silty Sand</u> , tan, saturated, fine grained			
8	11		pH = 7.06			
2	5		<u>Sandy Silt</u> , grey, wet, fine gravel, roots			
5	9		0.1' layer of dark grey clay			
2	5					
11			<u>Silty Clay</u> , grey, wet, plastic, roots			
20	6					4" PVC screen casing
12						
16						
3	6		<u>Sand</u> , grey, saturated, medium grained			
6	8		Saturated sand began to enter the augers as the center bit was being removed			
25						
			<u>Clay</u> , grey, wet, plastic			Bottom Cap
						Bottom sluff caused by running sand
			Total Depth of Drill Hole = 27 feet			
30						
35						

Client: Alamitos Generating Station				Boring/Well: AW-9	
Project: Groundwater Quality Monitoring Program				Well Construction Data	
Date Started: DEC 12 95		Date Completed: DEC 12 95		Screen: 0.02-inch slot From: 10 To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 8 To: 25	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite From: 6 To: 8	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 To: 6	
Boring Depth (feet)/ Diameter: 27.0 / 10-inch		Measuring Point Elevation (feet): 12.70		Casing Size: 4-inch PVC	
Initial GW Level (feet): 12.85		GW Level (feet): 14.57		Time/Date: 0649 5/31/96	
				Protective Casing: 10-inch sch. 80 PVC	

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, gravel (fill)			0	
	4 10 18						
	8 17 27						Cement seal
5	3 7 12		pH = 10.28			5	4" PVC blank casing
	5 11 18						Bentonite Seal
	2 6 12		<u>Silty Sand</u> , mottled grey-brown, moist				
	3 8 13		pH = 10.18				
10	1 3 5		pH = 8.18			10	Lone Star #3 Gravel Pack, calculated and used 9 cu.ft.
	5 10 16		pH = 8.36				
	2 6 8		pH = 8.04				Method of placement: slowly poured as augers were removed
			<u>Clayey Silt</u> , grey, moist, roots				
			pH = 7.75				
			<u>Sand</u> , tan, wet, fine grained				
			pH = 6.68				
15			pH = 6.76			15	
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
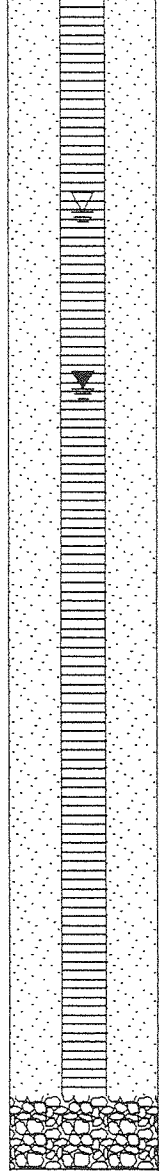


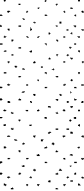
Project: Groundwater Quality Monitoring Program					Boring/Well: AW-9		
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silty Clay</u> , dark grey, moist, plastic, roots				
	2 5 8		pH = 7.50				
	2 5 9		pH = 7.63				
	5 11 18		pH = 7.31				4" PVC screen casing
20						20	
	2 4 8		pH = 7.55				
	3 7 12		<u>Sand</u> , grey, saturated, medium grained				
			Saturated sand began to enter the augers as the center bit was being removed				
25						25	Bottom Cap
							Bottom sluff caused by running sand
			Total Depth of Drill Hole = 27 feet				
30						30	
35						35	



Client: Alamitos Generating Station				Boring/Well: AW-10			
Project: Groundwater Quality Monitoring Program				Well Construction Data			
Date Started: DEC 5 95		Date Completed: DEC 5 95		Screen: 0.02-inch slot		From: 15 To: 30	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 13 To: 30	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite		From: 11 To: 13	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 To: 11	
Boring Depth (feet)/ Diameter: 31.0 / 10-inch		Measuring Point Elevation (feet): 12.18		Casing Size: 4-inch PVC			
Initial GW Level (feet): 17.90		GW Level (feet): 20.34		Time/Date: 0659 5/31/96		Protective Casing: 10-inch sch. 80 PVC	

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Asphalt and Road Base</u>			0	
			<u>Silty Sand</u> , dark grey, dry, fine grained, roots				
	3 8 18		pH = 8.13				
	13 27 39		Moist conditions 0.3' layer of clay, grey green, plastic				
5	3 7 13		pH = 7.98			5	Cement Seal
			pH = 8.26				
	10 22 33		<u>Sandy Silt</u> , grey green, moist				
			<u>Sand</u> , mottled tan, moist, fine grained, roots				4" PVC blank casing
	3 9 16		ph = 8.03				
	6 11 18		<u>Silt</u> , tan, moist, plastic vertical seams of dark grey silt			10	
10			<u>Sand</u> , mottled tan and grey, wet, medium grained thin layers or pods of dark grey silt				
	2 5 9		pH = 7.64				Bentonite Seal
	2 6 12						
	2 4 8		pH = 7.31			15	

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Project: Groundwater Quality Monitoring Program						Boring/Well: AW-10	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	7 15 24		<u>Clayey Silt</u> , dark brown, wet, plastic, gravel pH = 7.20				Lone Star #3 Gravel Pack, calculated and used 10 cu.ft. Method of placement: slowly poured as augers were removed
	1 3 11		<u>Sand</u> , mottled tan and brown, wet, fine grained organic material (roots and wood) pH = 7.05				
	9 17 26		<u>Sand</u> , grey, saturated, fine grained organic material (roots) pH = 7.27				
20	3 7 13					20	
	5 11 19		1' layer of gravel with roots pH = 7.46 Saturated sand began to enter the augers as the center bit was being removed				
25						25	
30						30	Bottom Cap Bottom sluff due to running, saturated sand
35			Total Depth of Drill Hole = 31 feet			35	



Client: Alamitos Generating Station					Boring/Well: AW-11	
Project: Groundwater Quality Monitoring Program					Well Construction Data	
Date Started: DEC 18 95		Date Completed: DEC 18 95		Screen: 0.02-inch slot From: 15 To: 30		
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 13 To: 30		
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite From: 11 To: 13		
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 To: 11		
Boring Depth (feet)/ Diameter: 31.0 / 10-inch		Measuring Point Elevation (feet): 12.02		Casing Size: 4-inch PVC		
Initial GW Level (feet): 19.10		GW Level (feet): 23.82		Protective Casing: 10-inch sch. 80 PVC		
Time/Date: 0654 5/31/96						

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, gravel				
	2 5 10		<u>Sandy Silt</u> , grey, dry				
5	8 16 26		pH=8.38			5	Cement Seal
	5 11 19		<u>Silty Sand</u> , tan, dry, fine grained				
	9 19 21		No gravel				4" PVC blank casing
	2 5 9		pH=9.59 pH=9.09 pH=7.95				
10			<u>Sandy Silt</u> , grey, dry, gravel			10	
	5 10 16		<u>Silty Sand</u> , tan, dry, fine grained				
	2 6 10		<u>Sand</u> , grey, wet, fine grained, roots				Bentonite Seal
	4 8 14		<u>Silty Clay</u> , dark, grey, moist, plastic				
15			<u>Sand</u> , grey, wet, medium grained, roots			15	

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Project: Groundwater Quality Monitoring Program				Boring/Well: AW-11			
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 14		<u>Sand</u> , grey, wet, medium grained, roots				
			pH = 6.73				
			pH = 6.29				
	5 12 21		pH = 6.86				Lone Star #3 Gravel Pack, calculated 10, used 9 cu.ft.
	3 7 12		pH = 6.90				Method of placement: slowly poured as augers were removed
20	5 10 17		pH = 7.05			20	
			Saturated sand began to enter the augers as the center bit was being removed				
25						25	4" PVC screen casing
30						30	
			Total Depth of Drill Hole = 31 feet				Bottom Cap Bottom sluff caused by running sand
35						35	



Client: Alamitos Generating Station				Boring/Well: AW-12	
Project: Groundwater Quality Monitoring Program				Well Construction Data	
Date Started: DEC 19 95		Date Completed: DEC 19 95		Screen: 0.02-inch slot From: 15 To: 30	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 13 To: 30	
Drilling Co.: Odyssey		Driller: R. Loftis		Seal: Bentonite From: 11 To: 13	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 To: 11	
Boring Depth (feet)/ Diameter: 31.0 / 10-inch		Measuring Point Elevation (feet): 11.02		Casing Size: 4-inch PVC	
Initial GW Level (feet): 13.90		GW Level (feet): 17.38		Time/Date: 0656 5/31/96	
				Protective Casing: 10-inch sch. 80 PVC	

Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Sandy Silt</u> , mottled brown, moist, fine grained pods of grey, sandy silt				
	2 4 7		pH = 10.09				
	5 10 15						
5			<u>Sandy Silt</u> , grey, moist, fine grained			5	Cement Seal
	1 4 9		pH = 8.21 pH = 8.58				
	5 10 16		pH = 8.11				4" PVC blank casing
	2 6 12						
10			<u>Silty Sand</u> , tan-grey mottled, moist, fine grained			10	
	7 14 22		pH = 7.09 pH = 6.61				
	2 3 6						
	4 7 10		<u>Sand</u> , grey, moist, fine grained, roots				Bentonite Seal
			pH = 7.36 pH = 7.16				
	2 4 6		0.5' layer of grey clay, plastic (pH = 7.17)				
15						15	

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Project: Groundwater Quality Monitoring Program						Boring/Well: AW-12	
Depth Feet	Blow Count	Sampler	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 8 13		<u>Sand</u> , grey, wet, fine grained, roots pH = 8.83				
	2 5 11		<u>Silty Clay</u> , dark grey, wet, plastic, roots pH = 7.66				
	1 4 8		 pH = 8.13				
20	2 6 12		 pH = 8.03			20	
	4 9 18		<u>Sand</u> , grey, saturated, fine grained				
	6 10 16		Saturated sand began to enter the augers as the center bit was being removed				
25						25	
30						30	
35						35	
Total Depth of Drill Hole = 31 feet							
							Lone Star #3 Gravel Pack, calculated and used 9 cu.ft. Method of placement: slowly poured as augers were removed
							4" PVC screen casing
							Bottom Cap Bottom sluff caused by running sand



Client: Alamitos Generating Station				Well Number: AW-13			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: DEC 9 93		Date Completed: DEC 9 93		Screen: 0.02-inch slot		From: 5 - To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 4 - To: 25	
Drilling Co.: Continental Drilling		Driller: E. Boyer		Seal: Bentonite		From: 3 - To: 4	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 - To: 3	
Boring Depth (feet): 28.0		Measuring Point Elevation (feet): 13.53		Casing Size: 4-inch, flush-threaded			
Initial GW Level (feet): 12.80		GW Level (feet): 12.80		Time/Date: 0820 3/16/94		Protective Casing: 10-inch sch. 80 PVC	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , tan, fine to medium grained, well sorted, wet from surface irrigation Color change to brown				Cement Seal 4" PVC blank casing Bentonite Seal
5			<u>Clayey Sand</u> , tan/brown mottled, moist, sticks to auger Small inclusions of organic material			5	Lone Star #3 Gravel Pack, calculated and used 10 cu.ft.
10			<u>Silty Sand</u> , brown, fine to medium grained, moist Saturated conditions at 14 feet			10	Method of placement: slowly poured as augers were removed
15						15	

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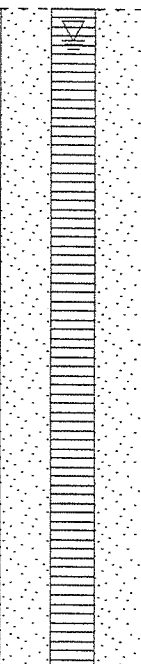




Project: Ground Water Quality Monitoring Program				Well Number: AW-13			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			Minor coarse sand layers from 13 to 18 feet, grey color				4" PVC screen casing
20			<u>Clayey Sand</u> , grey, wet, rolls on auger			20	
25			<u>Sand</u> , grey, fine to medium grained, saturated			25	Bottom Cap
							Bottom Sluff due to running saturated sand
30			Total Depth of Drill Hole			30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-16			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 9 99		Date Completed: NOV 9 99		Screen: 0.02-inch slot From: 9 - To: 24			
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 25			
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite From: 5 - To: 7			
Method: Hollow stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5			
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 12.91		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 15.43		GW Level (feet): 14.82		Time/Date: 0945 11/10/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium grained, gravel			0	
12	26		pH = 8.13 PID = 5.7				Cement Seal
9	21		0.2-inch layer of sand, gray, moist, medium grained				4" PVC blank casing
5	34		pH = 8.57 PID = 8.3				
6	15		pH = 8.09 PID = 7.7			5	Bentonite Seal
5	27		0.3-inch layer of sand, gray, moist, medium grained				
5	11		0.2-inch layer of sand, brown, moist, fine grained				
11	19		pH = 8.19 PID = 8.7				
4	9		pH = 7.92 PID = 8.1				
9	16						
10	6		0.4-inch layer of sand, gray, moist, medium grained			10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
10	10		pH = 8.16 PID = 8.3				
15	15		pH = 8.22 PID = 6.4				Method of placement: slowly poured as augers were removed
4	9						
9	19		<u>Silty Clay</u> , dark gray, moist, plastic, roots				
6	11		pH = 7.68 PID = 5.4				
11	17						
5	9						4" screen casing
14	14					15	

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Project: Ground Water Quality Monitoring Program					Well Number: AW-16			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details	
	4 9 15		<u>Silty Clay</u> , dark gray, moist, plastic, roots				Bottom Cap	
	4 11 19							
	4 8 13		0.2-inch layer of sand, tan, wet, fine grained					
20								20
	4 8 16							
	5 10 17		0.4-inch layer of sand, gray, wet, medium grained					
	3 7 14		<u>Sand</u> , gray, saturated, medium grained					
25						25		
			Total Depth of Drill Hole = 25 feet					
30						30		
35						35		



Client: Alamitos Generating Station				Well Number: AW-17			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 9 99		Date Completed: NOV 9 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 12.25		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.41		GW Level (feet): 13.53		Time/Date: 1012 11/10/99		Protective Casing: 10-inch sch 80 PVC	

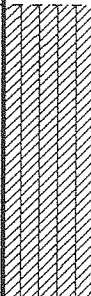
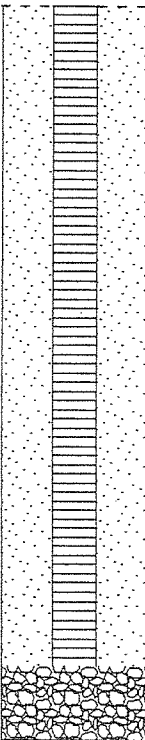
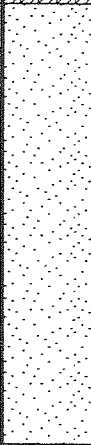
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained gravel				
	9 16 28		pH = 8.67 PID = 8.3				Cement Seal
	5 12 19		pH = 8.51 PID = 6.5				4" PVC blank casing
5	6 14 23		pH = 8.63 PID = 10.1			5	
	5 13 23		<u>Sandy Silt</u> , dark gray, moist, gravel organic material				Bentonite Seal
	5 12 16		pH = 7.89 PID = 8.3				
			pH = 8.16 PID = 6.9				
			<u>Clay</u> , gray, moist, plastic				
10	2 4 12		pH = 7.91 PID = 10.3			10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	4 9 16		<u>Sand</u> , gray, moist, fine grained, roots pebbly gravel				
			pH = 7.62 PID = 6.7				Method of placement: slowly poured as augers were removed
	5 12 21		<u>Silty Sand</u> , mottled gray, wet, fine grained				
	5 10 17		pH = 7.74 PID = 7.4				4" screen casing
15						15	

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Project: Ground Water Quality Monitoring Program						Well Number: AW-17	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 9 14		pH = 7.69 PID = 8.1				
			pH = 7.58 PID = 6.6				
	5 8 17		<u>Silty Clay</u> , dark gray, moist, plastic organic material				
	7 11 19		pH = 7.49 PID = 6.8				
20			pH = 7.64 PID = 7.9			20	
	5 10 17		pH = 7.44 PID = 8.7				
	4 9 16		<u>Silty Sand</u> , gray, saturated, medium grained				
	4 7 14		pH = 7.53 PID = 6.2				
			pH = 7.36 PID = 7.6				
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-18			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 8 99		Date Completed: NOV 8 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 4 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 4	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 12.88		Casing Size: 10-inch, sch 80 PVC			
Initial GW Level (feet): 14.44		GW Level (feet): 14.56		Time/Date: 1145 11/9/99		Protective Casing: 4-inch PVC, flush-thread	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained gravel				
	15 25 36		pH=8.61 PID=9.8				Cement Seal
	8 14 25		<u>Sand</u> , gray, moist, medium grained				4" PVC blank casing
5			pH=8.47 PID=12.3			5	
	6 12 19		pH=8.71 PID=7.6				Bentonite Seal
	5 13 21		<u>Clay</u> , gray, moist, plastic (pH=8.43)				
	8 17 26		<u>Sand</u> , gray, moist, fine grained pebbly gravel				
10			0.3-foot layer of sandy silt, gray			10	
	8 14 22		pH=8.36 PID=9.1				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	6 11 18		pH=7.98 PID=7.3				
	5 12 17		pH=8.09 PID=6.8				Method of placement: slowly poured as augers were removed
	4 10 16		<u>Silty Sand</u> , gray, moist, medium grained				4" PVC screen casing
			pH=8.13 PID=7.3				
			pH=7.68 PID=10.4				
15						15	
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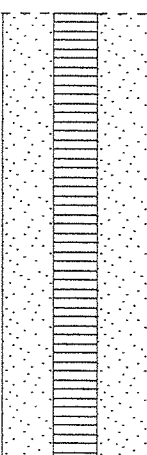
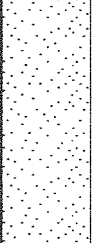
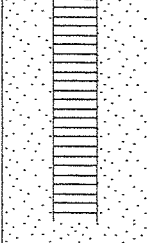
Project: Ground Water Quality Monitoring Program					Well Number: AW-18		
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silty Clay</u> , dark gray, wet, plastic root fragments				Bottom Cap
	4 9 14		pH = 7.86 PID = 5.7				
	5 12 19		0.2-foot layer of sand, tan, fine grained pH = 7.74 PID = 9.2				
	3 10 18		<u>Sand</u> , gray, saturated, medium grained				
20	3 7 11		pH = 7.54 PID = 7.1		20		
			Saturated sand began to enter the augers as the center bit was being removed PID = 8.9 PID = 6.3				
25			Total Depth of Drill Hole = 25 feet		25		
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-19			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 8 99		Date Completed: NOV 8 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 13.02		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 14.55		GW Level (feet): 14.83		Time/Date: 1257 11/9/99		Protective Casing: 10-inch, sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained gravel				
	9 18 27		0.1-foot layer of brown clay, plastic pH=8.26 PID=6.8				Cement Seal
	5 11 22		0.2-foot layer of tan sand, brown mottled pH=8.33 PID=5.7				4" PVC blank casing
5	7 14 26		Minor rounded gravel layer pH=8.74 PID=10.2			5	Bentonite Seal
	6 13 20		<u>Sand</u> , tan, moist, medium grained root fragments pH=8.91 PID=9.6				
	6 15 19		Shell fragments pH=9.06 PID=7.7				
10	5 14 20		pH=8.98 PID=7.1			10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	3 8 19		<u>Silty Sand</u> , brown, moist, medium grained gravel, root fragments pH=8.04				
	5 11 23		0.5-foot layer of silty clay, gray, plastic root fragments (pH=7.68) PID=8.3 pH=7.81 PID=6.9				Method of placement: slowly poured as augers were removed
15	2 6 11		<u>Silty Clay</u> , dark gray, moist, plastic, roots pH=7.43			15	4" PVC screen casing

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Project: Ground Water Quality Monitoring Program						Well Number: AW-19	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 7 13		0.1-foot layer of gray sand, medium grained pH = 7.44 PID = 5.9				
	4 10 16		0.2-foot layer of gray sand, medium grained pH = 7.83 PID = 9.2				
	5 9 18		0.2-foot layer of gray sand, medium grained pH = 7.27 PID = 6.6				
20			0.2-foot layer of gray sand, medium grained pH = 7.35 PID = 6.1			20	
	4 9 16		<u>Sand</u> , gray, saturated, medium grained root fragments pH = 7.29 PID = 7.8				
	3 9 19						
	5 16 26						
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-20			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 10 99		Date Completed: NOV 10 99		Screen: 0.02-inch slot From: 9 - To: 24			
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 25			
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite From: 4 - To: 7			
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 4			
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 11.96		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.98		GW Level (feet): 13.63		Time/Date: 0910 11/15/99		Protective Casing: 10-inch sch 80 PCV	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained, gravel				
	9 14 22		pH = 8.67 PID = 4.6				Cement Seal
	7 12 23		Color change to gray, no gravel pH = 8.73 PID = 3.3				4" PVC blank casing
5	6 10 19		Color change to brown pH = 8.14 PID = 5.1			5	Bentonite Seal
	5 11 17		<u>Sand</u> , brown, moist, medium grained pH = 8.43 PID = 4.8				
	4 10 16		pH = 8.11 PID = 6.3				
10	5 9 14		pH = 8.56 PID = 5.5			10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	1 3 6		<u>Sandy Silt</u> , gray, wet, roots pH = 7.89 PID = 4.9				Method of placement: slowly poured as augers were removed
	2 4 7		pH = 8.23 PID = 5.3				
	2 4 6						4" screen casing
15						15	

Continued Next Page

Project: Ground Water Quality Monitoring Program					Well Number: AW-20		
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 8 13		pH = 7.92 PID = 4.8 <u>Silty Sand</u> , gray, saturated, medium grained				
	5 7 12		pH = 7.86 PID = 5.7 0.2-inch layer of sand, gray, saturated, medium grained				
	5 11 15		pH = 7.36 PID = 4.9 <u>Sandy Silt</u> , gray, saturated, organic material				
20	3 6 13		pH = 7.58 PID = 4.3 0.3-inch layer of sand, gray, medium grained			20	
	5 9 17		pH = 7.21 PID = 4.6				
	4 9 18		pH = 7.06 PID = 5.6				
			pH = 7.29 PID = 4.2				
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-21			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 10 99		Date Completed: NOV 10 99		Screen: 0.2-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 12.28		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 14.28		GW Level (feet): 13.98		Time/Date: 0915 11/15/99		Protective Casing: 10-inch sch 80 PVC	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium grained, gravel			0	
	7 14 26		No gravel				Cement Seal
	5 12 21						4" PVC blank casing
5	4 11 19		Color change to gray			5	Bentonite Seal
	5 9 13						
	5 12 19		<u>Sand</u> , brown, moist, medium grained				
10	4 10 17					10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	3 7 12						Method of placement: slowly poured as augers were removed
	3 5 13		<u>Sandy Silt</u> , gray, wet, organic material				
	4 6 10						4" PVC screen casing
15						15	

Continued Next Page



Project: Ground Water Quality Monitoring Program						Well Number: AW-21	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 8 14		<u>Sandy Silt</u> , gray, wet, organic material pH = 8.07 PID = 5.1				
	5 10 14		<u>Silty Sand</u> , gray, saturated, medium grained pH = 7.44 PID = 5.9				
	4 9 16		0.2-inch layer of sand, gray, fine grained pH = 7.56 PID = 4.3				
20						20	
	5 9 13		<u>Sandy Silt</u> , gray, saturated, organic material pH = 7.18 PID = 4.8				
	2 5 8		pH = 7.16 PID = 4.4				
	3 5 9		pH = 7.23 PID = 5.6				
			pH = 7.07 PID = 4.3				
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-22			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 11 99		Date Completed: NOV 11 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 12.18		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 14.56		GW Level (feet): 14.13		Time/Date: 1045 11/16/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained, gravel				
	6 12 21		pH = 7.98 PID = 5.1				Cement Seal
	4 15 26		No gravel				4" PVC blank casin
5			Color change to gray			5	
	5 11 19		Color change to brown				Bentonite Seal
	5 8 17		pH = 8.12 PID = 4.6				
	6 10 19		pH = 8.31 PID = 5.8				
			pH = 7.86 PID = 6.1				
10			<u>Sand</u> , gray, moist, medium grained			10	
	5 9 16		pH = 7.79 PID = 4.7				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	3 7 14		pH = 7.69 PID = 7.1				
			<u>Sandy Silt</u> , gray, moist, organic material				Method of placement: slowly poured as the augers were removed
	3 5 12		pH = 7.73 PID = 7.3				
	2 6 13		pH = 7.55 PID = 5.7				4" PVC screen casing
15						15	
Continued Next Page							

Project: Ground Water Quality Monitoring Program				Well Number: AW-22			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silt</u> , tan, wet, plastic				
	4 7 12		pH = 7.14 PID = 11.2				
	3 7 10		<u>Sandy Silt</u> , gray, wet, plastic				
	5 9 14		0.2-inch layer of sand, tan, medium grained				
20	3 7 14		pH = 7.28 PID = 8.3			20	
	4 8 16		pH = 7.66 PID = 8.4				
	3 6 12		Color change to brown				
			pH = 7.41 PID = 6.1				
			pH = 7.63 PID = 4.7				
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-23			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 16 99		Date Completed: NOV 16 99		Screen: 0.02-inch slot		From: 13 - To: 28	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 11 - To: 29	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 8 - To: 11	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 8	
Boring Depth (feet): 29.0		Measuring Point Elevation (feet): 16.39		Casing Size: 4-inch PVC			
Initial GW Level (feet): 18.94		GW Level (feet): 17.93		Time/Date: 1219 11/17/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			Fill - Silty Sand, gray, dry, medium grained			0	
5	11 18 21		pH = 8.42 PID = 9.4			5	Cement Seal
9	17 27		Silty Sand, brown, moist, medium grained pH = 8.51 PID = 6.9				4" PVC blank casing
6	12 19		pH = 8.11 PID = 7.2				
10	4 11 17		Silt, gray, moist, organic material pH = 8.26 PID = 8.2			10	Bentonite Seal
5	10 18		pH = 8.04 PID = 5.7				
4	9 16		Sand, gray, moist, medium grained pH = 7.95 PID = 7.6				
3	10 16		pH = 8.06 PID = 3.8				
15			Continued Next Page			15	

Project: Ground Water Quality Monitoring Program						Well Number: AW-23	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Sandy Clay</u> , gray, moist, plastic				
	4 8 14		pH = 7.24 PID = 8.2				
	3 7 13		<u>Silt</u> , tan, moist, plastic, organic material				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	4 7 12		pH = 7.44 PID = 6.7				
			pH = 7.82 PID = 7.1				Method of placement: slowly poured as augers were removed
20	3 6 9		pH = 7.62 PID = 4.8			20	
	3 5 10		<u>Sandy Clay</u> , gray, wet, plastic				
			pH = 7.19 PID = 5.7				
	4 6 11		pH = 7.56 PID = 4.3				4" screen casing
25	2 5 8		<u>Silty Sand</u> , gray, saturated, medium grained			25	
	3 5 9		pH = 7.24 PID = 6.4				
			pH = 7.14 PID = 5.1				
	3 4 8		pH = 7.26 PID = 6.1				Bottom Cap
			Total Depth of Drill Hole = 29 feet				
30						30	
35						35	



Client: Alamitos Generating Station						Well Number: AW-24	
Project: Ground Water Quality Monitoring Program						Well Construction Data	
Date Started: NOV 15 99		Date Completed: NOV 15 99		Screen: 0.02-inch slot		From: 13 - To: 28	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 11 - To: 29	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 8 - To: 11	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 8	
Boring Depth (feet): 29.0		Measuring Point Elevation (feet): 16.31		Casing Size: 4-inch PVC			
Initial GW Level (feet): 18.16		GW Level (feet): 17.88		Time/Date: 1221 11/17/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			Fill - <u>Silty Sand</u> , gray, dry, medium grained			0	
5	7 12 19		pH=8.26 PID=12.3			5	Cement Seal
	5 9 17		<u>Silty Sand</u> , brown, moist, medium grained				4" PVC blank casing
	3 7 13		pH=8.11 PID=9.2				
	4 8 15		pH=8.41 PID=10.6				
10			pH=8.19 PID=8.8			10	Bentonite Seal
	3 7 14		pH=8.24 PID=9.3				
	2 6 12		<u>Sand</u> , gray, medium grained				
	4 8 16		pH=7.99 PID=6.4				
15						15	

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Project: Ground Water Quality Monitoring Program						Well Number: AW-24	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 12		pH = 7.68 PID = 9.1				
			pH = 7.49 PID = 5.8				
	3 6 11		<u>Silt</u> , tan, moist, plastic, organic material				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	4 9 15		pH = 7.24 PID = 7.8				Method of placement: slowly poured as augers were removed
20			pH = 7.52 PID = 9.5			20	
	3 5 10		pH = 7.63 PID = 6.7				
	4 8 16		<u>Sandy Clay</u> , gray, wet, plastic				
	3 7 14		pH = 7.16 PID = 12.4				4" screen casing
			pH = 7.21 PID = 14.5				
25			<u>Sandy Silt</u> , gray, wet, plastic			25	
	2 5 9		pH = 7.38 PID = 5.9				
			0.02-foot layer of sand, gray, medium grained				
	2 3 5		pH = 7.41 PID = 5.2				
			0.03-foot layer of sand, gray, medium grained				
	2 4 8		pH = 7.59 PID = 6.7				Bottom Cap
			Total Depth of Drill Hole = 29 feet				
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-25			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 12 99		Date Completed: NOV 12 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet)/Diameter: 25.0		Measuring Point Elevation (feet): 10.95		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 17.94		GW Level (feet): 17.27		Time/Date: 1218 11/17/99		Protective Casing: 10-inch sch 80 PVC	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Asphalt and base material</u>			0	
			<u>Silty Sand</u> , brown, moist, medium grained				
	10 18 29		pH=8.48 PID=22.3				Cement Seal
	7 12 23		<u>Sandy Silt</u> , gray, moist, plastic				4" PVC blank casing
5	4 7 12		pH=8.27 PID=24.6			5	
	5 8 11		<u>Sand</u> , brown, moist, medium grained				Bentonite Seal
	3 6 9		pH=8.41 PID=12.4				
			<u>Silty Sand</u> , gray, moist, medium grained				
	2 7 10		pH=8.16 PID=10.1			10	
	3 6 10		pH=8.54 PID=8.6				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	4 7 11		pH=8.59 PID=14.1				Method of placement: slowly poured as augers were removed
	3 5 8		pH=8.23 PID=10.9				4" screen casing
15			pH=8.06			15	

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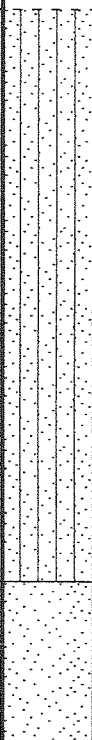
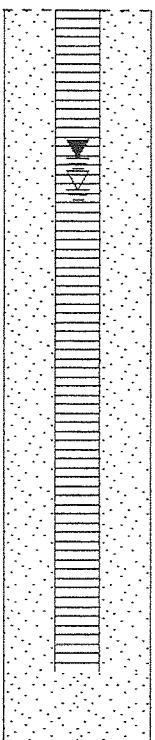

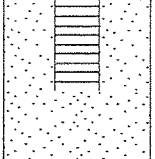
Project: Ground Water Quality Monitoring Program				Well Number: AW-25			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			PID = 12.6				
	2 4 7		pH = 8.26 PID = 12.1				
	3 6 10		pH = 7.91 PID = 11.9				
	2 5 9		pH = 7.63 PID = 12.4				
20						20	
	2 4 7		pH = 7.16 PID = 8.6				
	3 5 8		<u>Sand</u> , gray, saturated, medium grained				
	2 5 7		pH = 7.26 PID = 8.8				
			pH = 7.11 PID = 9.3				
25			Total Depth of Drill Hole = 25 feet			25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-26			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 12 99		Date Completed: NOV 12 99		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 25	
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet)/Diameter: 25.0		Measuring Point Elevation (feet): 11.43		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 17.46		GW Level (feet): 17.04		Time/Date: 1215 11/17/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained, gravel				
			Layer of cobbles				
	10 23 36		pH=8.67 PID=9.1				Cement Seal
	8 18 24		<u>Sandy Silt</u> , gray, moist, plastic				4" PVC blank casing
5			pH=8.44 PID=8.4			5	
	5 8 11		pH=8.05 PID=7.1				Bentonite Seal
	3 5 9		<u>Silty Sand</u> , brown, moist, fine grained				
	4 7 10		pH=8.16 PID=10.4				
			pH=8.67 PID=8.5				
10			pH=8.05 PID=11.1			10	Lone Star #3 gravel pack, calculated 8.5 cu.ft. used 8 cu.ft.
	4 8 11		pH=8.64 PID=10.3				
			<u>Silty Sand</u> , gray, moist, medium grained				Method of placement: slowly poured as augers were removed
	3 6 8		pH=8.18 PID=9.7				
	2 5 9		pH=7.96 PID=8.3				4" screen casing
15						15	

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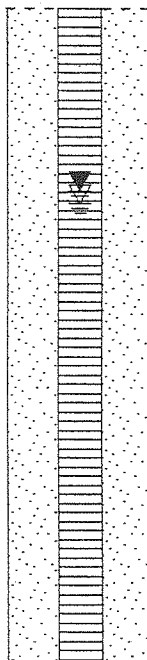

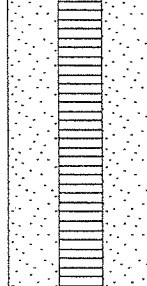
Project: Ground Water Quality Monitoring Program				Well Number: AW-26			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 12	X	pH = 8.23 PID = 12.1				
	2 4 8	X	pH = 7.88 PID = 9.6				
	2 5 9	X	pH = 8.06 PID = 10.3				
20	4 7 10	X	pH = 7.81 PID = 9.3				
	2 4 7	X	pH = 7.66 PID = 9.9				
	2 5 8	X	<u>Sand</u> , gray, saturated, medium grained				
			pH = 7.54 PID = 10.3				
25	Total Depth of Drill Hole = 25 feet					25	Bottom Cap
30						30	
35						35	



Client: Alamitos Generating Station				Well Number: AW-27			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: NOV 11 99		Date Completed: NOV 11 99		Screen: 0.02-inch slot From: 9 - To: 24			
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 6 - To: 25			
Drilling Co.: Odyssey		Driller: D. Loftis		Seal: Bentonite From: 4 - To: 6			
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 4			
Boring Depth (feet): 25.0		Measuring Point Elevation (feet): 11.49		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 17.66		GW Level (feet): 17.48		Time/Date: 1212 11/17/99		Protective Casing: 10-inch sch 80 PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, medium grained, gravel				
	3 6 11		pH=8.31 PID=9.4				Cement Seal
			<u>Sandy Silt</u> , gray, moist, plastic				4" PVC blank casing
	5 10 16		pH=7.79 PID=11.7				
5	4 8 14		pH=7.96 PID=8.4			5	Bentonite Seal
			Color change to brown				
	3 7 11		pH=7.99 PID=7.9				
			Color Change to dark gray				
	5 11 20		pH=8.07 PID=12.1				
10	3 6 12		pH=8.21 PID=6.5			10	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft.
	2 6 11		pH=7.61 PID=8.6				
			<u>Sandy Clay</u> , gray, moist, plastic				
			<u>Sandy Silt</u> , gray, moist, plastic				Method of placement: slowly poured as augers were removed
	4 7 13		pH=7.23 PID=6.7				
	3 6 10		pH=7.38 PID=14.2				4" PVC screen casing
15						15	

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Project: Ground Water Quality Monitoring Program				Well Number: AW-27			
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 12	X	<u>Silty Sand</u> , gray, wet, fine grained pH = 7.04 PID = 8.6				
	3 6 13	X	pH = 7.13 PID = 9.1				
	4 8 15	X	pH = 6.98 PID = 10.3				
20						20	
	3 7 12	X	pH = 6.94 PID = 6.7				
	4 9 16	X	pH = 7.09 PID = 5.3				
	3 8 13	X	<u>Sand</u> , gray, saturated, medium grained pH = 7.12 PID = 7.1				
25			Total Drill Hole Depth = 25 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-28	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: May 7, 01		Date Completed: May 7, 01		Screen: 0.02-inch slot From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 13.29		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 14.32		GW Level (feet): 14.55		Time/Date: 1122 6/8/01	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
5	7 16 25		<u>Sandy Silt</u> , dark gray, moist, gravel, roots pH=8.10 PID=5.9			5	Cement Seal 4" PVC blank casing
	5 9 14		pH=8.43 PID=6.5				Bentonite Seal
	3 9 20		<u>Clay</u> , gray, moist, plastic pH=8.24 PID=9.1				
10	4 8 19		pH=7.87 PID=4.7			10	
	2 9 17		<u>Sand</u> , gray, moist, fine-grained, roots pH=7.93 PID=5.9				Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed
	3 8 19		<u>Silty Sand</u> , mottled gray, wet, fine-grained pH=7.24 PID=8.3				
15	2 6 16					15	

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Project: Ground Water Quality Monitoring Program						Well Number: AW-28	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 9 21	X	<u>Silty Sand</u> , mottled gray, wet, fine-grained				
			pH=7.16 PID=9.2				
	5 9 14	X	<u>Silty Clay</u> , dark gray, moist, plastic, roots				
			pH=7.23 PID=8.8				
	3 7 11	X					
20			pH=7.57 PID=7.2				
	2 6 10	X					
			pH=7.51 PID=4.7			20	4" screen casing
	3 9 11	X					
	2 6 9	X					
			pH=7.39 PID=6.7				
			pH=7.26 PID=5.8				
			pH=7.33 PID=7.0				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-29			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 7, 01		Date Completed: May 7, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 13.26		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.53		GW Level (feet): 14.58		Time/Date: 1124 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
5	8 13 22		pH=8.87 PID=9.4			5	Cement Seal 4" PVC blank casing Bentonite Seal
	4 7 13		<u>Sandy Silt</u> , dark gray, moist, gravel, roots pH=9.01 PID=5.1				
	4 8 18		pH=8.43 PID=6.7				
10	3 9 21		<u>Clay</u> , gray, moist, plastic pH=7.99 PID=3.9			10	
	3 8 16		<u>Silty Sand</u> , mottled gray, wet, fine-grained pH=7.62 PID=5.2				
	4 7 17		pH=7.40 PID=5.9				
15	3 5 14					15	Lone Star #3 gravel pack, calculated and used 8.5 cu.ft. Method of placement: slowly poured as augers were removed

Continued Next Page



Project: Ground Water Quality Monitoring Program						Well Number: AW-29	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	4 8 16	X	<u>Silty Sand</u> , mottled gray, wet, fine-grained <u>Silty Clay</u> , dark gray, moist, plastic, roots				
	3 7 12	X	pH=7.11 PID=8.2				
	2 6 10	X	pH=7.41 PID=6.7				
20	3 6 11	X	pH=7.61 PID=4.9			20	4" screen casing
	2 8 12	X	pH=7.47 PID=4.2				
	2 8 10	X	pH=7.99 PID=6.0				
			pH=7.31 PID=7.5				
			pH=7.24 PID=6.4				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-30	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: May 8, 01		Date Completed: May 8, 01		Screen: 0.02-inch slot From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.90		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 12.95		GW Level (feet): 14.08		Time/Date: 1126 6/8/01	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	8 13 24		pH=8.99 PID=8.2			5	Bentonite Seal
	7 11 21		pH=9.12 PID=7.6				
	5 9 18		pH=8.67 PID=7.3				
10	3 9 17		<u>Sandy Silt</u> , dark gray, moist, gravel, roots			10	
	2 7 11		pH=8.29 PID=4.0				
	5 8 12		pH=8.03 PID=5.2				
			pH=7.69 PID=6.1				
15	3 7 14		<u>Sand</u> , gray, moist, fine-grained, roots			15	
							Lone Star #3 gravel pack, calculated and used 8.5 cu.ft. Method of placement: slowly poured as augers were removed

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-30		
Depth Feet	Blow Count	Sample	Description		Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
				pH=7.41 PID=4.7				
	4 8 11		<u>Sand</u> , gray, moist, fine-grained, roots					
				pH=7.48 PID=7.3				
	3 6 10			pH=8.02 PID=4.6				
	2 6 9		<u>Silty Clay</u> , gray, wet, plastic					
20				pH=7.81 PID=5.5			20	4" screen casing
	3 8 12			pH=7.55 PID=5.3				
	2 5 9		0.4-foot layer of gray sand, fine-grained					
				pH=7.16 PID=5.1				
	2 6 11		0.2-foot layer of gray sand, fine-grained					
				pH=7.26 PID=5.9				
			Total Depth of Drill Hole = 24 feet					Bottom Cap
25							25	

Client: Alamitos Generating Station				Well Number: AW-31			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 8, 01		Date Completed: May 8, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.77		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.31		GW Level (feet): 14.14		Time/Date: 1128 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
5	6 12 22	X	pH=9.68 PID=7.9			5	Cement Seal
	5 9 19	X	<u>Sand</u> , brown, moist, medium-grained				4" PVC blank casing
	6 11 23	X	pH=8.64 PID=6.9				Bentonite Seal
10	3 10 17	X	<u>Sandy Silt</u> , gray, moist, roots			10	
	3 6 13	X	pH=8.43 PID=5.2				
	4 9 15	X	pH=7.64 PID=2.9				
15	3 9 16	X	pH=7.49 PID=4.1				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft. Method of placement: slowly poured as augers were removed
			pH=7.33 PID=6.9			15	

Continued Next Page



Project: Ground Water Quality Monitoring Program						Well Number: AW-31	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 8 12		<u>Sandy Silt</u> , gray, moist, roots pH=7.29 PID=3.1				
			<u>Sand</u> , gray, moist, fine-grained, roots pH=7.44 PID=5.3				
	2 6 11		pH=7.81 PID=5.0				
	3 7 11		pH=7.37 PID=5.1				
20						20	4" screen casing
	3 6 10		<u>Sandy Silt</u> , gray, wet, plastic, organic material pH=7.26 PID=4.8				
			0.3-foot layer of gray sand, fine-grained				
	2 5 9		pH=7.36 PID=6.4				
	2 6 8		pH=7.18 PID=5.2				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-32	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: May 9, 01		Date Completed: May 9, 01		Screen: 0.02-inch slot From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.52		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 14.42		GW Level (feet): 13.87		Time/Date: 1130 6/8/01	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	9 18 29		pH=9.03 PID=3.3			5	Bentonite Seal
	6 12 24		<u>Sand</u> , brown, moist, medium-grained				
	5 10 19		pH=8.13 PID=4.1				
			pH=7.52 PID=3.6				
10	4 9 18		pH=7.11 PID=3.6			10	
	3 7 12		<u>Sandy Silt</u> , gray, moist, roots				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft. Method of placement: slowly poured as augers were removed
	4 9 17		pH=7.64 PID=2.9				
			pH=7.62 PID=6.0				
15	3 8 14					15	

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-32	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 7 11	X	<u>Sandy Silt</u> , gray, moist, roots pH=7.13 PID=3.9				
		X	<u>Sand</u> , gray, moist, fine-grained, roots pH=7.37 PID=3.4				
	3 5 10	X	pH=7.18 PID=5.9				
	2 6 9	X	pH=7.67 PID=4.6				
20						20	4" screen casing
	3 5 9	X	pH=7.31 PID=3.7				
	2 7 11	X	<u>Sandy Silt</u> , gray, wet, plastic, organic material pH=7.14 PID=6.9				
	2 6 9	X	pH=7.34 PID=3.6				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-33	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: May 9, 01		Date Completed: May 9, 01		Screen: 0.02-inch slot From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.31		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 12.85		GW Level (feet): 13.71		Time/Date: 1132 6/8/01	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	9 18 29					5	Bentonite Seal
			<u>Sand</u> , brown, moist, medium-grained				
	6 12 24						
	5 10 19						
10	4 9 18					10	
	3 7 12						Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed
	4 9 17		<u>Sandy Silt</u> , gray, moist, roots				
	3 8 14						
15						15	

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-33	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 7 11	X	<u>Sandy Silt</u> , gray, moist, roots				
			pH=7.64 PID=3.1				
	3 5 10	X	<u>Sand</u> , gray, moist, fine-grained, roots				
			pH=7.73 PID=2.7				
	2 6 9	X					
			pH=7.50 PID=5.3				
20			pH=7.34 PID=3.1			20	4" screen casing
	3 5 9	X	<u>Sandy Silt</u> , gray, wet, plastic, organic material				
			pH=7.14 PID=3.1				
	2 7 11	X					
			pH=7.19 PID=6.1				
	2 6 9	X					
			pH=7.11 PID=4.2				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-34			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 12, 01		Date Completed: May 12, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.36		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 12.83		GW Level (feet): 13.77		Time/Date: 1135 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
5	6 13 24	X	pH=7.98 PID=5.7			5	Cement Seal 4" PVC blank casing
	8 17 26	X	<u>Sand</u> , brown, moist, medium-grained				Bentonite Seal
	5 11 18	X	pH=8.25 PID=4.2				
10	4 9 16	X	pH=8.06 PID=3.9			10	
	3 7 16	X	<u>Sandy Silt</u> , gray, moist, roots				Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed
	4 9 18	X	pH=7.91 PID=4.1				
15	3 7 18	X	pH=7.88 PID=5.3			15	
			pH=7.63 PID=5.7				

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-34	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 8 11	X	<u>Sandy Silt</u> , gray, moist, roots				
	3 6 12	X					
	2 6 9	X	<u>Sand</u> , gray, moist, fine-grained, roots				
20	3 6 10	X				20	4" screen casing
	3 7 9	X	<u>Sandy Silt</u> , gray, wet, plastic, organic material				
	2 4 7	X					
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-35			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 12, 01		Date Completed: May 12, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 12.13		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.81		GW Level (feet): 15.58		Time/Date: 1138 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
5	9 20 29		<u>Sandy Silt</u> , gray, moist, plastic, roots pH=9.06 PID=6.1			5	Cement Seal 4" PVC blank casing
	10 18 27		pH=8.38 PID=5.6				Bentonite Seal
10	5 11 21		<u>Sand</u> , brown, moist, medium-grained pH=8.54 PID=4.9			10	
	3 9 16		pH=7.63 PID=3.6				
	4 8 17		<u>Silty Sand</u> , gray, moist, medium-grained pH=7.61 PID=5.7				Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed
	3 8 11		pH=7.52 PID=6.3				
15	2 6 9					15	

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-35	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 11		<u>Silty Sand</u> , gray, moist, medium-grained				
			pH=7.38 PID=3.7				
	2 6 9						
			pH=7.77 PID=4.2				
	3 7 10						
			pH=7.16 PID=5.6				
20							4" screen casing
	2 6 9		<u>Sand</u> , gray, wet, medium-grained			20	
			pH=7.34 PID=5.1				
	3 7 9		<u>Silty Clay</u> , gray, wet, plastic, organic material				
			pH=7.43 PID=5.7				
	2 5 8		0.3-foot layer of gray sand, fine-grained				
			pH=7.17 PID=4.6				
			pH=7.22 PID=4.1				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-36			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 14, 01		Date Completed: May 14, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 11.77		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 14.53		GW Level (feet): 15.24		Time/Date: 1142 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	8 18.24		pH=8.06 PID=7.8			5	
			<u>Sandy Silt</u> , gray, moist, plastic, roots				Bentonite Seal
	6 15 27		pH=8.13 PID=6.1				
	4 9 18		pH=8.14 PID=4.3				
10	3 8 15		<u>Sand</u> , brown, moist, medium-grained			10	
			pH=7.69 PID=2.8				
	2 7 12		<u>Silty Clay</u> , gray, wet, plastic, organic material				
			pH=7.77 PID=4.8				
	3 7 15		pH=7.49				
			<u>Silty Sand</u> , gray, moist, medium-grained				
			PID=3.7				
15	2 6 12					15	
							Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-36		
Depth Feet	Blow Count	Sample	Description		Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
				pH=7.38 PID=7.3				
	3 8 14		<u>Silty Sand</u> , gray, moist, medium-grained					
	2 7 10			pH=7.43 PID=3.8				
				pH=7.62 PID=4.6				
	3 6 9		<u>Sand</u> , gray, wet, medium-grained					
20				pH=7.72 PID=3.1			20	4" screen casing
	3 5 8		<u>Silty Clay</u> , gray, wet, plastic, organic material	pH=7.24 PID=5.0				
	2 4 7			pH=7.26 PID=3.9				
	3 5 8		0.3-foot layer of gray sand, fine-grained	pH=7.19 PID=4.7				
			Total Depth of Drill Hole = 24 feet					Bottom Cap
25							25	
30							30	
35							35	

Client: Alamitos Generating Station				Well Number: AW-37			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 14, 01		Date Completed: May 14, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 10.79		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 13.72		GW Level (feet): 14.70		Time/Date: 1146 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	6 18 26		<u>Sandy Silt</u> , gray, moist, plastic, roots pH=8.28 PID=3.2			5	Bentonite Seal
	5 11 21		pH=8.56 PID=7.3				
	4 8 12		pH=7.82 PID=5.8				
10	3 7 11		pH=8.06 PID=4.6			10	
	2 4 8		<u>Silty Clay</u> , gray, wet, plastic, organic material pH=8.16 PID=3.7				
	2 6 9		<u>Silty Sand</u> , brown, moist, fine-grained pH=7.67 PID=4.6				
15	3 8 11					15	Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-37	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	3 7 9		<u>Silty Sand</u> , gray, moist, medium-grained				
			pH=7.83 PID=6.8				
	2 8 12						
			pH=7.51 PID=6.7				
	3 7 11		<u>Silty Sand</u> , gray, wet, medium-grained				
			pH=7.29 PID=4.5				
20						20	4" screen casing
	2 5 9						
			pH=7.29 PID=3.9				
	2 5 10		<u>Silty Clay</u> , gray, wet, plastic, organic material				
			pH=7.33 PID=5.7				
	3 6 9						
			pH=7.41 PID=3.0				
			pH=7.25 PID=4.1				
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap
30						30	
35						35	

Client: Alamitos Generating Station				Well Number: AW-38	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: May 16, 01		Date Completed: May 16, 01		Screen: 0.02-inch slot From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 10.43		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 14.05		GW Level (feet): 15.16		Time/Date: 1148 6/8/01	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
			<u>Sandy Silt</u> , gray, moist, plastic				Cement Seal
							4" PVC blank casing
5	5 11 21		<u>Silty Sand</u> , brown, moist, fine-grained			5	Bentonite Seal
	6 11 19		pH=7.68 PID=8.6				
	5 9 14		pH=7.66 PID=6.9				
10	4 8 11		pH=8.02 PID=3.4			10	
	2 5 9		<u>Silty Clay</u> , dark gray, wet, plastic, roots				
	3 6 10		pH=7.19 PID=6.1				
	3 8 11		pH=7.64 PID=5.6				
15			<u>Silty Sand</u> , gray, wet, medium-grained			15	Lone Star #3 gravel pack, calculated and used 8.5 cu. ft. Method of placement: slowly poured as augers were removed
			pH=7.37 PID=4.0				

Continued Next Page

Project: Ground Water Quality Monitoring Program						Well Number: AW-38	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	2 5 9		<u>Silty Sand</u> , gray, moist, medium-grained				
	3 7 15						
	2 7 11						
20						20	4" screen casing
	3 6 10						
	2 6 10		<u>Sand</u> , gray, saturated, medium-grained				
	3 6 8						
25			Total Depth of Drill Hole = 24 feet			25	Bottom Cap

Client: Alamitos Generating Station				Well Number: AW-39			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: May 16, 01		Date Completed: May 16, 01		Screen: 0.02-inch slot		From: 9 - To: 24	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 7 - To: 24	
Drilling Co.: Odyssey		Driller: M. Wanhala		Seal: Bentonite		From: 5 - To: 7	
Method: Hollow Stem Auger		Equipment: SIMCO		Grout: Cement		From: 0 - To: 5	
Boring Depth (feet): 24.0		Measuring Point Elevation (feet): 13.08		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 15.33		GW Level (feet): 16.62		Time/Date: 1152 6/8/01		Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , brown, dry, medium-grained, gravel			0	
							Cement Seal
							4" PVC blank casing
5	4 10 23		pH=7.49 PID=9.3			5	
			<u>Sand</u> , mottled tan, moist, fine-grained				Bentonite Seal
	3 8 15		pH=7.77 PID=5.1				
	2 7 11		pH=7.38 PID=2.6				
			pH=7.44 PID=5.5				
10	3 7 10					10	
	2 5 9		pH=7.46 PID=5.0				Lone Star #3 gravel pack, calculated and used 8.5 cu.ft. Method of placement: slowly poured as augers were removed
			<u>Silty Clay</u> , dark gray, wet, plastic, roots				
	3 5 9		pH=7.54 PID=3.8				
			<u>Silty Sand</u> , gray, wet, medium-grained				
	2 8 11		pH=7.79 PID=6.9				
15						15	

Continued Next Page

Project: Ground Water Quality Monitoring Program					Well Number: AW-39		
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			<u>Silty Sand</u> , gray, moist, medium-grained				
	3 6 8		pH=7.63 PID=4.1				
	2 7 10		pH=7.18 PID=4.9				
	3 6 9		<u>Sand</u> , gray, saturated, fine-grained, roots				4" screen casing
20			pH=7.29 PID=3.4			20	
			Saturated sand began to enter the augers as the center bit was being removed				
			Total Depth of Drill Hole = 24 feet				Bottom Cap
25						25	
30						30	
35						35	



Southern California Edison

Client: Alamitos Generating Station				Well Number: AW-40			
Project: Ground Water Quality Monitoring Program				Well Construction Data			
Date Started: Aug 10, 06		Date Completed: Aug 10, 06		Screen: 0.02-inch slot		From: 15 - To: 30	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3		From: 13 - To: 30	
Drilling Co.: Gregg Drilling		Driller: Juan		Seal: Bentonite		From: 10 - To: 13	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement		From: 0 - To: 10	
Boring Depth (feet): 30.0		Measuring Point Elevation (feet): 11.96		Casing Size: 4-inch PVC, flush-threaded			
Initial GW Level (feet): 14.80		GW Level (feet): 13.81		Time/Date: 1322 8/22/06		Protective Casing: 10-inch, sch. 80, PVC	
Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, gravel				
			<u>Sandy Silt</u> , brown, moist, gravel, clay pods				
5			pH=8.29			5	
			pH=8.48				Cement Seal
			pH=7.34				
			<u>Sandy Clay</u> , layers of dark grey and tan, moist, plastic				4" PVC blank casing
10			pH=7.07			10	
			pH=7.13				
			Began to encounter small gravel				Bentonite Seal
			pH=7.46				
			<u>Sandy Silt</u> , tan, moist, fine-grained				
			pH=7.31				
15			<u>Sandy Silt</u> , gray, moist, minor gravel, ribbons of decomposing organics			15	
			pH=7.30				Lone Star #3 Gravel Pack, calculated and used 10 cu.ft.
			pH=8.12				Method of placement: slowly poured as augers were removed
			<u>Clay</u> , greenish gray, moist, plastic, pods of light grey clay, organics				
			pH=8.36				
20			pH=8.22			20	
			pH=8.09				
			<u>Silty Sand</u> , grey, moist, organics				4" PVC screen casing
			pH=7.85				
			pH=7.49				
25			pH=7.71			25	
			<u>Sandy Clay</u> , grey, moist, plastic				
			pH=8.01				
			<u>Silty Sand</u> , grey, saturated, medium-grained				
			pH=7.82				
30			Total Depth of Drill Hole = 30 feet			30	Bottom Cap

Client: Alamitos Generating Station				Well Number: AW-41	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: Aug 10, 06		Date Completed: Aug 10, 06		Screen: 0.02-inch slot From: 15 - To: 30	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 13 - To: 30	
Drilling Co.: Gregg Drilling		Driller: Juan		Seal: Bentonite From: 10 - To: 13	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 - To: 10	
Boring Depth (feet): 30.0		Measuring Point Elevation (feet): 11.34		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 14.01		GW Level (feet): 13.36		Time/Date: 1405 8/22/06	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0			<u>Silty Sand</u> , dark brown, moist, gravel			0	
5			pH=8.48 pH=8.32			5	Cement Seal
			<u>Silt</u> , dark grey with streaks of grey, moist, plastic				
			<u>Sandy Clay</u> , layers of dark grey and tan, moist, plastic				4" PVC blank casing
10			6" layer of tan, coarse-grained sand			10	Bentonite Seal
			pH=8.38 pH=8.62 pH=8.27 pH=7.67 pH=7.94				
15			<u>Clay</u> , dark grey, moist, plastic, seams of coarse grained tan sand			15	Lone Star #3 Gravel Pack, calculated and used 10 cu.ft. Method of placement: slowly poured as augers were removed
			pH=7.08 pH=6.88 pH=7.65				
20			<u>Silty Sand</u> , gray, saturated, coarse-grained			20	
			pH=7.34 pH=7.52				
			<u>Sandy Clay</u> , gray, moist, plastic, organics				4" PVC screen casing
			pH=7.73				
25			<u>Silty Sand</u> , grey, saturated, medium-grained			25	
			pH=7.88				
30			Total Depth of Drill Hole = 30 feet			30	Bottom Cap

Client: Alamitos Generating Station				Well Number: AW-42	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: Aug 11, 06		Date Completed: Aug 11, 06		Screen: 0.02-inch slot From: 12 - To: 27	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 10 - To: 27	
Drilling Co.: Gregg Drilling		Driller: Juan		Seal: Bentonite From: 8 - To: 10	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 - To: 8	
Boring Depth (feet): 33.0		Measuring Point Elevation (feet): 11.35		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 15.47		GW Level (feet): 13.26		Time/Date: 1345 8/22/06	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, gravel				
			pH=8.09				
5			<u>Clay</u> , gray, moist, ribbons of brown sand			5	Cement Seal
			pH=8.24				
			<u>Peat</u> , grey/black, moist, soft				
			<u>Clay</u> , gray/black, moist, plastic, organics				
			<u>Sandy Silt</u> , tan, moist, fine-grained				
10			pH=8.11			10	Bentonite Seal
			pH=8.24				
			pH=8.44				
			pH=8.53				
			pH=8.36				
15			pH=8.41			15	Lone Star #3 Gravel Pack, calculated and used 10 cu.ft. Method of placement: slowly poured as augers were removed
			pH=8.07				
			pH=8.16				
			pH=8.32				
20			<u>Sandy Clay</u> , greenish gray, moist, plastic			20	4" PVC screen casing
			pH=8.51				
			pH=8.43				
			pH=8.37				
25			<u>Silty Sand</u> , gray, saturated, medium-grained			25	
			pH=8.13				
			pH=8.04				
			pH=8.11				
30			Water rushed into the auger when the silty sand was encountered			30	Bottom Cap
			pH=7.69				Bottom sluff due to running, saturated sand
			Total Depth of Drill Hole = 33 feet				

Client: Alamitos Generating Station				Well Number: AW-43	
Project: Ground Water Quality Monitoring Program				Well Construction Data	
Date Started: Aug 11, 06		Date Completed: Aug 11, 06		Screen: 0.02-inch slot From: 15 - To: 25	
Logged By: P. Hamilton		Checked By: P. Hamilton		Pack: Lone Star #3 From: 13 - To: 25	
Drilling Co.: Gregg Drilling		Driller: Juan		Seal: Bentonite From: 10 - To: 13	
Method: Hollow Stem Auger		Equipment: Mobile B-80		Grout: Cement From: 0 - To: 10	
Boring Depth (feet): 26.0		Measuring Point Elevation (feet): 11.57		Casing Size: 4-inch PVC, flush-threaded	
Initial GW Level (feet): 14.21		GW Level (feet): 13.42		Time/Date: 1255 8/22/06	
				Protective Casing: 10-inch, sch. 80, PVC	

Depth Feet	Blow Count	Sample	Description	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0						0	
			<u>Silty Sand</u> , brown, dry, gravel				
5			<u>Sandy Clay</u> , dark gray, moist, ribbons of brown clay pH=8.14 pH=8.31			5	Cement Seal
			<u>Sandy Silt</u> , gray, moist, organics Encountered 6" sand layer: coarse grained, grey at 6 feet pH=7.44				
			<u>Sandy Clay</u> , light grey, moist pH=8.33				4" PVC blank casing
10			<u>Silty Sand</u> , tan, moist, fine-grained, zones of red staining pH=8.09			10	
			Begin encountering organics pH=8.21				Bentonite Seal
			Moisture change to wet pH=8.07				
15			6" layer of gray coarse grained sand pH=7.92			15	Lone Star #3 Gravel Pack, calculated and used 10 cu. ft. Method of placement: slowly poured as augers were removed
			<u>Silt</u> , layered grey and brown, wet, gravelly pH=8.14 pH=8.12				
20			<u>Sand</u> , grey, saturated, medium-grained pH=7.84 pH=7.53			20	4" PVC screen casing
25						25	Bottom Cap
							Bottom sluff due to running, saturated sand
			Total Depth of Drill Hole = 26 feet				