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DEPARTMENT OF THE NAVY
Base Realignment and Closure Program Management Office West
1455 Frazee Road, Suite 900, San Diego, California 92108-4310

FINAL

# SCAPS LASER INDUCED FLUORESCENCE TARRY REFINERY WASTE INVESTIGATION REPORT ALAMEDA POINT, ALAMEDA, CALIFORNIA

June 2008

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Prepared for:

DEPARTMENT OF THE NAVY- BASE REALIGNMENT AND CLOSURE
UNDER NAVFAC SOUTHWEST CONTRACT N68711-03-D-4302

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June 10, 2008

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SUBJECT: Final SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation Report Alameda Point, Alameda, California

Dear Ms. Hurst,

Richard Brady & Associates is pleased to submit one copy of the Final SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation Report Alameda Point, Alameda, California. It has been a pleasure working with you on this project, and we appreciate your support throughout the year.

Please contact me at 619-571-4176 if you have any questions or comments.

Sincerely,

Timothy Shields
Program Manager
Richard Brady & Associates

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Ms. Anna-Marie Cook, U.S. EPA (1 copy)
Ms. Dot Lofstrom, Department of Toxic Substances Control (1 copy)
Mr. John West, California Regional Water Quality Control Board (1 copy)
Ms. Karla Brasaemle, Tech Law Inc. (1 copy)
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Mr. Craig Hunter, Tetra Tech (1 copy; CD only)
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## ACRONYMS/ ABBREVIATIONS

| | |
|---|---|
| AST | above ground storage tank |
| AVGAS | aviation gasoline |
| Bay Area | San Francisco Bay Area |
| BCT | Base Closure Team |
| bgs | below ground surface |
| BRAC PMO West | Base Realignment and Closure Project Management Office West |
| BSU | bay sediment unit |
| BTEX | benezene, toluene, ethyl benzene and total xylenes |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| COC | Chain-of-Custody |
| CPT | cone penetrometer test |
| CSM | conceptual site model |
| DOT | Department of Transportation |
| DTSC | Department of Toxic Substance Control |
| DQO | Data Quality Objectives |
| EPA | Environmental Protection Agency |
| FQC | Field Quality Control |
| FS | Feasibility Study |
| ft | feet |
| GAP | generator accumulation point |
| GC/MS | gas chromatograph/mass spectrometer |
| GMS | Groundwater Modeling System |
| GPS | global positioning system |
| IR | Installation Restoration |
| ITSI | Innovative technical Solutions, INC. |
| JP | jet propellant |
| LCS | laboratory control sample |
| LDC | Laboratory Data Consultants |
| LIF | Laser Induced Fluorescence |
| mg/kg | milligrams per kilogram |
| MS/MSD | matrix spike/matrix spike duplicate |
| NADEP | Naval Aviation Depot |

| | |
|---|---|
| NAVFAC SW | Naval Facilities Engineering Command Southwest |
| Navy | United Stated Navy |
| NFESC | Naval Facilities Engineering Service Center |
| nm | nanometer |
| | |
| OU | Operable Unit |
| OWS | oil water seperator |
| | |
| PAH | polycyclic aromatic hydrocarbons |
| PARCC | precision, accuracy, representativeness, completeness, and comparability |
| % D | percent difference |
| % R | percent recoveries |
| % RSD | percent relative standard deviation |
| pH | potential of hydrogen |
| POL | petroleum, oil and lubricants |
| PRC | PRC Environmental Management Incorporated |
| PRCs | preliminary remediation criteria |
| PRGs | U.S Environmental Protection Agency Region 9 Preliminary Remediation Goals |
| PWC | U.S. Navy Public Works Center |
| | |
| QA/QC | quality assurance/quality control |
| | |
| RAB | Restoration Advisory Board |
| RBA | Richard Brady & Associates |
| RPD | relative percent difference |
| RRF | relative response factor |
| RSD | relative standard deviation |
| RV | recreational vehicle |
| | |
| SAP | Sampling and Analysis Plan |
| SCAPS | Site Characterization and Analysis Penetrometer System |
| SDG | sample delivery group |
| Shaw | Shaw Environmental Incorporated |
| SOP | Standard Operating Procedures |
| | |
| TPH | total petroleum hydrocarbons |
| TPH-d | total petroleum hydrocarbons as diesel |
| TPH-mo | total petroleum hydrocarbons as motor-oil |
| TRW | tarry refinery wastes |
| | |
| µg/kg | micrograms per kilogram |
| UST | underground storage tank |
| | |
| VOC | volatile organic compounds |

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# 1.0 INTRODUCTION

This Final Report has been prepared by Richard Brady & Associates (RBA) for the Site Characterization and Analysis Penetrometer System (SCAPS) Laser Induced Fluorescence (LIF) Investigation of Tarry Refinery Waste (TRW) at Installation Restoration (IR) Program Site 13, Alameda Point, Alameda, California (Figure 1-1). This report was prepared under subcontract to Shaw Environmental, Inc. (Shaw), for Naval Facilities Engineering Command Southwest (NAVFAC SW) and Base Realignment and Closure Program Management Office West (BRAC PMO West) under Contract Number N68711-03-D-4302. This Final Report has been prepared in general accordance with Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requirements.

Several environmental investigations have identified the presence of black, tarry, and asphaltic residues in soils within IR Site 13. These observations are supplemented by analytical results, which demonstrate elevated levels of petroleum-related compounds associated with the residues. The residue is believed to be TRW disposed of at the site during historic oil refinery operations, which pre-date Navy ownership of the property. The previous investigations did not define the subsurface distribution, chemical nature, and variability of TRW with sufficient resolution to optimize decisions regarding remedial alternatives at IR Site 13.

## 1.1 Purpose

Prior to this investigation, the conceptual site model (CSM) left uncertainty regarding the thickness, spatial distribution, and variation in the chemical nature of the TRW disposed of during historic oil refinery operations at IR Site 13. The Navy identified the SCAPS LIF technology as being appropriate to provide additional data that will reduce uncertainty about the distribution of TRW.

The purpose of the SCAPS LIF investigation was to provide data to update and refine the CSM with regards to:

- the horizontal and vertical extent of TRW,
- the concentration and type of contaminants in the TRW, and
- the general chemical properties of the TRW.

The refined CSM of the nature and extent of the TRW will support the determination of useful monitoring well locations (if monitoring wells are required or recommended in the future) and optimization of remedial alternatives analysis in the Operable Unit (OU) 2A (OU-2A) Feasibility Study (FS).

## 1.2 Scope of Work

This section discusses the tasks that were conducted to meet project objectives.

The SCAPS investigation proceeded by pushing the LIF probe at 182 locations to depths ranging from 15 feet (ft) to 22 ft below ground surface (bgs). The florescence intensity was compared to background fluorescence and wavelength data to determine the presence of TRW and other petroleum hydrocarbon contamination.

A total of sixteen solid soil samples were collected from SCAPS push locations and analyzed for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), metals, polycyclic aromatic hydrocarbons (PAHs), and general chemistry parameters by a fixed-based laboratory. TRW matrix sample locations were selected based on real-time data to evaluate SCAPS LIF data, and characterize variability in chemical composition of TRW for input in the CSM. All soil and TRW matrix data obtained during the investigation was independently validated in accordance with the United States Navy (Navy) IR Program guidelines for data validation.

The existing CSM has been redefined using the newly obtained data and usable historical data.

# 2.0 BACKGROUND

## 2.1 Facility Location

Alameda Point is located at the western end of Alameda Island near the northwestern corner of Alameda County, California (Figure 1-1). Alameda Island is located at the eastern edge of San Francisco Bay adjacent to the City of Oakland. Alameda Point is approximately 2 miles long and 1 mile wide, and occupies 2,634 acres.

Originally a peninsula, Alameda Island was detached from the mainland in 1876 when a channel was cut to link San Leandro Bay with the San Francisco Bay. The northern portion of Alameda Island was formerly tidal areas, marshlands, and sloughs adjacent to the historic San Antonio Channel, now known as the Oakland Inner Harbor. During the late 1800s, the eastern portion of Alameda Point was used for industrial purposes. Specifically, the Pacific Coast Oil Company operated a refinery along the western shore of the island (SulTech, 2005a).

## 2.2 Site Description and History

IR Site 13 encompasses the majority of the former location of the Pacific Coast Oil Works Company Refinery, which operated from 1879 to 1903. The refinery formerly occupied IR Site 13 as well as adjoining IR Sites 19, 22, and 23. Historic fire insurance maps show the location of the refinery structures, which consisted of pump and lubricant houses, two laboratories, agitators, and bleaching tanks, as well as nineteen iron aboveground storage tanks (ASTs), six iron underground storage tanks (USTs) and a storage area containing drums of oil (Sanborn, 1897). The former tanks were used to store crude oil and finished products, as well as to store materials for processes such as bleaching and condensing. The majority of refinery operations occurred in the southern portion of IR Site 13. Petroleum refinery operations in the late 1800s consisted of distilling crude oil to kerosene and fuel oil. Wastes from this type of operation would be expected to include heavier-end hydrocarbons that weather to an asphaltic-like consistency. The type and quantity of wastes and location of disposal are not documented; however, it is reasonable to hypothesize that the refinery wastes and asphaltic residues were disposed of at the site, the surrounding tidal lands, and the native sediments of San Francisco Bay (SulTech, 2005a).

IR Site 13 is situated about 1,000 ft east of the Seaplane Lagoon and lies at the center of OU-2A (Figure 2-1). The site is approximately 17.5 acres in size, relatively flat, partially paved, and comprises primarily open space with several structures. IR Site 13 includes former jet engine test cells in Building 397, a self storage area (Buildings MS-01 through MS-10), a recreational vehicle (RV) park, the Naval Aviation Depot (NADEP) generator accumulation point (GAP) 62 (a temporary hazardous waste storage area); oil water separators (OWSs) 397A, 397B, and 397C; and several storm sewer lines. No structures from the former oil refinery remain at IR Site 13.

Located to the south, within Site 23, is Building 530, which operated as a missile rework facility. The paved area directly west of Building 530 was used for aircraft defueling

between 1958 and 1985 (Tetra Tech, 2003). To the east of Building 530 is the mini-storage area, also within the boundaries of IR Sites 13 and 23. The area is currently occupied by rows of cinder-block storage structures, and little is known about the historic use of this area.

Currently, approximately 90 percent of IR Site 13 consists of open space. Approximately half of the ground surface is exposed soil, and the other half is paved with asphalt or concrete with some minor areas of exposed soil and weeds. Current uses for the site include vehicle parking, and storage (SulTech, 2005a).

## 2.3 Historical and Anecdotal Information

The former Pacific Coast Oil Works Company Refinery, which occupied parts of OU-2A from 1879 to 1903, has been the subject of historical and anecdotal information. TRW or oil has been noted at the surface or in the storm drain system over the years since the refinery was moved to Richmond, California in 1903. Historic site conditions, along with a series of historic maps and figures, are depicted on Figure 2-2. Figure 2-3 depicts recent and repaired surface expressions of TRW or oil at OU-2A.

References to an explosion and surface repair by the emplacement of a 30 by 30 foot concrete pad have been made in the RI Report for OU-2A (SulTech, 2005a). However, no documentation or physical evidence of this has been found. The SCAPS advanced 182 pushes on a grid with approximately 50-foot spacing across OU-2A, and the concrete pad was not encountered.

Oil has been reported seeping into the storm drain system in localized areas of the Alameda Point Mini Storage (Figure 2-3). Several activities to abate the flow of oil into the storm drain system have been completed to date, including lining the storm drain system and catch basins, and the removal of oil from the storm drain system (SulTech, 2005a).

Low potential of hydrogen (pH) in soil has been reported during previous investigations, treatability studies, and remedial actions at IR Site 13. The low pH is suspected to be related to the refining process used to produce kerosene and fuel oil at the time of the refinery's operation at Alameda Point. Soil with pH lower than 2.0 was reported in several borings advanced during the 1991 Phase I and II investigation in the area of the 1993 Lead Removal Action. The known area of low pH occurrence in soil is depicted on Figure 2-3 (SulTech, 2005a).

## 2.4 Topography and Climate

Alameda Point is located at the western end of Alameda Island, which lies at the base of a generally western-sloping plain that extends from the Oakland-Berkley hills on the east to the shore of the San Francisco Bay on the west (Figure 1-1). The island is also bordered by the San Francisco Bay to the south, and the Oakland Inner Harbor to the north (Tetra Tech, 1998).

The San Francisco Bay Area (Bay Area) experiences a maritime climate, with mild summer and winter temperatures. Prevailing winds in the Bay Area are from the west. Due to the varied topography of the Bay Area, climate conditions vary considerably throughout the region. Heavy fogs occur on an average of twenty-one days per year. Rainfall occurs primarily during the months of October through April. The installation averages about 18 inches of rainfall a year (Tetra Tech, 1998).

Physical features at Alameda Point include runways, streets, buildings, fuel lines, USTs, ASTs, and utility lines (sanitary sewer, storm drain, water, and power lines). Some fuel lines, USTs, and ASTs have been removed, and others have been closed in place (SulTech, 2005a).

## 2.5 Geology

The subsurface materials historically encountered at OU-2A primarily consist of interbedded sand, silt and clay layers. Bedding appears to be somewhat continuous, but irregular over the site [Public Works Center (PWC), 1997].

In general, six stratagraphic units underlie OU-2A including artificial fill, the Bay Sediment Unit (BSU), the Merritt Sand, the Upper San Antonio Formation, the Yerba Buena Mud, and the Alameda Formation/Franciscan Complex. The six stratagraphic units are described in greater detail below (SulTech, 2005a).

The artificial fill is the uppermost unit that underlies most of OU-2A, ranging in thickness from 0 to 15 feet bgs. This unit is thickest in the western portion of IR Site 9 and decreases in thickness until it pinches out at Site 22 and the northeast corner of IR Site 13 (Figure 2-1). The artificial fill unit at OU-2A is mainly composed of brown, dense to medium dense silty sand. Local variations in the fill include discontinuous clay and gravel lenses. Construction debris consisting of concrete, asphalt, and wood has been encountered in numerous borings at OU-2A (SulTech, 2005a).

The Holocene Estuarine BSU underlies the artificial fill at OU-2A at IR Site 9 and the western portions of IR Sites 13, 19, and 23, where it pinches out along the historic shoreline of Alameda Island (Figure 2-2). Northeast of the historic shoreline, the BSU is not present. The BSU at OU-2A reaches a maximum thickness of 9 feet at IR Sites 9 and 13 and consists of loose silt and soft gray to black clay with laterally discontinuous, poorly graded, silty and clayey sands associated with subtidal deposits (SulTech, 2005a).

The late Pleistocene/Holocene eolian deposit known as the Merritt Sand is present at the ground surface at OU-2A in the eastern portion of IR Site 22 and in the northeastern portion of IR Site 13 (Figure 2-1). In the western portion of IR Site 22 and the central portion of IR Sites 13, 19, and 23, the Merritt Sand underlies the artificial fill. At IR Site 9 and the western portions of IR Sites 13, 19, and 23, the Merritt Sand underlies the BSU. The Merritt Sand ranges in thickness from 55 feet at IR Site 9 to 80 feet at IR Sites 13 and 23 and is comprised of brown, dense to medium dense, fine- to medium-grained sand with some thin continuous clayey or silty sands (SulTech, 2005a).

The late Pleistocene/Holocene alluvial deposit known as the upper unit of the Upper San Antonio Formation underlies the Merritt Sand at OU-2A. The depth to the top of the upper unit of the Upper San Antonio Formation is between 68 feet bgs at IR Site 19 and 84 feet bgs at IR Site 23 (Figure 2-1). The thickness of the upper unit ranges from 3 to 8 feet at IR Site 9 and from 15 to 28 feet at IR Site 13. This unit consists of medium-grained dark gray to olive brown sand containing varying amounts of silt and clay (SulTech, 2005a).

The late Pleistocene estuarine deposit known as the Yerba Buena Mud comprise the lower unit of the Upper San Antonio Formation. The depth to the top of the Yerba Buena Mud is between 79 feet bgs at IR Site 9 and 100 feet bgs at IR Sites 13 and 23 (Figure 2-1). The total thickness of the Yerba Buena Mud at OU-2A has not been explored during investigations to date. The Yerba Buena Mud is described as a bluish gray, stiff silty clay or fat clay with some organic matter (SulTech, 2005a).

Geologic Units thought to occur below the Yerba Buena Mud include the Alameda Formation and the Franciscan Complex (SulTech, 2005a).

## 2.6 Hydrogeology

Groundwater is shallow (less than 10 ft bgs) at Alameda Point. Depth to groundwater has been reported in previous investigations at IR Site 13 as being approximately 6 ft bgs. Groundwater elevations are quite variable across the central portion of OU-2A. Figure 2-2 depicts the groundwater elevations from the spring 2007 annual basewide groundwater monitoring event by Innovative Technical Solutions, Inc. (ITSI, 2008). The unusual variability in groundwater elevations at the site may be attributable to the relatively impermeable nature of the TRW, shallow utilities that cross the site and potentially the TRW and groundwater table. This groundwater anomaly is discussed in detail in Section 5.5, TRW Modeling. Groundwater flow across the site is estimated to be west towards San Francisco Bay (ITSI, 2008).

# 3.0 INVESTIGATION RATIONALE

## 3.1 Rationale for Selecting LIF/CPT

The LIF probe was selected for this investigation because of its concurrent cone penetrometer test (CPT) and petroleum contamination screening capability that guide the collection of soil samples. This assessment strategy allowed for rapid and optimized sample depth selection based on fluorescence intensity and CPT soil classification with the enhanced vertical accuracy afforded by the computerized sample depth control.

## 3.2 Rationale for Selecting Analytical Methods

Chemicals historically associated with TRW include TPH, benzene, toluene, ethylbenzene, and total xylenes (BTEX), PAHs, and lead. Associated pH values as low as 1.1 have also been reported in samples collected from the site. Black and gray sand observed surrounding the TRW has historically contained elevated concentrations of TPH, xylene, ethylbenzene, and PAHs (SulTech, 2005a).

Soil and TRW matrix samples were analyzed for the following:

- TPH extractable by EPA Method 8015M
- BTEX and VOCs including Methyl Tertiary Butyl Ether by EPA Method 8260B
- SVOCs by EPA Method 8270C
- PAHs by EPA Method 8270 SIM
- Metals and Mercury by EPA Method 6010/4740
- pH by EPA Method 150.1
- general chemistry and bulk density

The regulatory partners requested additional analyses on TRW matrix samples, including viscosity, specific gravity, and flammability, during a meeting held November 28, 2007 to discuss the sampling strategy for OU-2A. Details regarding this meeting are provided in Section 3.3 below. Upon submittal of the samples to the laboratory, it was determined that these analyses were not possible without the presence of free phase liquid in the samples. The samples collected by the SCAPS field team did not contain free phase liquid. The laboratory informed the RBA QA Manager of this situation and suggested that the samples be analyzed for moisture and density as these analyses would provide similar information as specific gravity for solid samples. Subsequently the BRAC PMO West RPM and the RBA QA Manager and Project manager agreed to proceed with the laboratory's suggestion.

## 3.3 Sampling Rationale

This investigation was designed primarily to use field methods, specifically SCAPS LIF, to delineate the extent of TRW contamination. SCAPS LIF and CPT real-time data were interpreted to identify the presence of TRW in the subsurface.

Soil samples were collected and analyzed for the purpose of evaluating SCAPS LIF effectiveness in accordance with analytical approaches 4, 5, and 6 as presented in the sampling design rationale in Table 4-1 of the Final Sampling and Analysis Plan (SAP) (RBA, 2007), as well as to further characterize the chemical nature of TRW. The Data Quality Objectives (DQOs) developed for this project is provided as Appendix A.

The SCAPS team identified five locations with relatively consistent elevated fluorescence intensity through a continuous depth interval more than 18 inches thick. This was done in order to provide assurance that all of the soil recovered in the 18-inch-long drive sampler would be from an interval of elevated fluorescence. Once an individual location was identified, two related sample locations were selected to make a sample set. A set consisted of three samples: one sample representing the elevated fluorescence and two samples representing areas of background fluorescence adjacent to the elevated fluorescence.

The first sample of each set was from a depth interval of background fluorescence directly above the interval of elevated fluorescence. This sample was intended to address DQO analytical approaches 5 and 6 in the Final SAP by confirming that background fluorescence represents concentrations below project action levels.

The second sample of each set was from a lower depth in the same hole. This second sample targeted the interval of greatest fluorescence. This sample was intended to address DQO analytical approach 4 in the Final SAP by confirming TRW fluorescence.

The third soil sample of each set was from an adjacent LIF location where background fluorescence was measured through the entire push interval. This sample targeted a depth corresponding to the second sample of each set (the highest fluorescence at the adjacent push location). This sample was intended to address DQO analytical approaches 5 and 6 in the Final SAP by confirming that background fluorescence represents concentrations below project action levels.

A meeting was held on November 28, 2007 at the Department of Toxic Substance Control (DTSC) offices in Berkeley, California to review the LIF data collected during the initial phase of the investigation and to agree on the locations of the soil and TRW matrix samples for the sampling phase of this investigation. The meeting included representatives from the Navy, Environmental Protection Agency (EPA), DTSC, and the SCAPS Team. The field team presented the recommended fifteen sampling locations, and after discussion, the sampling locations were agreed upon. All sample locations were consistent with the analytical approach criteria in the DQOs presented in the regulatory agency-approved Final Work Plan (RBA, 2007). In addition, one soil sample location in

an area of extremely high fluorescence was selected to further characterize the variability in chemical composition of TRW. The meeting minutes are provided in Appendix B.

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# 4.0 FIELD ACTIVITIES

The SCAPS LIF investigation of TRW at IR Site 13, the former oil refinery, was performed in four deployments. The deployments were completed as follows:

- October 15 through 23, 2007 (LIF Pushes)
- October 29 through November 3, 2007 (LIF Pushes)
- December 3 through 5, 2007 (Soil and TRW Matrix Sampling)
- January 2 and 3, 2008 (Final LIF Pushes)

## 4.1 Permitting and Notification

A Drilling Permit Application was submitted to the Alameda County Public Works Agency, Water Resources Section, on October 10, 2007. The Application was approved on October 12, 2007. A copy of Alameda County Public Works Agency Water Resources Well Permit W2007-1056 is provided in Appendix C.

## 4.2 Utilities

Underground utility clearance was completed for each subsurface investigation location (push). Proposed direct-push locations and the utility lines in the area of interest were marked using color-coded surveyor paint. Cruz Brothers Locators, an underground utility marking service, cleared the push locations using geophysical methods. Underground Service Alert was notified prior to the start of work. The LIF and soil sample push locations were located at least 3 ft away from any marked or otherwise suspected underground utility.

## 4.3 Investigation Methods

This section describes the SCAPS investigation methods used at the site. The findings of the investigation are described in Section 5.

### 4.3.1 LIF/CPT Investigation

One hundred eighty two SCAPS CPT/LIF pushes were completed at Alameda Point at locations depicted on Figure 4-1. The CPT/LIF work was conducted in three deployments between October 15, 2007 and January 3, 2008. Lithologic data was collected using a CPT probe. The CPT is an instrumented probe that measures the cone resistance and sleeve friction of the probe penetration. Data for cone resistance and sleeve friction are simultaneously recorded in units of tons per square foot at approximately 1-inch vertical intervals. The data processing unit calculates the friction ratio (the ratio of sleeve friction to cone resistance). The friction ratio and cone resistance values are mapped to corresponding soil behavior classifications using Robertson and Campanella's method (Figure 4-2), providing continuous, real-time profiling of the subsurface lithology.

The LIF probe augments the above-described standard CPT capabilities to include Petroleum Oil and Lubricants (POL) detection. SCAPS uses the LIF via the push-rod and probe fiber-optic cable system to detect relative subsurface soil POL concentrations. The LIF provides measurements of POL with a vertical resolution of approximately 2 inches as the probe is pushed into the ground at a rate of 3 feet per minute.

The SCAPS 308-nanometer (nm) xenon-chloride laser technology is best suited for investigating sites that include compounds containing two-ring (or greater) PAHs, such as aviation gasoline (AVGAS), gasoline, JP-4, JP-5, diesel fuel, or oils. The SCAPS laser produced excellent fluorescence in the TRW.

As the LIF probe is pushed into the ground, laser light is transmitted via fiber optics within the rod-probe assembly. The light is transmitted to the soil through an optical window mounted in the probe. As the optical window passes by the soil, the PAHs contained in POL are induced to fluoresce. This fluorescence signal is carried back to the surface through a second optical fiber in the probe-rod assembly. The return signal is analyzed by a linear photodiode array spectrophotometer and recorded on the onboard computer.

As the probe is advanced, computer-generated real-time continuous logs of fluorescence intensity and wavelength are produced simultaneously with the CPT soil resistance, cone pressure and soil classification logs. Fluorescence intensity, wavelength logs, and spectral curves are used to evaluate the relative abundance of subsurface POL contaminants and to evaluate whether or not different types of POL are present.

### 4.3.2 Soil and TRW Matrix Sampling

Soil and TRW matrix samples were collected on December 4 and 5, 2007 using 6-inch-long, stainless steel tubes and a direct-push drive sampling tool. Samples for VOC analysis were immediately collected from the drive tube using three 5-gram EnCore® devices in accordance with EPA Method 5035. A total of sixteen solid soil and TRW matrix samples were analyzed for VOCs, PAHs, TPH-d, TPH-mo, metals, pH, and general chemistry by EMAX Laboratories Inc. in Torrance, California. The laboratory analyses were scheduled in accordance with the Final SAP (RBA, 2007) and the agreements made at the November 28, 2007 planning meeting.

### 4.3.3 Destruction and Grouting of SCAPS Holes

The LIF/CPT probe is equipped with an internal grout injection tube which runs the length of the probe to backfill and destroy penetrometer holes in accordance with California state regulations. The grout consisted of water, Portland cement, bentonite and Sikament (a non-toxic friction reducing additive). After the completion of each penetrometer push, the probe was withdrawn approximately 1 inch to allow grout pump pressure ejection of the sacrificial probe. The grout mixture was then pumped down the tubing to the total push depth. As the rods were extracted, the grout mixture filled the hole under positive pressure from bottom to top. SCAPS soil sampling holes that did not extend deeper than the water table were grouted by pouring from the surface; otherwise they were grouted from the bottom up using a dedicated grouting probe. The borehole

grout log is provided as an attachment to the Boring Permit Report which is located in Appendix C.

### 4.3.4 Sample Handling and Custody

Samples were packaged to allow the samples to be delivered to the laboratory undisturbed and in good condition. The packaging procedures used were designed to meet EPA and Department of Transportation (DOT) regulations. Immediately after sample collection, sample labels were filled out and affixed to each sample container. Each sample was placed in a re-sealable plastic bag to keep the sample container and label dry, as well as prevent any spills from coming into contact with other samples. Sufficient packing material was used to prevent sample containers from making contact during shipment. Enough wet ice was added to maintain sample temperatures at $4^{o}\pm2°C$. Field samples and ice were collectively double-bagged in plastic trash bags and taped shut to avoid water leakage, then placed in the ice chests that served as shipping containers. The ice chest drain plug (if present) was taped shut both inside and outside to further ensure that there was no water leakage.

The Chain-of-Custody (COC) forms were completed and signed by RBA field personnel before the samples were transported to the laboratory. The COC was placed in a re-sealable plastic bag, and taped to the inside of the shipping container lid. The shipping container was closed and taped shut with strapping tape (filament-type) completely around at both ends.

Because the samples were delivered to the laboratory using a commercial shipment courier service, custody seals were used on each ice chest to provide tampering detection. The signed and dated custody seals were placed on the front right and back left of the shipping container, and were covered with wide, clear tape. Samples accumulated before transfer to the laboratory were stored in an ice-filled chest and properly protected from breakage. Samples were not held on site for more than 24 hours.

All samples were recorded on COC forms using the sample identification numbers described in the Final SAP (RBA, 2007). COCs were completed using waterproof ink and in a manner to ensure entries were legible. Any errors made by the individual completing the COC were crossed out with a single line, initialed, and dated. The COC serves as the legal documentation of the sample custody since it records the transfer of the samples from field personnel to the laboratory to ensure that no tampering occurs.

Upon receipt, the laboratory representative signed the COC form and recorded the temperature of the temperature blank on the COC form and on the Sample Condition Upon Receipt form.

### 4.3.5 Decontamination Procedures

For each SCAPS push, the push-rod assembly and probe were decontaminated as they were withdrawn from the subsurface by a manifold system with high-pressure water jets, located beneath the floor of the SCAPS truck. The manifold decontamination water was then recovered and contained in a storage drum at the rear of the truck.

Non-disposable sampling equipment was decontaminated to prevent the introduction of extraneous material into samples and to prevent cross-contamination between samples. Decontamination of small non-disposable sample equipment was conducted in accordance with the Final SAP.

#### 4.3.6 Investigative Derived Waste

Wastes generated during the fieldwork included decontamination water, personal protective equipment, and minor quantities of soil waste. The wastes were containerized on site and stored temporarily in labeled, DOT approved, 55-gallon drums at the Shaw Storage Yard. All waste was disposed of by Shaw. Analytical results for IDW are located in Appendix F.

#### 4.3.7 Land Survey

SCAPS direct push LIF and sample locations were surveyed by the SCAPS field crew using a portable Trimble Global Positioning System (GPS) receiver capable of sub-meter horizontal accuracy. GPS survey data are summarized in Table 4-1.

### 4.4 Regulatory Agency and Public Partnering

Several activities have occurred to involve the regulatory agency partners and the public in the planning and execution of the investigation. A summary of partnering activities related to this project is provided below:

**July 17, 2007 Base Closure Team (BCT) Meeting.** The project team made a presentation to the BCT on July 17, 2007, to present the proposed project plans to the agency partners and solicit agency input on the proposed execution of the project. A copy of the presentation is provided in Appendix B.

**August 2, 2007 Restoration Advisory Board (RAB) Meeting.** Based upon input received from the agency partners during the July 17, 2007, BCT Meeting, the project team made a presentation to the RAB on August 2, 2007, at Building 1 at Alameda Point to present the proposed project plans to the RAB and the public. A copy of the presentation is provided in Appendix B.

**October 16, 2007 BCT Meeting and Field Tour of SCAPS.** On October 16, 2007, the BCT visited the project field team to observe the execution of the approved Final Work Plan (RBA, 2007) by SCAPS at OU-2A.

**November 1, 2007 DTSC Project Manager Site Visit:** On November 1, 2007 the DTSC Project Manager visited the field team to observe the advancement of SCAP LIF pushes in accordance with the Final Work Plan (RBA, 2007).

**November 28, 2007 Agency Partnering Meeting on Sampling Strategy:** On November 28, 2007 a meeting was held between the project team and the agency partners at the DTSC Offices in Berkeley, California to discuss preliminary LIF results and sampling strategy. As a result of this meeting the soil sampling strategy for this project

was finalized. A copy of the November 27, 2007 meeting minutes are provided in Appendix B.

**February 29, 2008 Investigation Results meeting with the Agency Partners:** On February 29, 2008 a meeting was held at Building 1 at Alameda Point to discuss the results of the SCAPS LIF Investigation at OU-2A and to prepare a presentation for the March 6, 2008 RAB Meeting. A copy of the February 29, 2008 meeting minutes are provided in Appendix B.

**March 6, 2008 RAB Meeting:** On February 29, 2008 the project team presented the results of the SCAPS LIF Investigation at OU-2A to the RAB and the public at Building 1 at Alameda Point. A copy of the RAB meeting presentation is provided in Appendix B.

## 4.5 Deviations from the Work Plan and Sampling and Analysis Plan

Fieldwork was conducted in general accordance with the Final Work Plan and SAP (RBA, 2007). However, as a result of the November 28, 2007 meeting at the DTSC Office in Berkeley, California to discuss preliminary LIF results and sampling strategy, the EPA Project Manager requested that additional analyses be considered for the potential TRW matrix samples. The requested analyses included viscosity, specific gravity, and flammability. At the request of the BRAC PMO West RPM, the RBA QA Manager contacted the Navy QAO to discuss adding the additional analyses. The Navy QAO concurred with this request, as long as it was understood that it was not a precedent for conducting out of scope sampling. The Navy QAO added that the resultant data would not be used for site characterization or risk assessment purposes. Data use would be restricted to optimization of potential remedial strategies for the site. Subsequently the SCAPS field team added these analyses to the COC forms upon collection and shipment of the potential TRW matrix samples to the laboratory.

Upon submittal of the samples to the laboratory, it was determined that analysis for viscosity, specific gravity, and flammability was not possible without the presence of free phase liquid in the samples. The samples collected by the SCAPS field team did not contain free phase liquid. The laboratory informed the RBA QA Manager of this situation and suggested that the samples be analyzed for moisture and density as these analyses would provide similar information as specific gravity for solid samples. Subsequently the BRAC PMO West RPM and the RBA QA Manager and Project manager agreed to proceed with the laboratory's suggestion. No other deviations from the Final Work Plan and SAP occurred.

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# 5.0 INVESTIGATION RESULTS

This section describes the results of the SCAPS LIF Investigation of TRW at Alameda Point. All work was conducted in general accordance with Final Work Plan (RBA, 2007).

## 5.1 SCAPS CPT Soil Classification Data

Completed SCAP CPT/LIF logs are provided in Appendix D. The column on the left labeled "Qc" is the measured CPT cone (tip) resistance, the next column "Qs" is the measured CPT sleeve friction resistance, and the central column "Soil Class" is the numerical classification of Roberson and Campanella's 1988 soil behavior classification system (Figure 4-2).

In general, blue soil classification colors represent clay, red represents silt, and yellow represents sand. The meaning of the various soil classification colors is provided in greater detail on Figure 4-1. Areas inferred to be impacted with TRW tend to be classified as finer grained material such as silt, silty sand, and clay.

In general, SCAPS CPT soil classification mirrored lithological data generated from previous subsurface investigations at OU-2A.

## 5.2 SCAPS LIF Data

Of the 182 SCAPS LIF pushes completed at Alameda Point OU-2A, the LIF pushes generally fell into four groups based solely on fluorescent intensity. The first group consists of pushes where fluorescence was considered background for the entire length of the LIF push or only recorded surficial fluorescence from asphalt. The second group recorded slightly elevated fluorescence which may be inferred to be from petroleum. The third group recorded fluorescent response at intensities indicative of TRW and/or petroleum impacts. The fourth group recorded fluorescent responses that were so great that the returning light saturated the detector creating a clipped response which is inferred to be fluorescence from TRW or soils highly impacted by petroleum.

Figure 4-1 depicts all of the SCAPS LIF pushes completed at the site color-coded by the four fluorescence groups described above. SCAPS LIF profiles for all of the pushes completed during this investigation are provided in Appendix D. The two columns on the right side of the SCAPS LIF/CPT data profiles present the LIF data. The column labeled "Wavelength @ Peak" plots the wavelength of the highest fluorescence intensity. The column labeled "Peak Intensity" plots the maximum fluorescence intensity for each reporting point depth. Figure 5-1 depicts the fluorescent intensity for each of the SCAPS LIF pushes that did not meet shallow refusal.

The following sections discuss the fluorescence groups and how they relate to the residential preliminary remediation criteria (PRCs) of 1,380 milligrams per kilogram (mg/kg) for TPH-d and 1,900 mg/kg of TPH-mo established in TPH strategy for Alameda Point (NAVFAC SW, 2001).

### 5.2.1 Group 1: Background or Surficial Fluorescence

Ninety three LIF pushes recorded background or surficial fluorescence and are included in Group 1. The Group 1 LIF pushes are inferred to be not impacted by TRW or petroleum in excess of the residential PRCs for TPH and PAHs, EPA Region IX Residential Preliminary Remediation Goals (PRGs), and background metals values established for the site (NAVFAC SW, 2001; EPA, 2004; and Tetra Tech, 2004). The Group 1 pushes are inferred to establish the boundary of TRW and petroleum-impacted soils at the OU-2A, and are used to establish bounding conditions for the TRW in the CSM.

### 5.2.2 Group 2: Potential Petroleum Fluorescence

Thirteen LIF pushes that recorded slightly elevated fluorescence and/or wavelength characteristics that the SCAPS team interprets to represent the possible presence of petroleum. These pushes are included in Group 2. Since the fluorescence intensity is very low compared to the Group 3 fluorescence below (Section 5.2.3), these Group 2 pushes act as boundary conditions for the TRW in the mathematically interpolated 3-D CSM.

### 5.2.3 Group 3: Petroleum Fluorescence

Forty nine LIF pushes that recorded elevated fluorescence indicative of petroleum impacts or TRW are included in Group 3. The fluorescence was elevated, but not so extremely high as to have a clipped response. The Group 3 pushes are inferred to be impacted at levels in excess of residential PRCs, PRGs, and background metals values established for the site. The Group 3 pushes are also inferred to be sufficiently impacted by petroleum to be included in the TRW mass at the site or petroleum impacted soils being addressed in the on-going FS for OU-2A. These pushes are used to develop the CSM for TRW at OU-2A.

### 5.2.4 Group 4: Clipped Petroleum Fluorescence

Twenty seven LIF pushes recorded extremely high fluorescent responses that saturated the detector creating a clipped response and are included in Group 4. This clipped fluorescence is inferred to be fluorescence from TRW or soils highly impacted by petroleum. The Group 4 pushes are inferred to be impacted at levels in excess of residential PRCs, PRGs, and background metals values established for the site. The Group 4 pushes are also inferred to be sufficiently impacted by petroleum to be included in the TRW mass at the site or petroleum impacted soils being addressed in the on-going FS for OU-2A. These pushes are used to develop the CSM for TRW at OU-2A.

## 5.3 Soil Analytical Data

Sixteen soil samples were collected on December 4 and 5, 2007. Samples were collected in accordance with the analytical approach presented in the DQOs of the Final Work Plan (RBA, 2007) and the November 28, 2007 planning meeting discussed in Section 3.3. Soil sample locations are depicted on Figure 5-1. Soil sample logs are provided in Appendix E.

Soil samples were collected adjacent to the LIF push holes at the following locations and depths:

| Location | Shallow Sample Depth (ft bgs) | Deep Sample Depth (ft bgs) |
|---|---|---|
| AP13-07 | 2.5 to 4.0 | 13.0 to 14.5 |
| AP13-08 | - | 13.0 to 14.5 |
| AP13-41 | - | 7.0 to 8.5 |
| AP13-43 | 4.5 to 6.0 | 10.5 to 12.0 |
| AP13-44 | - | 10.5 to 12.0 |
| AP13-93 | 6.5 to 8.0 | 11.5 to 13.0 |
| AP13-94A | - | 11.5 to 13.0 |
| AP13-147 | - | 8.0 to 9.5 |
| AP13-148 | 5.5 to 7.0 | 8.0 to 9.5 |
| AP13-169 | 3.0 to 4.5 | 5.5 to 7.0 |
| AP13-170 | - | 5.5 to 7.0 |

Soil samples were analyzed by EMAX Laboratories Inc., in Torrance, California. A table of the analytical data and the final laboratory report is provided in Appendix F. Data validation of the final laboratory report was conducted by Laboratory Data Consultants Inc., in Carlsbad, California. The data validation narratives are provided in Appendix G. Reported and estimated values of TPH, VOCs, SVOCs, PAHs, and metals analyzed for this investigation are summarized in Table 5-1. Soil and TRW matrix samples with reported values above residential PRCs, PRGs, and background metals values are summarized in Table 5-2. Reported and estimated values for general chemistry parameters (alkalinity, nitrate, nitrite, and sulfate), pH, and bulk density are summarized in Table 5-3.

Soil samples above residential PRCs, except for metals, are depicted on Figure 5-2. Arsenic was reported above the EPA Region 9 PRG (the residential PRC for metals at OU-2A) in every sample collected during this investigation. The final RI report for OU-2A states that the highest concentration for arsenic in the background data set was 23 mg/kg and the highest arsenic concentration collected during the RI from IR Site 13 was 20 mg/kg (SulTech, 2005a). In the RI Report for OU-1, the 95$^{th}$ quantile background value established for arsenic for OU-2A soils was 16.55 mg/kg (Tetra Tech, 2004). The maximum reported arsenic value during this investigation was 8.29 mg/kg. Therefore, arsenic in soil is likely attributed to background. Vanadium was reported at 79 mg/kg above the 95$^{th}$ quantile background value of 41.78 mg/kg and the residential PRG of 78 mg/kg in soil sample AP13-094-S01 collected at a depth of 11.5 to 13.0 ft bgs.

TPH-d was reported or estimated above the residential PRC of 1,380 mg/kg in soils and TRW matrix samples AP13-007-S-02, AP13-041-01, AP13-043-S-02, AP13-093-S-02, AP13-169-S-01, AP13-169-S-02, and AP13-170-S-01. TPH-mo was reported above the residential PRC of 1,900 mg/kg in soils samples AP13-169-S-01, AP13-169-S-02, and AP13-170-S-01. Benzene was estimated above the residential PRC of 640 micrograms per kilogram µg/kg in soil samples AP13-148-S-01 and -02. Benzo(a)pyrene was

reported above the residential PRC of 620 µg/kg in soil sample AP13-S-169-S-02 (Figure 5-2).

Soil samples were analyzed for pH as a part of this investigation based on historic refinery operations and the occurrence of low pH in soil samples previously collected at OU-2A (Figure 2-3). Neutral pH values were reported between 6.75 and 8.97 in 15 of the 16 soil samples collected during this investigation. Sample AP13-169-S-02 had a pH of 4.09 and is in an area of OU-2A that is inferred to not contain TRW (Figure 5-2). Reported pH values in soil are provided on Table 5-3.

Six soil samples (AP13-007-S-02, -041-S-10, -043-S-02, -093-S-02, -148-S-02, and -169-S-02) were additionally analyzed for bulk dry density and in-place moisture (Figure 5-2). Moisture and density values were consistent with known values for the soil types logged during this investigation. Moisture and dry density values for the six soil samples are summarized in Table 5-3.

## 5.4 Laser Induced Fluorescence Compared to Laboratory Analysis of Soil Matrix Samples

To further define the extent of TRW at Alameda Point OU-2A, the SCAPS investigation area has been divided into separate areas of elevated LIF data. Based on comparison of the LIF data to laboratory analytical data, one of the areas represents TRW and the other represents a petroleum release not related to TRW.

In general, laboratory analytical results from soil samples compared well to LIF data. The laboratory reported TPH concentrations above residential PRCs at all six locations that targeted intervals of elevated fluorescence. The laboratory reported either non-detectable TPH or TPH below residential PRCs at eight of ten locations targeting background fluorescence.

The laboratory reported TPH concentrations above residential PRCs from two samples chosen to represent background fluorescence at a pair of locations (AP13-169 and -170) located in an eastern area of OU-2A, separated from the TRW mass to the west. The sample from location AP13-169 was targeted for a depth just above LIF fluorescence, and the laboratory reported 1,900 mg/kg of TPH-d and 5,300 mg/kg TPH-mo. This result may represent localized heterogeneity in petroleum distribution. Soil sample AP13-170-S-01 was collected approximately three feet west of LIF push AP13-170. The laboratory reported 2,100 mg/kg of TPH-d and 6,700 mg/kg TPH-mo. This sample may also represent localized heterogeneity and is thought to be at the eastern edge of the smaller, non-TRW petroleum area. LIF and soil sample push holes at locations AP13-169 and -170 were noted to exhibit a hydrogen sulfide odor, and push holes in this area of the site had liquid at the surface at the time the pavement was penetrated by the LIF and soil sampler probes. The presence of the liquid may be attributable to a temporary soil stockpile laydown area a contractor for the City of Alameda was using for a nearby construction project. Soils in the stockpile were noted to be saturated by the field team.

As discussed above, separate areas of TPH impacted soil are inferred to exist in the vicinity of OU-2A at Alameda Point. One is a fluorescent mass associated with analytical results that show high TPH but very low VOCs and PAHs. This is a relatively large area in the western and central part of OU-2A that is inferred to define the TRW above residential PRCs. The other areas are smaller separate fluorescent masses to the east that are associated with high TPH and high VOCs and/or PAHs. These appear to be unrelated plumes that contain compounds normally associated with fuel releases.

The area inferred to be impacted with TRW above TPH residential PRC is depicted on Figure 5-1. Elevated fluorescence from SCAPS LIF pushes to the east of Skyhawk Street and southeast of the intersection of Skyhawk and West Oriskany Streets (shown on Figure 4-1) appears to be due to separate non-TRW plumes containing elevated BTEX and/or PAHs. Two cross-sections have been developed to depict LIF intensity data across the site and to distinguish the TRW and the non-TRW petroleum impacts. Figure 5-3 depicts the overall site LIF intensity with the section lines in plan view, and the two cross-sections are provided as Figures 5-4 and 5-5.

## 5.5 TRW Modeling

Groundwater Modeling System (GMS) software was used to interpolate the LIF data and create three-dimensional distribution models of LIF intensity. The models included:

- A three-dimensional depiction of total fluorescence. This includes the entire area investigated by SCAPS, with no distinction made between fluorescence associated with the TRW and the non-TRW fluorescence associated with the elevated BTEX and PAHs; and,

- A second model of fluorescence attributed to TRW. For this model, elevated fluorescence to the east of Skyhawk Street and southeast of the intersection of Skyhawk and West Oriskany Streets was not used because it is associated with an inferred non-TRW TPH release containing elevated BTEX and PAHs (discussed in Section 5.4). Figure 5-6 depicts the modeled TRW at OU-2A. Appendix H on the compact disc attachment contains an animation file of the TRW model. The TRW volume presented in Section 5.6 was calculated by GMS.

The GMS models were imported into GIS software and combined with previous groundwater contour maps at OU-2A that showed a cone of depression in the groundwater (Figure 5-2). Additionally, the groundwater maps showed a groundwater high to the northeast (adjacent) of the cone of depression. The figure shows the TRW wedged between the cone of depression and the groundwater high. The low permeability of the TRW material appears to be acting as a hydraulic barrier to groundwater flow with higher groundwater elevations on the upgradient side of the TRW and lower groundwater elevations on the downgradient side of the TRW.

One artifact of the TRW modeling is graphically depicted on Figure 5-3. The area to the east and north of the former Jet Engine Test Cells (Building 397) is depicted with the blue color inferred to be TRW. However, the inferred TRW does not extend north or east

of LIF push location AP13-028 (Figure 4-1). This is due to the relatively deeper fluorescent responses in AP13-024 and -025. Elevated fluorescent responses were recorded as deep as 18 feet bgs in these pushes causing the modeling software to interpolate TRW at 18 feet bgs to the north of these two LIF pushes. Pushes to the north of AP13-024 and -025 were terminated at depths near 15 feet bgs for fluorescent response considered to be background in accordance with the DQOs for this project. The modeling software erroneously interpreted TRW below 15 bgs to the north of these two LIF push locations. TRW is not inferred to occur as depicted by the model immediately north or east of Building 397.

## 5.6 Estimated Area and Volume of TRW

The estimated area of OU-2A impacted with TRW is approximately 175,000 square feet. The estimated volume of TRW from the GMS model depicted on Figure 5-6 is approximately 8,570 cubic yards. The volume was calculated using the modeling software and includes the limited volume caused by the artifact from modeling described above. The maximum depth of material inferred to be TRW is approximately 18 feet bgs southeast of Building 397. The volume of overburden fill soils above the TRW is an estimated 38,000 cubic yards.

## 5.7 Conceptual Site Model of TRW

A revised CSM of TRW has been developed using all available data for OU-2A. The graphical representation of the revised CSM of TRW at OU-2A is provided on Figure 5-7. As discussed above, the TRW has been segregated from the other petroleum release at OU-2A based on LIF spectra and soil analytical results. In general, the TRW had lower reported concentrations of benzene than the non-TRW related petroleum release to the east of IR Site 13.

Historic site structures from the Pacific Coast Oil Works Refinery, which operated at the site from 1879 to 1903, were more proximal to the inferred TRW at the site (Sanborn, 1897 and Figure 5-7). In addition, the San Francisco Bay shoreline was at the approximate western edge of the present TRW at the time of the refinery's operation. The primary release mechanism for TRW appears to be the dumping of refinery wastes at the surface and low-lying areas of the site.

The TRW or mobile oil that has surfaced at IR Site 13 or entered the storm drain system at OU-2A may be due to density differences between the TRW and/or mobile oil and the surrounding soils. These assumed density differences were not readily apparent based upon the geotechnical analysis of soil samples collected during this investigation. This may be because the samples were collected at depth, and are not representative of the density of near-surface soil (which is expected to be less compacted and dense). Additionally, in the area where TRW has been observed at the surface is proximal to the historic shoreline of San Francisco Bay and may have been a preferred area for the disposal of TRW at the time of the operation of the refinery, and may represent the top of piled waste.

The horizontal and vertical extent of TRW at OU-2A has been defined by the advancement of 182 SCAPS LIF pushes and the collection and analysis of 16 soil samples. The extent of TRW as interpreted by three dimensional modeling is graphically depicted on Figure 5-6. Based upon the results of the investigation and previous investigations at the site, the TRW contains very low volatile or semi-volatile fraction as expected from a refinery waste that has been in-place for over 100 years. The TRW appears to be mainly comprised of solid long chain alkanes, and it appears the low pH conditions reported in previous investigations is localized and may have been removed during previous removal actions of trenching operations at the site.

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# 6.0 LABORATORY DATA QUALITY REVIEW

RBA performed field activities and collected samples during the SCAPS Investigation at IR Site 13, Alameda Point, Alameda, California in December 2007. The purpose of this review is to evaluate the data collected from these confirmation samples and determine whether they meet the quality objectives outlined in the Final SAP dated October 17, 2007.

The following sections provide a summary of the quality assurance/quality control (QA/QC) review and data validation results for laboratory analytical data generated during the investigation. At IR Site 13, the investigation included the collection and analyses of 16 confirmation soil samples and the associated quality control (QC) samples. The analyses were performed by the following methods:

- Volatile Organics by EPA SW 846 Method 8260B
- Semi-volatile Organics by EPA SW 846 Method 8270C
- Polycyclic Aromatic Hydrocarbons by EPA SW 846 Method 8270C SIM
- Total Petroleum Hydrocarbons as Extractables by EPA SW 846 Method 8015
- Metals by EPA SW 846 Method 6020A
- Mercury by EPA SW 846 Method 7470A/7471A
- Sulfate (SO42-)/Nitrate (NO3-)/Nitrite (NO2-) by EPA SW846 Method 300.0
- Alkalinity by EPA SW846 Method SM 2320B
- pH by EPA SW 846 Method 150.1
- Bulk Density by American Society of Testing Materials (ASTM) Method D2937

The data quality review was based on verification of field and laboratory QA measures to determine the overall quality and validity of analytical results. QA for field activities was managed through appropriate documentation, collection of field quality control (FQC) samples, and oversight of field procedures. QA/QC measures were employed by the laboratory to determine the precision and accuracy of the analytical system as measured by laboratory control samples (LCS), matrix spike/matrix spike duplicates (MS/MSD), surrogate spikes, and internal standards (where applicable). Results from the equipment blanks, field blank, and method blanks were also evaluated to assess the possibility of external contamination of environmental samples during field and laboratory activities.

The following sections provide the results of field and laboratory QA samples, the data validation results, and the data usability evaluation to be considered during data interpretation.

## 6.1 Field Documentation

A number of QA/QC measures were employed in the field to ensure that the collected soil samples were representative of site conditions at the time of sampling. Prior to the collection of any sample, all reusable sampling equipment was decontaminated to minimize the chance of cross-contamination. FQC samples, as discussed in Section 6.2 below, were collected and analyzed to provide QC checks on the representativeness of the environmental samples collected and handling procedures. Field documentation protocols included the use of field logbooks and COC forms.

## 6.2 Field Quality Control Samples

The following sections discuss the FQC samples that were collected during the SCAPS LIF investigation at Alameda Point, Alameda, California. Analyte detections in field quality control samples such as blanks were evaluated with respect to their associated environmental samples to make an overall judgment regarding whether any constituents detected in the environmental samples were contributed by conditions independent of the matrix sampled or are representative of site conditions. Field contamination was assessed by the simultaneous evaluation of the equipment blank and field blanks. In accordance with validation guidelines, sample concentrations were compared to concentrations detected in the blanks to determine whether sample qualification was deemed necessary.

The assigned identification numbers for the FQC samples collected are listed below.

- Field Blank: AP13-170-W-02
- Equipment Blanks: AP13-148-W-01 & AP13-093-W-01
- Trip Blanks: AP13-007-W-01 & AP13-170-W-01

### 6.2.1 Method Blanks

The method blank is a laboratory blank that is prepared to represent the matrix as closely as possible. It is prepared/extracted/digested and analyzed exactly like the field samples. The purpose of the method blank is to assess contamination introduced during sample preparation activities. Method blanks generally occur at a frequency of one blank per batch of samples.

As a result of method blank contamination, fifteen metal results with low estimated concentrations below the reporting limit were qualified as non-detected (U). The details regarding the qualification of results are provided in the data validation reports.

### 6.2.2 Field Blanks and Equipment Blanks

The field blank (or source blank) is a sample of analyte-free water poured into the sample container in the field, which is preserved and shipped to the laboratory with the field samples. These blanks are used to assess contamination from field conditions during sampling. For this project, one field blank was collected for each new source of water utilized for the decontamination process. The equipment blank (or rinsate blank) is a sample of analyte-free water poured over or through decontaminated field sampling

equipment prior to the collection of environmental samples. The purpose is to assess the adequacy of the decontamination process. For this project, one field blank and two equipment blanks were submitted with the samples from the site.

The field blank and equipment blank samples were analyzed for the same parameters as the environmental samples from IR Site 13. Any detection of target analytes in these blank samples was evaluated with respect to associated sample concentrations to determine whether qualification of sample results was deemed necessary. As a result of equipment blank contamination, four associated samples with carbon disulfide concentrations at or below the reporting limit were qualified as non-detected (U). As a result of field blank contamination, copper and zinc in sample AP13-093-S-2 were qualified as non-detected (U) with reporting limits several orders of magnitude below residential PRGs. The details regarding the qualification of these results are provided in the data validation reports.

### 6.2.3 Trip Blanks

The trip blank is a clean sample of a matrix that is taken from the laboratory to the sampling site and transported back to the laboratory without having been exposed to sampling procedures. The purpose of the trip blank is to assess contamination introduced during shipping and field handling procedures. For this project, two trip blanks were submitted with the samples from IR Site 13, for volatile organic compounds (VOC) analysis. As a result of trip blank contamination, four associated samples were qualified as non-detected (U) for carbon disulfide. The details regarding the qualification of these results are provided in the data validation reports.

## 6.3 Laboratory Quality Control

A total of 16 soil samples and associated QC samples were submitted to a California-certified laboratory for analyses. Analytical services were provided by EMAX Laboratories, Inc. in Torrance, California. Data were reported in the following sample delivery groups (SDGs):

- 07L053 (12 soil samples, 1 trip blank & 1 equipment blank)
- 07L082 (4 soil samples, 1 trip blank, 1 equipment blank & 1 field blank)

The analytical data were evaluated for QA/QC based on the following documents: Naval Facility Engineering Service Center (NFESC) Special Publication SP-2056-ENV, Navy Installation Restoration Chemical Data Quality Manual, Naval Facilities Engineering Command (NAVFAC), Sept 1999, Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999, and the EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste. In general, QC sample results that were outside the laboratory acceptance criteria for data accuracy and precision were flagged by the laboratory and further qualified during data validation. Results for laboratory QC samples and reporting limits are discussed in the data validation section below.

## 6.4 Data Validation Results

The data collected were validated by Laboratory Data Consultants Inc. (LDC). Validation was performed under the EPA Level III and IV guidelines. For IR Site 13, data validation was performed to Level III criteria on 90% of the data, and Level IV on 10% of the data. Both levels of validation include the review of laboratory quality control summaries (blank, calibrations, spike recoveries, duplicates, etc.). Level IV process incorporates a review of raw data including chromatograms and quantitation reports. This additional information is utilized in the Level IV data validation process for checking calculations of quantified analytical data. Data validation reports are presented in Appendix G.

Data that did not meet the applicable validation criteria were flagged with the qualifiers listed below. In addition, any detected concentrations between the method detection limit and the reporting limit were flagged as estimated quantities (J):

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

J – The associated value is an estimated quantity.

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

R – The data are unusable.

This review also summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness and comparability (PARCC) relative to the project data quality objectives (DQOs). This review provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

### 6.4.1 Volatile Organic Compounds – (VOCs by EPA 8260B)

All samples analyzed for VOCs were received by the laboratory in good condition. A total of five FQC water samples and sixteen soil samples were analyzed for VOCs by EPA SW 846 Method 8260B. All 756 volatile results were assessed to be valid since none of the results were rejected based on QC exceedances.

All holding times and cooler temperature requirements were met. The gas chromatography-mass spectrometry (GC/MS) instrument performance was checked at 12 hour intervals, and all ion abundance requirements were met.

#### 6.4.1.1 Instrument Calibration

Initial and continuing calibration results provide a means of evaluating accuracy within a particular SDG. Relative response factor (RRF), percent relative standard deviation (%RSD), and percent difference (%D) are the three major parameters used to measure the effectiveness of instrument calibration. RRF is a measure of the relative spectral response of an analyte compared to its internal standard. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. %RSD and %D exceedances suggest routine

instrumental anomalies, which typically impact all sample results for the affected compounds.

Sixteen volatile results were qualified as detected estimated (J) and non-detected estimated (UJ). The percent difference between the initial calibration mean relative response factors and the continuing calibration relative response factors for 2-hexanone, chloromethane, carbon tetrachloride, 1,2-dichloroethane and methylene chloride were outside the acceptance criteria of 25 percent. The affected samples are identified in the data validation reports.

#### 6.4.1.2 Surrogates

Nineteen volatile results were qualified as detected estimated (J). The surrogate percent recovery for 4-bromofluorobenzene, 1,2-dichloroethane-d4 and toluene-d8 were outside the acceptance criteria. The details regarding the qualification of results are provided in the data validation reports.

#### 6.4.1.3 Matrix Spike / Matrix Spike Duplicates (MS/MSD) Samples

MS/MSD samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits. No data were qualified based on MS/MSD non-conformances.

#### 6.4.1.4 Laboratory Control Samples (LCS)

Five volatile results were qualified as detected estimated (J) and non-detected estimated (UJ) based on LCS non-conformances. The percent recoveries were evaluated against the acceptance criteria. The affected samples are identified in the data validation reports.

#### 6.4.1.5 Internal Standards

The recoveries and retention times were evaluated against the acceptance criteria. Two volatile results were qualified detected estimated (J) and non-detected estimated (UJ).

#### 6.4.1.6 Compound Quantitation and Target Identification

All compound quantitation and target compound identifications were within validation criteria with the exception of benzene and ethylbenzene (AP13-148-S-01), which exceeded the calibration range. Two volatile results were qualified as detected estimated (J) based on this exceedance. The details regarding the qualification of results are provided in the data validation reports.

### 6.4.2 Semi-volatile Organic Compounds – (SVOCs by EPA 8270C)

Samples analyzed for SVOCs were received by the laboratory in good condition. A total of three water FQC samples and six soil samples were analyzed for SVOCs by EPA SW 846 method 8270C. All 567 semi-volatile results were assessed to be valid since none of the results were rejected based on QC exceedances.

All holding times and cooler temperature requirements were met. The GC/MS instrument performance was checked at 12 hour intervals, and all ion abundance requirements were met.

#### 6.4.2.1 Instrument Calibration

As previously discussed in Section 6.4.1.1, initial and continuing calibration results provide a means of evaluating accuracy. Initial calibration was performed using required standard concentrations and continuing calibration was performed at the required frequencies. All compounds were within the validation criteria. The RRF met the acceptance criteria of 0.05 in the initial and continuing calibration standards. The RSD in the initial calibrations and/or percent difference between the initial calibration mean RRFs and the continuing calibration RRFs met acceptance criteria of 25 percent.

#### 6.4.2.2 Surrogates

No data were qualified based on surrogate nonconformance. Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. Since the samples were diluted out, no data were qualified.

#### 6.4.2.3 MS/MSD Samples

As previously mentioned in Section 6.4.2, only six soil samples were analyzed for SVOCs by 8270C. (The remaining samples were analyzed for PAHs by 8270 SIM, discussed below.) The MS/MSD sample that was collected during this sampling event was not among those six samples; therefore MS/MSD analyses were not performed for SVOCs.

#### 6.4.2.4 LCS

Three FQC samples had semi-volatile results that were qualified as non-detected estimated (UJ) due to the RPDs being outside of QC limits. The RPDs were evaluated against the acceptance criteria. The affected samples are identified in the data validation reports.

#### 6.4.2.5 Internal Standards

One sample (AP13-041-S-01) had eight semi-volatile results that were qualified as detected estimated (J) and non-detected estimated (UJ) based on internal standard nonconformance. The recoveries and retention times were evaluated against the acceptance criteria. The internal standard area for phenanthrene-d10 was outside QC limits.

#### 6.4.2.6 Compound Quantitation and Target Identification

All compound quantitation and target compound identifications were within validation criteria with the exception of 2-methylnaphthalene and naphthalene (AP13-043-S-02, AP13-041-S-01), and 2-methylnaphthalene (AP13-148-S-02) which exceeded the calibration range. The subsequent diluted samples did not require qualification.

### 6.4.3 Poly Aromatic Hydrocarbons – (PAHs by 8270C SIM)

Samples analyzed for PAHs were received by the laboratory in good condition. A total of three water FQC samples and ten soil samples were analyzed for PAHs by EPA SW 846

method 8270C-SIM. All PAH data were assessed to be valid since none of the 208 results were rejected based on QC exceedances.

All holding times and cooler temperature requirements were met. The GC/MS instrument performance was checked at 12 hour intervals, and all ion abundance requirements were met.

#### 6.4.3.1 Instrument Calibration

Seven PAH results were qualified as detected estimated (J) and non-detected estimated (UJ). The continuing calibration %D between the initial calibration RRF and continuing calibration RRF was slightly greater than 25 percent for benzo(b)fluoranthene.

#### 6.4.3.2 Surrogates

No data were qualified based on surrogate nonconformance. Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were within QC limits.

#### 6.4.3.3 MS/MSD Samples

The MS/MSD samples were reviewed for each matrix as applicable. Percent recoveries and relative percent differences were within QC limits.

#### 6.4.3.4 LCS

Three FQC samples had PAH results that were qualified as non-detected estimated (UJ) due to the RPDs being outside of QC limits. The RPDs were evaluated against the acceptance criteria. The affected samples and compounds are identified in the data validation reports.

### 6.4.4 Total Petroleum Hydrocarbon Extractables – (TPH-e by EPA 8015)

All samples analyzed for TPH-e were received by the laboratory in good condition. A total of three water FQC samples and sixteen soil samples were analyzed for TPH as extractables by EPA SW 846 method 8015. All TPH-e results were assessed to be valid since none of the 38 total results were rejected based on QC exceedances. All holding times and cooler temperature requirements were met.

#### 6.4.4.1 Instrument Calibration

The relative standard deviations in the initial calibrations and/or percent differences between the initial calibration and the continuing calibration concentrations were within the acceptance criteria. No data were qualified based on calibration nonconformance.

#### 6.4.4.2 Surrogates

Six results were qualified as detected estimated (J) and non-detected estimated (UJ) based on surrogate non-conformance. The percent recovery for hexacosane was outside the acceptance criteria. The details regarding the qualification of the results are provided in the data validation reports.

#### 6.4.4.3 MS/MSD Samples

The MS/MSD samples were reviewed to ensure that %R and RPD were within QC limits. No data were qualified based on MS/MSD non-conformances.

#### 6.4.4.4 LCS

No data were qualified based on LCS nonconformance. The recoveries were evaluated against the acceptance criteria. %R was within limits.

### 6.4.5 Metals with Mercury (Hg) – (by EPA 6010/7470)

Samples analyzed for metals were received by the laboratory in good condition. A total of three water FQC samples and sixteen soil samples were analyzed for metals by EPA SW 846 methods 6020A and 7470A. All metals data were assessed to be valid since none of the 323 total results were rejected based on QC exceedances. All holding times and cooler temperature requirements were met.

#### 6.4.5.1 Instrument Calibration

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met. No data were qualified based on calibration nonconformance.

#### 6.4.5.2 MS/MSD Samples

Thirty-two metal results were qualified as detected estimated (J) and non-detected estimated (UJ) based on MS/MSD non-conformances. The %R for antimony and barium was outside of QC limits. The details regarding the qualification of the results are provided in the data validation reports.

#### 6.4.5.3 LCS

No data were qualified based on LCS nonconformance. The recoveries were evaluated against the acceptance criteria. %R was within limits.

### 6.4.6 $SO_4^{2-}/NO_3^-/NO_2^-$ - (by EPA 300.0)

A total of three water FQC samples and sixteen soil samples were analyzed for anions by EPA SW 846 method 300.0. All analyses met holding time criteria. Method blanks were free of contamination at the reporting limit, and laboratory control sample results were within QC limits. Sample AP13-148-W-01 was analyzed as a duplicate and a spike sample. The %RPDs and the recoveries were also within QC limits.

### 6.4.7 Alkalinity – (by EPA 5M 2320)

A total of three water FQC samples and sixteen soil samples were analyzed for alkalinity by EPA SW 846 method SM 2320B. All analyses met holding time criteria. Method blanks were free of contamination at the reporting limit, and laboratory control sample results were within QC limits. Sample AP13-044-S-01 was analyzed as a duplicate sample. The %RPD was also within QC limits.

### 6.4.8 pH – (by EPA 150.1)

A total of three water FQC samples and sixteen soil samples were analyzed for pH by EPA SW 846 method 150.1. The water samples were analyzed the same day they were received, and the extracts of the soil samples were analyzed the same day of the extraction. Samples AP13-148-W-01, AP13-044-S-01, and AP13-094-S-01 were analyzed as duplicates. The %RPDs were within QC limits.

### 6.4.9 Bulk Density (by ATSM D2937)

A total of six soil samples were analyzed for bulk density by ASTM method D2937. All samples were received by the subcontracted lab in good condition.

## 6.5 Data Usability

Field and laboratory QC elements were assessed for conformance with project DQOs. The overall assessment of the data is that it is acceptable. In the cases where more than one result was reported for an individual sample, the least technically acceptable results were rejected. The affected samples and associated analytes are identified in the data validation reports in the data qualification summaries.

Although a few QC elements associated with the analytical procedures have been identified during the data quality assessment, a thorough review of the data indicates that these discrepancies do not adversely affect the quality, validity, usability, and overall data interpretation presented in this report. Therefore, the data presented herein are considered valid and usable as indicated by their specific qualifiers.

The analytical and geospatial data generated from this investigation have been uploaded to the NAVFAC SW NEDD/NIRIS systems. The confirmation number for the submittal is 20080422135643.

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# 7.0 SUMMARY

The SCAPS LIF TRW Investigation at Alameda Point OU-2A was conducted in general accordance with the Final Work Plan (RBA, 2007). The investigation consisted of 182 SCAPS LIF pushes and the collection and analysis of 16 soil samples.

The source of the TRW is thought to be the oil refinery that operated at the site from 1879 to 1903. Kerosene and heavy fuel oil were refined from crude oil during the operation of the refinery. The TRW is most likely the byproduct of the refining process used at that time, and was disposed of on site.

Separate areas of TRW and petroleum-impacted soil are inferred to exist at OU-2A. The portion of OU-2A impacted with TRW is mainly confined to the western and central portion of OU-2A at IR Site 13 and the intersection of West Oriskany and Skyhawk Streets. Smaller masses of petroleum-impacted soil are inferred to exist at OU-2A east of the TRW mass.

The laboratory results for samples collected from the area inferred to contain TRW during this investigation (AP13-07-S-02, AP13-41-S-01, and AP13-43-S-02) reported or estimated relatively lower VOCs and PAHs, specifically benzene and PAHs as Benzo(a)pyrene equivalents, than soil samples collected to evaluate elevated LIF in the non-TRW petroleum impacted area to the east adjacent to LIF pushes AP13-148, -169, and -170. The relative lack of elevated benzene and PAHs is consistent with the presumed origin and age of the TRW deposition. Benzene was not produced as a petroleum distillate during the time period of the operation of the former refinery.

## 7.1 CPT Data

The SCAPS CPT data demonstrated good correlation to the logged soil sample descriptions. Soil types were consistent with information provided during previous investigations at OU-2A. Artificial fill consisting mainly of silty sands was recorded consistently in the upper 5 to 10 feet at the site. In areas inferred to contain TRW, CPT classification was slightly finer indicating silts and clays, and mixtures of both.

## 7.2 LIF Data

The SCAPS LIF was an effective tool for rapidly delineating the extent of TRW at OU-2A. The TRW fluoresces extremely well, to the point of saturating the detector in 20 of the pushes advanced through the area inferred to contain TRW.

## 7.3 Soil Analytical Results

Soil analytical results correlated well with LIF response recorded by SCAPS. The samples were collected and analyzed in accordance with DQOs developed for project (RBA, 2007) and regulatory partner input. In all cases the samples to evaluate LIF detect effectiveness, had reported or estimated TPH-d above OU-2A residential PRCs (SulTech, 2005b and RBA, 2007). Eight of the ten samples collected to evaluate what is considered LIF background or non-detect response did not contain TPH-d or TPH-mo above PRCs.

The exceptions were samples AP13-170-S-01 and AP13-169-S-01, which are located east of the TRW mass, at the eastern edge of the non-TRW petroleum impacts at OU-2A. The laboratory results may reflect localized heterogeneity in petroleum distribution in this area.

Arsenic was reported above the U.S. EPA region 9 residential PRGs in every sample collected during this investigation. However, arsenic levels were consistent with background levels established for the soil types that characterize OU-2A soils and are not thought to be associated with the TRW release. Soil samples collected and analyzed to evaluate potential low pH or acidic conditions within the area inferred to contain TRW did not report low pH. Soil samples collected from the area inferred to contain TRW, AP13-07-S-02, AP13-41-S-01, and AP13-43-S-02, had neutral pHs of 7.01, 6.99, and 7.2, respectively.

Soil samples collected and analyzed to assess the potential for TRW mobility did not reveal density data that conclusively shows the in-place TRW is currently mobile. Visual observations of the TRW at the surface within IR Site 13 during the timeframe of this investigation (Fall and Winter 2007) did not reveal any trends in TRW mobility.

## 7.4 Conclusions

The SCAPS LIF Investigation at Alameda Point OU-2A was effective in further delineating and characterizing TRW impacts at the site. An estimated 8,570 cubic yards of TRW exist at the site. In addition, a separate non-TRW petroleum impacted area was identified to the east of the TRW. Relatively high levels of benzene and other petroleum related constituents were identified in the eastern area of OU-2A.

The horizontal and vertical extent of TRW at OU-2A has been defined by the advancement of 182 SCAPS LIF pushes and the collection and analysis of 16 soil samples. The extent of TRW as interpreted by three dimensional modeling is graphically depicted on Figure 5-6. Based upon the results of the investigation and previous investigations at the site, the TRW contains very low volatile or semi-volatile fraction as expected from a refinery waste that has been in-place for over 100 years. The TRW appears to be mainly comprised of solid long chain alkanes, and it appears the low pH conditions reported in previous investigations is localized and may have been removed during previous remedial actions of trenching operations at the site

## 7.5 Recommendations

Based on the results of the SCAPS LIF investigation at OU-2A at Alameda Point, it is recommended that data generated from this investigation be used in evaluating the remedial options in the ongoing Feasibility Study for OU-2A.

# 8.0 REFERENCES


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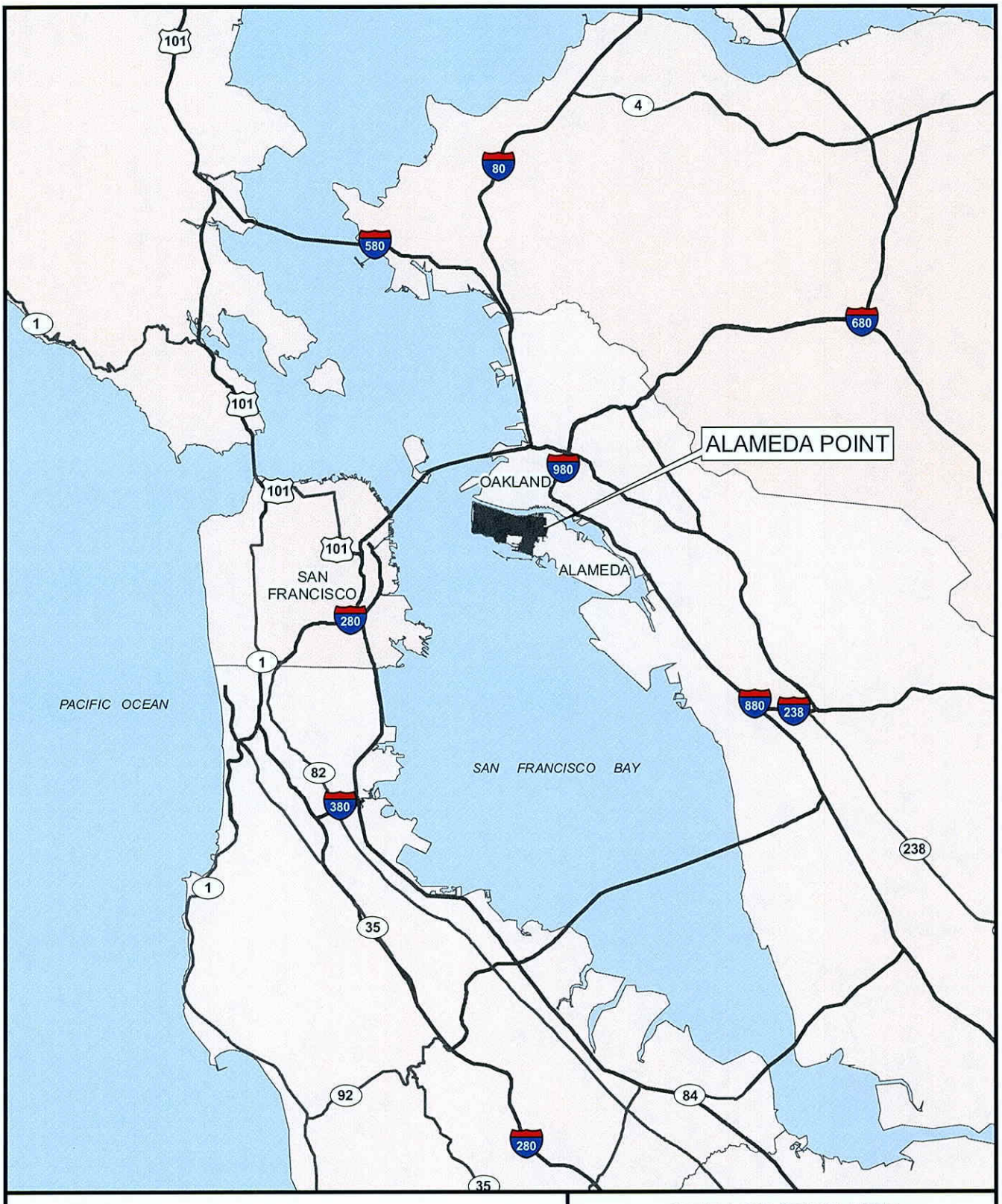
# FIGURES




N

0 2.5 5 10

Miles

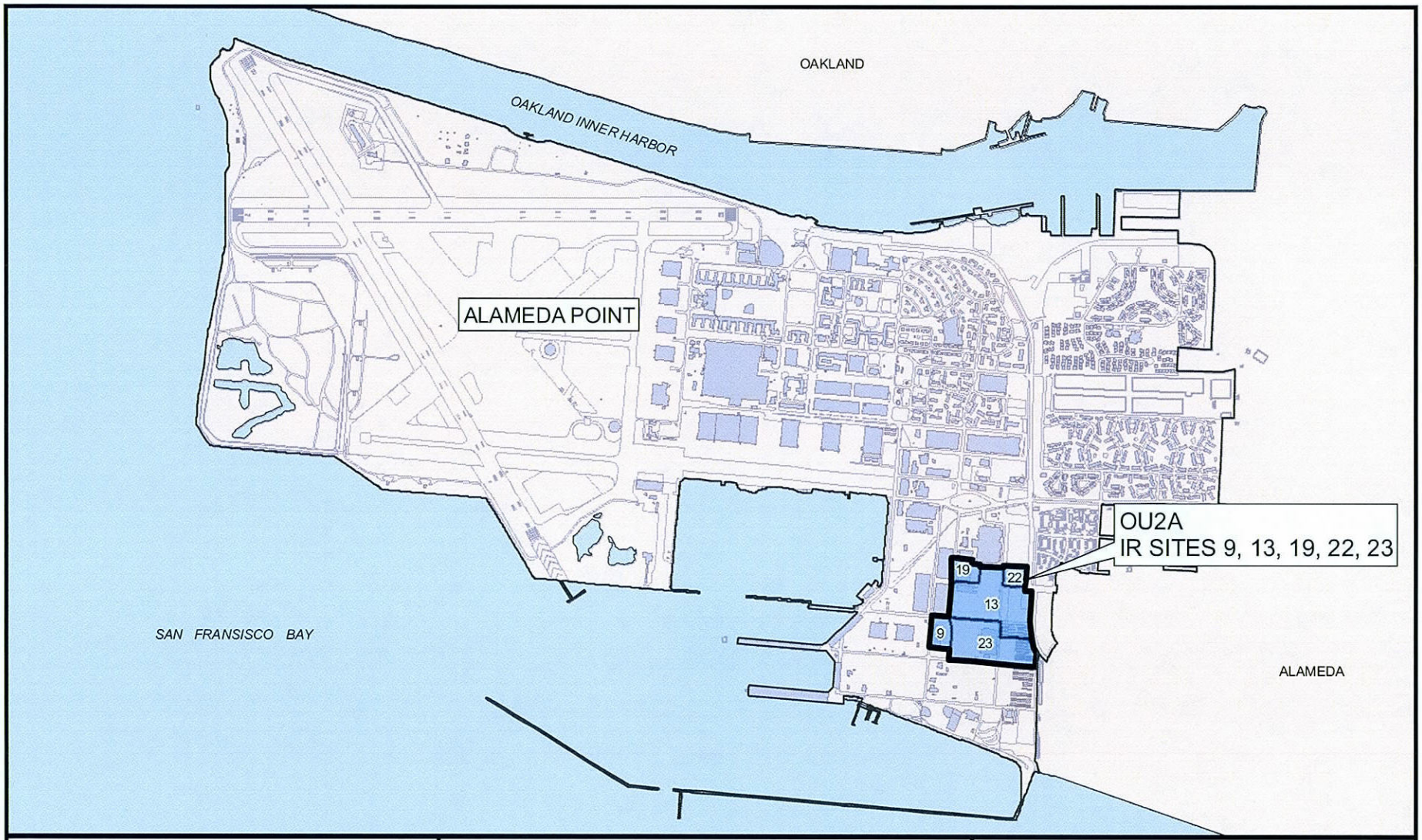
SITE LOCATION MAP

ALAMEDA POINT
ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Oct 16, 2007
FILE: AlaBaseLoc

FIGURE:
1-1




N

0 1,000 2,000 4,000

FEET

SITE LOCATION

ALAMEDA POINT
ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Feb 28, 2008
FILE: AlaBaseOv

FIGURE: 2-1

SITE 19
SITE 13
SITE 22
SITE 9
SITE 23
NRC ENVIRONMENTAL
SOCCER FIELD
ALAMEDA AEROSPACE
ALAMEDA SELF STORAGE
PREVIOUS CSM OF AREA POTENTIALLY IMPACTED BY TRW
PREVIOUS CSM OF AREA IMPACTED BY TRW
GROUNDWATER FLOW DIRECTION
W. PACIFIC STREET
W. ORISKANY STREET
W. TICONDEROGA STREET
VIKING STREET
ORION STREET
SKYHAWK STREET
MAIN STREET
CENTRAL AVENUE
HISTORIC SHORELINE
IRON OIL TANKS
IRON STORAGE IN BARRELS
CAN/BOX SHOP
LUBRICATING HOUSE
LABORATORY
CONDENSING BOXES
STILLS
TAR STILLS
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PUMP HOUSE
CONDENSER
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TRENCH, TERRAIN CONDUCTIVITY MAPPING, 1997
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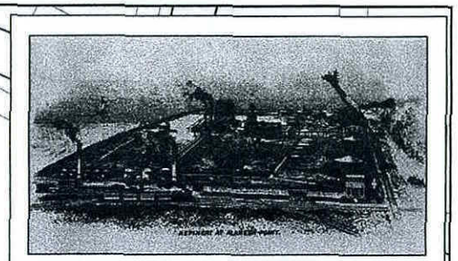
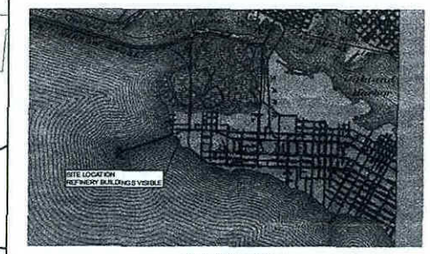
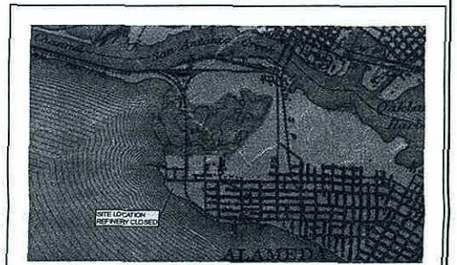


PACIFIC COAST OIL REFINERY, CIRCA 1890
VIEW LOOKING WEST




ALAMEDA POINT, 1895
USGS

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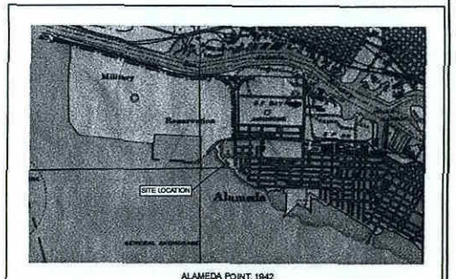
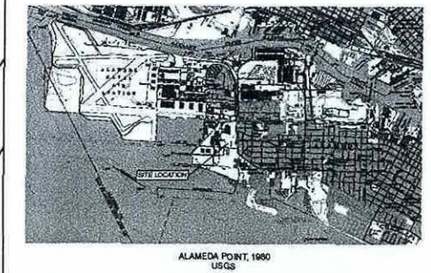
USGS




ALAMEDA POINT, 1942
USGS




ALAMEDA POINT, 1980
USGS

LEGEND
- MONITORING WELL
- OTHER WATER SAMPLE LOCATION
- SCAPS INVESTIGATION (NRAD, 1994)
- MONITORING WELL (E-PHONE, 1997)
- SOIL SAMPLE (CANONIE, 1991)
- MONITORING WELL (PRC ENVIRONMENTAL, 1991)
- SOIL SAMPLE (PRC ENVIRONMENTAL, 1991)
- MONITORING WELL (HARDING LAWSON ASSOC., 1992)
- SOIL SAMPLE (HARDING LAWSON ASSOC., 1992)
- TPH PRC EXCEEDED
- LEAD PRC EXCEEDED
- BENZENE PRC EXCEEDED
- IR SITE BOUNDARY
- FORMER OIL REFINERY FEATURES (FROM SANBORN FIRE INSURANCE MAP)
- HISTORIC SHORELINE
- TARRY REFINERY WASTE IDENTIFIED IN SAMPLE DURING BASEWIDE PAH STUDY (BIOCHTEL, 2003)
- TARRY REFINERY WASTE
- POTENTIALLY IMPACTED (BIOCHTEL, 2003)
- IMPACTED (BIOCHTEL, 2003)
- TOTAL - TOTAL PETROLEUM HYDROCARBONS (TTPH CONTOUR LINE, DASHED WHERE INFERRED SULTECH, 2005a
- BENZENE CONTOUR LINE, DASHED WHERE INFERRED SULTECH, 2005a

NOTES:
CSM = CONCEPTUAL SITE MODEL
PRC = PRELIMINARY REMEDIATION CRITERIA
TRW = TARRY REFINERY WASTE
PAH = POLYNUCLEAR AROMATIC HYDROCARBONS
GW = GROUNDWATER
TPH = TOTAL PETROLEUM HYDROCARBONS
TTPH = TOTAL TOTAL PETROLEUM HYDROCARBONS
ug/L = MICROGRAMS PER LITER
mg/kg = MILLIGRAMS PER KILOGRAM
J = ESTIMATED
U = NOT DETECTED
MSL = MEAN SEA LEVEL
DASHED LINE IN PLUME CONTOURS INDICATES INFERRED

0 40 80 160 FEET

MAP PROJECTION: NAD 83 CALIFORNIA STATE PLANE 3, SURVEY FEET

HISTORIC SITE CONDITIONS

ALAMEDA POINT
ALAMEDA, CALIFORNIA

Rickard Brady and Associates
Engineers and Surveyors
of Pacific Grove
Tel (831) 649-1660 Fax (831) 649-8501

DATE: Mar 27, 2006
FILE: Alam Bas GF1004
FIGURE: 2-2

N

0 50 100
FEET

LEGEND
- ● SCAPS PUSH LOCATION
- ▲ PRIOR LOCATION HAVING pH LESS THAN 2

TARRY REFINERY WASTE AND LOW PH LOCATIONS

ALAMEDA POINT
ALAMEDA, CALIFORNIA

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Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: Feb 25, 2008
FILE: Alameda TRWLocations

FIGURE: 2-3

N

0 50 100
FEET

LEGEND
- Background Fluorescence
- Surficial Fluorescence
- Potential Petroleum
- Petroleum
- Clipped Petroleum

# GENERALIZED LIF INTERPRETATION

## ALAMEDA POINT
## ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
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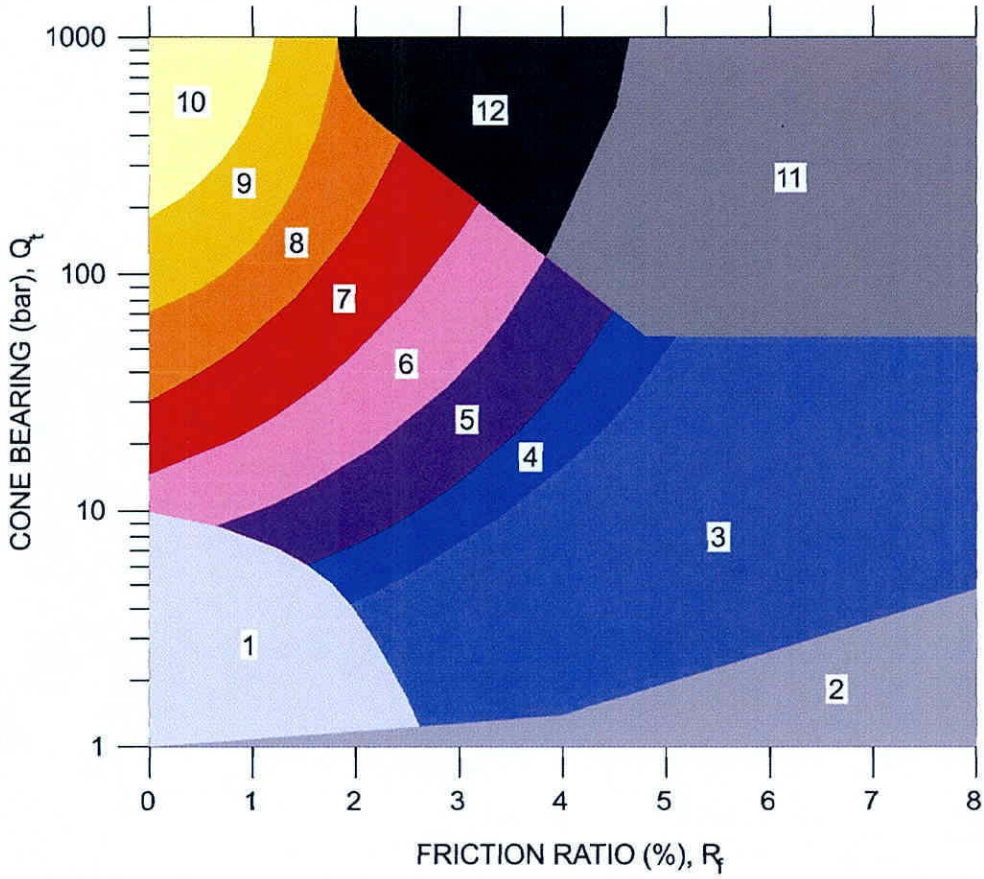
Telephone 858.496.0500 Fax 858.496.0505

DATE: April 25, 2008
FILE: Alameda GenLifInterp

FIGURE: 4-1

CPT CLASSIFICATION CHART
( after Robertson and Campanella, 1988)




Friction Ratio ($R_f$) = Sleeve Friction ($F_s$)/Cone Pressure ($Q_t$) x 100%
1 tons per square foot (tsf) ≈ 0.9576 bar
N = Standard penetration value, blows/foot

| Zone | | $Q_t$/ N | Soil Behavior Type |
|---|---|---|---|
| 1 | | 2 | sensitive fine grained |
| 2 | | 1 | organic material |
| 3 | | 1 | clay |
| 4 | | 1.5 | silty clay to clay |
| 5 | | 2 | clayey silt to silty clay |
| 6 | | 2.5 | sandy silt to clayey silt |
| 7 | | 3 | silty sand to sandy silt |
| 8 | | 4 | sand to silty sand |
| 9 | | 5 | sand |
| 10 | | 6 | gravelly sand to sand |
| 11 | | 1 | very stiff fine grained* |
| 12 | | 2 | sand to clayey sand* |

* overconsolidated or cemented

CPT SOIL CLASSIFICATION CHART

Richard Brady and Associates
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3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: April 24, 2008
FILE:ScapsCPTChart

FIGURE: 4-2

N

0 50 100
FEET

LEGEND
- BACKGROUND FLUORESCENCE
- SURFICIAL FLUORESCENCE
- POTENTIAL PETROLEUM
- PETROLEUM
- CLIPPED PETROLEUM

DEPTH ↓ INTENSITY →
SCAPS INTENSITY MEASUREMENT

NOTE: SEE CPT CLASSIFICATION CHART ON FIGURE 4-2 FOR SOIL CLASS COLOR INTERPRETATION.

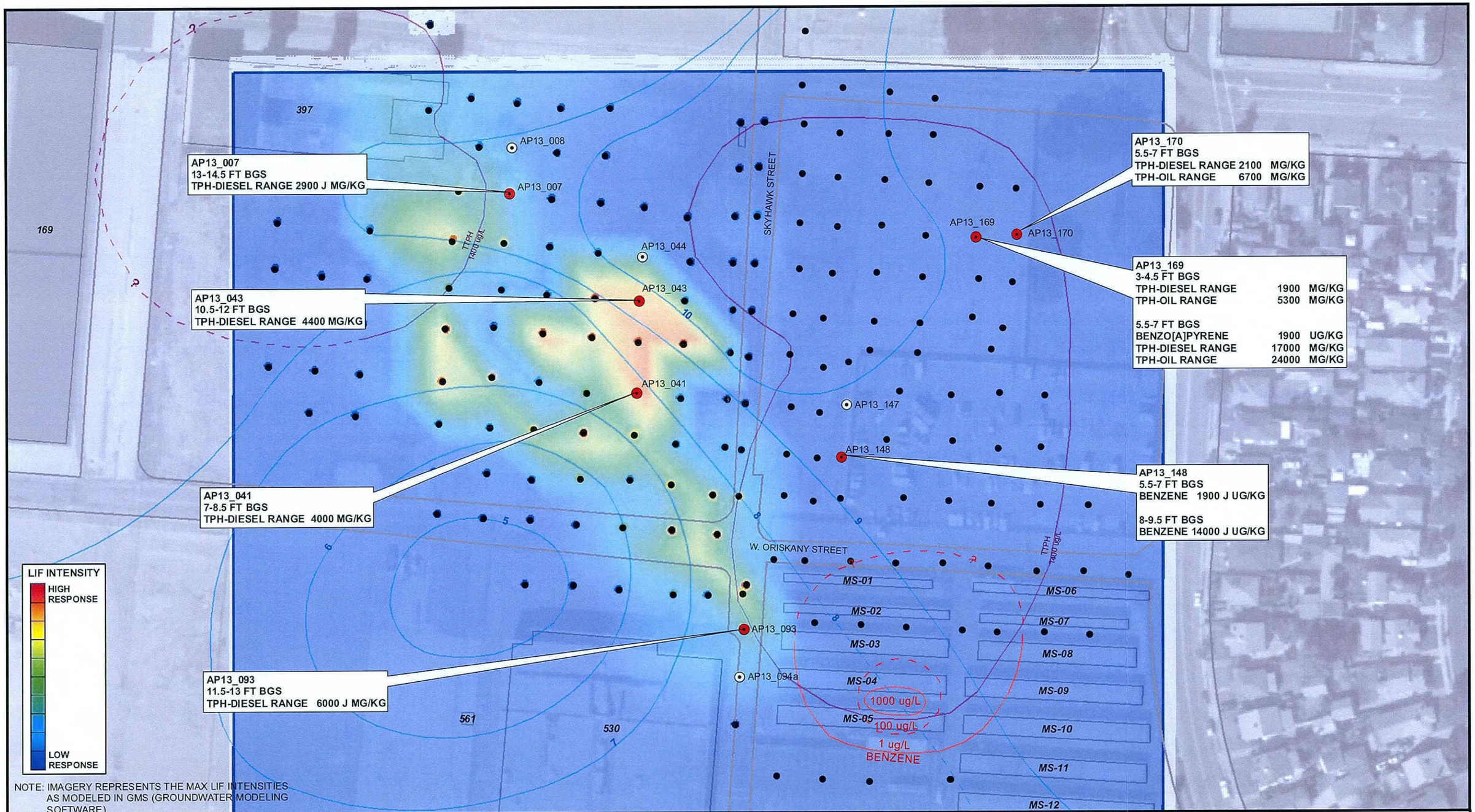
# SOIL CLASSIFICATION AND LIF INTENSITY

## ALAMEDA POINT
## ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: April 25, 2008
FILE: Alameda SoilClassLifIntensity

FIGURE: 5-1




NOTE: IMAGERY REPRESENTS THE MAX LIF INTENSITIES AS MODELED IN GMS (GROUNDWATER MODELING SOFTWARE)

N

0 50 100
FEET

LEGEND

- SOIL SAMPLE WITH ANALYTE CONCENTRATION GREATER THAN RESIDENTIAL PRCs/PRGs, EXCLUDING METALS
- SOIL SAMPLE WITH ANALYTE CONCENTRATIONS LESS THAN RESIDENTIAL PRCs/PRGs, EXCLUDING METALS
- SCAPS PUSH LOCATION
- GROUNDWATER ELEVATION CONTOUR LINE SPRING 2007 (FEET MSL) ITSI, 2008
- TOTAL - TOTAL PETROLEUM HYDROCARBONS (TTPH) CONTOUR LINE, DASHED WHERE INFERRED SULTECH, 2005a
- BENZENE CONTOUR LINE, DASHED WHERE INFERRED SULTECH, 2005a

NOTE:
PRC = PRELIMINARY REMEDIATION CRITERIA
PRG = US EPA REGION IX PRELIMINARY REMEDIATION GOALS

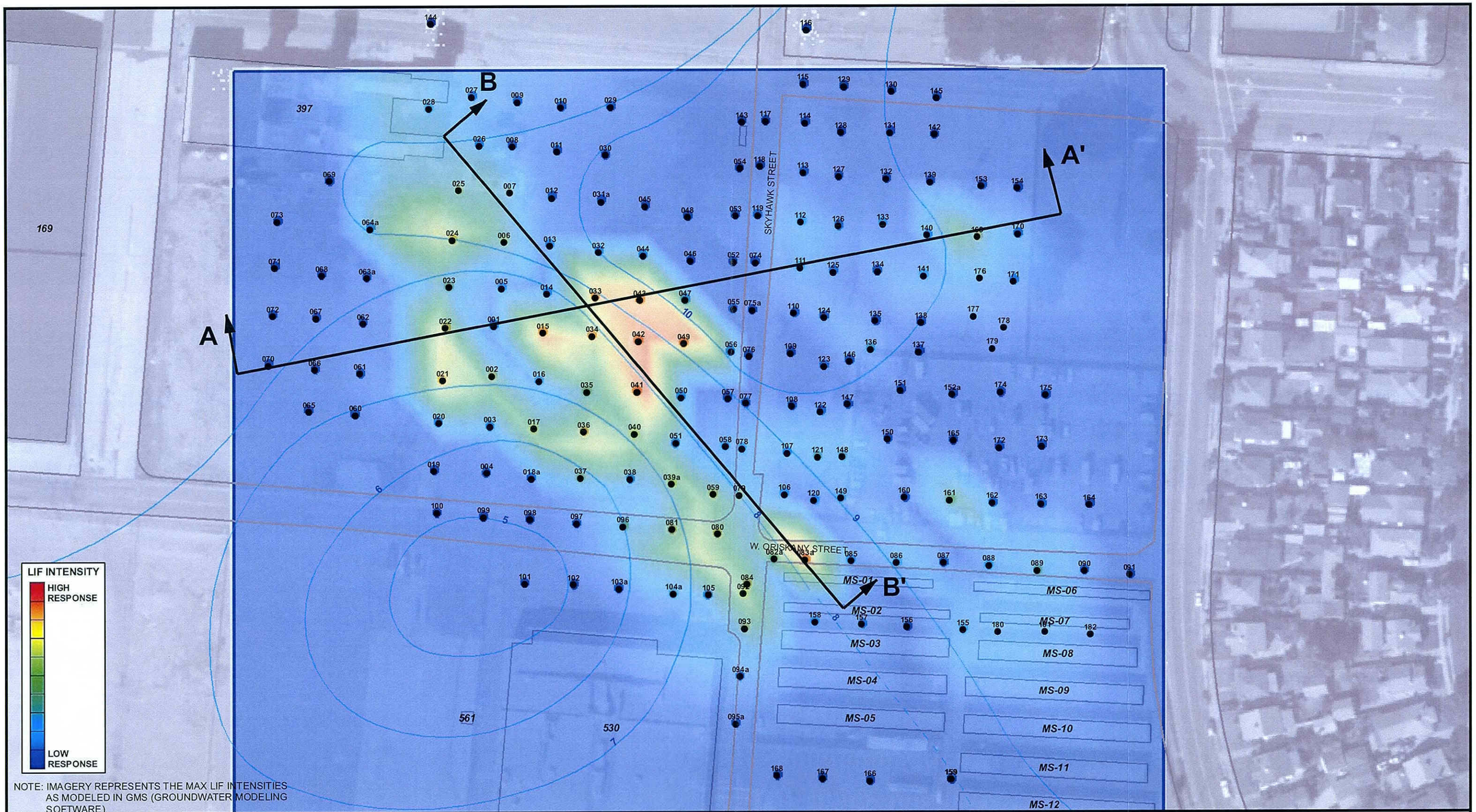
# SOIL SAMPLE SUMMARY

## ALAMEDA POINT
## ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858 496 0500 Fax 858 496 0505

DATE: April 26, 2008
FILE: Alameda SoilSampleSummary

FIGURE: 5-2




NOTE: IMAGERY REPRESENTS THE MAX LIF INTENSITIES AS MODELED IN GMS (GROUNDWATER MODELING SOFTWARE)

N

0 50 100
FEET

LEGEND

● SCAPS PUSH LOCATION

GROUNDWATER ELEVATION CONTOUR LINE SPRING 2007 (FEET MSL) ITSI, 2008

LIF = LASER INDUCED FLUORESCENCE

# OU-2A LIF INTENSITY MODEL AND CROSS-SECTION LINES

## ALAMEDA POINT ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
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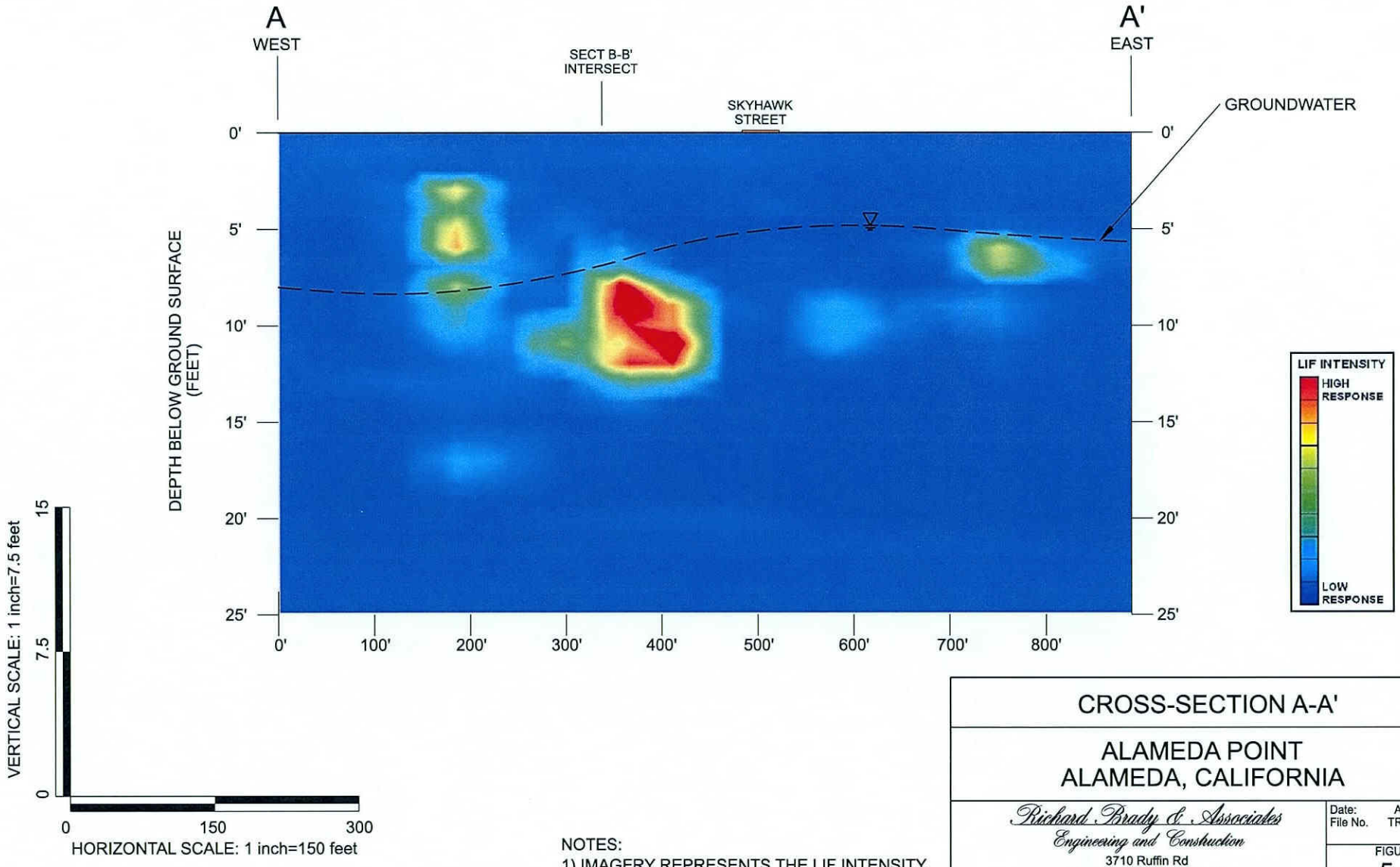
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: April 26, 2008
FILE: Alameda XSectLoc

FIGURE: 5-3

# CROSS-SECTION A-A'

VIEW LOOKING NORTH

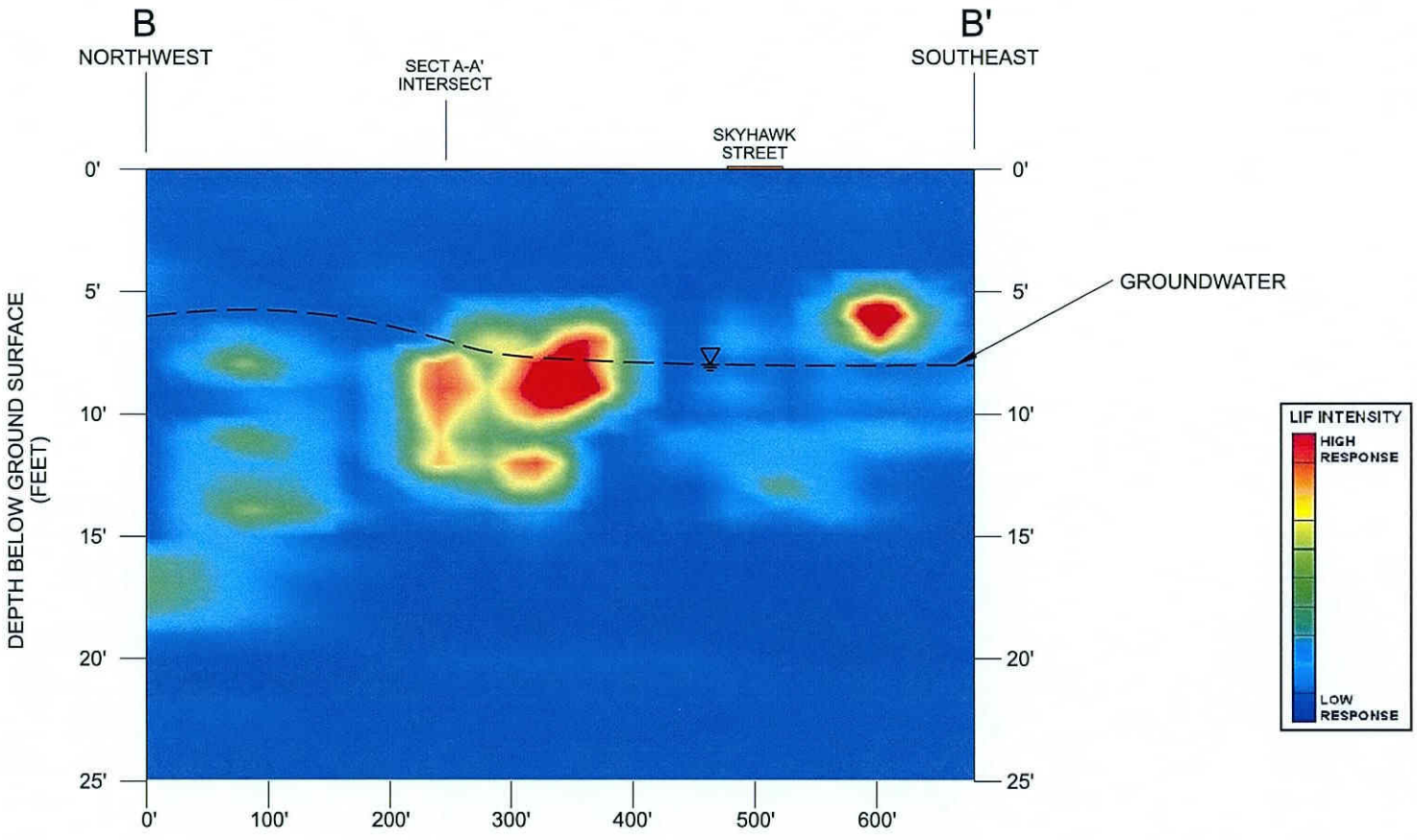


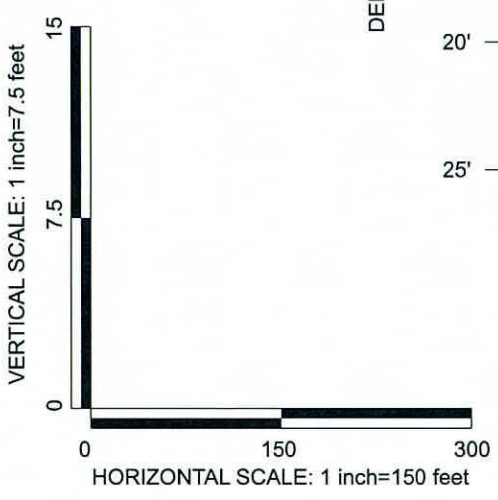

NOTES:
1) IMAGERY REPRESENTS THE LIF INTENSITY

| | |
|---|---|
| CROSS-SECTION A-A' | |
| ALAMEDA POINT<br>ALAMEDA, CALIFORNIA | |
| Richard Brady & Associates<br>Engineering and Construction<br>3710 Ruffin Rd<br>San Diego California 92123 | Date: April 28, 2008<br>File No. TRW_XSECTS<br>FIGURE:<br>5-4 |

# CROSS-SECTION B-B'

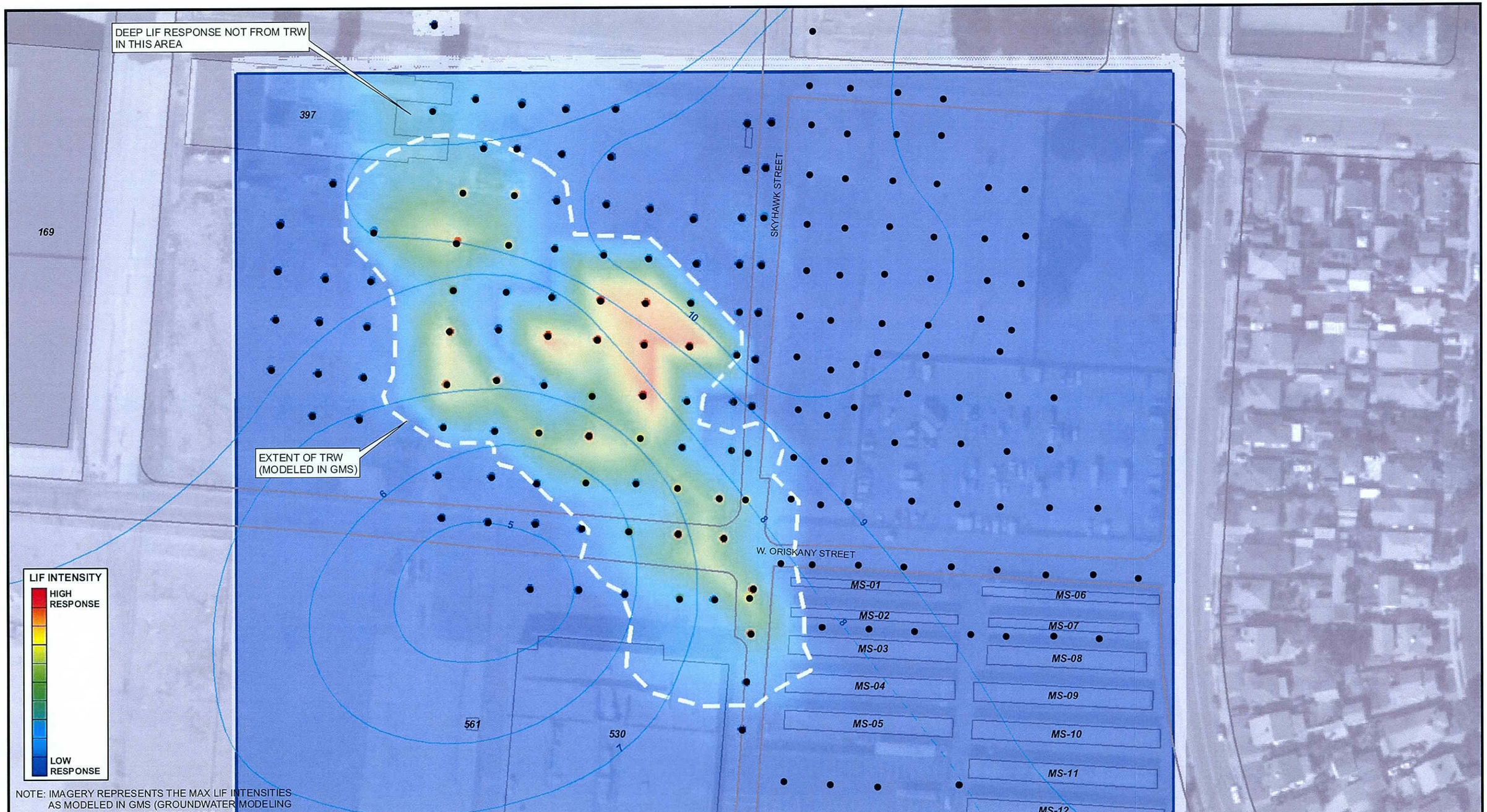
VIEW LOOKING NORTHEAST




NOTES:
1) IMAGERY REPRESENTS THE LIF INTENSITY

| | |
|---|---|
| CROSS-SECTION B-B' | |
| ALAMEDA POINT<br>ALAMEDA, CALIFORNIA | |
| Richard Brady & Associates<br>Engineering and Construction<br>3710 Ruffin Rd<br>San Diego California 92123 | Date: April 28, 2008<br>File No. TRW_XSECTS<br>FIGURE:<br>5-5 |




NOTE: IMAGERY REPRESENTS THE MAX LIF INTENSITIES AS MODELED IN GMS (GROUNDWATER MODELING SOFTWARE) WITHIN THE TRW AREA

N

0 50 100
FEET

LEGEND

● SCAPS PUSH LOCATION

5 GROUNDWATER ELEVATION CONTOUR LINE SPRING 2007 (FEET MSL) ITSI, 2008

LIF = LASER INDUCED FLUORESCENCE
TRW = TARRY REFINERY WASTE

# TRW MODEL

## ALAMEDA POINT
## ALAMEDA, CALIFORNIA

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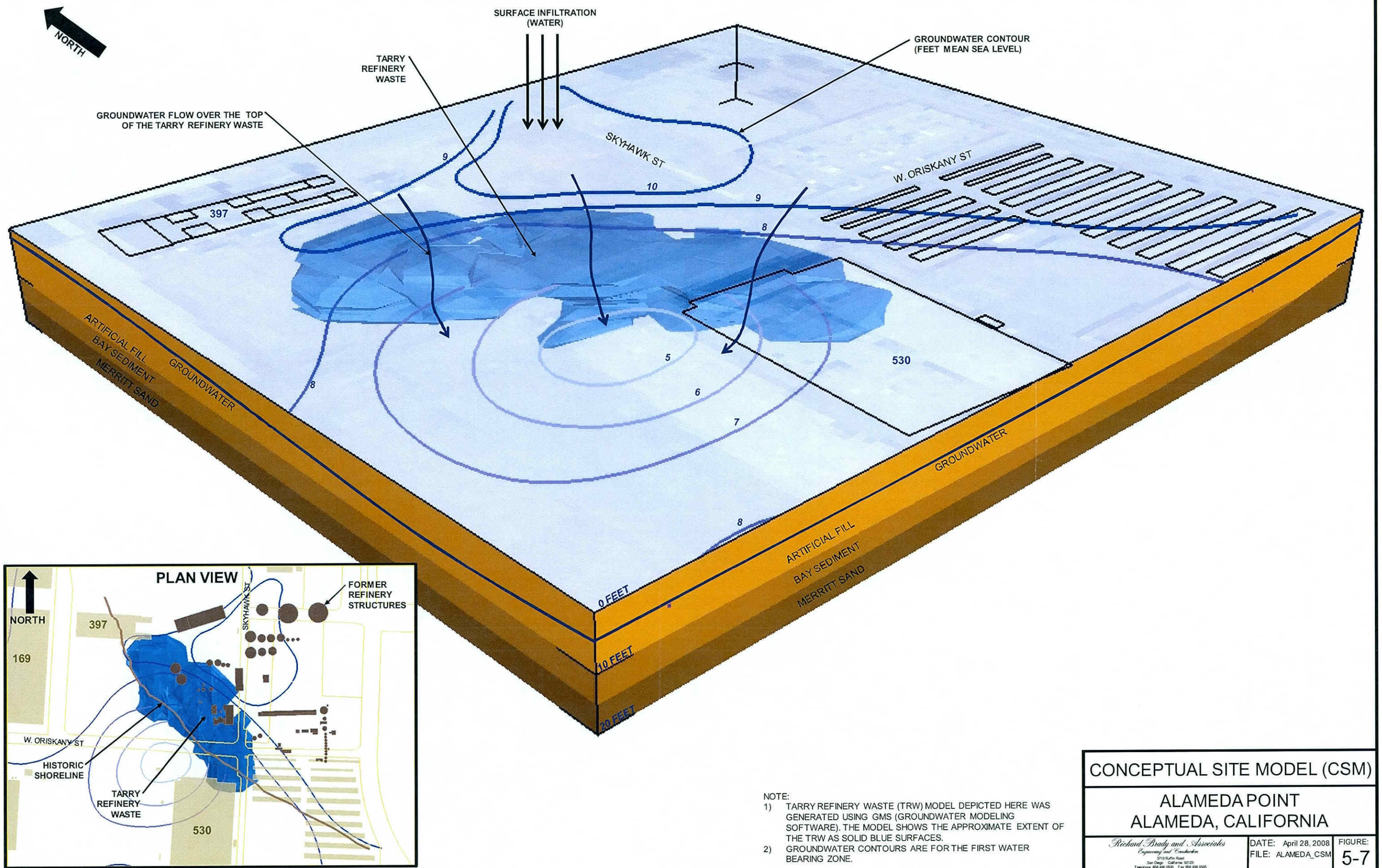
3710 Ruffin Road
San Diego California 92123
Telephone 858.496.0500 Fax 858.496.0505

DATE: April 28, 2008
FILE: Alameda TRWModel2

FIGURE: 5-6




NOTE:
1) TARRY REFINERY WASTE (TRW) MODEL DEPICTED HERE WAS GENERATED USING GMS (GROUNDWATER MODELING SOFTWARE). THE MODEL SHOWS THE APPROXIMATE EXTENT OF THE TRW AS SOLID BLUE SURFACES.
2) GROUNDWATER CONTOURS ARE FOR THE FIRST WATER BEARING ZONE.

CONCEPTUAL SITE MODEL (CSM)

ALAMEDA POINT
ALAMEDA, CALIFORNIA

Richard Brady and Associates
Engineering and Construction
3710 Ruffin Road
San Diego California 92123
Telephone 858 496 0500 Fax 858 496 0505

DATE: April 28, 2008
FILE: ALAMEDA_CSM

FIGURE: 5-7

# TABLES

Table 4-1 Survey Data
Alameda Point, California

| Location | Easting (ft) | Northing (ft) |
|---|---|---|
| ap13_001 | 6043300.55 | 2109929.82 |
| ap13_002 | 6043298.18 | 2109876.35 |
| ap13_003 | 6043296.00 | 2109822.00 |
| ap13_004 | 6043292.35 | 2109772.39 |
| ap13_005 | 6043308.88 | 2109969.97 |
| ap13_006 | 6043311.17 | 2110019.81 |
| ap13_007 | 6043317.81 | 2110071.78 |
| ap13_008 | 6043320.69 | 2110121.05 |
| ap13_009 | 6043326.11 | 2110168.63 |
| ap13_010 | 6043372.67 | 2110162.77 |
| ap13_011 | 6043368.40 | 2110115.34 |
| ap13_012 | 6043362.64 | 2110066.62 |
| ap13_013 | 6043360.55 | 2110015.39 |
| ap13_014 | 6043357.53 | 2109963.95 |
| ap13_015 | 6043353.30 | 2109922.44 |
| ap13_016 | 6043348.83 | 2109870.71 |
| ap13_017 | 6043343.24 | 2109819.58 |
| ap13_018a | 6043340.60 | 2109765.63 |
| ap13_019 | 6043235.42 | 2109774.36 |
| ap13_020 | 6043241.00 | 2109826.00 |
| ap13_021 | 6043245.15 | 2109871.84 |
| ap13_022 | 6043248.49 | 2109927.90 |
| ap13_023 | 6043252.34 | 2109971.82 |
| ap13_024 | 6043256.14 | 2110021.96 |
| ap13_025 | 6043262.89 | 2110074.47 |
| ap13_026 | 6043285.20 | 2110122.12 |
| ap13_027 | 6043276.86 | 2110174.28 |
| ap13_028 | 6043230.49 | 2110161.66 |
| ap13_029 | 6043426.25 | 2110162.91 |
| ap13_030 | 6043420.66 | 2110111.96 |
| ap13_031a | 6043415.60 | 2110062.27 |
| ap13_032 | 6043412.99 | 2110008.62 |
| ap13_033 | 6043409.23 | 2109959.89 |
| ap13_034 | 6043405.98 | 2109918.66 |
| ap13_035 | 6043400.43 | 2109858.87 |
| ap13_036 | 6043396.75 | 2109816.08 |
| ap13_037 | 6043393.14 | 2109766.61 |
| ap13_038 | 6043447.01 | 2109765.24 |
| ap13_039a | 6043491.55 | 2109759.93 |
| ap13_040 | 6043451.40 | 2109813.65 |
| ap13_041 | 6043454.54 | 2109859.00 |
| ap13_042 | 6043455.82 | 2109913.11 |
| ap13_043 | 6043457.31 | 2109957.02 |
| ap13_044 | 6043460.38 | 2110004.62 |
| ap13_045 | 6043462.67 | 2110057.43 |
| ap13_046 | 6043511.60 | 2109999.02 |
| ap13_047 | 6043506.00 | 2109957.27 |
| ap13_048 | 6043508.33 | 2110046.19 |

Notes: NAD 83, California State Plane 3

Table 4-1 Survey Data
Alameda Point, California

| Location | Easting (ft) | Northing (ft) |
|---|---|---|
| ap13_049 | 6043504.16 | 2109910.46 |
| ap13_050 | 6043501.58 | 2109852.76 |
| ap13_051 | 6043496.34 | 2109803.85 |
| ap13_052 | 6043557.61 | 2109997.89 |
| ap13_053 | 6043560.24 | 2110047.35 |
| ap13_054 | 6043564.89 | 2110097.37 |
| ap13_055 | 6043557.69 | 2109947.59 |
| ap13_056 | 6043554.91 | 2109902.04 |
| ap13_057 | 6043551.43 | 2109851.65 |
| ap13_058 | 6043548.93 | 2109800.31 |
| ap13_059 | 6043535.97 | 2109748.81 |
| ap13_060 | 6043150.80 | 2109834.69 |
| ap13_061 | 6043155.75 | 2109879.33 |
| ap13_062 | 6043159.45 | 2109932.74 |
| ap13_063a | 6043163.77 | 2109981.34 |
| ap13_064a | 6043166.96 | 2110033.91 |
| ap13_065 | 6043101.22 | 2109838.20 |
| ap13_066 | 6043107.03 | 2109883.44 |
| ap13_067 | 6043108.65 | 2109938.82 |
| ap13_068 | 6043115.16 | 2109984.11 |
| ap13_069 | 6043122.92 | 2110084.94 |
| ap13_070 | 6043057.52 | 2109888.18 |
| ap13_071 | 6043064.25 | 2109992.49 |
| ap13_072 | 6043061.72 | 2109941.26 |
| ap13_073 | 6043067.13 | 2110042.10 |
| ap13_074 | 6043581.41 | 2109997.17 |
| ap13_075a | 6043578.24 | 2109946.51 |
| ap13_076 | 6043574.77 | 2109896.83 |
| ap13_077 | 6043571.02 | 2109846.67 |
| ap13_078 | 6043567.19 | 2109797.59 |
| ap13_079 | 6043564.30 | 2109747.57 |
| ap13_080 | 6043540.25 | 2109706.56 |
| ap13_081 | 6043491.69 | 2109711.20 |
| ap13_082a | 6043601.53 | 2109679.16 |
| ap13_083a | 6043635.54 | 2109678.14 |
| ap13_084 | 6043572.40 | 2109652.09 |
| ap13_085 | 6043684.72 | 2109677.33 |
| ap13_086 | 6043733.91 | 2109675.28 |
| ap13_087 | 6043784.02 | 2109675.32 |
| ap13_088 | 6043832.96 | 2109672.03 |
| ap13_089 | 6043885.12 | 2109666.44 |
| ap13_090 | 6043935.45 | 2109666.28 |
| ap13_091 | 6043984.45 | 2109662.04 |
| ap13_092 | 6043568.45 | 2109642.51 |
| ap13_093 | 6043569.79 | 2109604.54 |
| ap13_094a | 6043564.89 | 2109553.71 |
| ap13_095a | 6043560.29 | 2109503.38 |
| ap13_096 | 6043439.44 | 2109714.34 |

Notes: NAD 83, California State Plane 3

Table 4-1 Survey Data
Alameda Point, California

| Location | Easting (ft) | Northing (ft) |
|---|---|---|
| ap13_097 | 6043388.81 | 2109717.77 |
| ap13_098 | 6043339.29 | 2109722.45 |
| ap13_099 | 6043289.02 | 2109724.70 |
| ap13_100 | 6043239.38 | 2109729.53 |
| ap13_101 | 6043333.61 | 2109653.45 |
| ap13_102 | 6043385.65 | 2109652.39 |
| ap13_103a | 6043435.00 | 2109647.66 |
| ap13_104a | 6043493.16 | 2109642.31 |
| ap13_105 | 6043530.48 | 2109641.08 |
| ap13_106 | 6043613.27 | 2109748.42 |
| ap13_107 | 6043616.28 | 2109792.99 |
| ap13_108 | 6043620.98 | 2109843.24 |
| ap13_109 | 6043619.57 | 2109899.70 |
| ap13_110 | 6043623.48 | 2109943.31 |
| ap13_111 | 6043629.94 | 2109991.42 |
| ap13_112 | 6043631.10 | 2110040.57 |
| ap13_113 | 6043633.73 | 2110093.07 |
| ap13_114 | 6043635.65 | 2110145.60 |
| ap13_115 | 6043633.88 | 2110187.36 |
| ap13_116 | 6043636.88 | 2110244.86 |
| ap13_117 | 6043592.34 | 2110147.78 |
| ap13_118 | 6043586.54 | 2110099.40 |
| ap13_119 | 6043584.41 | 2110047.69 |
| ap13_120 | 6043645.06 | 2109742.32 |
| ap13_121 | 6043648.83 | 2109788.63 |
| ap13_122 | 6043651.99 | 2109836.86 |
| ap13_123 | 6043655.53 | 2109885.89 |
| ap13_124 | 6043656.05 | 2109938.23 |
| ap13_125 | 6043665.32 | 2109986.59 |
| ap13_126 | 6043670.96 | 2110036.37 |
| ap13_127 | 6043671.72 | 2110088.76 |
| ap13_128 | 6043674.12 | 2110135.58 |
| ap13_129 | 6043677.04 | 2110184.52 |
| ap13_130 | 6043727.79 | 2110179.33 |
| ap13_131 | 6043726.63 | 2110135.25 |
| ap13_132 | 6043722.83 | 2110085.86 |
| ap13_133 | 6043718.74 | 2110038.18 |
| ap13_134 | 6043713.15 | 2109987.45 |
| ap13_135 | 6043710.63 | 2109934.96 |
| ap13_136 | 6043705.97 | 2109904.08 |
| ap13_137 | 6043757.55 | 2109901.13 |
| ap13_138 | 6043760.10 | 2109932.81 |
| ap13_139 | 6043769.90 | 2110082.60 |
| ap13_140 | 6043766.27 | 2110026.44 |
| ap13_141 | 6043762.48 | 2109982.48 |
| ap13_142 | 6043774.43 | 2110133.41 |
| ap13_143 | 6043566.88 | 2110146.71 |
| ap13_144 | 6043233.09 | 2110252.14 |

Notes: NAD 83, California State Plane 3

Table 4-1 Survey Data
Alameda Point, California

| Location | Easting (ft) | Northing (ft) |
|---|---|---|
| ap13_145 | 6043776.86 | 2110172.54 |
| ap13_146 | 6043682.61 | 2109891.01 |
| ap13_147 | 6043681.09 | 2109845.15 |
| ap13_148 | 6043675.15 | 2109789.13 |
| ap13_149 | 6043674.04 | 2109744.74 |
| ap13_150 | 6043723.77 | 2109807.91 |
| ap13_151 | 6043737.96 | 2109860.38 |
| ap13_152a | 6043793.47 | 2109855.67 |
| ap13_153 | 6043824.72 | 2110077.99 |
| ap13_154 | 6043863.66 | 2110075.97 |
| ap13_155 | 6043804.91 | 2109602.81 |
| ap13_156 | 6043744.79 | 2109606.25 |
| ap13_157 | 6043696.45 | 2109609.25 |
| ap13_158 | 6043645.99 | 2109611.72 |
| ap13_159 | 6043792.46 | 2109443.78 |
| ap13_160 | 6043741.99 | 2109745.36 |
| ap13_161 | 6043790.72 | 2109742.27 |
| ap13_162 | 6043836.06 | 2109739.33 |
| ap13_163 | 6043889.48 | 2109737.88 |
| ap13_164 | 6043940.64 | 2109737.14 |
| ap13_165 | 6043794.47 | 2109806.40 |
| ap13_166 | 6043705.40 | 2109442.03 |
| ap13_167 | 6043654.29 | 2109444.63 |
| ap13_168 | 6043605.04 | 2109448.06 |
| ap13_169 | 6043820.72 | 2110024.65 |
| ap13_170 | 6043864.44 | 2110027.47 |
| ap13_171 | 6043859.61 | 2109976.66 |
| ap13_172 | 6043844.04 | 2109798.38 |
| ap13_173 | 6043889.96 | 2109799.85 |
| ap13_174 | 6043845.25 | 2109858.16 |
| ap13_175 | 6043893.96 | 2109855.05 |
| ap13_176 | 6043823.30 | 2109980.14 |
| ap13_177 | 6043816.22 | 2109939.26 |
| ap13_178 | 6043848.96 | 2109927.34 |
| ap13_179 | 6043836.14 | 2109904.75 |
| ap13_180 | 6043842.52 | 2109600.68 |
| ap13_181 | 6043893.35 | 2109600.90 |
| ap13_182 | 6043942.21 | 2109598.18 |

Notes: NAD 83, California State Plane 3

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| ***Semivolatiles Analysis by EPA Method 8270C (ug/kg)*** | | | | | |
| AP13-007-S-02 | 12/4/2007 | 2-METHYLNAPHTHALENE | 4200 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | NAPHTHALENE | 1400 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | PHENANTHRENE | 820 | | 13 - 14.5 |
| AP13-041-S-01 | 12/4/2007 | ANTHRACENE | 820 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | BENZO[A]ANTHRACENE | 520 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | CHRYSENE | 830 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | 2-METHYLNAPHTHALENE | 53000 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | NAPHTHALENE | 25000 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | FLUORANTHENE | 450 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | FLUORENE | 1900 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | PHENANTHRENE | 6400 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | PYRENE | 720 | J | 7 - 8.5 |
| AP13-043-S-02 | 12/4/2007 | DIBENZOFURAN | 550 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | 2-METHYLNAPHTHALENE | 18000 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | NAPHTHALENE | 6100 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | PHENANTHRENE | 1300 | | 10.5 - 12 |
| AP13-148-S-02 | 12/4/2007 | FLUORENE | 260 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | NAPHTHALENE | 2100 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | PHENANTHRENE | 280 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | 2-METHYLNAPHTHALENE | 6200 | | 8 - 9.5 |
| AP13-169-S-02 | 12/4/2007 | ANTHRACENE | 1500 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | BENZO[A]ANTHRACENE | 3500 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | BENZO[A]PYRENE | 1900 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | BENZO[B]FLUORANTHENE | 1400 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | CHRYSENE | 7100 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | FLUORANTHENE | 2100 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | FLUORENE | 1700 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | NAPHTHALENE | 940 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | PHENANTHRENE | 2000 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | PYRENE | 4900 | | 5.5 - 7 |
| ***Gasoline and Diesel Range Organics Analysis by EPA Method 8015M (mg/kg)*** | | | | | |
| AP13-007-S-02 | 12/4/2007 | TPH-DIESEL RANGE | 2900 | J | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | TPH-MOTOR OIL RANGE | 1300 | J | 13 - 14.5 |
| AP13-041-S-01 | 12/4/2007 | TPH-DIESEL RANGE | 4000 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | TPH-MOTOR OIL RANGE | 230 | | 7 - 8.5 |
| AP13-043-S-02 | 12/4/2007 | TPH-DIESEL RANGE | 4400 | | 10.5 - 12 |
| AP13-093-S-02 | 12/5/2007 | TPH-DIESEL RANGE | 6000 | J | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | TPH-MOTOR OIL RANGE | 1500 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | TPH-MOTOR OIL RANGE | 170 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | TPH-DIESEL RANGE | 73 | | 11.5 - 13 |
| AP13-147-S-01 | 12/4/2007 | TPH-MOTOR OIL RANGE | 8.8 | J | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | TPH-DIESEL RANGE | 48 | | 8 - 9.5 |
| AP13-148-S-01 | 12/4/2007 | TPH-DIESEL RANGE | 150 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | TPH-MOTOR OIL RANGE | 24 | | 5.5 - 7 |
| AP13-148-S-02 | 12/4/2007 | TPH-MOTOR OIL RANGE | 6.6 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | TPH-DIESEL RANGE | 1100 | | 8 - 9.5 |
| AP13-169-S-01 | 12/4/2007 | TPH-MOTOR OIL RANGE | 5300 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | TPH-DIESEL RANGE | 1900 | | 3 - 4.5 |

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| AP13-169-S-02 | 12/4/2007 | TPH-DIESEL RANGE | 17000 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | TPH-MOTOR OIL RANGE | 24000 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | TPH-DIESEL RANGE | 2100 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | TPH-MOTOR OIL RANGE | 6700 | | 5.5 - 7 |
| ***Volatile Organics Analysis by EPA Method 8260B (ug/kg)*** | | | | | |
| AP13-007-S-02 | 12/4/2007 | ACETONE | 10 | J | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | ETHYLBENZENE | 7.3 | J | 13 - 14.5 |
| AP13-041-S-01 | 12/4/2007 | ETHYLBENZENE | 2000 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | P-XYLENE | 23000 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | O-XYLENE | 6200 | J | 7 - 8.5 |
| AP13-043-S-01 | 12/4/2007 | 2-BUTANONE | 6 | J | 4.5 - 6 |
| AP13-043-S-02 | 12/4/2007 | ACETONE | 24 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | BENZENE | 7.2 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | ETHYLBENZENE | 41 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | P-XYLENE | 21 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | O-XYLENE | 18 | J | 10.5 - 12 |
| AP13-093-S-01 | 12/5/2007 | METHYLENE CHLORIDE | 3.2 | J | 6.5 - 8 |
| AP13-094-S-01 | 12/5/2007 | METHYLENE CHLORIDE | 4.6 | J | 11.5 - 13 |
| AP13-148-S-01 | 12/4/2007 | 2-BUTANONE | 20 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | ACETONE | 90 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | P-XYLENE | 390 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | O-XYLENE | 54 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | BENZENE | 1900 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | ETHYLBENZENE | 6400 | J | 5.5 - 7 |
| AP13-148-S-02 | 12/4/2007 | BENZENE | 14000 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | ETHYLBENZENE | 13000 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | O-XYLENE | 270 | J | 8 - 9.5 |
| AP13-169-S-01 | 12/4/2007 | ACETONE | 24 | | 3 - 4.5 |
| AP13-169-S-02 | 12/4/2007 | 2-BUTANONE | 23 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | ACETONE | 130 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | BENZENE | 44 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | ETHYLBENZENE | 58 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | P-XYLENE | 110 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | O-XYLENE | 140 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | TOLUENE | 11 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | 2-BUTANONE | 8.3 | J | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | ACETONE | 12 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | METHYLENE CHLORIDE | 4.1 | J | 5.5 - 7 |
| ***PAH Analysis by EPA Method 8270SIM (ug/kg)*** | | | | | |
| AP13-094-S-01 | 12/5/2007 | ANTHRACENE | 26 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BENZO[A]ANTHRACENE | 150 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BENZO[A]PYRENE | 300 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BENZO[B]FLUORANTHENE | 290 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BENZO[K]FLUORANTHENE | 83 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BENZO[G,H,I]PERYLENE | 290 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | CHRYSENE | 190 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | FLUORANTHENE | 300 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | INDENO[1,2,3-CD]PYRENE | 200 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | PHENANTHRENE | 35 | J | 11.5 - 13 |

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| AP13-094-S-01 | 12/5/2007 | PYRENE | 440 | | 11.5 - 13 |
| AP13-147-S-01 | 12/4/2007 | FLUORENE | 26 | | 8 - 9.5 |
| AP13-169-S-01 | 12/4/2007 | ACENAPHTHENE | 16 | J | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | BENZO[A]ANTHRACENE | 30 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | BENZO[G,H,I]PERYLENE | 39 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | CHRYSENE | 49 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | FLUORANTHENE | 23 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | FLUORENE | 54 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | PYRENE | 39 | | 3 - 4.5 |
| AP13-170-S-01 | 12/5/2007 | BENZO[A]ANTHRACENE | 140 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | BENZO[G,H,I]PERYLENE | 520 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | CHRYSENE | 200 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | FLUORANTHENE | 200 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | INDENO[1,2,3-CD]PYRENE | 220 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | PHENANTHRENE | 87 | J | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | PYRENE | 220 | | 5.5 - 7 |
| ***Metals Analysis by EPA Method 6010/7000 Series (mg/kg)*** | | | | | |
| AP13-007-S-01 | 12/4/2007 | ARSENIC | 1.23 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | BARIUM | 24.2 | J | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | BERYLLIUM | 0.141 | J | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 24.6 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | COBALT | 3.98 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | COPPER | 9.41 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | LEAD | 1.74 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | NICKEL | 24.6 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | VANADIUM | 16.4 | | 2.5 - 4 |
| AP13-007-S-01 | 12/4/2007 | ZINC | 22.5 | | 2.5 - 4 |
| AP13-007-S-02 | 12/4/2007 | ARSENIC | 2.69 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | BARIUM | 82 | J | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | BERYLLIUM | 0.292 | J | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | CADMIUM | 0.165 | J | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | CHROMIUM, TOTAL | 47 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | COBALT | 7.42 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | COPPER | 16.2 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | LEAD | 3.89 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | NICKEL | 53.8 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | VANADIUM | 28.4 | | 13 - 14.5 |
| AP13-007-S-02 | 12/4/2007 | ZINC | 37.5 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | ARSENIC | 1.34 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | BARIUM | 90.9 | J | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | BERYLLIUM | 0.211 | J | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 49.2 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | COBALT | 5.04 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | COPPER | 16.8 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | LEAD | 3 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | NICKEL | 39.8 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | VANADIUM | 20.9 | | 13 - 14.5 |
| AP13-008-S-01 | 12/4/2007 | ZINC | 34.1 | | 13 - 14.5 |
| AP13-041-S-01 | 12/4/2007 | ARSENIC | 4.76 | | 7 - 8.5 |

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| AP13-041-S-01 | 12/4/2007 | BARIUM | 85.6 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | BERYLLIUM | 0.37 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | CADMIUM | 0.137 | J | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 71.1 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | COBALT | 4.17 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | COPPER | 14 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | LEAD | 4.67 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | NICKEL | 54.9 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | VANADIUM | 48.2 | | 7 - 8.5 |
| AP13-041-S-01 | 12/4/2007 | ZINC | 40.8 | | 7 - 8.5 |
| AP13-043-S-01 | 12/4/2007 | ARSENIC | 2.82 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | BARIUM | 36.2 | J | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 27.2 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | COBALT | 3.04 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | COPPER | 6.22 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | LEAD | 4.26 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | NICKEL | 22.6 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | VANADIUM | 19 | | 4.5 - 6 |
| AP13-043-S-01 | 12/4/2007 | ZINC | 19.1 | | 4.5 - 6 |
| AP13-043-S-02 | 12/4/2007 | ARSENIC | 4.13 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | BARIUM | 114 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | BERYLLIUM | 0.48 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | CADMIUM | 0.162 | J | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | CHROMIUM, TOTAL | 67.7 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | COBALT | 10.5 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | COPPER | 15.4 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | LEAD | 4.29 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | NICKEL | 72.7 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | VANADIUM | 36.4 | | 10.5 - 12 |
| AP13-043-S-02 | 12/4/2007 | ZINC | 40.9 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | ARSENIC | 5.26 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | BARIUM | 99.2 | J | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | BERYLLIUM | 0.383 | J | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 56.3 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | COBALT | 6.85 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | COPPER | 14.1 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | LEAD | 3.82 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | MERCURY | 0.0824 | J | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | NICKEL | 60 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | THALLIUM/THALLIUM-201/230 | 0.607 | J | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | VANADIUM | 33.5 | | 10.5 - 12 |
| AP13-044-S-01 | 12/4/2007 | ZINC | 32.3 | | 10.5 - 12 |
| AP13-093-S-01 | 12/5/2007 | ARSENIC | 0.715 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | BARIUM | 53.1 | J | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | BERYLLIUM | 0.141 | J | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | CHROMIUM, TOTAL | 27.5 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | COBALT | 3.83 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | COPPER | 18.7 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | LEAD | 3.28 | | 6.5 - 8 |

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| AP13-093-S-01 | 12/5/2007 | NICKEL | 23.8 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | VANADIUM | 17 | | 6.5 - 8 |
| AP13-093-S-01 | 12/5/2007 | ZINC | 25 | | 6.5 - 8 |
| AP13-093-S-02 | 12/5/2007 | ARSENIC | 2.27 | | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | BARIUM | 63.6 | J | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | CHROMIUM, TOTAL | 1.26 | | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | COBALT | 0.368 | J | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | LEAD | 11.9 | | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | NICKEL | 1.42 | | 11.5 - 13 |
| AP13-093-S-02 | 12/5/2007 | VANADIUM | 0.692 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | ARSENIC | 11.1 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BARIUM | 92.8 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | BERYLLIUM | 0.863 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | CADMIUM | 0.522 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | CHROMIUM, TOTAL | 105 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | COBALT | 19.5 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | COPPER | 50.7 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | LEAD | 30.9 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | MOLYBDENUM | 0.666 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | NICKEL | 116 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | SELENIUM | 0.44 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | SILVER | 0.301 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | VANADIUM | 79 | | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | MERCURY | 0.182 | J | 11.5 - 13 |
| AP13-094-S-01 | 12/5/2007 | ZINC | 138 | | 11.5 - 13 |
| AP13-147-S-01 | 12/4/2007 | ARSENIC | 2.64 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | BARIUM | 74.8 | J | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | BERYLLIUM | 0.447 | J | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | CADMIUM | 0.207 | J | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 48.3 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | COBALT | 37.6 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | COPPER | 29.6 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | LEAD | 4.92 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | NICKEL | 83 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | SELENIUM | 0.128 | J | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | VANADIUM | 37.9 | | 8 - 9.5 |
| AP13-147-S-01 | 12/4/2007 | ZINC | 49.1 | | 8 - 9.5 |
| AP13-148-S-01 | 12/4/2007 | ARSENIC | 1.17 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | BARIUM | 40.3 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | BERYLLIUM | 0.153 | J | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 24.1 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | COBALT | 4.15 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | COPPER | 12.9 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | LEAD | 2.19 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | NICKEL | 17.4 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | VANADIUM | 19.3 | | 5.5 - 7 |
| AP13-148-S-01 | 12/4/2007 | ZINC | 27.7 | | 5.5 - 7 |
| AP13-148-S-02 | 12/4/2007 | ARSENIC | 3.79 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | BARIUM | 122 | J | 8 - 9.5 |

Table 5-1 Reported and Estimated Soil Sample Results
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) |
|---|---|---|---|---|---|
| AP13-148-S-02 | 12/4/2007 | BERYLLIUM | 0.423 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | CHROMIUM, TOTAL | 79.5 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | COBALT | 3.84 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | COPPER | 19 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | LEAD | 5.88 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | NICKEL | 47.4 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | SELENIUM | 0.276 | J | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | VANADIUM | 48.1 | | 8 - 9.5 |
| AP13-148-S-02 | 12/4/2007 | ZINC | 40.5 | | 8 - 9.5 |
| AP13-169-S-01 | 12/4/2007 | ARSENIC | 1.94 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | BARIUM | 67.3 | J | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | BERYLLIUM | 0.157 | J | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | CHROMIUM, TOTAL | 23.3 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | COBALT | 2.95 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | COPPER | 24.8 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | LEAD | 23.6 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | MERCURY | 0.139 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | NICKEL | 15 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | VANADIUM | 16.9 | | 3 - 4.5 |
| AP13-169-S-01 | 12/4/2007 | ZINC | 39.6 | | 3 - 4.5 |
| AP13-169-S-02 | 12/4/2007 | ARSENIC | 8.29 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | BARIUM | 70.9 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | CHROMIUM, TOTAL | 13.2 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | COBALT | 0.506 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | COPPER | 317 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | LEAD | 124 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | MERCURY | 0.0892 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | NICKEL | 4.36 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | SELENIUM | 0.29 | J | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | VANADIUM | 9.42 | | 5.5 - 7 |
| AP13-169-S-02 | 12/4/2007 | ZINC | 195 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | ARSENIC | 1.38 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | BARIUM | 30.3 | J | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | BERYLLIUM | 0.124 | J | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | CHROMIUM, TOTAL | 19.9 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | COBALT | 2.49 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | COPPER | 15.7 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | LEAD | 14.1 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | NICKEL | 12.5 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | VANADIUM | 12 | | 5.5 - 7 |
| AP13-170-S-01 | 12/5/2007 | ZINC | 40.9 | | 5.5 - 7 |

Notes and Acronyms

| | |
|---|---|
| EPA | Environmental Protection Agency |
| J | estimated value |
| mg/kg | milligrams per kilograms |
| sample ID | sample identification |
| ug/kg | micrograms per kilogram |

Table 5-2 Soil Sample Results Above Residential PRG, PRC, or Background
Alameda Point, California

| Sample ID | Collection Date | Analyte Name | Result | Validation Qualifier | Sample Depth (ft) | PRG/PRC |
|---|---|---|---|---|---|---|
| ***Diesel Range Organics by EPA Method 8015M (mg/kg)*** | | | | | | |
| AP13-007-S-02 | 12/4/2007 | TPH-Diesel | 2900 | J | 13.0-14.5 | 1,380 |
| AP13-041-S-01 | 12/4/2007 | TPH-Diesel | 4000 | | 7.0-8.5 | 1,380 |
| AP13-043-S-02 | 12/4/2007 | TPH-Diesel | 4400 | | 10.5-12.0 | 1,380 |
| AP13-093-S-02 | 12/5/2007 | TPH-Diesel | 6000 | J | 11.5-13.0 | 1,380 |
| AP13-169-S-01 | 12/4/2007 | TPH-Diesel | 1900 | | 3.0-4.5 | 1,380 |
| AP13-169-S-02 | 12/4/2007 | TPH-Diesel | 17000 | | 5.5-7.0 | 1,380 |
| AP13-170-S-01 | 12/5/2007 | TPH-Diesel | 2100 | | 5.5-7.0 | 1,380 |
| ***Oil Range Organics by EPA Method 8015M (mg/kg)*** | | | | | | |
| AP13-169-S-01 | 12/4/2007 | TPH-Motor Oil | 5300 | | 3.0-4.5 | 1,900 |
| AP13-169-S-02 | 12/4/2007 | TPH-Motor Oil | 24000 | | 5.5-7.0 | 1,900 |
| AP13-170-S-01 | 12/5/2007 | TPH-Motor Oil | 6700 | | 5.5-7.0 | 1,900 |
| ***Metals by EPA Method 6010B and 7000 Series(mg/kg)*** | | | | | | |
| AP13-094-S-01 | 12/5/2007 | Vanadium | 79 | | 11.5-13.0 | 78 |
| ***Volatile Organics Analysis by EPA Method 8260B (ug/kg)*** | | | | | | |
| AP13-148-S-01 | 12/4/2007 | Benzene | 1900 | J | 5.5-7.0 | 640 |
| AP13-148-S-02 | 12/4/2007 | Benzene | 14000 | J | 8.0-9.5 | 640 |
| ***Polynucleic Aromatic Hydrocarbons by EPA Method 8270C and SIM (ug/kg)*** | | | | | | |
| AP13-169-S-02 | 12/4/2007 | Benzo[A]Pyrene | 1900 | | 5.5-7.0 | 620 |

Notes and Acronyms

| | |
|---|---|
| Background | Alameda Point Background Metals in Soil Values, Tetra Tech 2004 |
| EPA | Environmental Protection Agency |
| J | estimated value |
| mg/kg | milligrams per kilograms |
| PRC | Preliminary Remediation Criteria for TPH and PAHs from NAVFAC SW, 2001 |
| PRG | U.S. EPA Region 9 2004 Residential Preliminary Remediaion Goal |
| sample ID | sample identification |
| ug/kg | micrograms per kilogram |

Table 5-3 General Chemistry and Bulk Density
Soil Sample Results

| Sample ID | Depth (ft bgs) | Sample Date | Analyte Name | Result | Validation Qualifier |
|---|---|---|---|---|---|
| ***Alkalinity by EPA Method 5M2320 (mg/kg)*** | | | | | |
| AP13-007-S-01 | 2.5-4.0 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 299 | |
| AP13-007-S-02 | 13.0-14.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 156 | |
| AP13-008-S-01 | 13.0-14.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 192 | |
| AP13-041-S-01 | 7.0-4.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 114 | |
| AP13-043-S-01 | 4.5-6.0 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 126 | |
| AP13-043-S-02 | 10.5-12.0 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 193 | |
| AP13-044-S-01 | 10.5-12.0 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 399 | |
| AP13-093-S-01 | 6.5-8.0 | 12/5/2007 | Alkalinity, AS $CaCO_3$ | 302 | |
| AP13-093-S-02 | 11.5-13.0 | 12/5/2007 | Alkalinity, AS $CaCO_3$ | 191 | |
| AP13-094-S-01 | 11.5-13.0 | 12/5/2007 | Alkalinity, AS $CaCO_3$ | 2310 | |
| AP13-147-S-01 | 8.0-9.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 202 | |
| AP13-148-S-01 | 5.5-7.0 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 105 | |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 376 | |
| AP13-169-S-01 | 3.0-4.5 | 12/4/2007 | Alkalinity, AS $CaCO_3$ | 212 | |
| AP13-170-S-01 | 5.5-7.0 | 12/5/2007 | Alkalinity, AS $CaCO_3$ | 276 | |
| ***Nitrate/Nitrite/Sulfate By EPA Method 300.0 (mg/kg)*** | | | | | |
| AP13-007-S-01 | 2.5-4.0 | 12/4/2007 | Nitrate | 1.76 | |
| AP13-007-S-01 | 2.5-4.0 | 12/4/2007 | Sulfate | 8.89 | |
| AP13-007-S-02 | 13.0-14.5 | 12/4/2007 | Nitrate | 1.25 | |
| AP13-007-S-02 | 13.0-14.5 | 12/4/2007 | Sulfate | 3.91 | J |
| AP13-008-S-01 | 13.0-14.5 | 12/4/2007 | Nitrate | 1.49 | |
| AP13-008-S-01 | 13.0-14.5 | 12/4/2007 | Sulfate | 3.71 | J |
| AP13-041-S-01 | 7.0-4.5 | 12/4/2007 | Nitrate | 2.14 | |
| AP13-041-S-01 | 7.0-4.5 | 12/4/2007 | Sulfate | 4.29 | J |
| AP13-043-S-01 | 4.5-6.0 | 12/4/2007 | Nitrate | 1.48 | |
| AP13-043-S-01 | 4.5-6.0 | 12/4/2007 | Sulfate | 8.2 | |
| AP13-043-S-02 | 10.5-12.0 | 12/4/2007 | Nitrate | 1.58 | |
| AP13-043-S-02 | 10.5-12.0 | 12/4/2007 | Sulfate | 9.67 | |
| AP13-044-S-01 | 10.5-12.0 | 12/4/2007 | Nitrate | 1.77 | |
| AP13-044-S-01 | 10.5-12.0 | 12/4/2007 | Sulfate | 3.52 | J |
| AP13-093-S-01 | 6.5-8.0 | 12/5/2007 | Nitrate | 1.37 | |
| AP13-093-S-01 | 6.5-8.0 | 12/5/2007 | Sulfate | 8.95 | |
| AP13-093-S-02 | 11.5-13.0 | 12/5/2007 | Nitrate | 1.3 | |
| AP13-093-S-02 | 11.5-13.0 | 12/5/2007 | Sulfate | 51.7 | |
| AP13-094-S-01 | 11.5-13.0 | 12/5/2007 | Nitrate | 2.81 | |
| AP13-094-S-01 | 11.5-13.0 | 12/5/2007 | Sulfate | 32.4 | |
| AP13-147-S-01 | 8.0-9.5 | 12/4/2007 | Nitrate | 2.34 | |
| AP13-147-S-01 | 8.0-9.5 | 12/4/2007 | Sulfate | 29.8 | |
| AP13-148-S-01 | 5.5-7.0 | 12/4/2007 | Nitrate | 2.11 | |
| AP13-148-S-01 | 5.5-7.0 | 12/4/2007 | Sulfate | 26 | |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | Nitrate | 4.7 | |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | Nitrite | 0.835 | J |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | Sulfate | 49.1 | |
| AP13-169-S-01 | 3.0-4.5 | 12/4/2007 | Nitrate | 0.955 | J |
| AP13-169-S-01 | 3.0-4.5 | 12/4/2007 | Sulfate | 29.9 | |
| AP13-169-S-02 | 5.5-7.0 | 12/4/2007 | Nitrate | 2.18 | |
| AP13-169-S-02 | 5.5-7.0 | 12/4/2007 | Sulfate | 56.8 | |
| AP13-170-S-01 | 5.5-7.0 | 12/5/2007 | Nitrate | 1.15 | J |
| AP13-170-S-01 | 5.5-7.0 | 12/5/2007 | Sulfate | 8.85 | |

Table 5-3 General Chemistry and Bulk Density
Soil Sample Results

| Sample ID | Depth (ft bgs) | Sample Date | Analyte Name | Result | Validation Qualifier |
|---|---|---|---|---|---|
| ***pH by EPA Method 150.1*** | | | | | |
| AP13-007-S-01 | 2.5-4.0 | 12/4/2007 | pH | 8.13 | |
| AP13-007-S-02 | 13.0-14.5 | 12/4/2007 | pH | 7.01 | |
| AP13-008-S-01 | 13.0-14.5 | 12/4/2007 | pH | 7.56 | |
| AP13-041-S-01 | 7.0-8.5 | 12/4/2007 | pH | 6.99 | |
| AP13-043-S-01 | 4.5-6.0 | 12/4/2007 | pH | 6.75 | |
| AP13-043-S-02 | 10.5-12.0 | 12/4/2007 | pH | 7.2 | |
| AP13-044-S-01 | 10.5-12.0 | 12/4/2007 | pH | 8.21 | |
| AP13-093-S-01 | 6.5-8.0 | 12/5/2007 | pH | 8.06 | |
| AP13-093-S-02 | 11.5-13.0 | 12/5/2007 | pH | 7.43 | |
| AP13-094-S-01 | 11.5-13.0 | 12/5/2007 | pH | 8.97 | |
| AP13-147-S-01 | 8.0-9.5 | 12/4/2007 | pH | 7.08 | |
| AP13-148-S-01 | 5.5-7.0 | 12/4/2007 | pH | 7.41 | |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | pH | 7.46 | |
| AP13-169-S-01 | 3.0-4.5 | 12/4/2007 | pH | 7.11 | |
| AP13-169-S-02 | 5.5-7.0 | 12/4/2007 | pH | 4.09 | |
| AP13-170-S-01 | 5.5-7.0 | 12/5/2007 | pH | 6.87 | |

| ***Dry Bulk Density in accordance with ASTM D2937*** | | | | |
|---|---|---|---|---|
| **Sample ID** | **Depth (ft bgs)** | **Sample Date** | **Result (g/cc)** | **Moisture Content (% wt)** |
| AP13-007-S-02 | 13.0-14.5 | 12/4/2007 | 1.58 | 18.39 |
| AP13-041-S-01 | 7.0-8.5 | 12/4/2007 | 1.66 | 13.5 |
| AP13-043-S-02 | 4.5-6.0 | 12/4/2007 | 1.53 | 19.17 |
| AP13-093-S-02 | 11.5-13.0 | 12/5/2007 | 1.35 | 26.76 |
| AP13-148-S-02 | 8.0-9.5 | 12/4/2007 | 1.82 | 15.45 |
| AP13-169-S-02 | 5.5-7.0 | 12/4/2007 | 1.50 | 19.18 |

ASTM - American Society for Testing and Materials
$CaCO_3$ - Calcium Carbonate
EPA - Environmental Protection Agency
ft bgs - feet below ground surface
g/cc - grams per cubic centimeter
J - estimated value
mg/kg - milligram per kilogram
% wt - percent weight
pH - potential of Hydrogen

# APPENDIX A

## 1.1 Data Quality Objectives

The following section describes the rational for the proposed investigation. The seven-step Data Quality Objectives (DQOs) process (EPA, 2006) was used as the technical framework to develop a scientifically sound and cost-effective data collection design. DQOs are an integrated set of specifications that define data quality requirements based on the intended use of the data. In this context, the CSM is the primary tool used to evaluate existing site data, data gaps, and to establish the level of data quality needed to support defensible decision-making.

### 1.1.1 Step 1: State the Problem

A former oil refinery, which was located within IR Site 13, produced tarry acidic refinery wastes that resulted from an acid-sludge process used to refine fresh crude oil. These refinery wastes were disposed of on the former refinery property, and present a significant source of contamination at the site.

TRW has been observed during numerous investigations at IR Site 13; however, there is uncertainty regarding the thickness, spatial distribution, variation, and chemical nature of the TRW.

### 1.1.2 Step 2: Identify Goals of the Study

**Primary Investigation Question:** What is the extent of contamination associated with the historic TRW release at IR Site 13?

To resolve the primary investigation question, the following decision questions will have to be addressed:

- What is the vertical extent of TRW contamination at IR Site 13?
- What is the lateral extent of TRW contamination at IR Site 13?
- Can the maximum depth of TRW contamination at a given location be determined with LIF data alone?
- Are all 300 proposed SCAPS direct-push locations necessary to define the lateral extent of TRW contamination?
- What is the chemical variability of TRW?

### 1.1.3 Step 3: Identify Information Inputs

- Facility operational history, geologic, hydrologic, and hydrogeologic information, as well as analytical data available from previous investigations and reports.
- SCAPS LIF and CPT data.
- Corroborating data from fixed-based laboratory analysis of soil samples. Because the LIF probe displaces soil as it is pushed into the ground, soil samples must be collected from a

separate SCAPS "hole" or push location. Soil samples are collected within three lateral feet of the LIF location.

- Laboratory data from the TRW investigation will be used to characterize the chemical composition of the TRW for optimization of remedial alternatives in a subsequent FS.

### 1.1.4 Step 4: Define the Boundaries of the Study

- The lateral study boundary of this investigation will be the boundaries of IR Sites 13, 19, and 22, and the Alameda Point Property Line to the east (Figure 3-1)
- If two consecutive LIF pushes of background fluorescence are recorded throughout the entire length of the push in a direction away from the TRW mass, then the edge of the TRW will be considered delineated.
- Unless there is evidence of deeper soil contamination, the vertical study boundary will consist of the maximum depth sampled, which is anticipated to be approximately 15 feet bgs.
- Temporal boundaries will be defined by data collected during this investigation, which will therefore reflect current site conditions.
- Physical constraints may be presented by site locations that are inaccessible to SCAPS.

### 1.1.5 Step 5: Analytical Approach

1. ***If*** LIF intensity at a depth exceeds background fluorescence intensity (as determined by comparing SCAPS background systems check fluorescence intensity to *in-situ* intensities at various depths), ***then*** the fluorescence is inferred to be due to the presence of TRW and/or TRW impacted matrices and this data will used to define the vertical and horizontal extent of TRW.
2. ***If*** LIF intensity at a particular location and/or depth is at background fluorescence intensity, ***then*** it is inferred that there is not TRW impact at that location and/or depth and this data will used to define the vertical and horizontal extent of TRW.
3. ***If*** LIF intensity does not exceed background fluorescence intensity during an entire push (to approximately 15 feet bgs), ***then*** the push location will be inferred to be not impacted by TRW and may be used to define the lateral extent of TRW impact.
4. ***If*** fixed-based laboratory analysis reports detectable TPH-d and/or TPH-mo concentrations from a soil sample collected 1) from a location within 3 lateral feet of the LIF push location and 2) from a depth interval of inferred TRW fluorescence, ***then*** TRW fluorescence is confirmed. Soil sample analytical results will be screened against project remediation criteria for TPH, BTEX and PAHs including naphthalene.
5. ***If*** fixed-based laboratory analysis reports concentrations less than 1,380 mg/kg TPH-d and 1,900 mg/kg TPH-mo, the project remediation criteria (PRCs) established in the TPH strategy in the remedial investigation report (SulTech, 2005a), from a soil sample collected from a location of background fluorescence, ***then*** the TRW impact below project remediation criteria is confirmed and this data will used to define the vertical and horizontal extent of TRW.

6. ***If*** fixed-based laboratory analysis reports TPH-d and/or TPH-mo concentrations greater than project remediation criteria in a soil sample collected from a location of background fluorescence, ***then*** LIF data alone may not sufficiently evaluate TRW impact and additional sampling may be recommended using alternate methodology.

7. ***If***, based on LIF intensity the lateral extent of TRW contamination is considered defined prior to the advancement of all direct-push locations shown on Figure 3-1, ***then*** the field team may eliminate proposed locations as appropriate.

8. ***If*** two consecutive LIF pushes of background fluorescence are recorded throughout the entire length of the push in a direction away from the TRW mass, ***then*** the edge of the TRQ will be considered delineated.

9. ***If*** the lateral extent of TRW contamination is not considered defined by the direct-push locations shown on Figures 3-1, ***then*** additional proposed locations may be recommended.

### 1.1.6 Step 6: Specify Performance or Acceptance Criteria

There are two types of decision errors: sampling design errors and measurement errors. Sampling design errors are a function of the selection of sample locations or analytical methods used to characterize the site to be studied. Measurement errors are a function of the procedures used to collect and analyze the samples.

In sampling designs that use a statistical approach to evaluate the data using decision rules, numerical limits on allowable error can be set and controlled by the sampling design (e.g., the number of samples). The use of classical statistics for this project would indiscriminately mix potentially distinct populations into a single data set. In this case, the anticipated high variability of the data set would make it impossible to attain acceptable statistical significance.

In sampling designs that base the conclusions on the judgment of the decision makers, decision errors are reduced by subjective definition of the factual basis for the judgment. Based on the initial CSM for the site, the proposed sampling design is a fundamentally judgmental approach. Measurement errors that arise during the various steps of the sample-measurement process (e.g., sample collection, sample handling, sample preparation, sample analysis, data reduction, and data handling) are possible regardless of the sampling design. Neither measurement errors nor variability can be eliminated, but they can be controlled by selecting appropriate procedures. The analytical methods and method reporting limits for soil samples are discussed in Section 4. Measurement error is further managed by using SOPs, second-party review of data records, and data quality management. Appendix A presents SOPs that will be followed to minimize and control measurement error.

Decision uncertainty is managed by increasing the density of sampling points, especially in areas where there is high uncertainty about the correctness of a decision. This is cost-effectively accomplished by using tools such as the SCAPS LIF and CPT to build a detailed CSM in near real-time. By collecting and analyzing data in near real-time, critical data gaps are identified and filled, an accurate and complete CSM is developed, and field mobilizations and work plan cycles are reduced. The results of this investigation will be used to optimize future planning documents.

Table 3-1 presents possible decision error, identifies associated consequences, and addresses related uncertainties. The most severe error in judgmental sampling would be to conclude that action is not required when, in reality, an unacceptable risk to human-health risk and/or the environment exists. The judgmental sampling approach is designed to limit the probability of this error.

### 1.1.7 Step 7: Develop the Plan for Obtaining Data

The SCAPS investigation will proceed by pushing the LIF probe at approximately 300 locations. Potential push locations are presented on Figure 3-1. Push locations will be selected in the field based on real-time data. The LIF probe will be pushed to a minimum depth of 15 feet bgs at each location. The probe may be advanced deeper at the discretion of the field team. Select soil samples will be collected and analyzed by a fixed base laboratory to evaluate the SCAPS LIF effectiveness, as well as further characterize the chemical nature of TRW.

The real-time data from SCAPS LIF and CPT, as well as other real-time data, will be communicated to the DQO Planning Team on a daily basis during the field investigation. This real-time data acquisition and communication will provide the basis for a dynamic work strategy. The DQO Planning Team will optimize the sampling design by directing the field team to add investigation locations as needed, based on the decision rules in Step 5 and the results from the real-time data sources.

# APPENDIX B

# Response to Comments
## Draft SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation Report
## Alameda Point, Alameda, California dated May 1, 2008

| **Comment of Anna-Marie Cook, U.S. Environmental Protection Agency received by e-mail on June 3, 2008**<br><br>***Draft Report*** | **BRAC PMO West Response** |
|---|---|
| 1) I have looked through the SCAPs report and RTCs on the work plan in Appendix B. The document looks great and we have no further comments.<br><br>Thank you for heading up such an interesting and thorough project. I particularly appreciate that we worked together so much during the course of the SCAPs investigation. The technical meetings to go over preliminary data, decide locations of additional samples and to discuss the conceptual site model were very helpful, and the end product reflects the collaboration and buy-in of all the agencies. | 1) Thank you, we appreciate the opportunity to partner with you on this interesting project. |
| **Comment of John West, California Regional Water Quality Control Board – San Francisco Region received by e-mail on June 3, 2008**<br><br>***Draft Report*** | **BRAC PMO West Response** |
| 1) I've reviewed the SCAPs report and RTCs and everything looks fine. The Water Board has no further comments. Thanks for all your work on this. | 1) Thank you, we appreciate the opportunity to partner with you on this interesting project. |

# Response to Comments
## Draft SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation Report
## Alameda Point, Alameda, California dated May 1, 2008

| **Comment of Peter Russell, Russell Resource, Inc. on behalf of the Alameda Reuse and Redevelopment Authority received by e-mail on June 3, 2008**<br><br>***Draft Report*** | **BRAC PMO West Response** |
|---|---|
| 1) ARRA does not plan to comment formally on the draft SCAPS investigation report, which is well-written and easy to follow. | 1) Thank you, we appreciate the opportunity to partner with you on this interesting project. |

# Response to Comments
## Draft SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation Report
## Alameda Point, Alameda, California dated May 1, 2008

| **Comment of Dot Lofstrom, California Environmental Protection Agency Department of Toxic Substances Control received by e-mail on June 4, 2008**<br><br>***Draft Report*** | **BRAC PMO West Response** |
|---|---|
| 1) DTSC has completed our review of the draft SCAPS Investigation Report and we have no substantive comments. We agree with the sentiment expressed by EPA, that it is the technical meetings and communication between the Navy, consultant, and regulatory agencies that made this project move along so well. Thank you for arranging that.<br><br>When you send the Final Document, please include a CD with the report broken into portions that are 10 MB or less. If some of the large maps exceed 10 Mb, perhaps they can be shrunk a bit, or reformatted to take up less electronic space. If not, we will just include a note with this report when we upload it to EnviroStor that states that not all the figures are included due to large file size. As a reminder, the reason we only upload documents that are 10 Mb or less is because it would take the public so long to download a larger file that they may become discouraged from ever accessing the report. I know that when I tried to open the CD that came with the report, it took longer than 30 minutes, and that is with a relatively fast system. | 1) Thank you, we appreciate the opportunity to partner with you on this interesting project. An attempt will be made to comply with the request on the CD version of the report. Some individual files such as the Final Laboratory Report, the Data Validation Narratives, and the SCAPS data profiles will be larger the 10 MB. |

# Response to Comments
## Draft SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation Report
## Alameda Point, Alameda, California dated May 1, 2008

| Additional Changes Made to the Final Report | Reason |
|---|---|
| Cover Page and Report Footers. | The version of the report has been changed from Draft to Final. |
| Section1.0, Page 1-1, 1st paragraph, 1st and last sentence. | The word Draft has been changed to Final |
| Section 5.4, Page 5-4, 3rd paragraph, 7th sentence. | The word "of" has been added to the sentence for clarity. The sentence has been changed to state: LIF and soil sample push holes at locations AP13-169 and -170 were noted to exhibit a hydrogen sulfide odor, and push holes in this area *"of"* the site had liquid at the surface at the time the pavement was penetrated by the LIF and soil sampler probes. |
| Section 5.7, Page 5-6, 1st paragraph, last sentence. | The last sentence has been modified to better reflect the results of the LIF Investigation. The last sentence now states: In general, the TRW had lower reported concentrations of benzene than the non-TRW related petroleum release to the east of IR Site 13. |
| Table 5-1. | The missing words and method numbers in the rows of the Table describing the Analyses and Method Numbers have been corrected. |

**Draft Meeting Minutes TRW Sampling Strategy**

**28 November 2007 1000 – 1230**

**Site Mitigation Conference Room, DTSC Office Berkeley, California**

**Attendees:** Anna-Marie Cook EPA, Dot Lofstrom DTSC, Karla Brasaemle Tech Law, Michelle Hurst BRAC PMO West, and Tim Shields and Don McHugh RBA

The meeting started approximately at 1010 and T. Shields presented the results of the first phase of SCAPS LIF fieldwork at Alameda Point. 175 LIF pushes have been completed to date, and the extent of TRW impacts have generally been delineated using LIF. The SCAPS field team will complete an additional five or six pushes prior to sampling at the beginning of the next field deployment now scheduled to begin on 3 December 2007. The additional LIF pushes are proposed for the eastern portion of the Alameda Point Mini Storage area and on the eastern edge of the parking lot southeast of the intersection of Pacific and Skyhawk.

Mr. Shields then presented a three-dimensional model of the LIF results at the site and an analysis of peak intensity and wavelength variability. He also presented four cross sections and a power point presentation showing peak intensity at various wavelength groupings on one-foot depth intervals to the total depth of the investigation, which varied from 15 to 20 feet bgs across the site. A general discussion on the LIF data and TRW mobility ensued. Mr. Shields was able to show wavelength and intensity data for a variety of investigative points across the site.

D. McHugh then presented the proposed sampling strategy for the next phase of the investigation. A general discussion ensued on the sampling strategy, and it was decided that the sampling strategy was sound. In addition, the team decided to add an additional sample from a potentially TRW-impacted depth interval adjacent to Push 41. The following samples will be collected adjacent to the following push locations during the next phase of SCAPS field work at Alameda Point.

Push 7: 2.5 to 4.0 feet bgs and 13.0 to 14.5 feet bgs

Push 8: 13.0 to 14.5 feet bgs

Push 41: 7.0 to 8.5 feet bgs

Push 43: 4.5 to 6.0 feet bgs and 10.5 to 12.0 feet bgs

Push 44: 10.5 to 12.0 feet bgs

Push 93: 6.5 to 8.0 feet bgs and 11.5 to 13.0 feet bgs

Push 94A: 11.5 to 13.0 feet bgs

Push 148: 5.5 to 7.0 feet bgs and 8.0 to 9.5 feet bgs

Push 147: 8.0 to 9.5 feet bgs

Push 169: 3.0 to 4.5 feet bgs and 5.5 to 7.0 feet bgs

Push 170: 5.5 to 7.0 feet bgs

All of these sample locations and depths were selected in accordance with Data Quality Objectives established in the Final Work Plan for the site. The meeting then adjourned.

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| **General Comments of Erich Simon, Project Manager, California RWQCB, San Francisco Bay Region dated 10 August 2007**<br><br>***Draft Work Plan*** | **Richard Brady & Associates Responses** |
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| 1) **Aboveground Storage Tanks (ASTs) 324 through 328** – This work plan indicates that Former ASTs 324 through 328 are a potential source of petroleum products, where as the Final Projects Plans for Petroleum Corrective Actions Areas 3A, 3B, 3C, 5B West, and 13 East (May 9, 2007) indicated these tanks were not used for petroleum storage. Furthermore, these tanks will be removed from CAA 13 and any contamination present near these tanks are to be handled under the CERCLA program at IR Site 13. Please revise all discussions of ASTs 324 through 328 to reflect this change. | 1) The Final Work Plan and Attachments for this investigation have been revised to reflect the information presented in the Final Project Plans. |
| 2) **High Detection Limit** – While the SCAPS Laser Induced Fluorescence method is a useful tool for increasing the resolution regarding the extent of tarry refinery waste, the method's high detection limit (>100 ppm) will only delineate the highest contaminated areas. Please further discuss how the extent of any refinery waste that exists below the method detection limit will be addressed in the future. | 2) The SCAPS Laser-Induced Fluorescence (LIF) method will be useful in mapping the extent of tarry refinery wastes (TRW) that exceed the project remediation criteria (PRCs) in soil presented in the Final Project Plans for TPH-g (1,030 mg/kg), TPH-d (1,380 mg/kg), and TPH-mo (1,900 mg/kg) under residential use. In addition, soil samples will be collected to evaluate concentrations at locations adjacent to the TRW extent as mapped by LIF. The analytical approach presented in the Data Quality Objectives (Section 3.3.5) and Table 4-1 of the Sampling and Analysis Plan (SAP) describe the soil sampling proposed for this investigation. The reporting limits for soil samples collected to define the edge of TRW are provided in Table 4-4 of the Draft |

| **General Comments of Erich Simon, Project Manager, California RWQCB, San Francisco Bay Region dated 10 August 2007**<br><br>***Draft Work Plan*** | **Richard Brady & Associates Responses** |
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| | Sampling and Analysis Plan and are below PRCs. The data generated from this investigation will be used to optimize remedial strategies in the Feasibility Study (FS). If this LIF investigation is unable to adequately delineate the edge of the TRW below PRCs, additional sampling may be recommended. |
| 3) **Extent of Contamination** – Figure 4-1 shows the proposed sampling locations in relation to the area impacted by tarry refinery waste. It shows the impacted area may extend under building 530 to the south of proposed sampling locations. Please indicate what step outs will be taken if SCAPS samples taken at the edge of the site, or adjacent to Building 530, indicate that tarry refinery waste may extend beyond proposed sampling locations. Also provided some discussion of how the extent of tarry refinery waste contamination will be delineated beneath Building 530. | 3) Figure 4-1 of the Draft Work Plan and Figure 3-1 of the Draft SAP present potential SCAPS locations in accordance with analytical approach presented in Section 3.3.5 of the Draft SAP. The word "proposed" under the legend on both figures is a typographical error. The word "proposed" in the legend on both figures has been replaced with the word "potential". In addition, potential SCAPS locations have been added to both figures to the west of Building 530. If the real-time LIF results indicate that additional step-outs are needed, then new step-out locations will be identified in the field based on the emerging conceptual site model. No work is authorized to occur inside of Building 530 during this investigation. The edge of the TRW under the building will be interpreted by extrapolating the data outside the building. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| **Specific Comments of Erich Simon, Project Manager, California RWQCB, San Francisco Bay Region dated 10 August 2007**<br><br>***Draft Work Plan*** | **Richard Brady & Associates Responses** |
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| 1) Figure 3-1 and Attachment, Figure 2-2 – Please label what contaminants are associated with the plumes presented in the figures. | 1) The figures have been revised as requested in the Final Work Plan and Attachments. |
| 2) Figure 3-2 and Attachment A, Figure 3-2 – This conceptual Site Hydrogeologic Model figure for the southern portion of Alameda Point shows that a layer of seawater within the artificial fill sits on top of the fresh water in the first water bearing zone. This thin layer of sea water in not known to exist above the first water bearing zone at these inland IR Sites. Please revise this figure to reflect the hydrogeology at these IR Sites. | 2) The figures have been revised as requested in the Final Work Plan and Attachments. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments of Anna-Marie Cook, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| 1) Laser Induced Fluorescence (LIF) technology described in the Draft Work Plan, SCAPS Laser Induced Fluorescence, Tarry Refinery Waste Investigation, Former Oil Refinery (the Work Plan) appears to be a promising screening tool for the delineation of the vertical and lateral extent of tarry refinery waste (TRW). We have some concerns that the high viscosity of the TRW that may be encountered will coat and obscure the probe window, thereby producing data that is not representative of the actual contamination at the measurement depths. We are also unsure of the effect of the low pH of the TRW on any non-metal instrument parts such as O-rings. How will it be determined if the window is being obscured while the probe is being pushed into the soil and through the TRW, and is there a procedure for periodically checking the condition of the instruments? | 1) The original SCAPS LIF system was used for an intercalibration/validation study and was utilized successfully at Former Naval Air Station Alameda (now known as Alameda Point) Installation Restoration (IR) Program Site 13 in 1994. The LIF probe proposed has not changed significantly from the LIF probe now in use on the current SCAPS platform. None of the concerns of the reviewer were encountered at that time and none of these issues are expected during this proposed SCAPS deployment at Alameda Point.<br><br>Upon completion of each LIF push, the LIF system performance is checked by measuring and recording the fluorescence of two substances: quinine sulfate solution (strongly fluorescing substance) and Fisher sea sand (a low fluorescing substance representing uncontaminated soil). In addition, the probe is visually inspected after each push and any worn parts are replaced prior to the next push. SCAPS post push system checks are described on page 7 of Richard Brady & Associates (RBA) Standard Operating Procedure (SOP) T-005, which is included as Appendix A of the Sampling and Analysis Plan (SAP). |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments of Anna-Marie Cook, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| 2) It seems that the LIF procedures should include some site specific calibration prior to use. It is recognized that different hydrocarbon mixtures have different responses in the LIF technology, and therefore only the relative LIF responses may be useful for a identifying whether the TRW (or other hydrocarbon wastes) are present. Please provide specific information on the calibration procedures that will be used to ensure that the LIF will function properly. Also, please provide procedures that will be used to identify the various spectral responses that may be encountered due to the potential presence of multiple types of hydrocarbons. | 2) Please see response below to comment 4 of Brad Parsons, California Department of Toxic Substances Control for expanded discussion on why site-specific calibration procedures for addressing hydrocarbon (and matrix) heterogeneity are not recommended.<br><br>The LIF system is checked before and after advancing the probe at each location. If the fluorescence intensity of the quinine sulfate system check is below acceptance criteria of 200,000 counts with a peak wavelength appropriate for the probe (typically 465 to 470 nanometers), troubleshooting and system corrective action procedures are initiated.<br><br>The procedure used to identify various spectral responses that may be encountered is:<br><br>• Inspect the real-time peak wavelength of the fluorescence for variations and groupings.<br>• Map the distribution of the various wavelength groupings.<br>• Use the mapped distributions when targeting sample locations for laboratory analysis. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

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| 3) Throughout the text of the Work Plan and the Sampling and Analysis Plan (SAP) reference is made to "background" fluorescence but it is unclear how the background fluorescence will be established. Please provide information on how background fluorescence will be determined. | 3) Background fluorescence is evaluated by comparing the fluorescence intensity of the Fisher Sea Sand systems check with the *in-situ* fluorescence intensities, and comparing *in-situ* fluorescence intensities at various depths and locations. Of particular interest are locations where no elevated fluorescence intensity is observed for the entire depth, and the fluorescence intensity is similar to the Fisher Sea Sand. Such locations define background fluorescence at the site and are good candidates for boundary soil sampling. In general, background intensity is less than 10,000 counts and elevated fluorescence is markedly greater than 10,000 counts. |
| 4) Procedures for borehole abandonment have not been included in the Work Plan, SAP, or standard operating procedures (SOPs). Boreholes should be abandoned by filling them with grout. This is required in the State of California and also will minimize the potential that TRW can surface through the boreholes. Please revise the SAP and SOPs to specify that boreholes will be abandoned by filling them with grout. | 4) SCAPS is equipped with a through the probe tip grouting system. Upon completion of a SCAPS push, the probe is withdrawn a few inches and an expendable tip is ejected using grout pump pressure. A cement and bentonite mixture is then pumped through a small diameter tube and through the tip of the probe as the probe and rod string are withdrawn from the push hole using the tremie method. A new section 4.2.5 describing SCAPS grouting has been added to the final SAP and Draft SAP sections 4.2.5, 4.2.6, and 4.2.7 are now 4.2.6, 4.2.7, and 4.2.8 in the final SAP. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments of Anna-Marie Cook, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| 5) Will the LIF technology be capable of finding the 30 ft x 30 ft area filled in with concrete in the 1940's at Site 13? This information would be useful in general and also possibly helpful in evaluating remedial alternatives in the FS. | 5) The SCAPS CPT system cannot push through concrete. If the 30 foot by 30 foot concrete pad is encountered by SCAPS, the cone pressure will rise to levels indicative of refusal and the push will be terminated. If this situation is encountered, this information will be recorded in the field logbook and presented in the LIF investigation report. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| Specific Comments of Anna-Marie Cook on the Work Plan, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| 1) **Section 1.2, Scope of Work, Page 2:** The second bullet on this page indicates that "Soil and TRW matrix sample locations will be selected based on real-time data to evaluate SCAPS LIF effectiveness and reduce uncertainty in the data set;" it is unclear what is meant by this statement. Please clarify whether the term "effectiveness" refers to the accuracy and representativeness of the LIF data for determining the extent of the TRW and any specific constituents or provide a definition for the term as used in the Work Plan. Similarly please identify the specific uncertainties in the data sets that will be resolved. Also, please provide a list of criteria that may be applied when selecting sampling locations. | 1) "LIF effectiveness" refers to the ability for the LIF to detect TRW in accordance with the decision rules in Step 5 of the data quality objectives (DQOs) presented in the Section 3.3.5 of the Sampling and Analysis Plan (SAP). The criteria that may be applied when selecting sampling locations are provided in Section 4.1.1, Sampling Rationale, and Table 4-1 of the SAP.<br><br>Uncertainties in the LIF data set that may be reduced by sampling include:<br><br>• Confirmation of elevated fluorescence associated with TRW.<br>• Confirmation of non-elevated fluorescence representative of TRW concentrations below Preliminary Remediation Criteria (PRCs)<br>• Evaluation of the petroleum characteristics (*e.g.* gasoline vs TRW) associated with different fluorescence wavelength populations.<br>• Other uncertainties that may emerge based on review and discussion of the real-time LIF data with regulatory partners.<br><br>A cross-reference to the SAP has been added to Section 1.2 of the Work Plan. |

| Specific Comments of Anna-Marie Cook on the Sampling and Analysis Plan, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| 2) **Table 4-1, Proposed Sampling Design and Rationale, Page 15:** This table indicates in the column titled "Soil and TRW Sampling and Analysis Strategies" that five of the fifteen Soil/TRW samples will be collected from the depth intervals of the highest site wide fluorescence; however it is unclear how this will be applied to selecting specific sites for sampling. It is unclear if all the LIF readings will be collected first and then sampling events will follow. Please provide the logistical and or procedural techniques that will be used to identify the sample locations with "highest fluorescence." | 2) A meeting or conference call between the Navy and the regulatory partners is proposed near the end of the LIF portion of the field work to discuss sampling locations and strategies. Available data will be presented at this proposed meeting in accordance with the data quality objectives (DQOs) for this investigation. |
| 3) **Section 2.4, Previous Investigations and Section 2.5, Removal Actions:** Many of the locations discussed in the text are not depicted on Figure 2-2, so it is difficult to understand the sequence of events and findings that are discussed in the text. For example, text in Section 2.4.2 describes borings B-IMF-02 through B-IMF-08, B-IMF-09 through B-IMF-11, and well M-IMF-02 that are not included on the figure. It would also be helpful to have a figure that depicts the location of known removal actions (e.g., those that occurred after 1990). Please revise Figure 2-2 to include all locations discussed in the text and provide a figure that includes the locations of the removal actions. Also, there was an additional removal action that is not mentioned | 3) Figure 3-1 of the Final Work Plan and Figure 2-2 of the Final SAP have been revised as requested. |

| Specific Comments of Anna-Marie Cook on the Sampling and Analysis Plan, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| in the text. In 2003, the Navy installed a fence around the perimeter of Site 13 as an engineering control to restrict access to the site. | |
| 4) **Section 3.3.2, Step 2: Identify Goals of the Study, Pages 20 and 21:** Another question is needed to cover the objective discussed in Section 4.1 of the Work Plan. The second paragraph on page 11 states that "several TRW matrix samples will be collected to characterize variability in chemical composition of the TRW." Please include a question to cover this objective. | 4) An additional question has been added to Section 3.3.2 of the Final SAP that states: *"What is the chemical variability of the TRW?"* |
| 5) **Section 3.3.4, Step 5: Analytical Approach, Pages 21 and 22**: It is unclear why Total Petroleum Hydrocarbons (TPH)-diesel and TPH-motor oil are the only hydrocarbons specifically identified in the Data Quality Objectives (DQO) Step 5, items 4 through 6, when benzene, toluene, ethylbenzene, xylenes (BTEX) and polycyclic aromatic hydrocarbons (PAHs) have also been associated with TRW. It is likely that naphthalene is also present. Please revise DQO Step 5, items 4 through 6 to include criteria for BTEX and PAHs. Please also include naphthalene as a constituent of concern. | 5) The requested information has been included in Section 3.3.5 of the Final SAP. |

| **Specific Comments of Anna-Marie Cook on the Sampling and Analysis Plan, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007** | **Richard Brady & Associates Responses** |
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| 6) **Section 3.3.4, Step 5: Analytical Approach, Page 22**: Item 7 indicates that field teams may eliminate proposed locations as appropriate but no information or criteria are provided to clarify how the field team will decide that sample locations are unnecessary. Please provide rationale and/or criteria that may be applied for the reduction of sample locations. | 6) The number of LIF pushes may be reduced during the LIF investigation. The following statement has been added to Section 3.3.4 of the Final SAP: *"If two consecutive LIF pushes of background fluorescence are recorded throughout the entire length of the push in a direction away from the TRW mass , then the edge of the TRW will be considered delineated."*<br><br>Soil samples will be collected to confirm the edge of the TRW has been delineated. |
| 7) **Section 4.1.1, Sampling Rationale, Page 24:** The basis for assumptions made in this section has not been included. For example, the third paragraph indicates that there is an expectation that surface LIF readings will be background. This section also assumes that contamination will exist at thicknesses greater than 1.5 feet. Both of these assumptions need to be explained, as TRW contamination has been observed as "oozes" at the surface. TRW may be present in thinner lenses or as globules and ganglia, possibly from multiple releases of contamination or subsequent flow as a viscous liquid. Please revise this paragraph to explain the assumption that readings at the surface will be background and the contamination is expected to occur in thicknesses of 18 inches. Such assumptions may bias the interpretation of the LIF information and ignore less contaminated areas of the site that | 7) In order to have the opportunity to receive input from regulatory partners regarding the final SCAPS sample strategy based on the LIF data, a meeting or conference call between the Navy and the regulatory partners is proposed near the end of the LIF portion of the field work to discuss sampling locations and strategies. Available data will be presented at this proposed meeting in accordance with the data quality objectives (DQOs) for this investigation.<br><br>Regarding the assumption that "surface LIF readings will be background": If elevated fluorescence (greater that background) is detected from ground surface to the depth of highest fluorescence at a location, then a sample representing background fluorescence above the interval of highest fluorescence cannot be |

| Specific Comments of Anna-Marie Cook on the Sampling and Analysis Plan, Remedial Project Manager, U.S. Environmental Protection Agency Region IX, dated 06 September 2007 | Richard Brady & Associates Responses |
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| may require remediation.<br><br>The text in Section 4.1 of the Work Plan states that samples will be collected from a minimum of five percent of the LIF locations, and it appears that - depending on the objectives of the study - more samples will be required. For example, if only correlation of the LIF data with constituents in the TRW is of interest (presuming TRW produces the highest LIF responses), then the five percent sampling strategy may be acceptable. However, if intermediate LIF responses are observed, these locations also could be sampled to better correlate the LIF responses with the different types/sources of contamination. More sampling to better characterize the site based on the use of SCAPS-LIF would be useful for eventual remediation decisions. Please provide some criteria for conducting soil sampling and analyses to best characterize the site, using more than the five percent criteria if necessary. | collected. In that case, the field team will propose an alternate sample location in a field change notice and during the sample strategy discussion proposed before the sampling event. Section 4.1.1 and Table 4-1 "Proposed Sampling Design Rationale" have been revised to include this decision path.<br><br>Regarding the noted assumption that "contamination will exist at thicknesses great than 1.5 feet": Section 4.1.1 states that the field team will propose sampling from an interval of fluorescence that "ideally is more than 18 inches thick." The goal of this statement is to ensure as much as possible that the *ex-situ* samples sent to the analytical laboratory will be representative by targeting an interval most likely to have consistent, homogenous contaminant distribution that can be represented by a subsample collected from a standard six-inch-long drive sample tube. If upon review of the LIF data, this goal can be accomplished better by targeting an interval that is less that the "ideal" 18 inch thickness, the language as currently written allows the field team to target a thinner interval.<br><br>However, very thin heterogeneous intervals, such as globules and ganglia, are much more difficult (and usually technically infeasible) to sample for the purpose of comparing to *in-situ* LIF. Factors causing this difficulty include the following: |

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| | • Potential incomplete *ex-situ* sample recovery and the associated loss of depth control, causing uncertainty in the correlation with the LIF measurement depth,<br><br>• The laboratory's standard subsampling procedure of drive sample tubes does not control the effect of heterogeneous distribution of globules or ganglia within the sample tube. Different subsamples of heterogeneous matrices within the same tube will produce a different concentration results depending on whether or not a globule or portion of a ganglia was captured in the subsample.<br><br>In areas of thin heterogeneous impact, the LIF data alone may provide best description of the TRW distribution, therefore sampling of very thin fluorescence intervals is not recommended.<br><br>The primary use of laboratory data in this investigation is to evaluate whether or not SCAPS-LIF data is useful in evaluating the extent of TRW. The secondary use of the laboratory data is to provide data on the chemical nature of the TRW. To address the primary use, ten samples are planned to evaluate the concentration of TRW and key TRW constituents in areas where the SCAPS-LIF does not show elevated fluorescence, *i.e.,* just outside of the boundary of TRW extent as determined by LIF. To address the secondary use, five samples are planned to target |

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| | areas with high fluorescence.<br><br>The total number of samples proposed is based on a scope of work designed to optimize project resources by focusing on the use of field methods capable of generating rapid near-continuous vertical measurements to evaluate TRW extent. The results of this investigation may lead to recommendations for additional sampling to assess the feasibility of eventual remediation options. |
| 8) **Section 4.2.5, Decontamination Procedures, Page 26 and Appendix A, SOP RBA T-01:** The decontamination procedures may not be sufficient to remove TRW from the SCAPS assembly and probe, or from non-disposable sampling equipment. It may be necessary to use diesel fuel or a suitable solvent to remove TRW. | 8) The SCAPS LIF study in 1994, using a similar decontamination system, did not have any issues related to removing TRW from subsurface investigative tools. It is not anticipated that the current system will have any difficulty removing TRW from subsurface investigative tools. |
| 9) **Figure 2-2, Previous Analytical Results:** Please include the location of the previous LIF investigation. | 9) Figure 3-1 of the Final Work Plan and Figure 2-2 of the Final SAP have been revised as requested. |
| 10) **Figure 3-1, Potential SCAPS LIF Locations:** Please provide a description of the systematic grid spacing of the sample locations.<br><br>Also, it appears that the sample spacing around the north and south side of building 397 may need to be denser if the data proximal to this building suggest there may be TRW in this area. | 10) The 50-foot grid pattern was developed by the DQO planning team to adequately address the goals of the study as outlined in the Data Quality objectives.<br><br>The SCAPS LIF investigation will incorporate additional LIF push locations if denser data is required around Building 397. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| Comments of Brad Parsons, Senior Environmental Scientist, Site Mitigation – Cleanup Operations, California Department of Toxic Substances Control, dated 10 September 2007 | Richard Brady & Associates Responses |
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| 1) Will the SCAPS Laser Induced Fluorescence (SCAPS-LIF) technique work successfully on a tarry matrix? DTSC is concerned that the tar will adhere to the window between the LASER and the soil. If the tar smears on the window, readings may occur that do not accurately reflect soil properties and contamination. | 1) The original SCAPS LIF system was used for an intercalibration/validation study was utilized successfully at Former Naval Air Station Alameda (now known as Alameda Point) Installation Restoration (IR) Program Site 13 in 1994. The LIF probe proposed has not changed significantly from the LIF probe now in use on the current SCAPS platform. None of the concerns of the reviewer were encountered at that time and none of these issues are expected during this proposed SCAPS deployment at Alameda Point. |
| 2) It is not clear how background fluorescence is established. It almost appears as if background is established with each push, using the prior reading prior to a significant increase in fluorescence. Nonetheless, specific concentrations are being used in point 5 of Section 3.3.5 (Data Quality Objectives), that is 1,380 miligrams per kilogram (mg/kg) for total petroleum hydrocarbons as diesel (TPH-d), and 1,900 mg/kg for total petroleum hydrocarbons as motor oil (TPH-mo). Perhaps a range of values could be used, rather than a brightline concentration. For example, if the readings are below 1000, the soil could be considered clean, above 2,000 and it would be considered contaminated, and between 1,000 and 2,000, it would be uncertain. After review of all the data and laboratory analysis, areas of uncertainty could be defined. | 2) The brightline values represent the Preliminary Remediation Criteria (PRCs) included in the TPH strategy for Alameda Point. The TPH Strategy and associated PRCs have been previously agreed to by the Navy and regulatory partners. This investigation attempts to work within that established framework.<br><br>Historical SCAPS operations at a wide variety of sites over a period of more than ten years have showed that SCAPS-LIF can be expected to have a detection threshold in the low hundreds of parts per million. The specific PRC concentrations in the DQOs are higher than the expected SCAPS-LIF detection threshold. If the planned soil samples corroborate the expected detection threshold, then the extent of TRW as determined by LIF would be a conservative estimate, with the boundary representing concentrations lower than the PRCs. However, due to the viscous nature of the TRW, the concentration gradient at the edge of the contaminant mass is likely to be quite steep, and the |

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| | boundary determined by LIF may be adequate for evaluating remediation options. |
| 3) Section 3.3.6, Performance of Acceptance Criteria, does not seem to contain measurable rates of decision errors. For example, what percent of false negatives or false positives are acceptable? | 3) As framed in the DQOs, the primary decision questions for this investigation relate to the extent of the TRW contamination. The potential decision errors as qualitatively analyzed in Table 3-1, are:<br><br>• Concluding that TRW is present at a location when it is not present (false positive),<br>• Concluding that TRW is not present at a location when it is present (false negative).<br><br>The qualitative analysis basically says that these potential decision errors across the site will be controlled by drastically increasing measurement density by using SCAPS-LIF technology, so that hot spots and substantial clean areas will not be missed in the sampling pattern.<br><br>The approach taken did not, however, address potential apparent false positive and false negatives due solely to conflicting data between SCAPS-LIF technology and laboratory analysis of samples. This is because the project remediation criteria concentrations are well above the typical detection threshold of the LIF system (see answer to question 2 above), and substantial conflicts between the SCAPS-LIF data and laboratory analysis of samples are not expected. If substantial conflicts between the two |

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| | data streams occur, then the potential for the effects of site heterogeneity will be evaluated, and if appropriate, recommendations given for additional sampling or limitations for the use of SCAPS-LIF data. |
| 4) Instrument calibration appears to be at the beginning of each push, according to the SCAPS-LIF Standard Operating Procedures. It would seem prudent to calibrate at the end of the push, prior to cleaning the window. Also, the Certification from DTSC recommends calibration using various lithologic soil types found at the site. Has this been inadvertently left out of the SOP, or has another approach been found subsequent to the DTSC certification process that works better? | 4) Both before and after each LIF push, the LIF system performance is checked by introducing the laser to a quinine sulfate solution and Fisher sea sand. The resultant ultraviolent light is recorded by the detector to assess system performance. In addition, the probe is visually inspected after each push and any worn parts are replaced prior to the next push. SCAPS post-push system checks are described on page 7 of Richard Brady & Associates (RBA) Standard Operating Procedure (SOP) T-005 which is included as Appendix A of the Sampling and Analysis Plan (SAP).<br><br>The 1996 DTSC Certification contained a statement that appropriately limited the usefulness of predeployment calibration: "Site Detection Limits and Fluorescent Thresholds determined through predeployment calibration procedures may not be representative of all matrices and contaminants encountered at a given site." Since the DTSC Certification, experience has shown that it was misleading to attempt to establish numeric limits and thresholds in an attempt to link *in-situ* fluorescence counts to concentrations. Benchtop predeployment calibration procedures are generally not recommended for the following reasons: |

| Comments of Brad Parsons, Senior Environmental Scientist, Site Mitigation – Cleanup Operations, California Department of Toxic Substances Control, dated 10 September 2007 | Richard Brady & Associates Responses |
|---|---|
| | • Sites are sufficiently heterogeneous in the mixtures of soil types and fuel products with various degrees of weathering to prevent representative benchtop simulation.<br><br>• Separate-phase petroleum product migration in the subsurface is typically bounded by a relatively steep concentration gradient that, despite the specific matrix and contaminant heterogeneities, rapidly drops below concentrations of regulatory interest (in terms of "soil contamination') over a relatively short distance.<br>• SCAPS-LIF, with a nominal detection threshold in the low hundreds of parts per million, is essentially a tool for investigating separate phase petroleum hydrocarbon product, and generally can map the edge of the product well enough to successfully target boundary confirmation soil sample locations.<br>The approach that is currently used is to use three-dimensional mapping of fluorescence distributions to optimize limited sampling locations for laboratory analysis, taking into account cone penetrometer soil classification data where appropriate. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007 | Richard Brady & Associates Responses |
|---|---|
| A) GSU requests that a discussion of potential matrix effects and spectral interferences that may occur during the investigation be included in the DWP. Please also discuss the possible effects of small scale heterogeneities on confirmation sample results. Please clarify the extent to which the presence of commingled petroleum hydrocarbons from other sources (such as the ASTs and near Building 397) may confound the interpretation of the SCAPS LIF results for the TRW investigation. Please also clarify the extent to which the presence of the Marsh Crust, if encountered, may interfere with the interpretation of the SCAPS LIF results for the TRW investigation (see Specific Comment 1c). | A) Previous SCAPS LIF investigations at Alameda Point have provided valuable spectral data on the differing petroleum related constituents in the OU-2A area. It is anticipated that the TRW will fluoresce at different wavelengths than other petroleum compounds known to occur at OU-2A.<br><br>The occurrence of Marsh Crust is not expected over the majority of the LIF investigation area as depicted on Figure 4-1 of the Work Plan and Figure 3-1 of the SAP. However, Marsh Crust may exist in the southwest corner of the investigation area where the BSU is present. It is anticipated that the Marsh Crust Unit will fluoresce with different spectral properties than the TRW. A subset of confirmation samples will be necessary if the spectral properties are similar between Marsh Crust and TRW. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| Specific Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007 | Richard Brady & Associates Responses |
|---|---|
| 1) Section 3.4 – Conceptual Site Model.<br><br>a) The second to last paragraph in this section references the Navy Public Works Center report dated 1997 for the groundwater flow direction information. Figure 3-1, which shows groundwater elevation contours, references the Tetra Tech EM Inc. Remedial Investigation (RI) Report dated 2005, but the date of the groundwater elevation information is not indicated on the figure. GSU requests that that the most recent available groundwater data be used to evaluate groundwater elevations and flow directions, and that this information is referenced accordingly in the DWP. Also, GSU requests that the date of the groundwater elevation measurements shown on figures be provided.<br><br>b) One sample with visual identification of TRW appears to be missing from Figure 3-1. A sample from boring B014 located on the eastern side of the "Iron Storage in Barrels" feature, approximately 120 feet from the southwest corner of IR Site 22, was identified as containing TRW as shown on Figure 6-12 of the Tetra Tech EMI Inc. RI Report (2005). Please clarify why this sample location is not shown or add this information to Figure 3-1. | 1)<br><br>a) The second to last paragraph of Section 3.4 and Figure 3-1 of the Final Work Plan has been revised to reflect the most current available groundwater elevation data from the Spring 2007 Basewide Groundwater Monitoring event.<br><br>b) The approximate location of boring B014 has been added to Figure 3-1 of the Final Work Plan.<br><br>c) The second to last paragraph of Section 3.4 of the Final Work Plan has been revised to include the requested information. The occurrence of Marsh Crust is not expected over the majority of the LIF investigation area as depicted on Figure 4-1 of the Work Plan and Figure 3-1 of the SAP. However, Marsh Crust may exist in the southwest corner of the investigation area where the BSU is present. It is anticipated that the Marsh Crust will fluoresce with different spectral properties than the TRW. A subset of confirmation samples will be necessary if the spectral properties are similar between Marsh Crust and TRW.<br><br>d) The requested information has been added to Figure 3-2 of the Final Work Plan. |

| **Specific Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007** | **Richard Brady & Associates Responses** |
|---|---|
| c) The conceptual site model (CSM) presented in the work plan should discuss the occurrence and thickness of the Bay Sediment Unit (BSU) and Marsh Crust in the investigation area. GSU questions whether the petroleum contamination associated with the Marsh Crust may potentially interfere with the results of the SCAPS LIF investigation for the TRW contamination. Please discuss the occurrence of the BSU and Marsh Crust in the investigation area and refine the conceptual site model, as appropriate.<br><br>d) Please identify the Artificial Fill, BSU, and Merritt Sand on Figure 3-2. | |
| 2) <u>Section 4.1 – Sampling Locations, Analyses, and Rationale</u>. Figure 4-1 shows only one of the three hydrocarbon plumes that are present in the study area (see DWP Figure 3-1). Please include all three plumes on Figure 4-1. Please also note that there is no reference to Figure 4-1 in the DWP, and include a reference to this figure. | 2) The requested information has been added to Figure 4-1 of the Final Work Plan. An additional sentence has been added to the end of the second paragraph of Section 4.1 of the Final Work Plan that states: *"Potential SCAPS LIF pushes locations are depicted on Figure 4-1."* |
| 3) <u>Attachment A, Section 3.3.2 – Step 2: Identify Goals of the Study</u>. It is stated that the primary investigation question is to define the extent of TRW. This section should clarify that another important investigation question is to characterize the chemical nature of the TRW. | 3) An additional question has been added to Section 3.3.2 of the Final SAP that states: *"What is the chemical variability of the TRW?"* |

| Specific Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007 | Richard Brady & Associates Responses |
|---|---|
| 4) Attachment A, Section 4.1.1 – Sampling Rationale.<br><br>a) The DWP specifies that soil samples and/or TRW matrix samples will be collected at five percent of the SCAPS LIF locations to confirm the effectiveness of the SCAPS LIF technology and to characterize the TRW. According to Table 4-1, five percent means that 15 of the 300 LIF locations will be selected for confirmation sampling, and one sample from each confirmation boring will be analyzed (for a total of 15 samples). GSU questions whether it would be prudent to collect more than one sample from at least some of the confirmation borings. Please clarify whether the Navy intends to collect more than one sample per confirmation boring at some locations and the rationale. Please also clarify how it was determined that five percent would be a sufficient number of confirmation samples for this investigation.<br><br>b) GSU requests that the Navy consider collecting confirmation soil samples from locations exhibiting high, medium, and low fluorescence, as well as from locations exhibiting background fluorescence.<br><br>c) Table 4-1 does not identify "analytical approaches 4, 5, and 6" referenced in this section. Please clarify the meaning of analytical approaches 4, 5, and 6. | 4)<br><br>a) A meeting or conference call between the Navy and the regulatory partners is proposed near the end of the LIF portion of the field work to discuss sampling locations and strategies. Available data will be presented at this proposed meeting in accordance with the data quality objectives (DQOs) for this investigation. The investigation is not bound to one soil sample per SCAPS soil sample push location. Five percent soil sampling was estimated to be sufficient for the goals of this investigation. If at the end of the LIF investigation, additional samples are appropriate, future sampling will be recommended.<br><br>b) A meeting or conference call between the Navy and the regulatory partners is proposed near the end of the LIF portion of the field work to discuss sampling locations and strategies. Available data will be presented at this proposed meeting in accordance with the data quality objectives (DQOs) for this investigation.<br><br>c) Analytical Approach is the new term for Step 5 of the DQO process (USEPA 2006). Step 5 was formerly called "Decision Rules" under the former EPA DQO guidance. The Analytical Approach is presented in Section 3.3.5 of the SAP. |

| Specific Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007 | Richard Brady & Associates Responses |
|---|---|
| 5) Attachment A, Section 4.2.4 – SCAPS Investigation. All CPT boreholes must be grouted to minimize the potential for the borehole to act as a conduit for contaminant migration. This section should provide the grouting procedures and materials that will be used to backfill CPT boreholes. | 5) SCAPS is equipped with a through the probe tip grouting system. Upon completion of a SCAPS push, the probe is withdrawn a few inches and an expendable tip is ejected using grout pump pressure. A cement and bentonite mixture is then pumped through a small diameter tube and through the tip of the probe as the probe and rod string are withdrawn from the push hole using the tremie method. A new section 4.2.5 describing SCAPS grouting has been added to the final SAP and Draft SAP sections 4.2.5, 4.2.6, and 4.2.7 are now 4.2.6, 4.2.7, and 4.2.8 in the final SAP. |
| 6) Attachment A, Section 4.2.4.3 – Soil Sampling Methods. A reference to the soil sampling Standard Operating Procedures (SOPs) in Appendix A should be added to this section. | 6) The following sentence has been added to the end of Section 4.2.4.3: *"Soil and TRW matrix samples will be collected in accordance with the SOPs RBA T-004 and T-006 (Appendix A)."* |
| 7) Attachment A, Section 4.3.1.1 – LIF. Please include a discussion of the type and frequency of SCAPS LIF system calibration that will be performed (i.e., initial, daily, before and after each push), and the type and frequency of system inspection and maintenance activities that will be performed (such as inspection of the system components to look for signs of | 7) Upon completion of each LIF push, the LIF system performance is checked by introducing the laser to a quinine sulfate solution and Fisher sea sand. The resultant ultraviolent light is recorded by the detector to assess system performance. In addition, the probe is visually inspected after each push and any worn parts are replaced prior to the next push. SCAPS post-push |

| Specific Comments and Recommendations of Michelle Dalrymple, Engineering Geologist, Geologic Services Unit, California Department of Toxic Substances Control, dated 06 September 2007 | Richard Brady & Associates Responses |
|---|---|
| deterioration as a result of extremely low pH). | system checks are described on page 7 of Richard Brady & Associates (RBA) Standard Operating Procedure (SOP) T-005, which is included as Appendix A of the Sampling and Analysis Plan (SAP). |
| 8) Attachment A, Appendix A. It is unclear why the Sampling and Analysis Plan contains a SOP for low-flow purging and sampling of groundwater monitoring wells since groundwater sampling is not included in the scope of this effort. Please clarify or remove the groundwater sampling SOP. | 8) SOP RBA T-002 has been removed from the Final Attachment A, Appendix A. |

## Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments of Nannette Oseas, Senior Industrial Hygienist, Human and Ecological Risk Division, Industrial Hygiene and Safety Branch, California Department of Toxic Substances Control, dated 29 August 2007 | Richard Brady & Associates Responses |
|---|---|
| 1) The Department of Toxic Substances Control (DTSC) reviewed the Health and Safety Plan, Emergency Action Plan and Spill Response and Reporting Requirements for compliance with Title 8, California Code of Regulations (T8 CCR), DTSC's policies and guidelines, and the NIOSH/OSHA/USCG/EPA Guidance Manual as well as other appropriate State and Federal Health and Safety Regulations. The review of the health and safety plan is not a guarantee that it will be properly and safely implemented; implementation is the employer's responsibility.<br><br>The DTSC is unable to foresee all the health and safety hazards in the work-place by the review of the submitted plan. Continuous surveillance of the work-site and creation of an effective health and safety program by the employer will reduce work place injuries and reduce liability.<br><br>An industrial hygienist from the IHSB may perform a field audit in order to confirm the implementation of the HASP. The review of this HASP is not a guarantee that it will be properly and safely implemented. HASP implementation is the employer's responsibility. | 1) The Navy appreciates DTSC's comments on the Draft Health and Safety Plan (HASP). The Navy agrees that a properly implemented safety plan is the employer's responsibility.<br><br>The Health and Safety Plan (HASP) provided with the Draft Work Plan and Attachments has been reviewed by the Naval Environmental Health Center (NEHC) in accordance with Naval Facilities Engineering Command Southwest (NAVFAC SW) and Base Realignment and Closure Program Management Office (BRAC PMO) West contractual requirements. NEHC comments have been incorporated in the Draft version of the HASP. The main guidance documents used by Department of Defense (DOD) Contractors on federally owned DOD facilities are the U.S. Army Corps of Engineers Safety and Health Manual EM 385-1-1, the U.S. Department of Labor Occupational Safety and Health Administration (OSHA) Title 29 Code of Federal Regulations Parts 1910 and 1926, U.S. Environmental Protection Agency (EPA) Standard Operating Safety Guides, and the NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.<br><br>NAVFAC SW, BRAC PMO West, and OSHA reserve the right to perform field safety audits on the proposed field work. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| General Comments of Nannette Oseas, Senior Industrial Hygienist, Human and Ecological Risk Division, Industrial Hygiene and Safety Branch, California Department of Toxic Substances Control, dated 29 August 2007 | Richard Brady & Associates Responses |
|---|---|
| In several sections of the HASP, Federal Occupational Safety and Health Administration (Fed-OSHA) regulations are referenced. Fed-OSHA is the overall governing body for occupational safety and health, when a state approved program does not exist. However, in the State of California, there is a state approved OSHA plan. Cal-OSHA standards should be referenced and followed, unless all work activities will be carried out by federal workers.<br><br>Please note that all sub-contractors must submit their own health and safety plans to the DTSC for review. The documents were reviewed for scientific content. Minor grammatical or typographical errors that do not affect interpretation have not been noted; however, these should be corrected in future versions of the documents. | All work is proposed to be performed by Federal Contractors on Federally owned DOD facilities. No field subcontractors are proposed for this investigation. |

## Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| Specific Comments of Nannette Oseas, Senior Industrial Hygienist, Human and Ecological Risk Division, Industrial Hygiene and Safety Branch, California Department of Toxic Substances Control, dated 29 August 2007 | Richard Brady & Associates Responses |
|---|---|
| 1) Section 4.2.2, Industrial Hazards. Please provide specific information on the distance that must be kept from overhead power lines. | 1) Drilling equipment will not operate within 15 feet of an overhead power line. |
| 2) Section 6.1, Organic Vapors.<br>A. It is understood that air monitoring has been done at other naval sites; unless the sites and site conditions are the same, and the data is provided, then air monitoring must be conducted at this site. Please include in the plan the instruments, frequency and action levels for organic vapor air monitoring.<br><br>B. The plan states, "All breathing zone samples with a sustained reading exceeding action levels presented ... and lasting at least 5 minutes in duration shall be evaluated." Please provide information relating to stop work levels.<br><br>C. The plan states, "If TVA levels indicate sustained levels greater than 25-ppm organic vapors, indirect air monitoring shall be considered." What is "indirect air monitoring"? | 2) Air monitoring will be performed in accordance with the HASP, Sections 6-0 through 6.3. |
| 3) Table 1, Activity Hazard Analysis. Please provide an activity hazard analysis specific to the work activities at this site. | 3) The Activity Hazard Analysis is provided in Table 1. |

# Response to Comments

**Draft Work Plan, SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation, Former Oil Refinery, Alameda Point, Alameda, California.**

| Conclusions and Recommendations of Nannette Oseas, Senior Industrial Hygienist, Human and Ecological Risk Division, Industrial Hygiene and Safety Branch, California Department of Toxic Substances Control, dated 29 August 2007 | Richard Brady & Associates Responses |
|---|---|
| In utilizing the Health and Safety Plan, field staff must be able to obtain sufficient information to compile an accurate assessment of the site safety issues associated with every job function. The submitted document requires additional information and/or clarification of the issues identified above; the areas where the IHSB has requested additional information and/or clarification must be corrected or clarified and resubmitted for further review.<br><br>Final revisions must be incorporated into the document in a comprehensive format which allows site workers to readily access information within the document. The final Health and Safety Plan must be available at all times for on-site personnel to reference. | Comment noted. Please see responses to general and specific comments above.<br><br>A copy of the Final Health and Safety Plan will be available at all times to site workers. |

## SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation

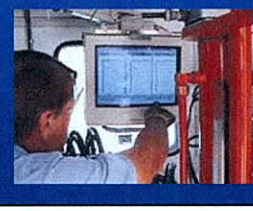
**BRAC Cleanup Team Meeting**
**Alameda Point, California**
**July 17, 2007**

*Richard Brady & Associates*

Timothy Shields and Donald McHugh
(858) 496-0500

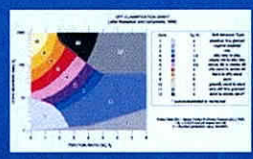
## *SCAPS in Action*

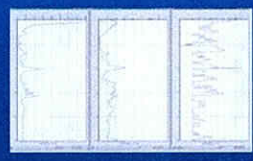
- Hydraulic rams grab the rod string and push it into the ground.
- The instrumented tool is at the bottom of the rod string.
- The investigator sees the data displayed immediately.



## *Cone Penetrometer Test*

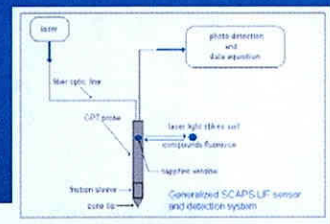
- Standard Cone Penetrometer Test (CPT) tip resistance and sleeve friction data are collected according to ASTM standards
- CPT data is analyzed by on-board computer, and soil classifications are displayed in real time with the contaminant sensor data





## *Petroleum Hydrocarbon Assessment*
### *Using SCAPS Laser-Induced Fluorescence*

- Laser Source: Ultraviolet (308 nm) Xenon Chloride Eximer laser
- Excites 2-ring and greater Polynuclear Aromatic Hydrocarbons (PAHs)

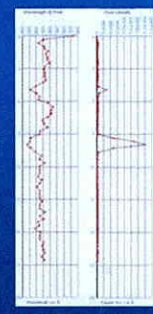


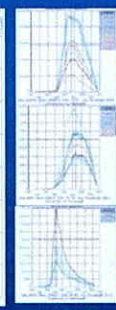
- LIF generally detects fuel concentrations greater than 100 ppm

## *XeCl Laser Ultraviolet Light Source*

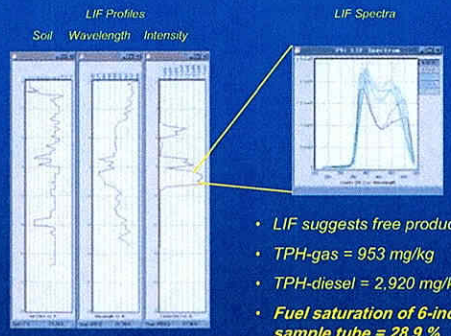
## *LIF Data Interpretation*
### *Factors to Evaluate Fuel (PAH) Detection by LIF*

- Increase in Fluorescence Intensity
- Corresponding Change in Fluorescence Wavelength
- Spectral Curve Shape Consistent with Fuel or PAHs
- Significant Thickness of Interval
- Spatial Location Consistent with Expected Migration Patterns
- Comparison with Sample Analysis



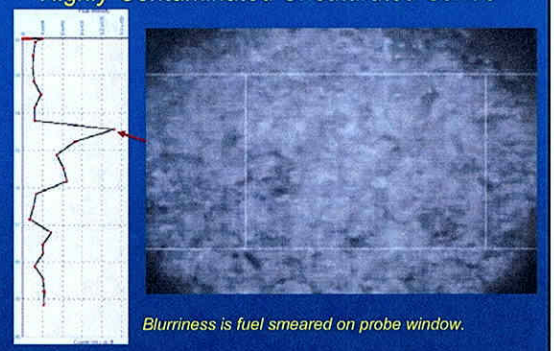


## "Confirmation" Sampling and Small Scale Subsurface Heterogeneity




- LIF suggests free product
- TPH-gas = 953 mg/kg
- TPH-diesel = 2,920 mg/kg
- ***Fuel saturation of 6-inch sample tube = 28.9 %***

## Fluorescence Requires Interpretation in Highly-Contaminated Unsaturated Sands



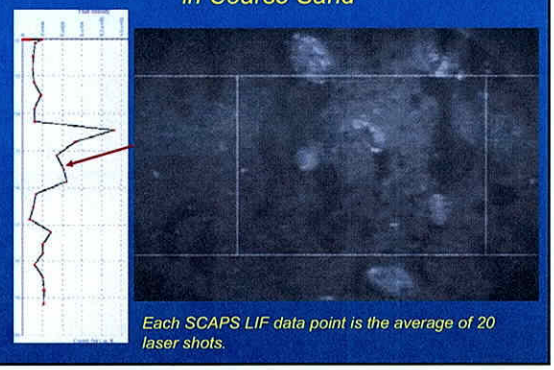
Blurriness is fuel smeared on probe window.

## First Indication of Saturation

(Mix of Water, Fuel, and Gas Bubbles)

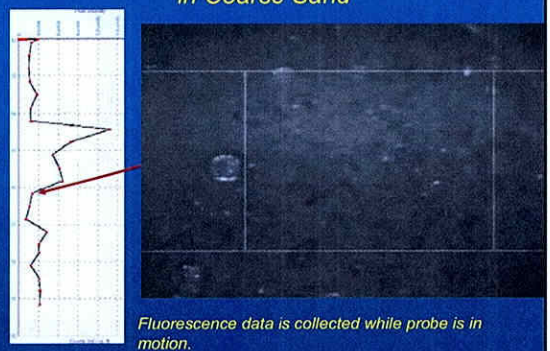
Window has been cleaned by sand and water.

## Fuel, Silty Water, and Gas Bubbles in Coarse Sand



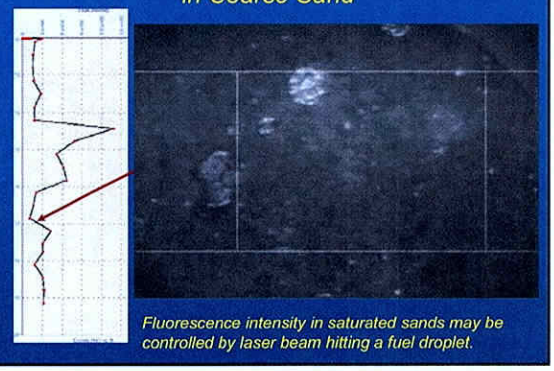
Each SCAPS LIF data point is the average of 20 laser shots.

## Fuel, Silty Water, and Gas Bubbles in Coarse Sand



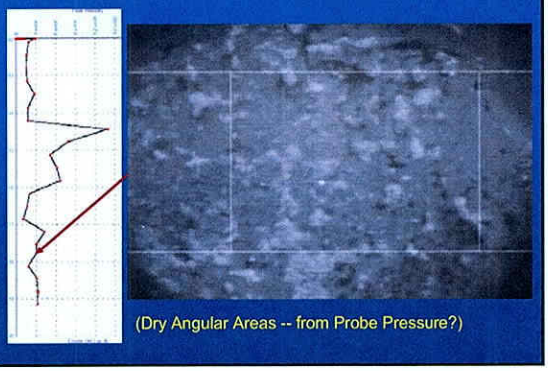
Fluorescence data is collected while probe is in motion.

## Fuel, Dirty Water, and Gas Bubbles in Coarse Sand



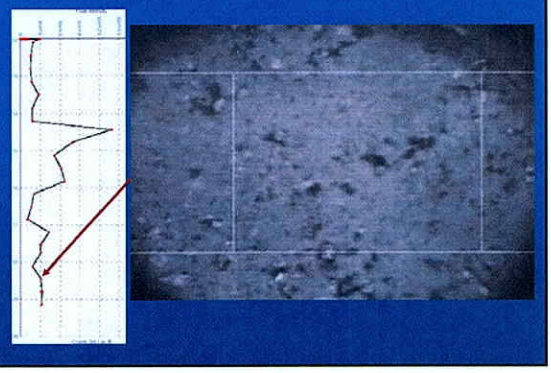
Fluorescence intensity in saturated sands may be controlled by laser beam hitting a fuel droplet.

## Fuel and Wet Fine Sand

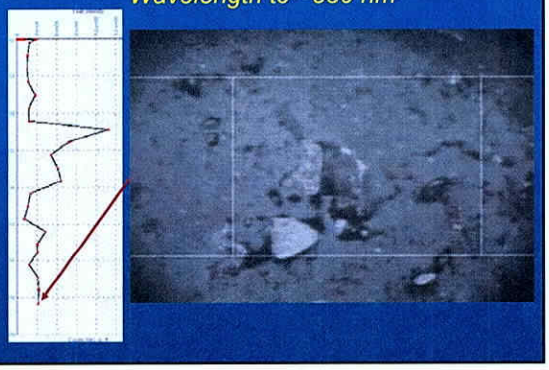


(Dry Angular Areas -- from Probe Pressure?)

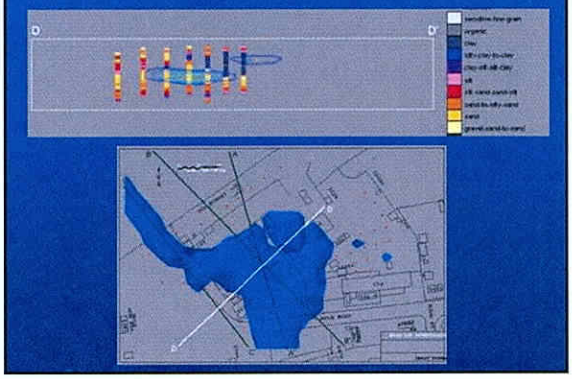
## Fuel and Saturated Fine Sand



## Dark Fuel Corresponding to Rise in Wavelength to ~530 nm



## Data Visualization



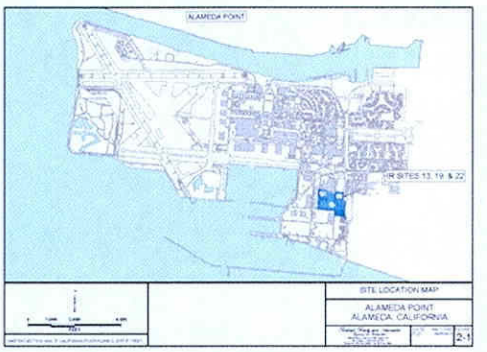
## Overall Fluorescence Intensity

## SCAPS Collects Samples to Corroborate Real-Time Sensor Data

- Soil Samples are Collected for Laboratory Analysis and Results Compared to LIF and CPT Data
- Groundwater Samples are Collected and Groundwater Elevations are Measured

## Former Oil Refinery Site History

- Former Pacific Coast Oil Works Company Refinery in Operation from 1879 to 1903
- Refinery Occupied IR Sites 13, 19, 22, and 23
- Distilled Crude Oil to Kerosene and Fuel Oil
- Refinery Wastes Disposed of On-Site and Surrounding Former Tidal Lands
- 13 Previous Investigations and 5 Removal Actions to Date
- SCAPS LIF to Refine Conceptual Site Model and Optimize the Feasibility Study

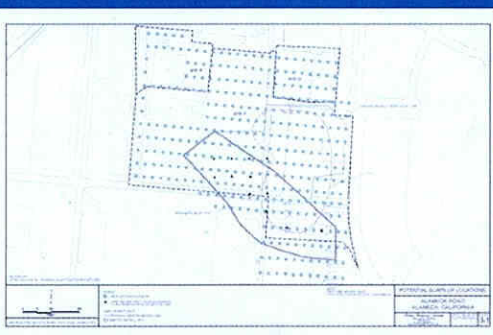


## Proposed Work at Former Oil Refinery Site

- Up to 300 SCAPS LIF Push Locations to Delineate the Horizontal and Vertical Extent of Tarry Refinery Waste (TRW) in the Vicinity of the Former Oil Refinery (IR Site 13)
- LIF Data will be used to Refine the Conceptual Site Model and Optimize the Subsequent Feasibility Study
- Soil and/or TRW Matrix Samples will be Collected from a Minimum of 5% of the LIF Locations (*i.e.* 15 Samples) for Laboratory Analysis to Evaluate LIF Data Effectiveness

## Proposed Work (continued)

- Real-Time SCAPS LIF and CPT Data will be Transmitted Daily to the DQO Planning Team to Optimize the Investigation using Dynamic Work Strategies
- The DQO Planning Team will Optimize the Sampling Design to Add or Delete Investigative Points based on DQO Decision Rules and Real-Time Data
- 3-dimensional Visualization Software will be used to Refine the Conceptual Site Model while the SCAPS is in the Field



## *Proposed Schedule*

- August/September 2007 – Submittal of the Final Project Planning Documents
- August/September 2007 – SCAPS Mobilization Activities
- September/October 2007 (Or Earlier if Possible) – Field Implementation of the Approved Final Project Planning Documents
- September/October 2007 – SCAPS Demobilization Activities
- April 2008 – Submittal of the Draft Report
- June 2008 – Submittal of the Final Report

## SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation OU-2A SITES 9, 13, 22, AND 23

**Restoration Advisory Board Meeting**
**Alameda Point, California**
**August 2, 2007**

*Richard Brady & Associates*

Timothy Shields and Donald McHugh
(858) 496-0500

## *Former Oil Refinery Site History*

- Former Pacific Coast Oil Works Company Refinery in Operation from 1879 to 1903
- Refinery Occupied IR Sites 13, 19, 22, and 23
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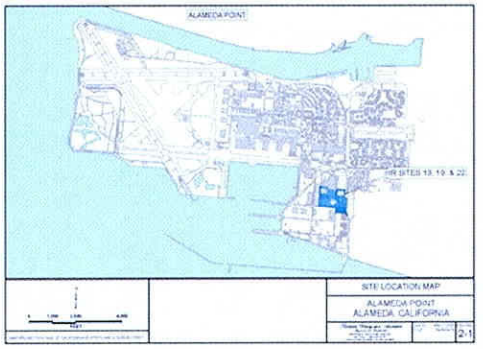
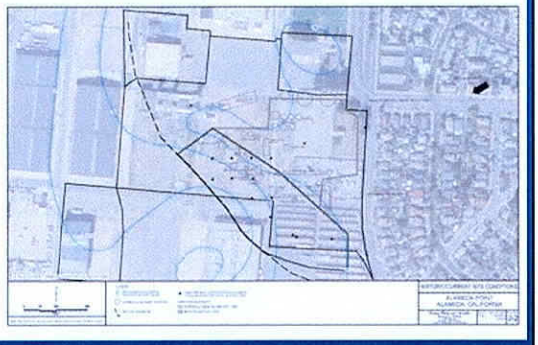


## *The Site Characterization and Analysis Penetrometer System*

## *SCAPS in Action*

- Hydraulic rams grab the rod string and push it into the ground.
- The instrumented tool is at the bottom of the rod string.
- The investigator sees the data displayed immediately.

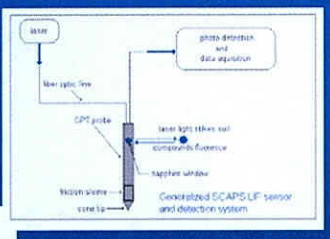
## Cone Penetrometer Test

- Standard Cone Penetrometer Test (CPT) tip resistance and sleeve friction data are collected according to ASTM standards
- CPT data is analyzed by on-board computer, and soil classifications are displayed in real time with the contaminant sensor data

## Petroleum Hydrocarbon Assessment

*Using SCAPS Laser-Induced Fluorescence*

- Laser Source: Ultraviolet (308 nm) Xenon Chloride Eximer laser
- Excites 2-ring and greater Polynuclear Aromatic Hydrocarbons (PAHs)



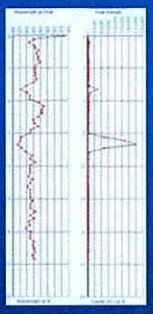
- LIF generally detects fuel concentrations greater than 100 ppm

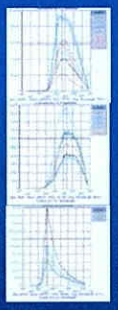
## XeCl Laser Ultraviolet Light Source

## LIF Data Interpretation

*Factors to Evaluate Fuel (PAH) Detection by LIF*

- Increase in Fluorescence Intensity
- Corresponding Change in Fluorescence Wavelength
- Spectral Curve Shape Consistent with Fuel or PAHs
- Significant Thickness of Interval
- Spatial Location Consistent with Expected Migration Patterns
- Comparison with Sample Analysis



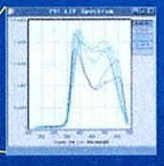


## "Confirmation" Sampling and Small Scale Subsurface Heterogeneity

*LIF Profiles*

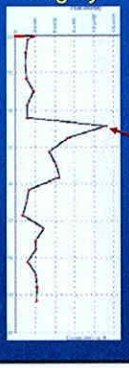
*Soil Wavelength Intensity*

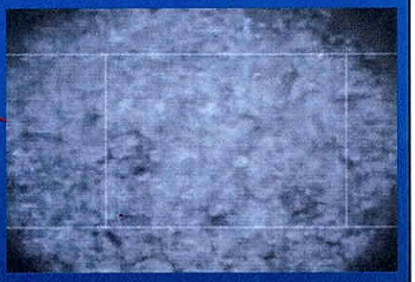
*LIF Spectra*



- *LIF suggests free product*
- *TPH-gas = 953 mg/kg*
- *TPH-diesel = 2,920 mg/kg*
- ***Fuel saturation of 6-inch sample tube = 28.9 %***

## Fluorescence Requires Interpretation in Highly-Contaminated Unsaturated Sands



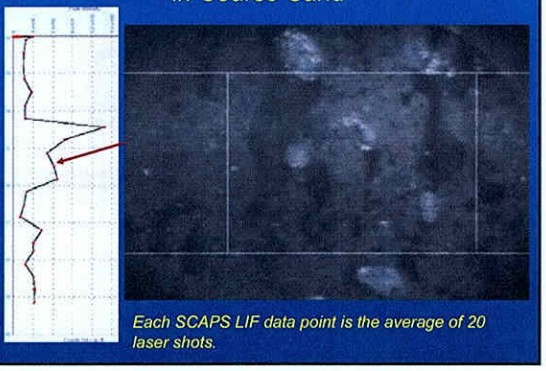


*Blurriness is fuel smeared on probe window.*

## First Indication of Saturation
*(Mix of Water, Fuel, and Gas Bubbles)*

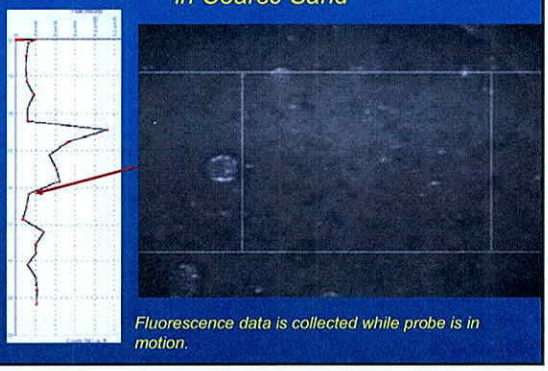
*Window has been cleaned by sand and water.*

## Fuel, Silty Water, and Gas Bubbles in Coarse Sand



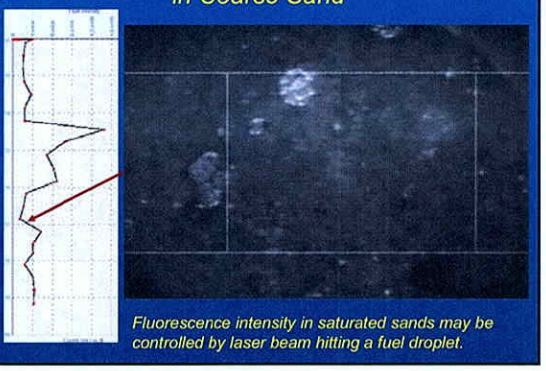
*Each SCAPS LIF data point is the average of 20 laser shots.*

## Fuel, Silty Water, and Gas Bubbles in Coarse Sand



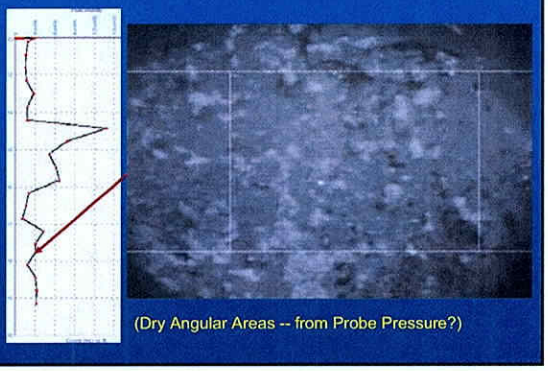
*Fluorescence data is collected while probe is in motion.*

## Fuel, Dirty Water, and Gas Bubbles in Coarse Sand



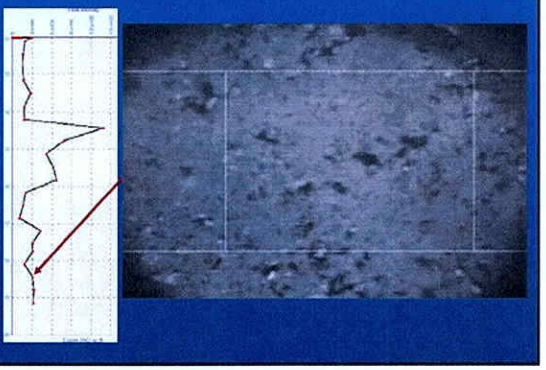
*Fluorescence intensity in saturated sands may be controlled by laser beam hitting a fuel droplet.*

## Fuel and Wet Fine Sand

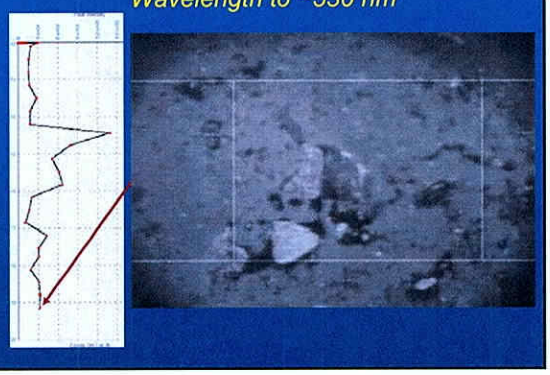


(Dry Angular Areas -- from Probe Pressure?)

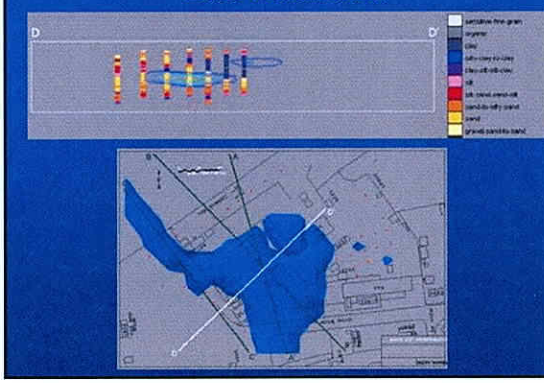
## Fuel and Saturated Fine Sand



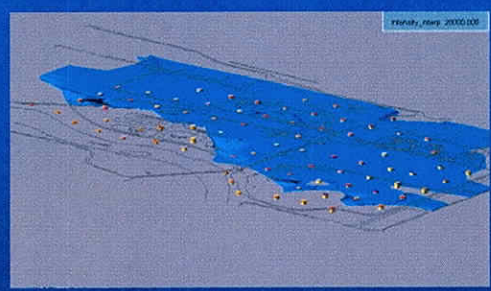
## Dark Fuel Corresponding to Rise in Wavelength to ~530 nm



## Data Visualization



## Overall Fluorescence Intensity



## SCAPS Collects Samples to Corroborate Real-Time Sensor Data

- Soil Samples are Collected for Laboratory Analysis and Results Compared to LIF and CPT Data
- Groundwater Samples are Collected and Groundwater Elevations are Measured

## Proposed Work at Former Oil Refinery Site

- Up to 300 SCAPS LIF Push Locations to Delineate the Horizontal and Vertical Extent of Tarry Refinery Waste (TRW) in the Vicinity of the Former Oil Refinery (IR Site 13)
- LIF Data will be used to Refine the Conceptual Site Model and Optimize the Subsequent Feasibility Study
- Soil and/or TRW Matrix Samples will be Collected from a Minimum of 5% of the LIF Locations (*i.e.* 15 Samples) for Laboratory Analysis to Evaluate LIF Data Effectiveness

## Proposed Work (continued)

- Real-Time SCAPS LIF and CPT Data will be Transmitted Daily to the DQO Planning Team to Optimize the Investigation using Dynamic Work Strategies
- The DQO Planning Team will Optimize the Sampling Design to Add or Delete Investigative Points based on DQO Decision Rules and Real-Time Data
- 3-dimensional Visualization Software will be used to Refine the Conceptual Site Model while the SCAPS is in the Field

## Proposed Schedule

- August/September 2007 – Submittal of the Final Project Planning Documents
- August/September 2007 – SCAPS Mobilization Activities
- September/October 2007 (Or Earlier if Possible) – Field Implementation of the Approved Final Project Planning Documents
- September/October 2007 – SCAPS Demobilization Activities
- April 2008 – Submittal of the Draft Report
- June 2008 – Submittal of the Final Report

## SCAPS Laser Induced Fluorescence Tarry Refinery Waste Investigation Results OU-2A SITES 9, 13, 22, AND 23

**Alameda Point, California**
**February 29, 2008**

*Richard Brady & Associates*

Timothy Shields and Donald McHugh
(858) 496-0500

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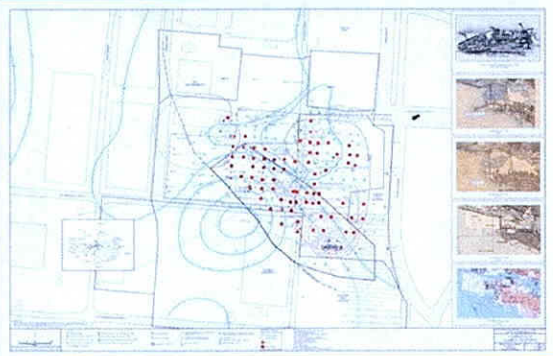
## *Former Oil Refinery Site History*

- Former Pacific Coast Oil Works Company Refinery in Operation from 1879 to 1903
- Refinery Occupied IR Sites 13, 19, 22, and 23
- Distilled Crude Oil to Kerosene and Fuel Oil
- Refinery Wastes Disposed of On-Site and Surrounding Former Tidal Lands
- 13 Previous Investigations and 5 Removal Actions to Date
- SCAPS LIF to Refine Conceptual Site Model and Optimize the Feasibility Study

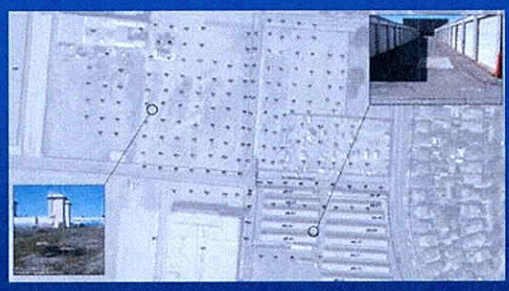
2

## *Site Location*

## *Current/Historic Site Conditions*



## *TRW or Oil at Surface*



5

## *Field Activities*

- Subsurface Utility Clearance/Boring Permits
- 182 SCAPS LIF Pushes
- 16 Soil and TRW Samples Collected and Analyzed
- All Investigative Points Destroyed by Tremie Grouting

6

## LIF Push Locations

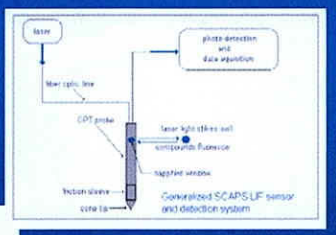
## SCAPS at OU-2A

## LIF Pushes

## Petroleum Hydrocarbon Assessment

*Using SCAPS Laser-Induced Fluorescence*

- Laser Source: Ultraviolet (308 nm) Xenon Chloride Eximer laser
- Excites 2-ring and greater Polynuclear Aromatic Hydrocarbons (PAHs)



- LIF generally detects fuel concentrations greater than 100 ppm

## XeCl Laser Ultraviolet Light Source

## LIF Data Interpretation

*Factors to Evaluate Fuel (PAH) Detection by LIF*

- Increase in Fluorescence Intensity
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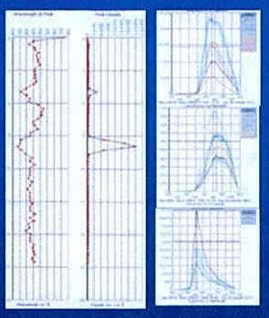
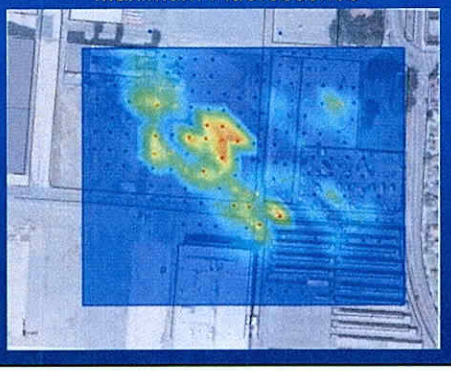
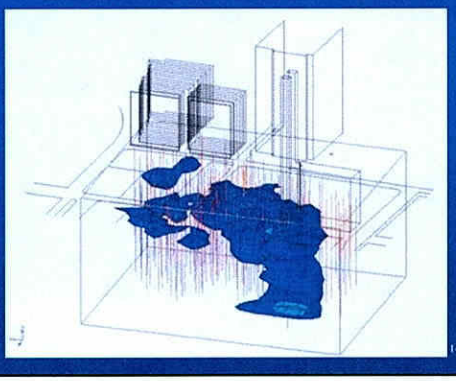


## Modeled Interpolation of Maximum Fluorescence



13

## Elevated Fluorescence at OU-2A



14

## SCAPS Collects Samples to Corroborate Real-Time Sensor Data

- Soil Samples are Collected for Laboratory Analysis and Results Compared to LIF and CPT Data

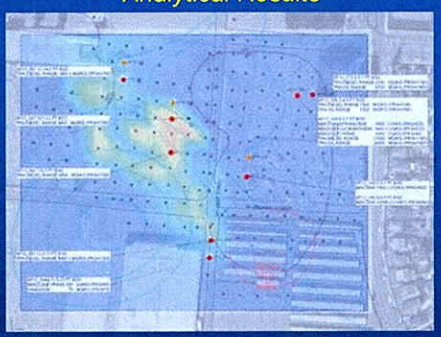
15

## Analytical Program

- TPH extractables
- VOCS
- SVOC/PAHs
- Metals
- Alkalinity
- Nitrite/Nitrate/Sulfate
- pH
- Moisture and Density

16

## Soil Sample Locations and Selected Analytical Results



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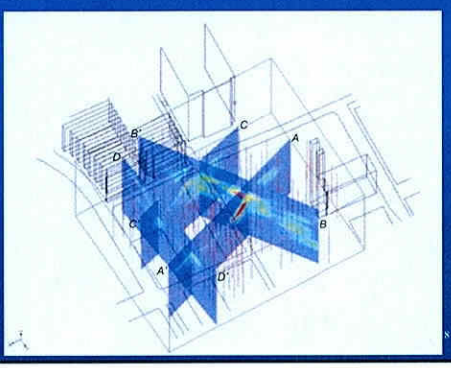
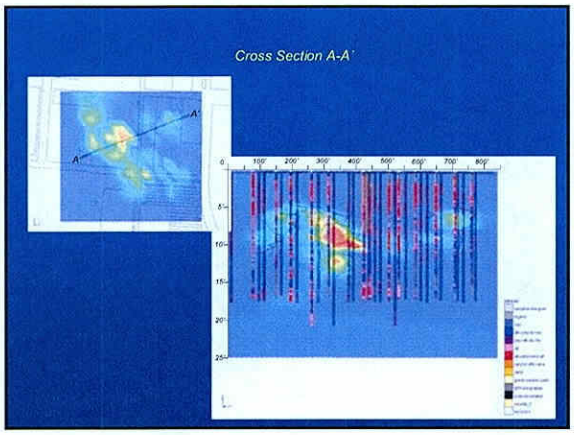
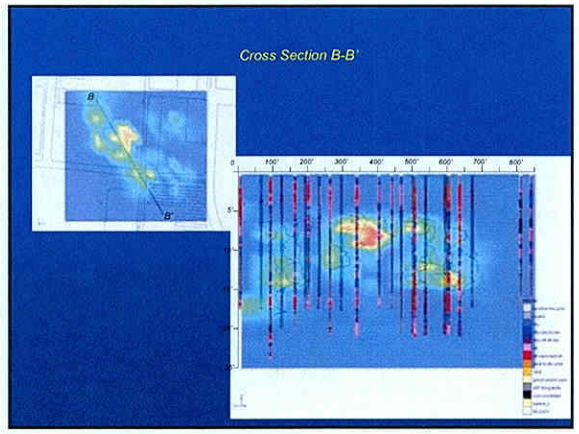
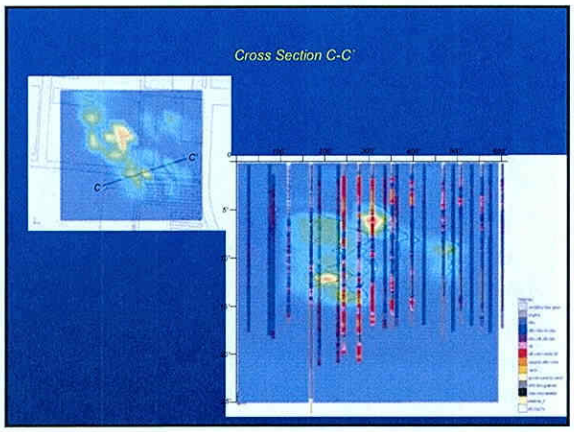
## Cross Sections of All Fluorescence

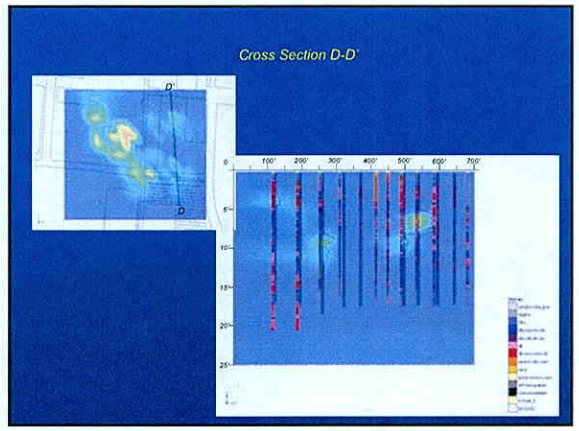



18




## TRW Investigation Results

- 182 SCAPS LIF Push Locations to Delineate the Horizontal and Vertical Extent of Tarry Refinery Waste (TRW) in the Vicinity of the Former Oil Refinery (IR Site 13)
- LIF Data was used to Refine the Conceptual Site Model and Optimize the Subsequent Feasibility Study
- 16 Soil and/or TRW Matrix Samples were Collected for Laboratory Analysis to Evaluate LIF Data Effectiveness

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## TRW Investigation Results (continued)

- 3-dimensional Visualization Software was used to Refine the Conceptual Site Model while the SCAPS was in the Field
- Two separate areas of petroleum impacts
- The western area is inferred to represent the TRW
- The TRW contains less volatile fraction than eastern area
- The eastern area which contains elevated benzene does not represent TRW
- The eastern area is being investigated under separate concurrent contract

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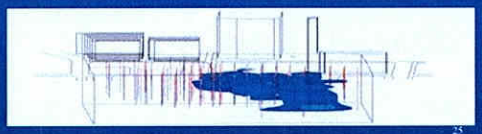
## TRW Investigation Results (continued)

- An estimated 8,570 cubic yards of TRW exist at the site
- Arsenic was reported above EPA Region 9 residential PRGs in every sample collected at OU-2A
- Reported arsenic is consistent with background values established for Alameda Point OU-2A soils
- Low pH was not reported in soil or TRW samples



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## Schedule

- Late March 2008 – Submittal of the Draft Report
- March/April 2008 – Agency Review Period
- Late May 2008 – Submittal of the Final Report

26

| 02/29/2008 1000-1330<br>SCAPS LASER INDUCED FLUORESCENCE<br>TARRY REFINERY WASTE INVESTIGATION<br>ALAMEDA POINT, ALAMEDA, CALIFORNIA<br>Draft Meeting Minutes | **TARRY REFINERY WASTE INVESTIGATION AT ALAMEDA POINT, CALIFORNIA**<br>**Regulatory Working Meeting to Present Results of the Site Characterization and Analysis Penetrometer Systems Laser Induced Fluorescence Tarry Refinery Waste Investigation for Preparation of the Preliminary Draft Investigation Report Alameda Point, Alameda, California** |
|---|---|
| **Meeting called by:** | Michelle Hurst |
| **Type of meeting:** | Regulatory working meeting to present results of the Site Characterization and Analysis Penetrometer Systems (SCAPS) Laser Induced Fluorescence (LIF) Tarry Refinery Waste (TRW) Investigation. |
| **Objectives** | • To obtain concurrence on the Restoration Advisory Board (RAB) presentation.<br>• To present results of the SCAPS LIF TRW Investigation at Alameda Point. |
| **Attendees:** | Anna-Marie Cook – U.S. EPA<br>Dot Lofstrom & Michelle Dalrymple - DTSC<br>Peter Russell – ARRA & RRII<br>Michelle Hurst – BRAC PMO West<br>Tim Shields & Don McHugh - RBA |

| **1) Presentation of Investigation Results** | **T. Shields / D. McHugh** |
|---|---|

The meeting started approximately at 1000. The purpose of this meeting was to have Tim Shields and Don McHugh present the results of the SCAPS LIF Investigation of the TRW at OU-2A at Alameda Point. The extent of TRW impacts has been delineated using LIF data collected during the advancement of 182 pushes at the site. The SCAPS field team also collected 16 soil and TRW matrix samples on 4 and 5 December 2007 for fixed-base laboratory analysis and validation. The samples were collected at locations and depths selected by the Navy and the regulatory partners at the 28 November 2008 meeting at the DTSC Offices in Berkeley, California. All of these sample locations and depths were selected in accordance with Data Quality Objectives established in the Final Work Plan and Sampling and Analysis Plan for the site.

The following bullets highlight the agreements reached on preparing the presentation for the RAB meeting on 6 March 2008:

- Slide 12 graphs, make more legible.
- LIF Figure, make text more legible.
- Slide 13, show footprint of old refinery.

- Show names of streets.
- Make GMS Animation of 3-d perspectives.
- Slide 17, make results legible and only show what we need to show. Take out Vanadium.
- Break 17 into 2 slides. 1) showing all dots and explaining why we selected certain. locations for sampling. 2) second slide showing only LIF dots that have sample results. Change title to Lab Results.
- Use 620 ug/kg Benzo(a)pyrene (BaP) equivalents as Site Residential Remediation Goal.
- Remove historical FS TPH and benzene groundwater plumes from Slide 17.
- Slide 17, change orange dots to green.
- Make boundary of plume conform to symbols on Slide 17.
- Slide 18, possibly add aerial photograph to make orientation clear.
- Make sure that page numbers show on all handouts (some are covered up now).
- Get rid of soil and all data sticks on cross sections. Make to be cross sections only. Cut down to 2 cross sections.
- Try to capture cross section through surface TRW (push 22).
- Use E-E' cross section made during meeting.
- On horizontal cross sections, make dots monochromatic. Avoid discrepancies between dot color and modeled plume boundaries on all slides.
- Remove groundwater contours from all figures.
- Slide 25, delete 2nd and 3rd bullets.
- Slide 7. Reinterpret yellow dots, make green or red.
- Change clipped dots to just red. All we will have are red and green dots.
- Change legend to define green and red dots only once.
- Do not draw line separating East and West plumes.
- Eliminate Slide 4. Replace with several slides showing the historic maps only.
- Mention number of LIF measurements (>18,000) and linear feet (>3000).

The project team agreed to make these changes to the RAB meeting presentation and the meeting was adjourned.

The following suggestions were offered for the report:

- Use a table to demonstrate LIF effectiveness by comparing LIF results to analytical results.
- Explain why the 14,000 ug/kg benzene result was J flagged.
- Make a table of TRW chemical nature, including PAHs, lead, pH, benzene.
- Discuss pH results.

| **Action items:** | **Person responsible:** | **Deadline:** |
|---|---|---|
| 1) Make changes to the RAB Meeting Presentation as discussed above. | D. McHugh - RBA | 3/4/08 |
| 2) Make changes to the Investigation Report as discussed above. | D. McHugh - RBA | 3/21/08 |

## SCAPS Laser Induced Fluorescence
## Tarry Refinery Waste Investigation
## OU-2A SITES 9, 13, 22, AND 23

**Restoration Advisory Board Meeting**
**Alameda Point, California**
**March 6, 2008**

*Richard Brady & Associates*

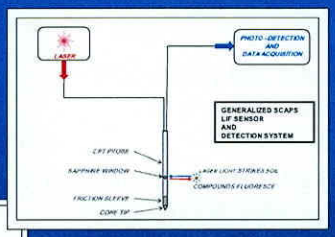
Timothy Shields and Donald McHugh
(858) 496-0500

## *Site Location*

2

## *Petroleum Hydrocarbon Assessment*
### *Using SCAPS Laser-Induced Fluorescence*

- Laser Source: Ultraviolet (308 nm) Xenon Chloride Eximer laser
- Excites 2-ring and greater Polynuclear Aromatic Hydrocarbons (PAHs)



- LIF generally detects fuel concentrations greater than 100 ppm

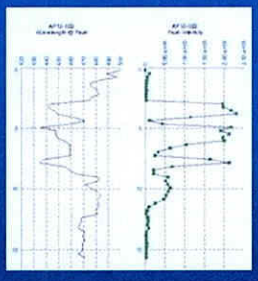
3

## *XeCl Laser Ultraviolet Light Source*

4

## *LIF Data Interpretation*
### *Factors to Evaluate Petroleum Detection by LIF*

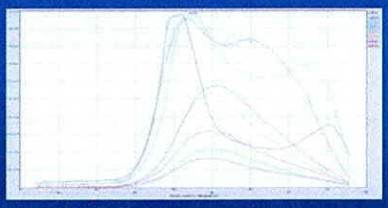
- Increase in Fluorescence Intensity
- Corresponding Change in Fluorescence Wavelength

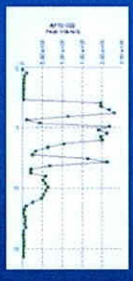


5

## *LIF Data Interpretation*
### *Continued*

- Spectral Curve Shape Consistent with Petroleum



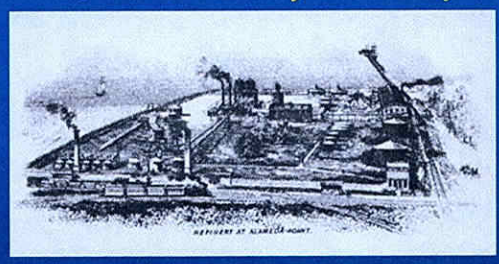


6

## LIF Data Interpretation
*Continued*

- Significant Thickness of Interval
- Spatial Location Consistent with Expected Migration Patterns
- Comparison with Sample Analysis

## Former Oil Refinery Site History

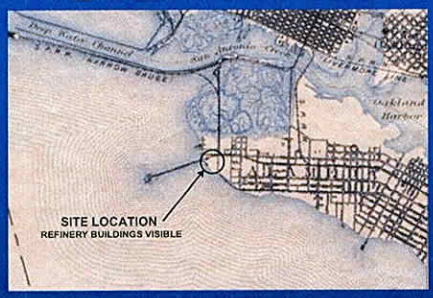


VIEW LOOKING WEST CIRCA 1890

- Former Pacific Coast Oil Works Company Refinery in Operation from 1879 to 1903
- Distilled Crude Oil to Kerosene and Fuel Oil



## ALAMEDA POINT - 1895

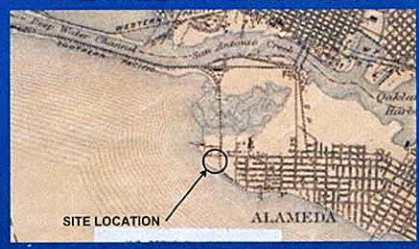



USGS MAP

- Refinery Wastes Disposed of On-Site and Surrounding Former Tidal Lands



## ALAMEDA POINT - 1915

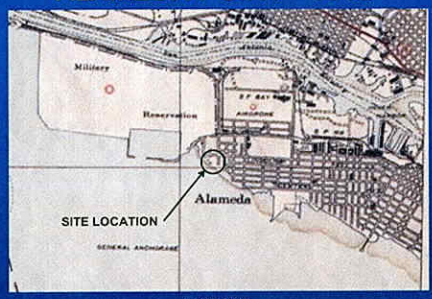



USGS MAP

- Refinery Occupied IR Sites 13, 19, 22, and 23



## ALAMEDA POINT - 1942




USGS MAP

- 13 Previous Investigations and 5 Removal Actions

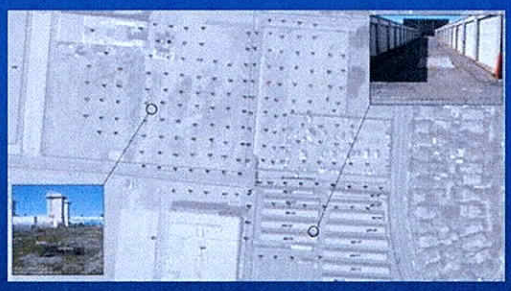


## ALAMEDA POINT - 1980

USGS MAP

- SCAPS LIF to Refine Conceptual Site Model and Optimize the Feasibility Study

## TRW or OIL at Surface



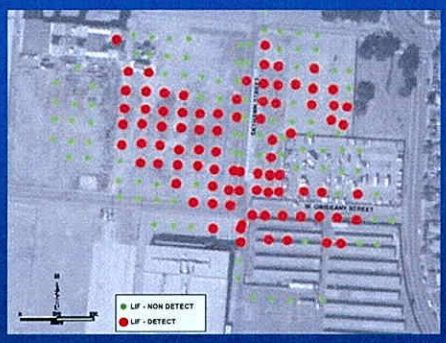
13

## Field Activities

- Subsurface Utility Clearance/Boring Permits
- 182 SCAPS LIF Pushes Covering 9.3 Acres
- 10,521 LIF Measurements
- 16 Soil and TRW Samples Collected and Analyzed
- All Investigative Points Destroyed by Tremie Grouting

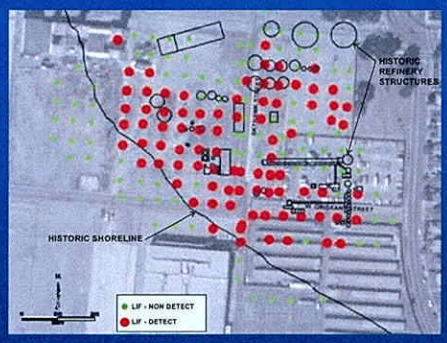
14

## LIF RESULTS



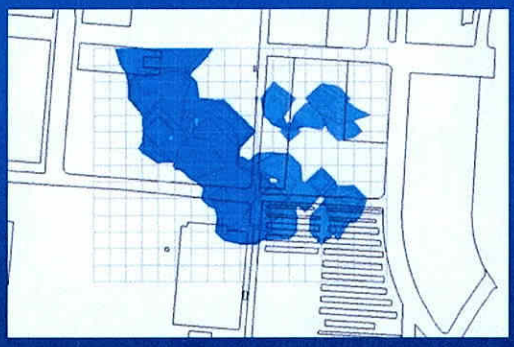

15

## LIF RESULTS

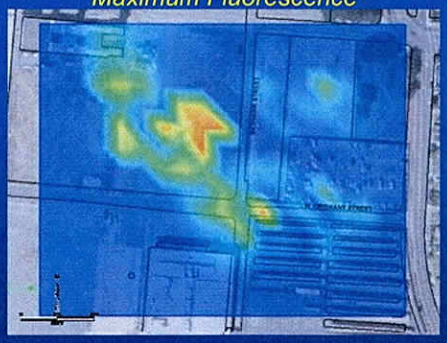



16

## 3-Dimensional Modeling



## Modeled Interpolation of Maximum Fluorescence



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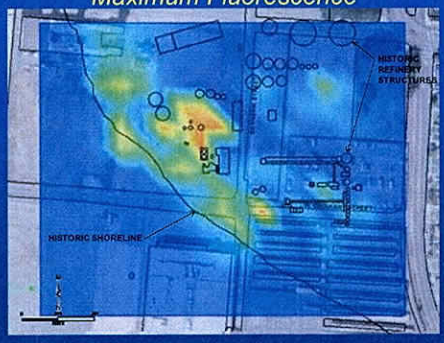
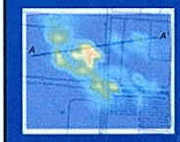
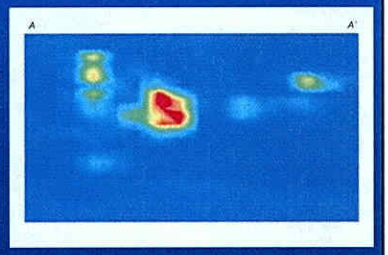
## Modeled Interpolation of Maximum Fluorescence





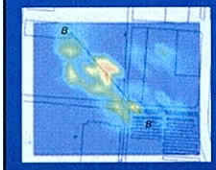

## Cross Section A-A'

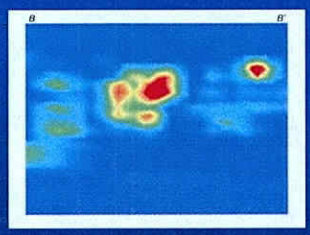





## Cross Section B-B'



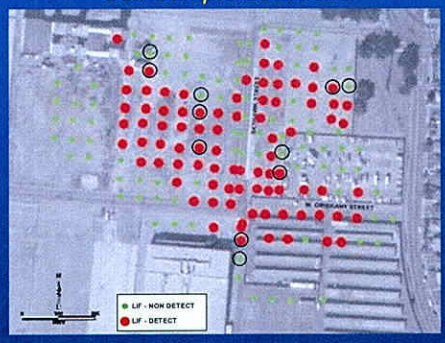






## SCAPS Soil Sampling

- Soil sample locations were collaboratively chosen during a planning meeting.
- Soil samples were collected for laboratory analysis
- Results were compared to LIF and CPT Data

## Soil Sample Locations

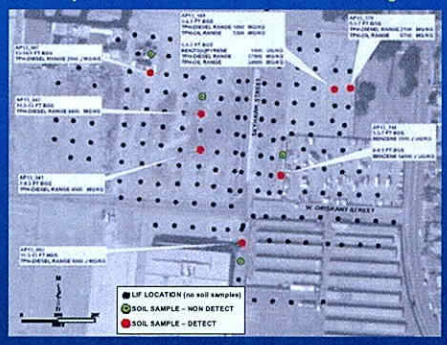





## Analytical Program

- TPH extractables
- VOCs
- SVOC/PAHs
- Metals
- Alkalinity
- Nitrite/Nitrate/Sulfate
- pH
- Moisture and Density

## Laboratory Results Above Residential Screening Criteria

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## TRW Investigation Results

- 182 SCAPS LIF Push Locations to Delineate the Horizontal and Vertical Extent of Tarry Refinery Waste (TRW) in the Vicinity of the Former Oil Refinery (IR Site 13)
- LIF Data was used to Refine the Conceptual Site Model and Optimize the Upcoming Feasibility Study
- 16 Soil and/or TRW Matrix Samples were Collected for Laboratory Analysis to Evaluate LIF Data Effectiveness and Characterize the TRW

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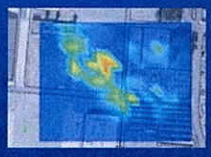
## TRW Investigation Results (continued)

- 3-dimensional Visualization Software was used to Refine the Conceptual Site Model while the SCAPS was in the Field
- Separate areas of petroleum impacts
- The western area is inferred to represent the TRW
- The TRW contains less volatile fraction than eastern area



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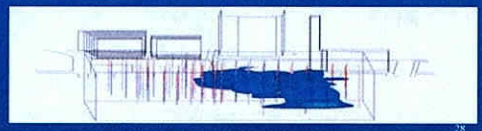
## TRW Investigation Results (continued)

- The eastern area contains elevated benzene and does not represent TRW
- The eastern area is being investigated under separate concurrent contract
- An estimated 8,570 cubic yards of TRW exist at the site
- Low pH was not reported in soil or TRW samples



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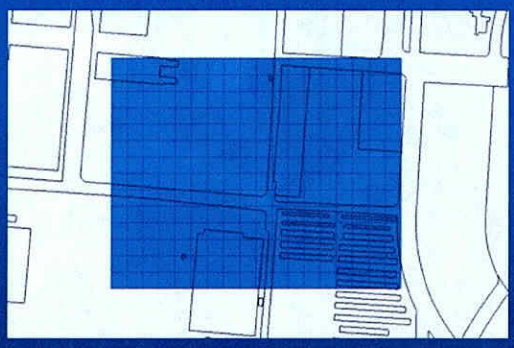
## Questions?



# APPENDIX C

31 January, 2008

Mr. James Yoo
Well Standards Program
Alameda County Public Works Agency
Water Resources
399 Elmhurst Street
Hayward, CA 94544

Subject: Cone Penetrometer Test Borehole Completion Report
Installation Restoration Site 13. Alameda Point, Alameda, California

Reference: Permit Number W2007-1056

Dear Mr. Yoo:

Enclosed is the borehole completion report for the field activities performed at Alameda Point, Installation Restoration Site 13. Direct-push borings and soil sampling were performed using the Navy's Site Characterization and Analysis Penetrometer System rig during an extended deployment commencing October 15, 2007 and completed on January 03, 2008.

This report is forwarded to comply with permit requirements. If you have any questions regarding this report, please contact me at (858) 496-0500.

Sincerely,

Donald McHugh, PG 8219
Senior Environmental Geologist
Richard Brady & Associates

REPORT FOR CONE PENETROMETER ACTIVITIES
INSTALLATION RESTORATION SITE 13
ALAMEDA POINT, ALAMEDA, CALIFORNIA

Permit Number: W2007-1056

Cone Penetrometer Test (CPT) and soil sampling activities were performed between October 15, 2007 and January 03, 2008. A total of 206 direct push boreholes were completed using the United States Navy's Site Characterization and Analysis Penetrometer System (SCAPS) CPT rig as depicted on the attached figure. Soil samples pushes were collocated with SCAPS pushes.

All direct push borings were advanced to the depth noted on the attached borehole abandonment table. All boreholes were backfilled to existing surface grade using tremmied grout. The area surrounding each borehole location was restored using traffic rated concrete.

DIRECT PUSH BOREHOLE ABANDONMENT TABLE: See attached

Reviewer: _____ Date: 1-31-08

Donald McHugh, PG 8219
Senior Environmental Geologist
Richard Brady & Associates

PROFESSIONAL GEOLOGIST
DONALD McHUGH
No. 8219
STATE OF CALIFORNIA

# PERMIT

# Alameda County Public Works Agency - Water Resources Well Permit

399 Elmhurst Street
Hayward, CA 94544-1395
Telephone: (510)670-6633 Fax:(510)782-1939

**Application Approved on: 10/12/2007 By jamesy**

**Permit Numbers: W2007-1056**
**Permits Valid from 10/15/2007 to 11/08/2007**

**Application Id:** 1192120693642 **City of Project Site:** Alameda
**Site Location:** western end of Alameda Island, Alameda Point IR Site #13, approx. 17.5 acres site approx 1000 ft east of Sesplane Lagoon
**Project Start Date:** 10/15/2007 **Completion Date:** 11/08/2007

**Applicant:** Richard Brady & Associates - Fred Essig **Phone:** 858-496-0500
3710 Ruffin Rd., San Diego, CA 92123
**Property Owner:** US Navy BRAC PMO West **Phone:** 415-743-4713
410 Palm Avenue Bldg 1 Suite 161, Treasure Island, San Francisco, CA 94130
**Client:** ** same as Property Owner **

**Total Due:** $200.00
**Receipt Number:** **Total Amount Paid:** $0.00
Payment Type: EXMPT **PAYMENT EXEMPT**

**Works Requesting Permits:**

Borehole(s) for Investigation-Environmental/Monitorinig Study - 300 Boreholes
Driller: NAVFAC Southwest, SCAPS - Lic #: 0 - Method: DP **Work Total: $200.00**

**Specifications**

| Permit Number | Issued Dt | Expire Dt | # Boreholes | Hole Diam | Max Depth |
|---|---|---|---|---|---|
| W2007-1056 | 10/12/2007 | 01/13/2008 | 300 | 2.00 in. | 15.00 ft |

**Specific Work Permit Conditions**

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

4. Applicant shall contact George Bolton for an inspection time at 510-670-5594 at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

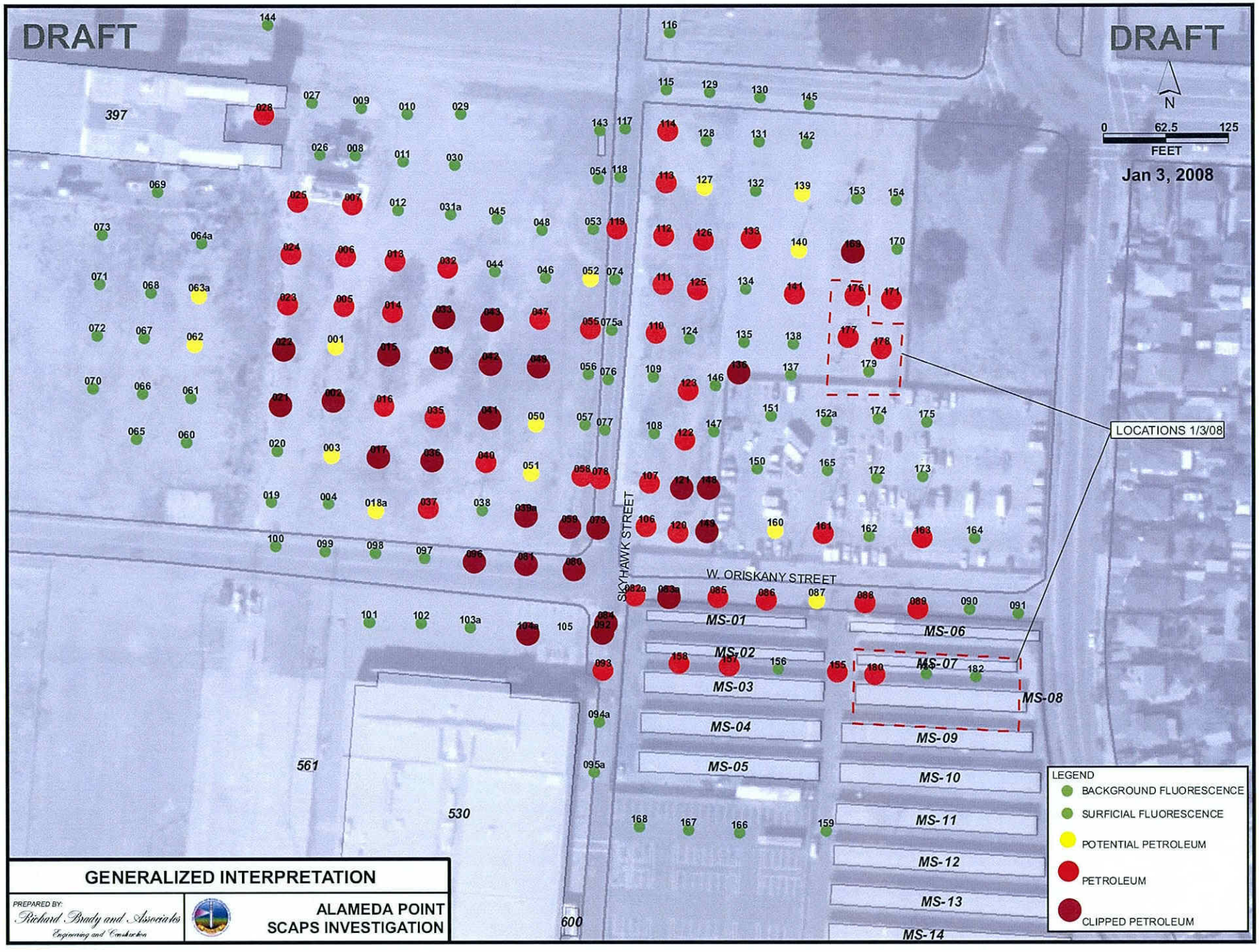
5. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of $500.00.

6. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits

required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

7. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

# FIGURE




**GENERALIZED INTERPRETATION**

PREPARED BY: Richard Brady and Associates Engineering and Construction

**ALAMEDA POINT SCAPS INVESTIGATION**

# BOREHOLE ABANDONMENT TABLE

**Site Characterization and Analysis Penetrometer System**

# Borehole Abandonment Table
## Alameda Point
## Site AP13

**Field Dates**
**10/15/2007 - 01/03/2008**

| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 1 | AP13-001 | 10/15/07 | LIF | 18.0 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 2 | AP13-002 | 10/15/07 | LIF | 17.2 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 3 | AP13-003 | 10/15/07 | LIF | 17.6 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 4 | AP13-004 | 10/15/07 | LIF | 17.7 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 5 | AP13-005 | 10/15/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 6 | AP13-006 | 10/15/07 | LIF | 20.3 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 7 | AP13-007 | 10/15/07 | LIF | 20.3 | 1.75 | 0 | 0.5 | 0 | 0 | 0.301 | 0 | 0.000 | 0.301 |
| 8 | AP13-008 | 10/15/07 | LIF | 17.6 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 9 | AP13-009 | 10/16/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 10 | AP13-010 | 10/16/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 11 | AP13-011 | 10/16/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 12 | AP13-012 | 10/16/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 13 | AP13-013 | 10/16/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 14 | AP13-014 | 10/16/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 15 | AP13-015 | 10/16/07 | LIF | 21.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 16 | AP13-016 | 10/16/07 | LIF | 18.2 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 17 | AP13-017 | 10/16/07 | LIF | 18.1 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 18 | AP13-018 | 10/16/07 | LIF | 14.5 | 1 | 0 | 0.5 | 0 | 0 | 0.201 | 0 | 0.000 | 0.201 |
| 19 | AP13-018A | 10/16/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 20 | AP13-019 | 10/16/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 21 | AP13-020 | 10/16/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 22 | AP13-021 | 10/16/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 23 | AP13-022 | 10/16/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 24 | AP13-023 | 10/17/07 | LIF | 18.2 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 25 | AP13-024 | 10/17/07 | LIF | 24.3 | 2 | 0 | 0.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 26 | AP13-025 | 10/17/07 | LIF | 24.3 | 2 | 0 | 0.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 27 | AP13-026 | 10/17/07 | LIF | 17.9 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 28 | AP13-027 | 10/17/07 | LIF | 17.2 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 29 | AP13-028 | 10/17/07 | LIF | 17.7 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 30 | AP13-029 | 10/17/07 | LIF | 18.1 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 31 | AP13-030 | 10/17/07 | LIF | 18.0 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 32 | AP13-031 | 10/17/07 | LIF | 10.8 | 1 | 0 | 0.5 | 0 | 0 | 0.201 | 0 | 0.000 | 0.201 |
| 33 | AP13-031A | 10/17/07 | LIF | 18.0 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 6 | 0.050 | 0.318 |
| 34 | AP13-032 | 10/17/07 | LIF | 17.8 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 35 | AP13-033 | 10/17/07 | LIF | 21.0 | 2 | 0 | 0.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 36 | AP13-034 | 10/17/07 | LIF | 18.1 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 37 | AP13-035 | 10/18/07 | LIF | 21.4 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |

# Borehole Abandonment Table
## Alameda Point
## Site AP13



| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 38 | AP13-036 | 10/18/07 | LIF | 28.0 | 3 | 0 | 8 | 0 | 0 | 1.471 | 15 | 0.125 | 1.596 |
| 39 | AP13-037 | 10/18/07 | LIF | 21.5 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 40 | AP13-038 | 10/18/07 | LIF | 17.9 | 1.5 | 0 | 0.5 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 41 | AP13-039 | 10/18/07 | LIF | 10.5 | 1 | 0 | 1 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 42 | AP13-039A | 10/18/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 43 | AP13-040 | 10/18/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 44 | AP13-041 | 10/18/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 45 | AP13-042 | 10/18/07 | LIF | 21.2 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 46 | AP13-043 | 10/18/07 | LIF | 20.9 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 47 | AP13-044 | 10/18/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 48 | AP13-045 | 10/18/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 49 | AP13-046 | 10/18/07 | LIF | 17.7 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 50 | AP13-047 | 10/18/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 51 | AP13-048 | 10/18/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 52 | AP13-049 | 10/19/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 53 | AP13-050 | 10/19/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 54 | AP13-051 | 10/19/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 55 | AP13-052 | 10/19/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 56 | AP13-053 | 10/19/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 57 | AP13-054 | 10/19/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 58 | AP13-055 | 10/19/07 | LIF | 17..8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 59 | AP13-056 | 10/19/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 60 | AP13-057 | 10/19/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 61 | AP13-058 | 10/19/07 | LIF | 21.3 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 62 | AP13-059 | 10/19/07 | LIF | 6.0 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 63 | AP13-060 | 10/19/07 | LIF | 18.1 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 64 | AP13-061 | 10/19/07 | LIF | 21.4 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 65 | AP13-062 | 10/19/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 66 | AP13-063 | 10/19/07 | LIF | 4.5 | 0 | 0 | 0 | 0 | 0 | 0.000 | 8 | 0.067 | 0.067 |
| 67 | AP13-063A | 10/19/07 | LIF | 10.5 | 0 | 0 | 0 | 0 | 0 | 0.000 | 19 | 0.159 | 0.159 |
| 68 | AP13-064 | 10/20/07 | LIF | 4.1 | 0 | 0 | 0 | 0 | 0 | 0.000 | 26 | 0.217 | 0.217 |
| 69 | AP13-065 | 10/20/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 70 | AP13-066 | 10/20/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 71 | AP13-067 | 10/20/07 | LIF | 18.2 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 7 | 0.058 | 0.393 |
| 72 | AP13-068 | 10/20/07 | LIF | 11.8 | 1 | 0 | 1 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 73 | AP13-069 | 10/20/07 | LIF | 4.3 | 0 | 0 | 1 | 0 | 0 | 0.134 | 0 | 0.000 | 0.134 |
| 74 | AP13-070 | 10/20/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |

**Site Characterization and Analysis Penetrometer System**

**Borehole Abandonment Table**
**Alameda Point**
**Site AP13**

**Field Dates**
**10/15/2007 - 01/03/2008**

| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 75 | AP13-071 | 10/21/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 76 | AP13-072 | 10/21/07 | LIF | 18.0 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 77 | AP13-073 | 10/21/07 | LIF | 21.3 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 78 | AP13-074 | 10/21/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 79 | AP13-075 | 10/21/07 | LIF | 11.1 | 1 | 0 | 1 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 80 | AP13-075A | 10/21/07 | LIF | 18.0 | 1 | 0 | 1 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 81 | AP13-076 | 10/21/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 82 | AP13-077 | 10/21/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 83 | AP13-078 | 10/21/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 84 | AP13-079 | 10/21/07 | LIF | 21.0 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 85 | AP13-080 | 10/21/07 | LIF | 21.3 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 86 | AP13-081 | 10/21/07 | LIF | 21.5 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 87 | AP13-082 | 10/21/07 | LIF | 21.2 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 88 | AP13-083 | 10/21/07 | LIF | 18.3 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 89 | AP13-083A | 10/21/07 | LIF | 18.3 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 90 | AP13-084 | 10/21/07 | LIF | 20.4 | 1.75 | 0 | 1 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 91 | AP13-085 | 10/22/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 6 | 0.050 | 0.384 |
| 92 | AP13-086 | 10/22/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 93 | AP13-087 | 10/22/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 94 | AP13-088 | 10/22/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 95 | AP13-089 | 10/22/07 | LIF | 20.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 96 | AP13-090 | 10/22/07 | LIF | 18.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 97 | AP13-091 | 10/22/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 98 | AP13-092 | 10/22/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 99 | AP13-093 | 10/22/07 | LIF | 21.4 | 2 | 0 | 1 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 100 | AP13-094 | 10/22/07 | LIF | 3.6 | 0 | 0 | 0 | 0 | 0 | 0.000 | 5 | 0.042 | 0.042 |
| 101 | AP13-094A | 10/22/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 5 | 0.042 | 0.376 |
| 102 | AP13-095A | 10/22/07 | LIF | 17.7 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 6 | 0.050 | 0.384 |
| 103 | AP13-096 | 10/23/07 | LIF | 21.1 | 2 | 0 | 1 | 0 | 0 | 0.401 | 6 | 0.050 | 0.451 |
| 104 | AP13-097 | 10/23/07 | LIF | 17.5 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 6 | 0.050 | 0.384 |
| 105 | AP13-098 | 10/23/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 11 | 0.092 | 0.426 |
| 106 | AP13-099 | 10/23/07 | LIF | 17.9 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 12 | 0.100 | 0.435 |
| 107 | AP13-100 | 10/23/07 | LIF | 17.8 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 108 | AP13-101 | 10/23/07 | LIF | 18.1 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 109 | AP13-102 | 10/23/07 | LIF | 18.4 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 110 | AP13-103A | 10/23/07 | LIF | 17.6 | 1.5 | 0 | 1 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 111 | AP13-104 | 10/23/07 | LIF | 7.1 | 0 | 0 | 0 | 0 | 0 | 0.000 | 16 | 0.134 | 0.134 |

# Borehole Abandonment Table
## Alameda Point
## Site AP13



| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 112 | AP13-104A | 10/23/07 | LIF | 18.7 | 2 | 0 | 0.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 113 | AP13-105 | 10/23/07 | LIF | 3.0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 4 | 0.033 | 0.033 |
| 114 | AP13-105A | 10/23/07 | LIF | 10.0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 12 | 0.100 | 0.100 |
| 115 | AP13-106 | 10/29/07 | LIF | 21.0 | 2 | 0 | 2 | 0 | 0 | 0.535 | 0 | 0.000 | 0.535 |
| 116 | AP13-107 | 10/29/07 | LIF | 21.4 | 2 | 0 | 2 | 0 | 0 | 0.535 | 0 | 0.000 | 0.535 |
| 117 | AP13-108 | 10/29/07 | LIF | 18.1 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 118 | AP13-109 | 10/29/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 119 | AP13-110 | 10/30/07 | LIF | 18.0 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 120 | AP13-111 | 10/30/07 | LIF | 21.2 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 121 | AP13-112 | 10/30/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 122 | AP13-113 | 10/30/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 123 | AP13-114 | 10/30/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 124 | AP13-115 | 10/30/07 | LIF | 18.0 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 125 | AP13-116 | 10/30/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 126 | AP13-117 | 10/30/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 127 | AP13-118 | 10/30/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 128 | AP13-119 | 10/30/07 | LIF | 17.5 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 129 | AP13-120 | 10/30/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 130 | AP13-121 | 10/30/07 | LIF | 18.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 131 | AP13-122 | 10/30/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 132 | AP13-123 | 10/30/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 133 | AP13-123A | 10/30/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 134 | AP13-124 | 10/30/07 | LIF | 17.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 135 | AP13-125 | 10/31/07 | LIF | 17.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 136 | AP13-126 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 137 | AP13-127 | 10/31/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 138 | AP13-128 | 10/31/07 | LIF | 18.0 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 139 | AP13-129 | 10/31/07 | LIF | 18.0 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 140 | AP13-130 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 141 | AP13-131 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 142 | AP13-132 | 10/31/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 143 | AP13-133 | 10/31/07 | LIF | 18.1 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 144 | AP13-134 | 10/31/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 145 | AP13-135 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 146 | AP13-136 | 10/31/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 147 | AP13-137 | 10/31/07 | LIF | 18.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 148 | AP13-138 | 10/31/07 | LIF | 17.2 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |

Site Characterization
and Analysis Penetrometer System

# Borehole Abandonment Table
## Alameda Point
## Site AP13

Field Dates
10/15/2007 - 01/03/2008

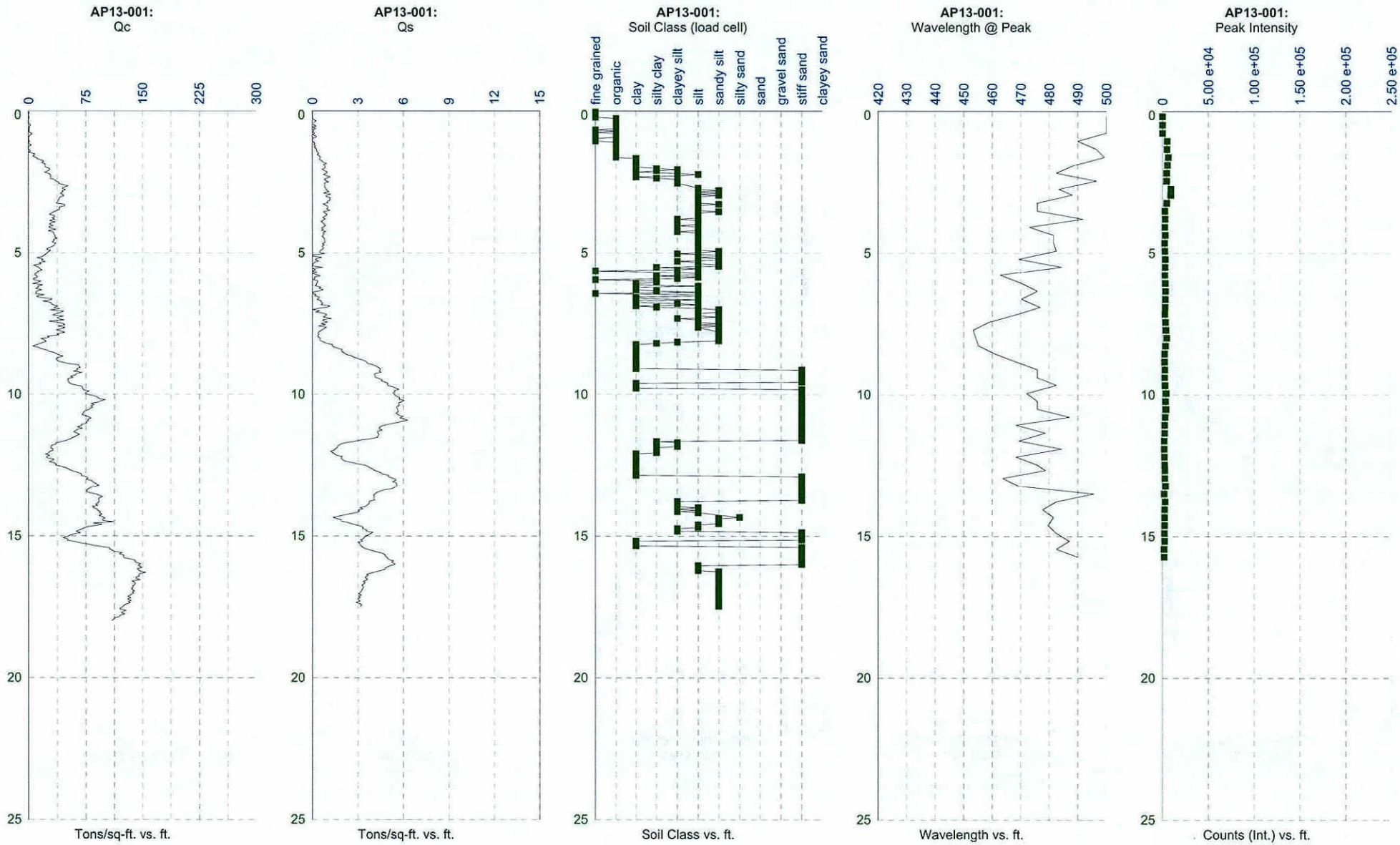
| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 149 | AP13-139 | 10/31/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 150 | AP13-140 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 151 | AP13-141 | 10/31/07 | LIF | 17.8 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 152 | AP13-142 | 10/31/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 153 | AP13-143 | 11/1/07 | LIF | 17.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 154 | AP13-144 | 11/1/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 155 | AP13-145 | 11/1/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 156 | AP13-146 | 11/1/07 | LIF | 17.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 157 | AP13-147 | 11/1/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 158 | AP13-148 | 11/1/07 | LIF | 19.3 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 159 | AP13-149 | 11/1/07 | LIF | 17.6 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 160 | AP13-150 | 11/1/07 | LIF | 17.3 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 161 | AP13-151 | 11/1/07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 162 | AP13-152 | 11/1/07 | LIF | 8.7 | 1 | 0 | 1 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 163 | AP13-152A | 11/1/07 | LIF | 17.9 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 164 | AP13-153 | 11/2//07 | LIF | 18.0 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 165 | AP13-154 | 11/2//07 | LIF | 17.9 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 166 | AP13-155 | 11/2//07 | LIF | 17.3 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 167 | AP13-156 | 11/2//07 | LIF | 17.9 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 168 | AP13-157 | 11/2//07 | LIF | 17.8 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 7 | 0.058 | 0.426 |
| 169 | AP13-158 | 11/2//07 | LIF | 17.7 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 170 | AP13-159 | 11/2//07 | LIF | 17.7 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 171 | AP13-160 | 11/2//07 | LIF | 17.4 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 172 | AP13-161 | 11/2//07 | LIF | 16.0 | 1.5 | 0 | 1.5 | 0 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 173 | AP13-162 | 11/2//07 | LIF | 17.5 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 174 | AP13-163 | 11/2//07 | LIF | 17.8 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 175 | AP13-164 | 11/2//07 | LIF | 17.9 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 176 | AP13-165 | 11/2//07 | LIF | 17.9 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 177 | AP13-166 | 11/2//07 | LIF | 17.9 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 178 | AP13-167 | 11/2//07 | LIF | 17.4 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 179 | AP13-168 | 11/2//07 | LIF | 17.7 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 180 | AP13-169 | 11/3/07 | LIF | 17.8 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 181 | AP13-170 | 11/3/07 | LIF | 17.5 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 182 | AP13-171 | 11/3/07 | LIF | 17.6 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 183 | AP13-172 | 11/3/07 | LIF | 17.5 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 184 | AP13-173 | 11/3/07 | LIF | 18.1 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |
| 185 | AP13-174 | 11/3/07 | LIF | 17.7 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 0 | 0.000 | 0.368 |

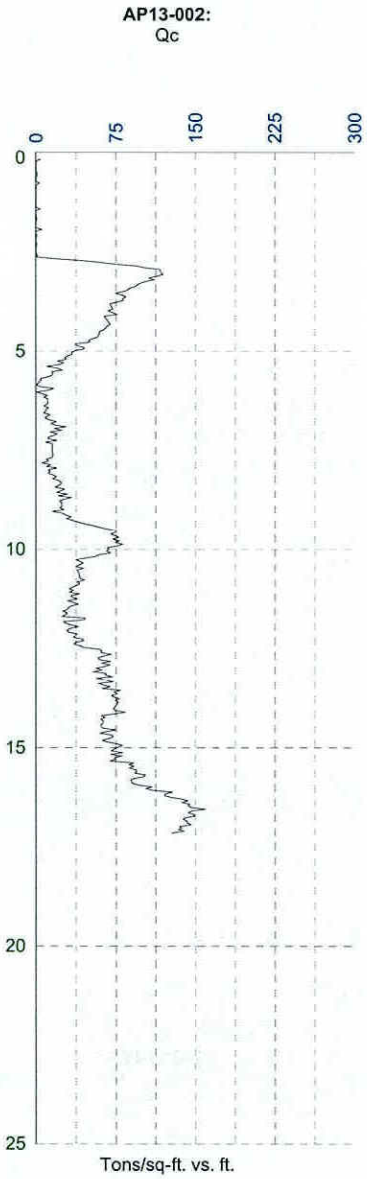
# Borehole Abandonment Table
## Alameda Point
## Site AP13

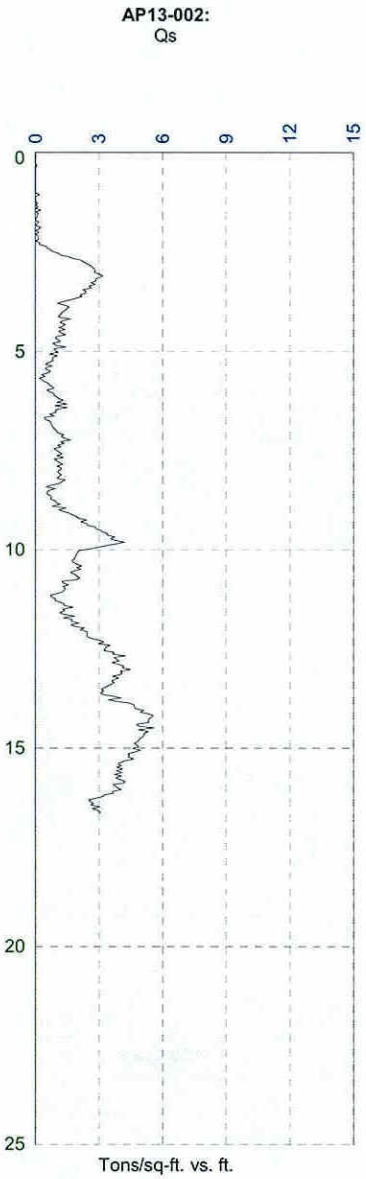


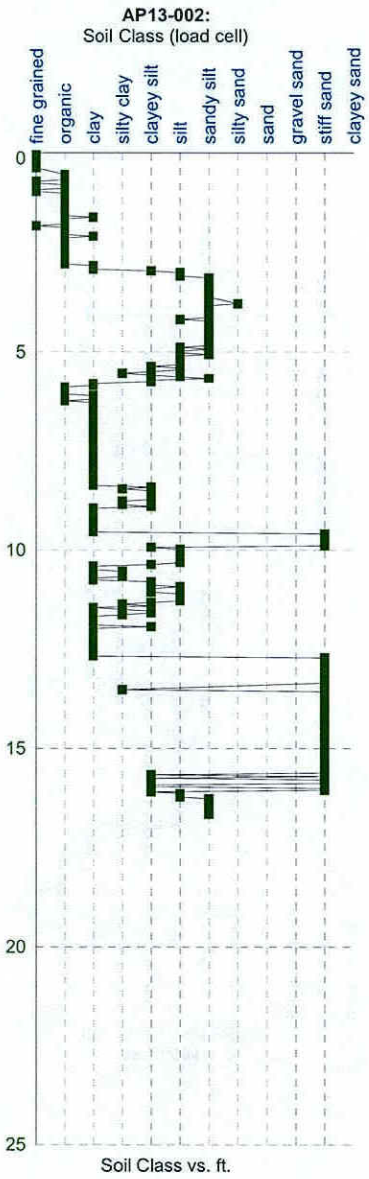
| | Push ID | Date | Push Type | T.D.-Ft. | Grout through tip | Tremie | Grout Top off from surface | | | Cubic Ft. Grout | Bent. Chips (cups) | Cubic Ft.-Bent. | Total Cubic Ft. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | #1 | #2 | #3 | | | | |
| 186 | AP13-175 | 11/3/07 | LIF | 18.0 | 1.5 | 0 | 1.25 | 0 | 0 | 0.368 | 6 | 0.050 | 0.418 |
| 187 | AP13-176 | 1/2/08 | LIF | 18.3 | 2 | 0 | 0.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 188 | AP13-007-S | 12/4/07 | Soil Samp | 14.5 | 0 | 0 | 2 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 189 | AP13-008-S | 12/4/07 | Soil Samp | 14.5 | 0 | 0 | 2 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 190 | AP13-044-S | 12/4/07 | Soil Samp | 12.0 | 0 | 0 | 2 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 191 | AP13-043-S- | 12/4/07 | Soil Samp | 12.0 | 0 | 0 | 2 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 192 | AP13-041-S | 12/4/07 | Soil Samp | 8.5 | 0 | 0 | 1.5 | 0.5 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 193 | AP13-169-S | 12/4/07 | Soil Samp | 7.0 | 0 | 0 | 2.5 | 0 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 194 | AP13-147-S | 12/4/07 | Soil Samp | 9.5 | 0 | 0 | 1.5 | 0 | 0 | 0.201 | 0 | 0.000 | 0.201 |
| 195 | AP13-148-S | 12/4/07 | Soil Samp | 9.5 | 0 | 0 | 2 | 0 | 0 | 0.267 | 5 | 0.042 | 0.309 |
| 196 | AP13-178-S | 12/5/07 | Soil Samp | 9.5 | 0 | 0 | 2 | 0 | 0 | 0.267 | 6 | 0.050 | 0.318 |
| 197 | AP13-170-S- | 12/5/07 | Soil Samp | 6.5 | 0 | 0 | 1 | 0.5 | 0 | 0.201 | 0 | 0.000 | 0.201 |
| 198 | AP13-094-S | 12/5/07 | Soil Samp | 13.0 | 0 | 0 | 2 | 0 | 0 | 0.267 | 0 | 0.000 | 0.267 |
| 199 | AP13-093-S | 12/5/07 | Soil Samp | 13.0 | 0 | 0 | 2 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 200 | AP13-176A | 1/3/08 | LIF | 18.3 | 2.5 | 0 | 1 | 0 | 0 | 0.468 | 0 | 0.000 | 0.468 |
| 201 | AP13-177 | 1/3/08 | LIF | 18.2 | 2.5 | 0 | 0 | 0.5 | 0 | 0.401 | 0 | 0.000 | 0.401 |
| 202 | AP13-178 | 1/3/08 | LIF | 17.8 | 2 | 0 | 0 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 203 | AP13-179 | 1/3/08 | LIF | 17.8 | 2 | 0 | 0 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |
| 204 | AP13-180 | 1/3/08 | LIF | 21.8 | 2.25 | 0 | 0 | 0.5 | 0 | 0.368 | 5 | 0.042 | 0.409 |
| 205 | AP13-181 | 1/3/08 | LIF | 17.8 | 2 | 0 | 0 | 0.5 | 0 | 0.334 | 6 | 0.050 | 0.384 |
| 206 | AP13-182 | 1/3/08 | LIF | 18.0 | 2 | 0 | 0 | 0.5 | 0 | 0.334 | 0 | 0.000 | 0.334 |

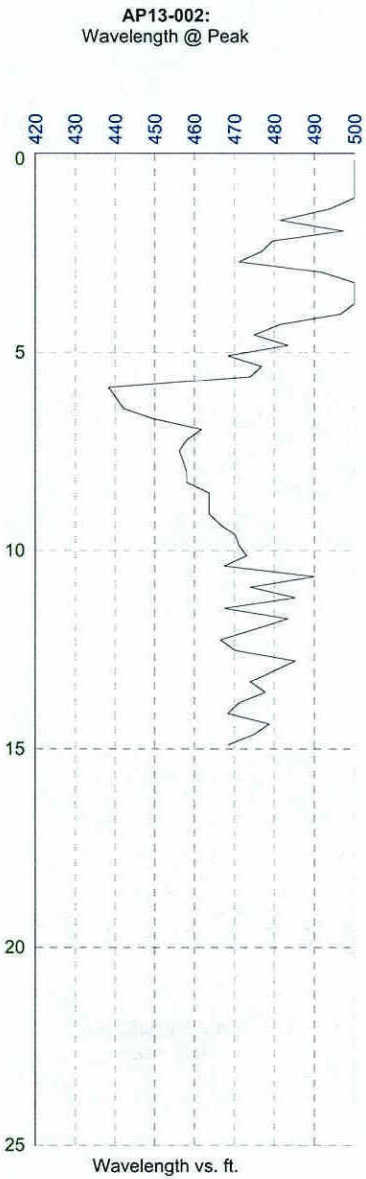
# APPENDIX D

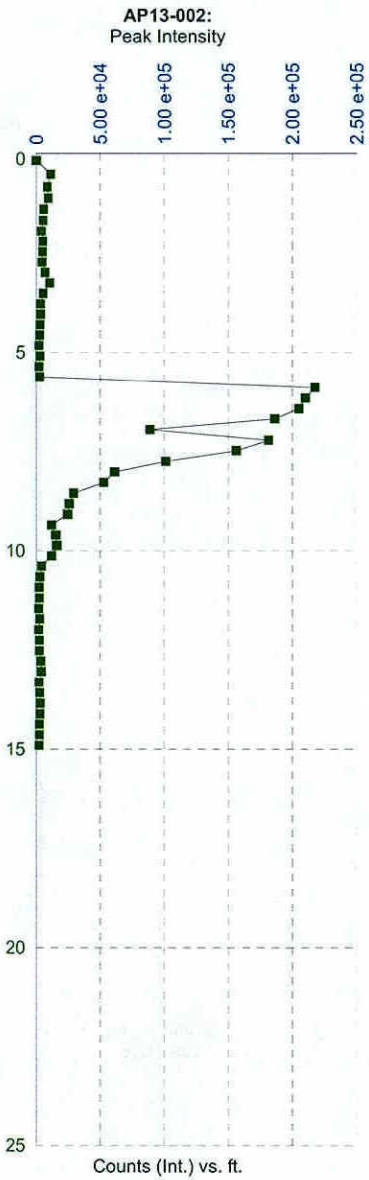

AP13-001:
Qc
0
75
150
225
300
Tons/sq-ft. vs. ft.
AP13-001:
Qs
0
3
6
9
12
15
Tons/sq-ft. vs. ft.
AP13-001:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
Soil Class vs. ft.
AP13-001:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
Wavelength vs. ft.
AP13-001:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
Counts (Int.) vs. ft.
0
5
10
15
20
25

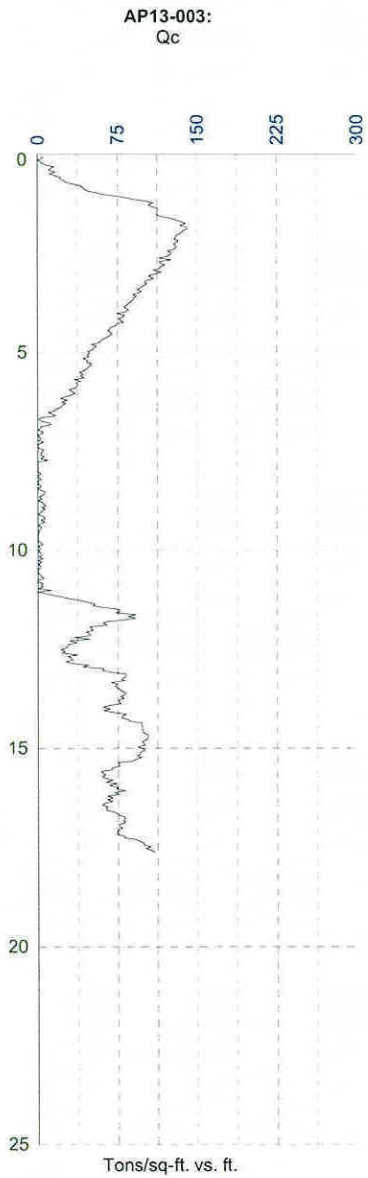

AP13-002:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

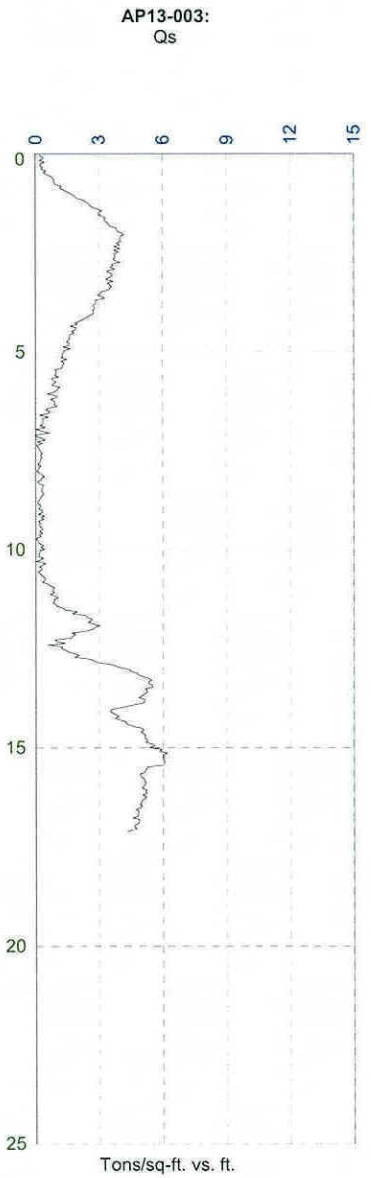

AP13-002:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

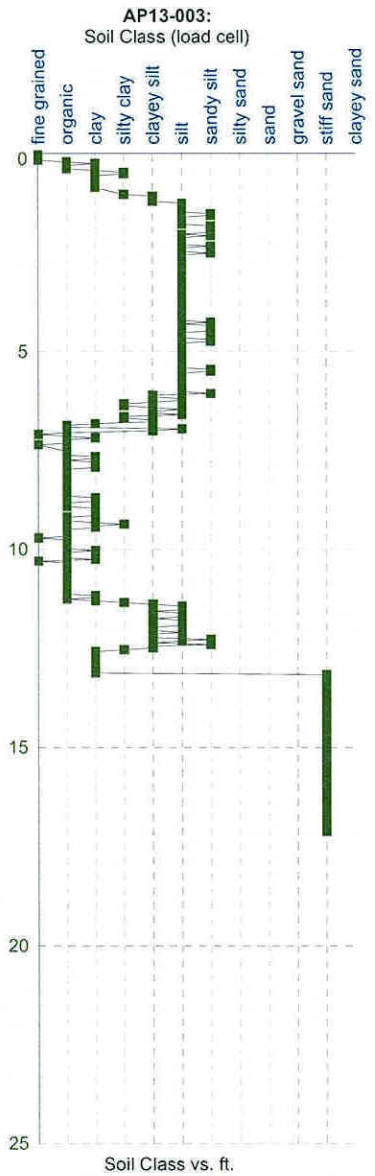

AP13-002:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

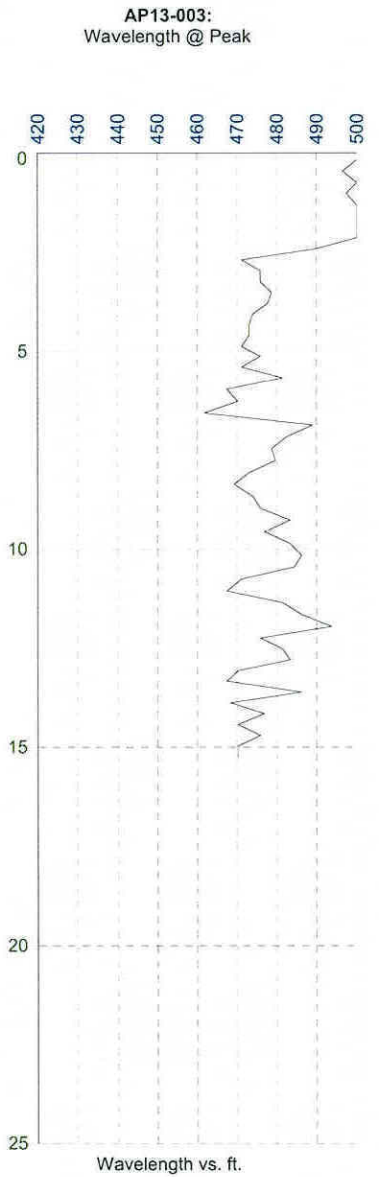

AP13-002:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

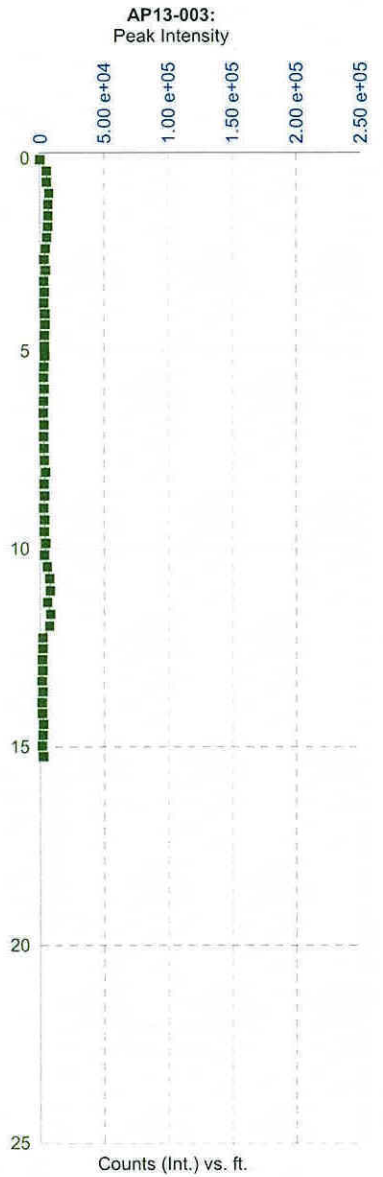

AP13-002:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

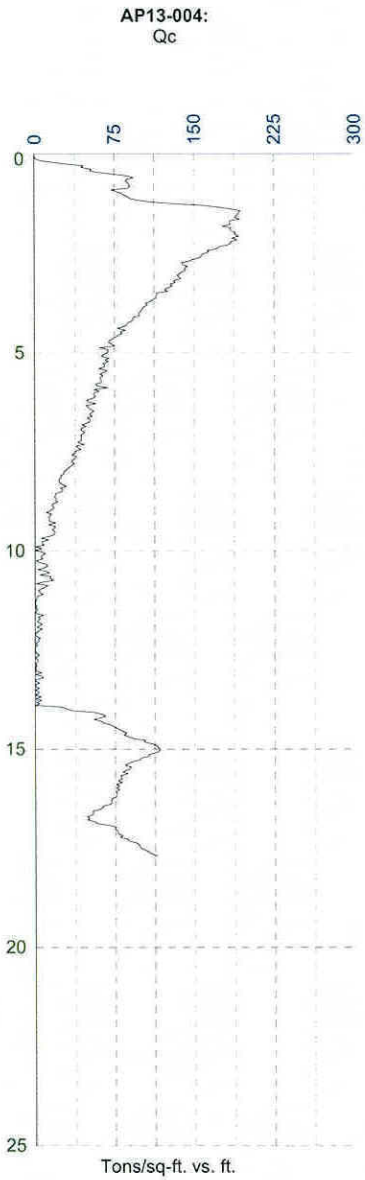

AP13-003:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

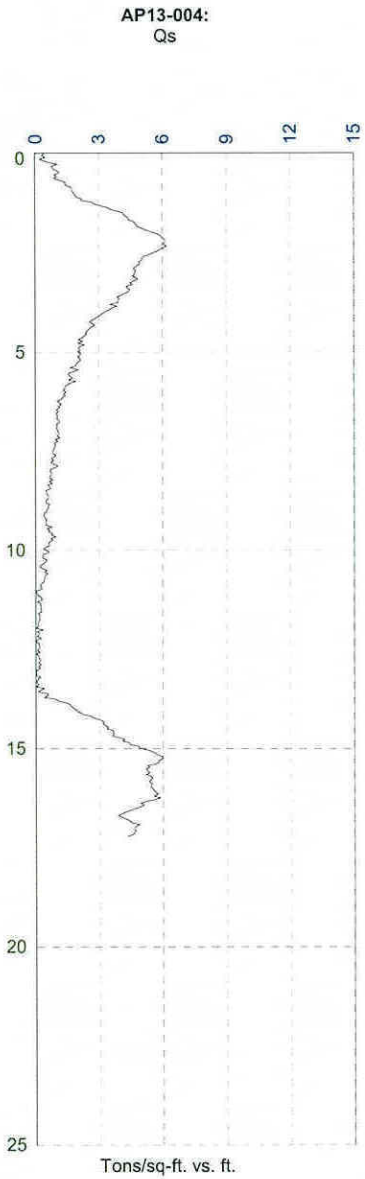

AP13-003:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

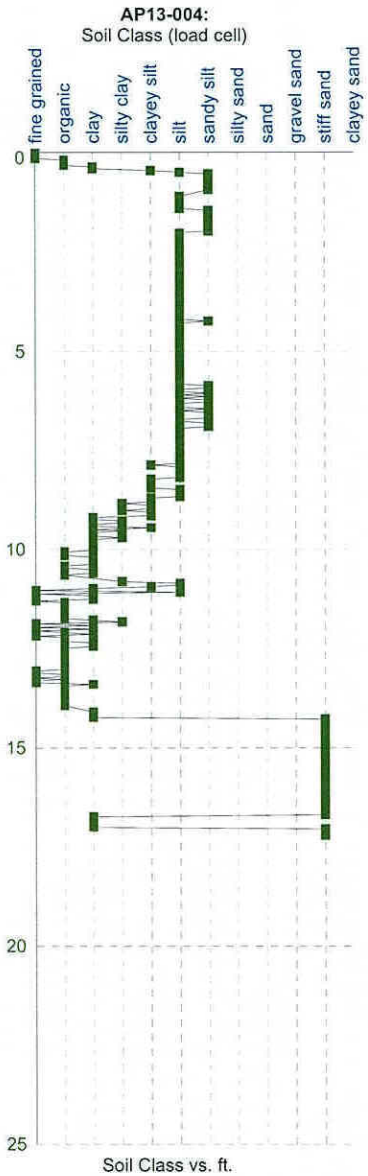

AP13-003:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

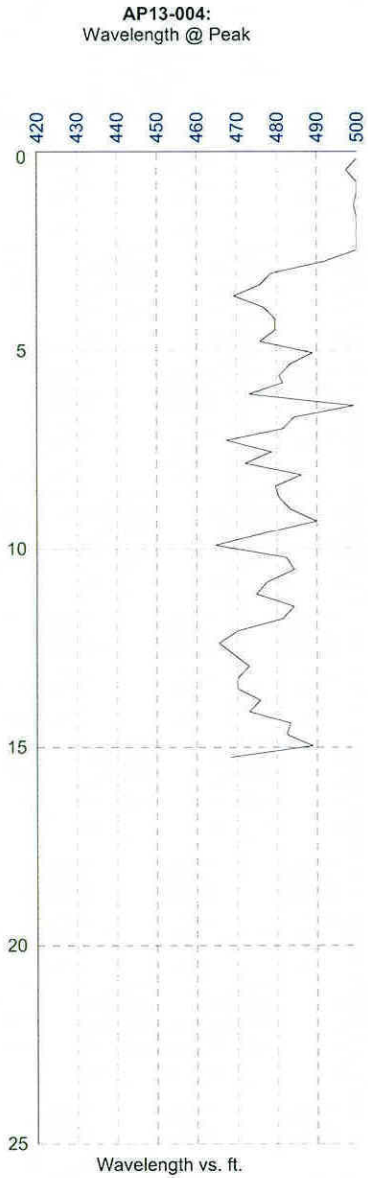

AP13-003:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

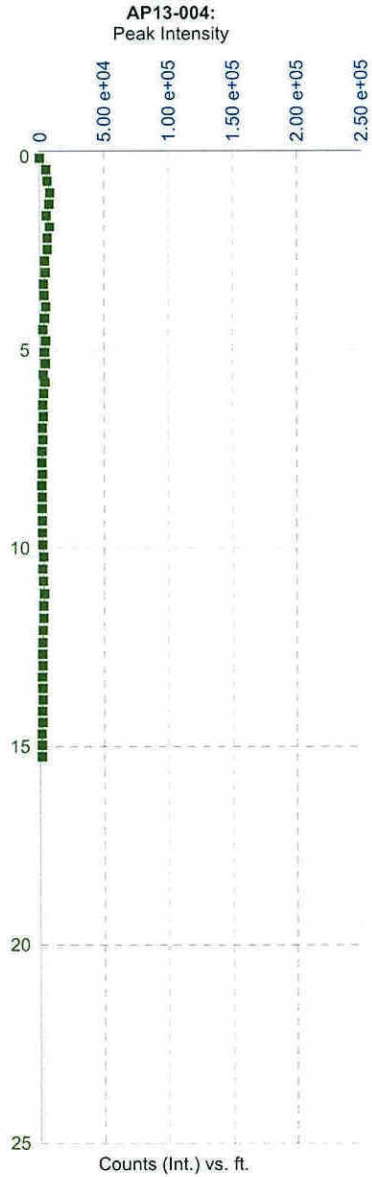

AP13-003:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

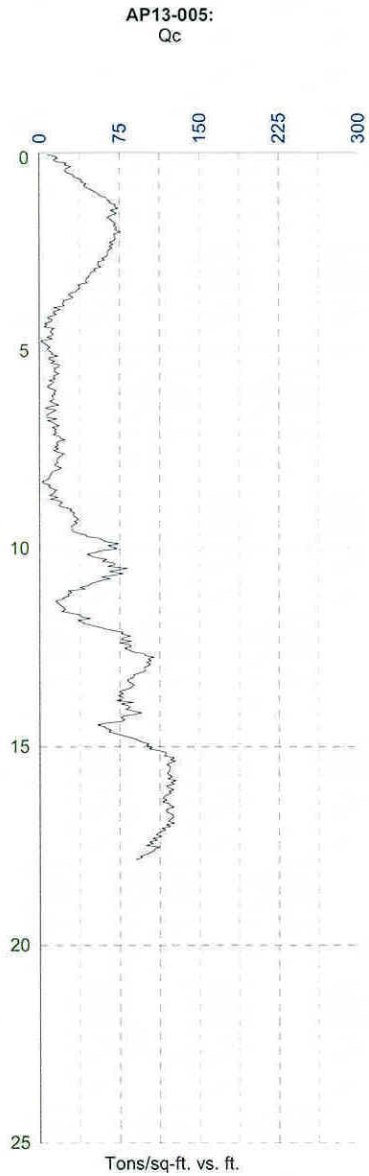

AP13-004:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

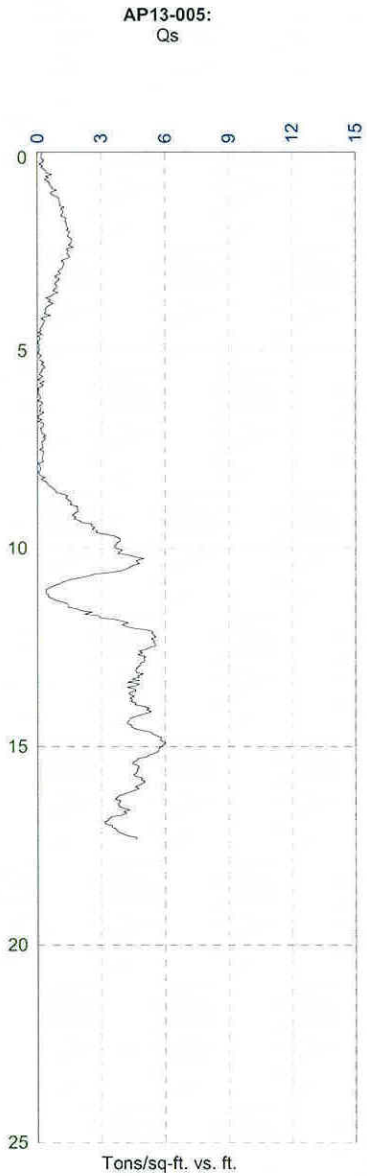

AP13-004:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

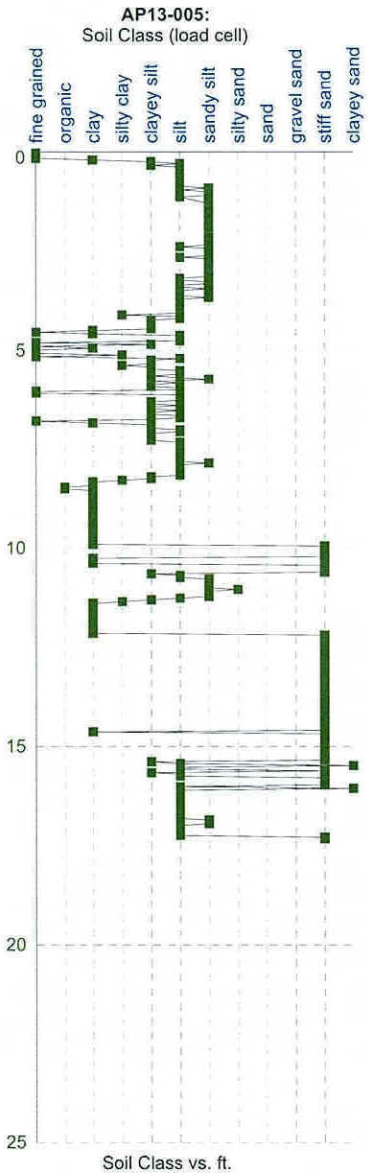

AP13-004:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

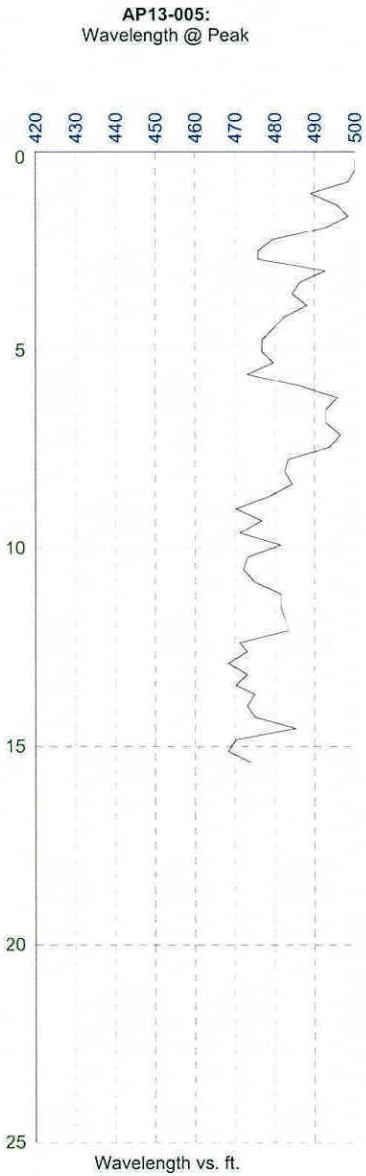

AP13-004:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

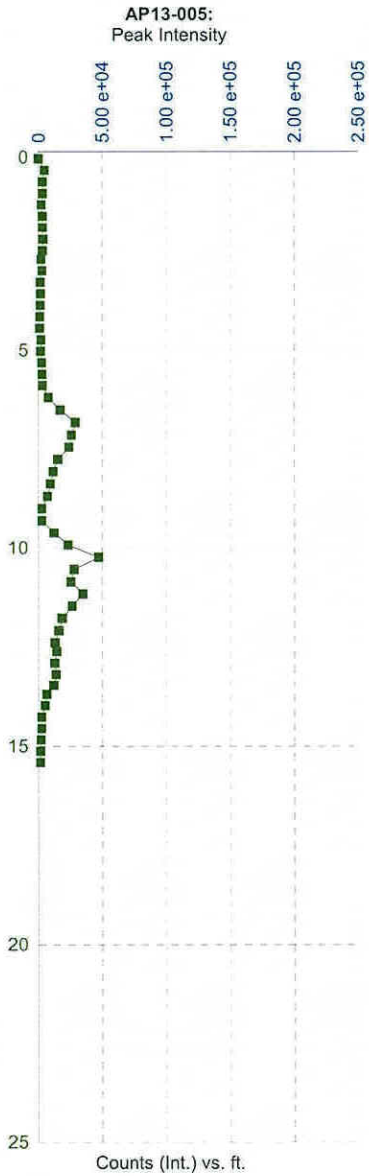

AP13-004:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

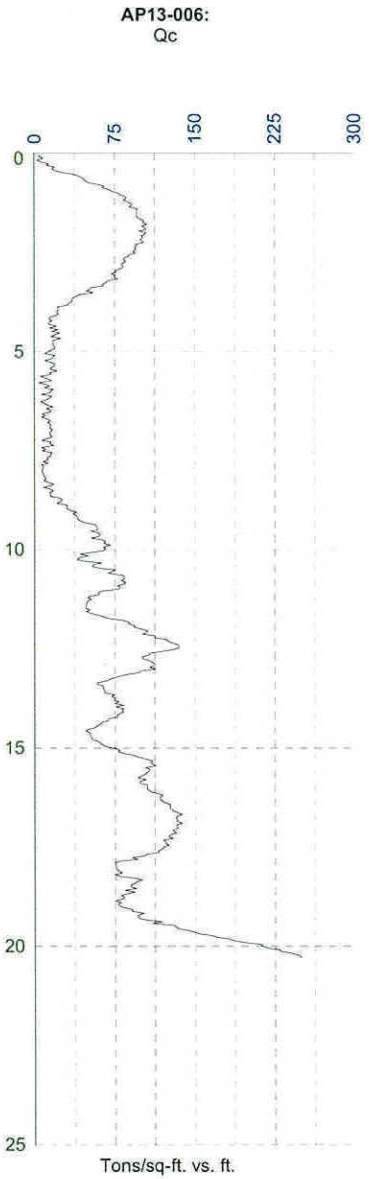

AP13-005:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

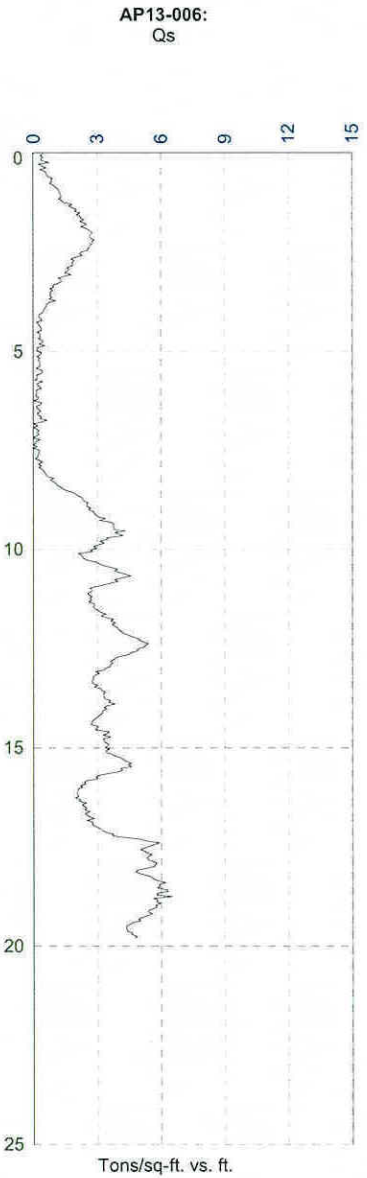

AP13-005:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

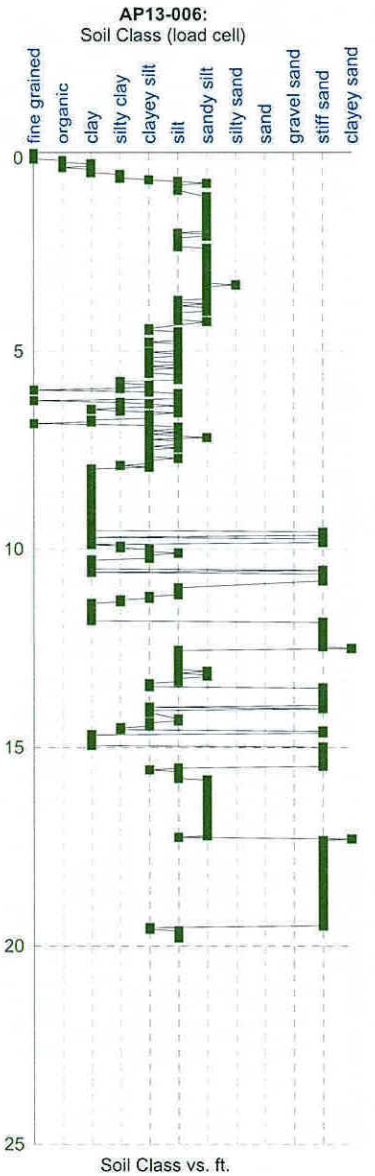

AP13-005:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

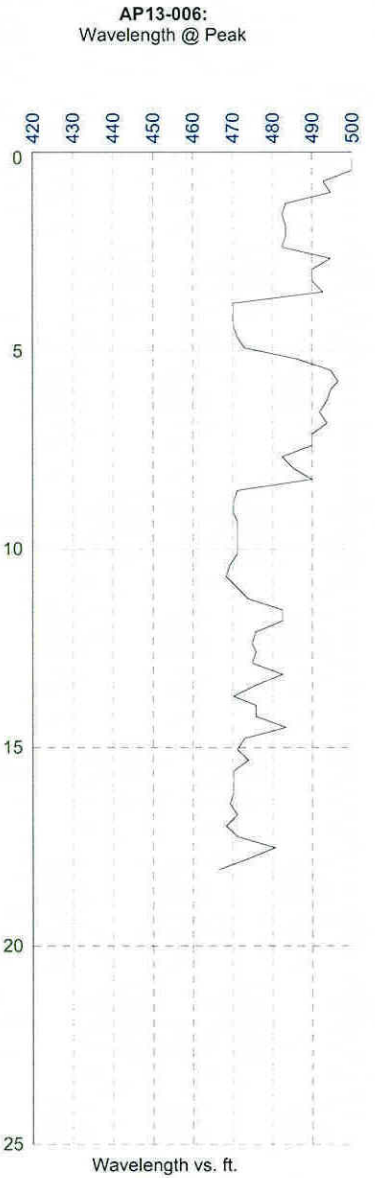

AP13-005:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

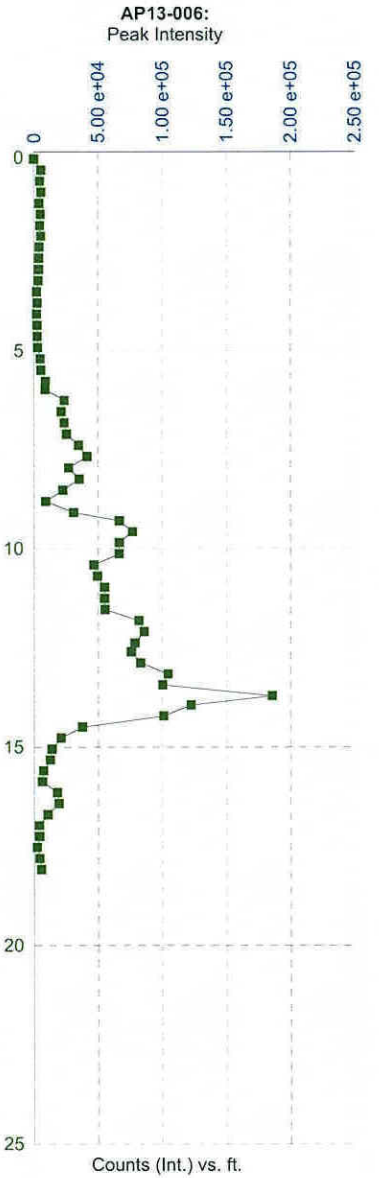

AP13-005:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

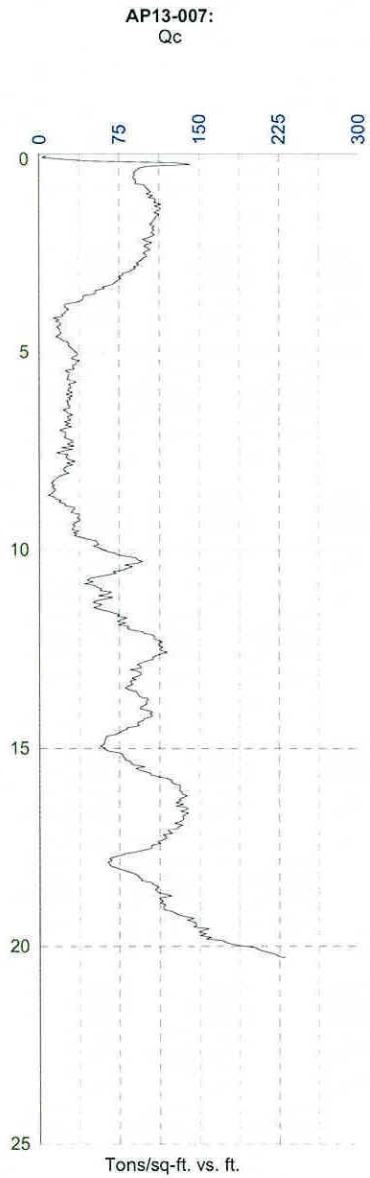

AP13-006:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

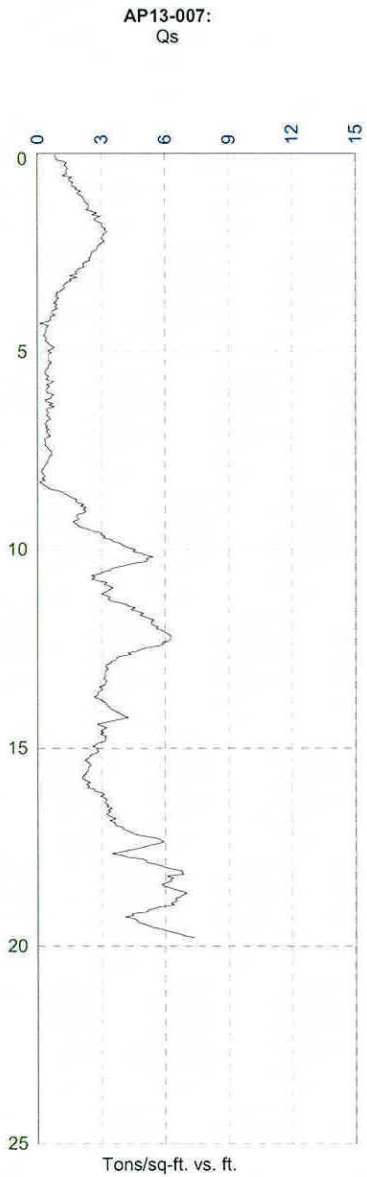

AP13-006:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

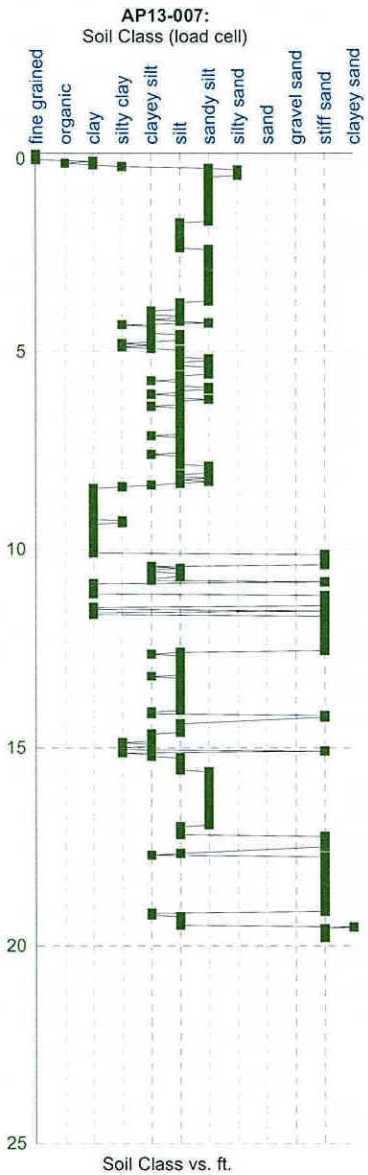

AP13-006:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

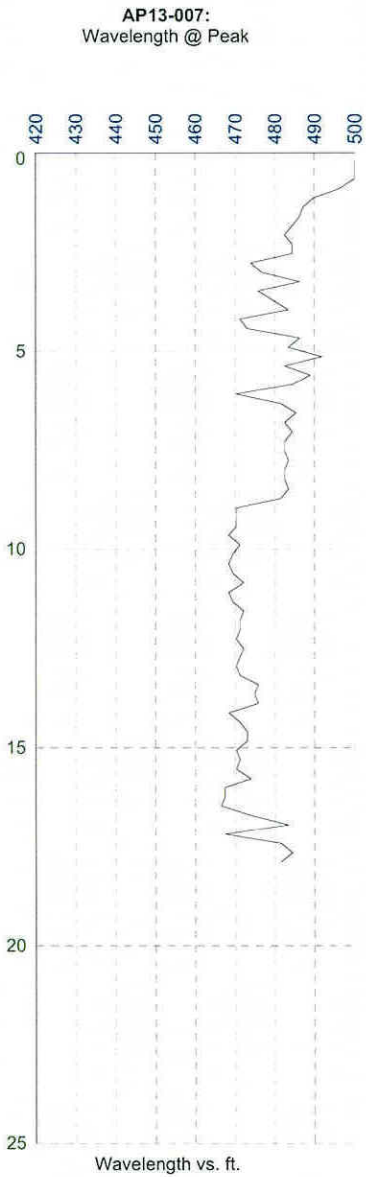

AP13-006:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

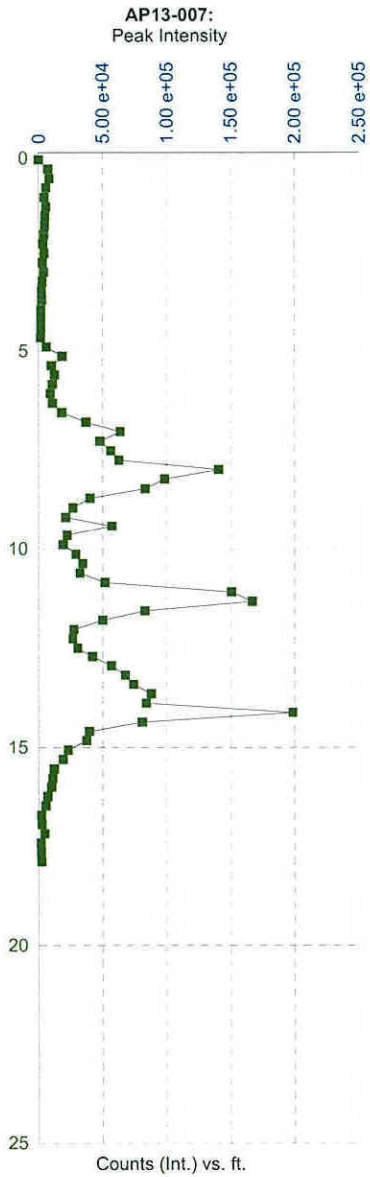

AP13-006:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

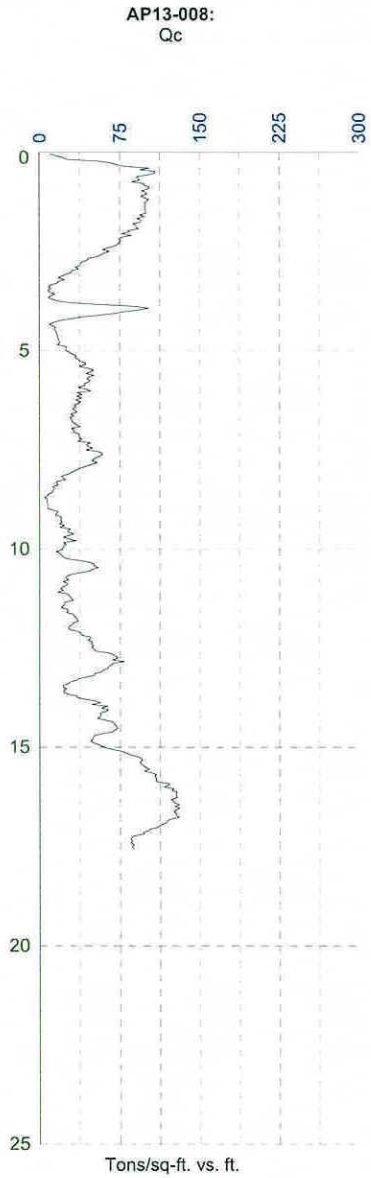

AP13-007:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

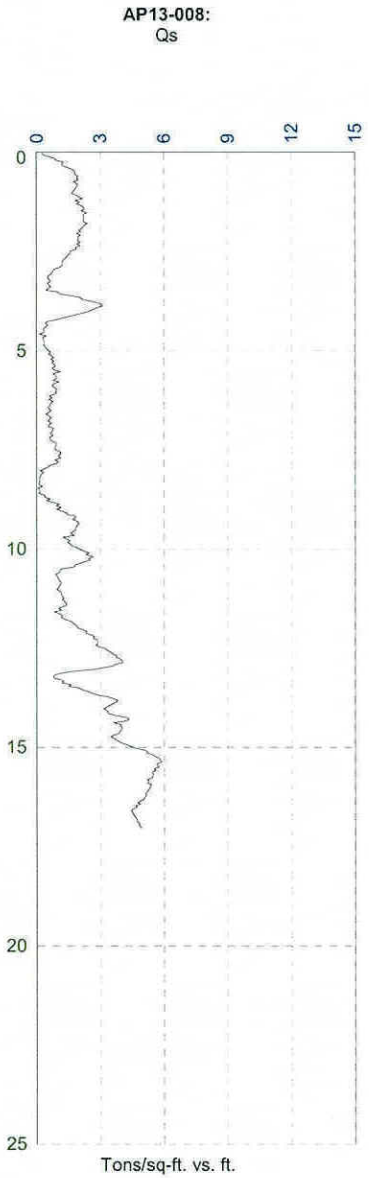

AP13-007:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

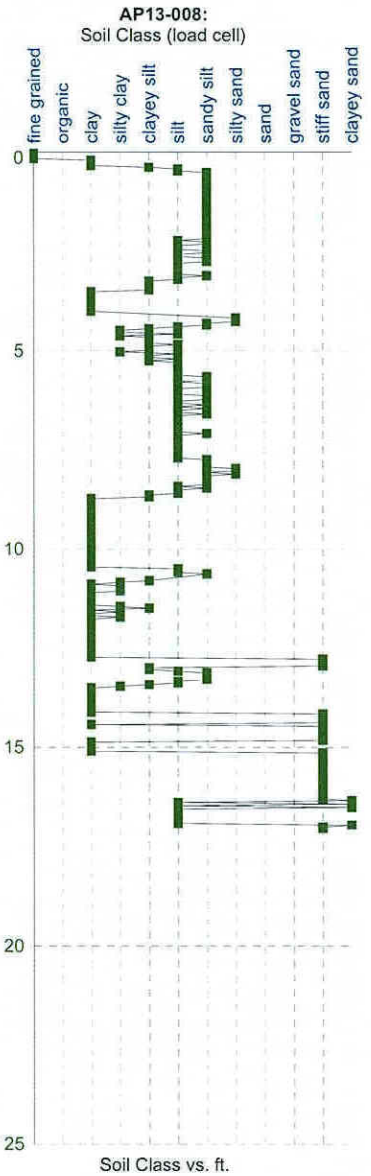

AP13-007:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

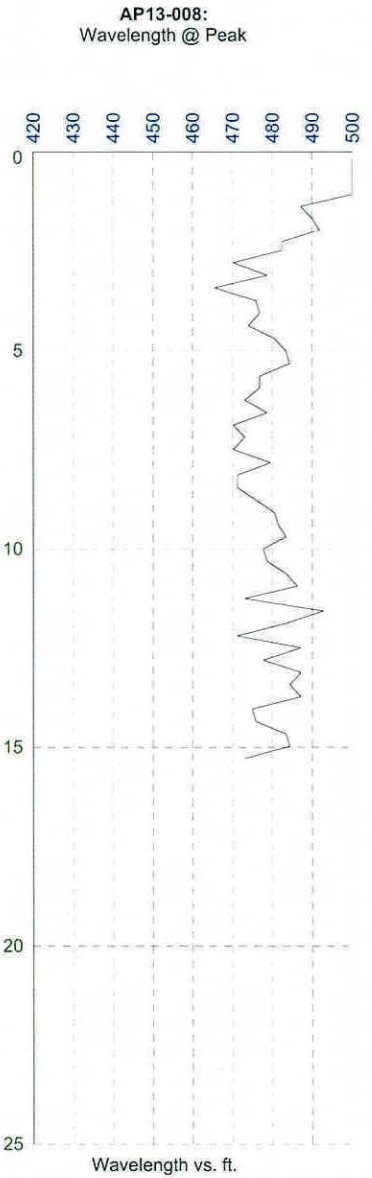

AP13-007:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

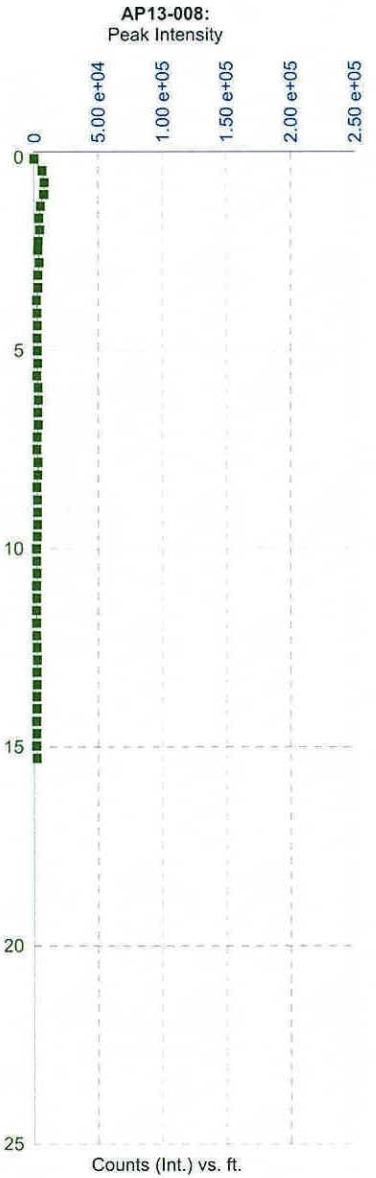

AP13-007:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

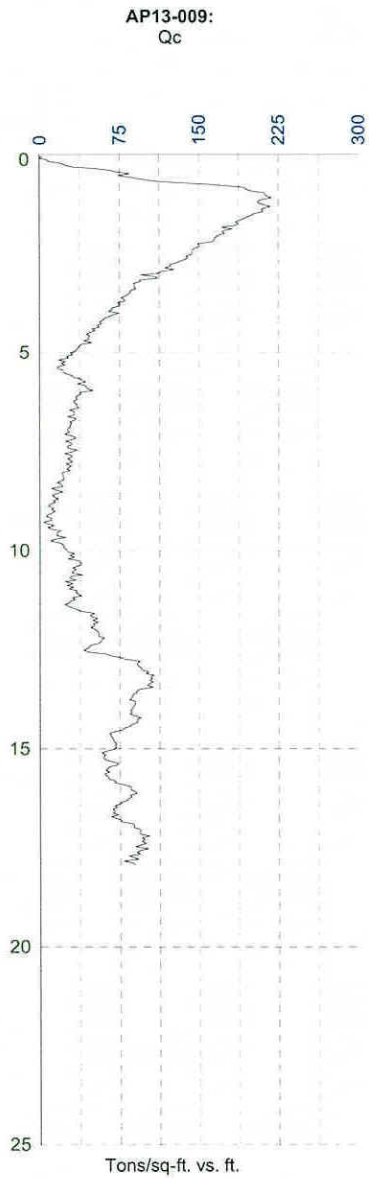

AP13-008:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

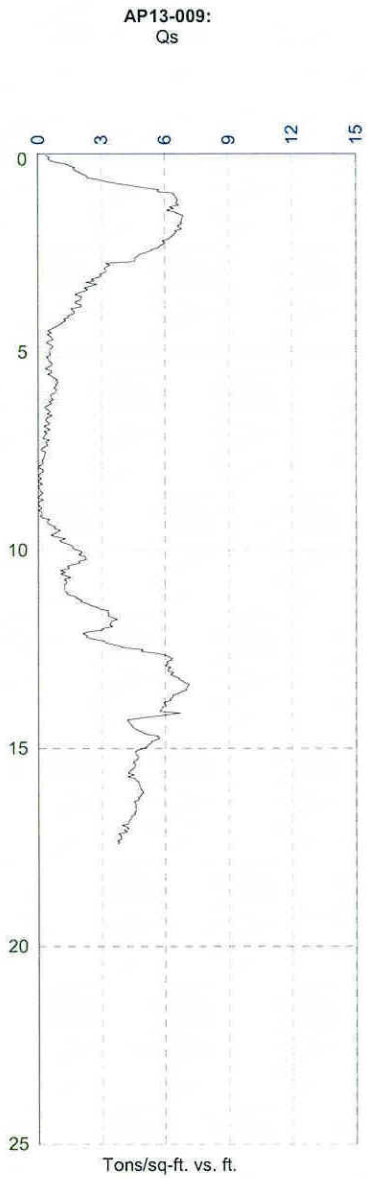

AP13-008:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

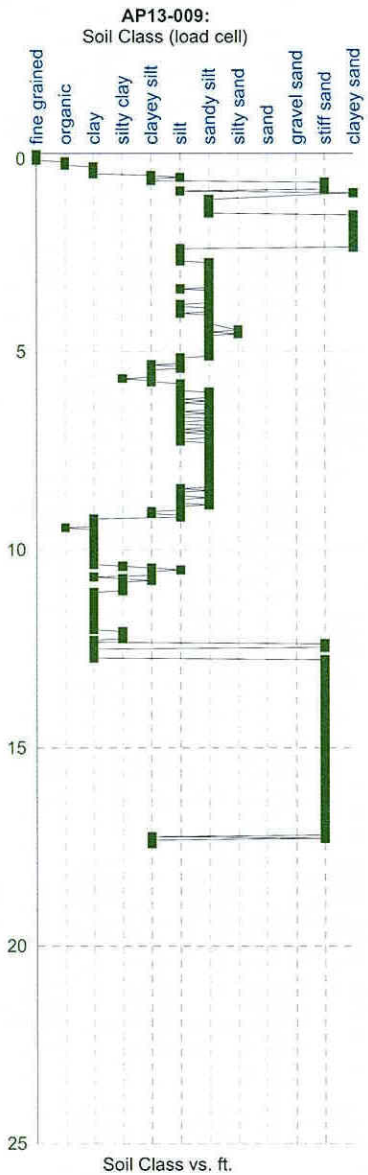

AP13-008:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

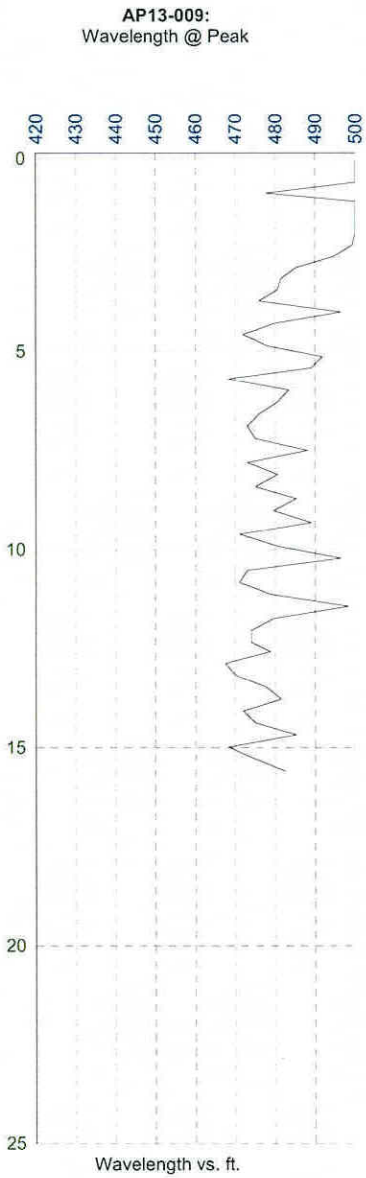

AP13-008:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

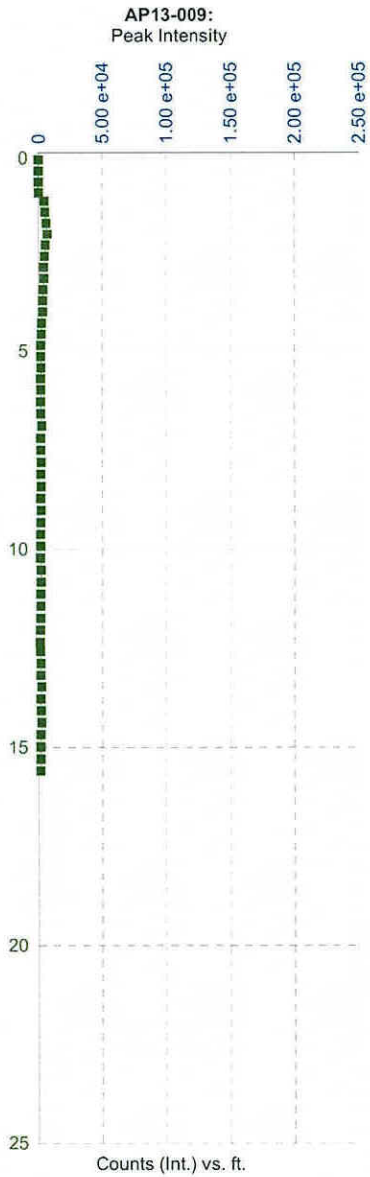

AP13-008:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

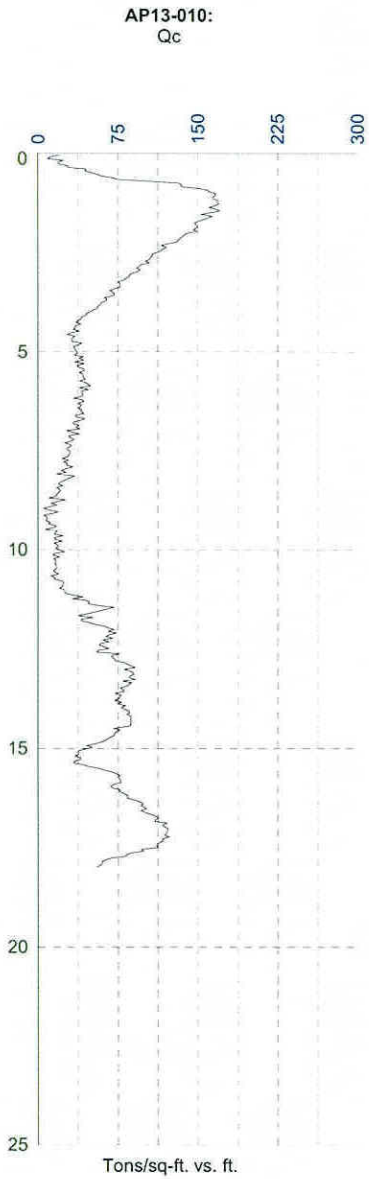

AP13-009:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

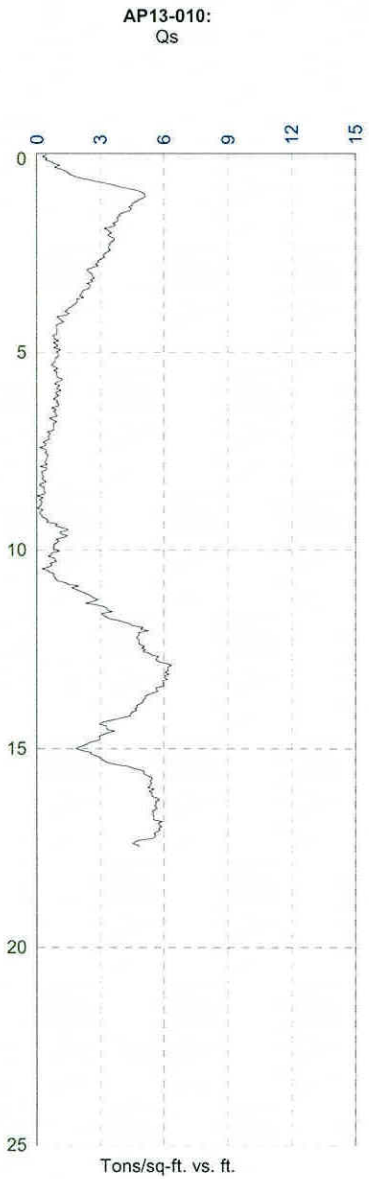

AP13-009:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

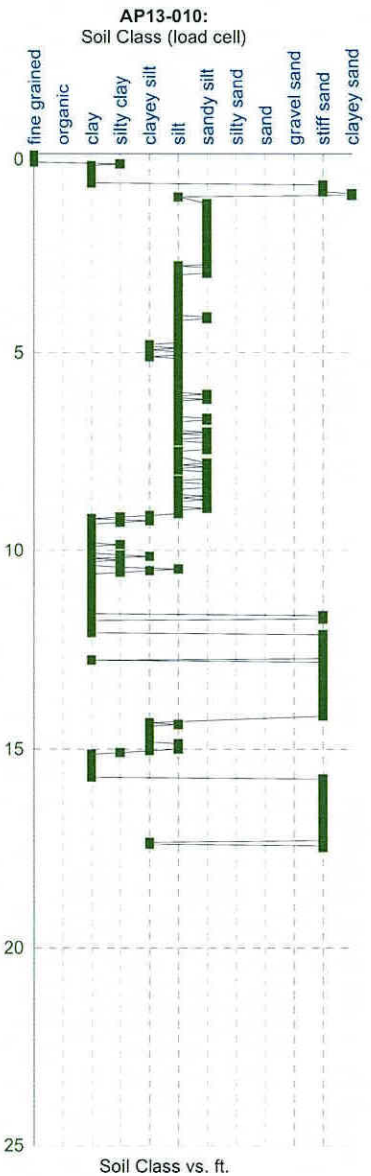

AP13-009:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

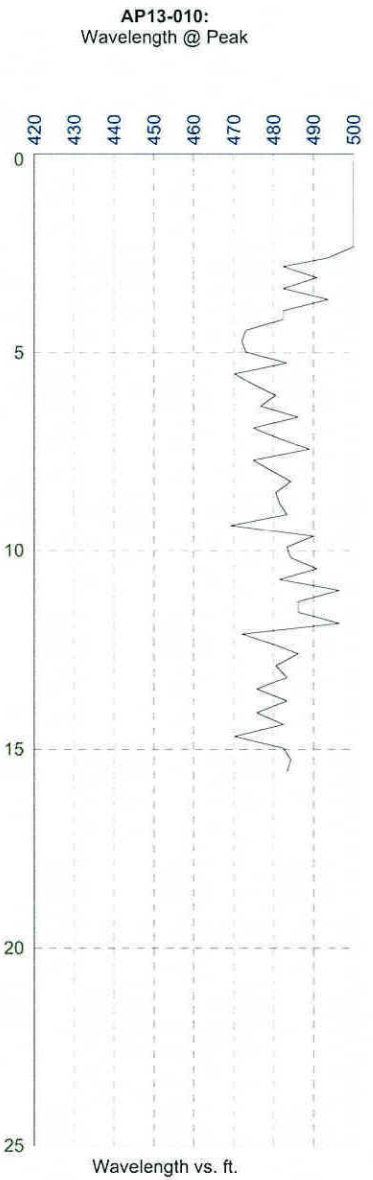

AP13-009:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

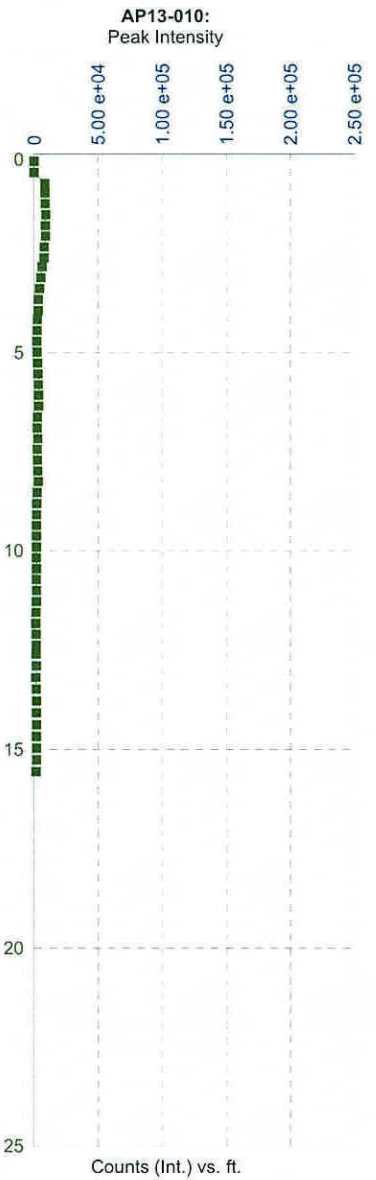

AP13-009:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

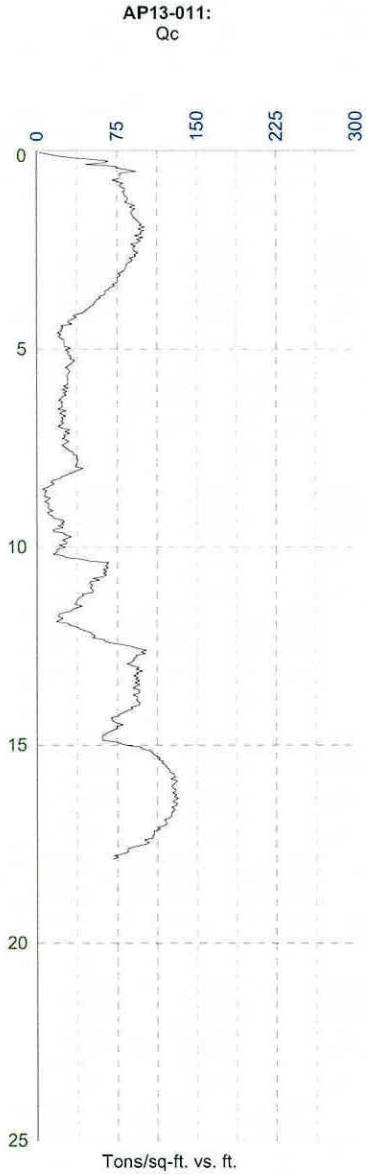

AP13-010:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

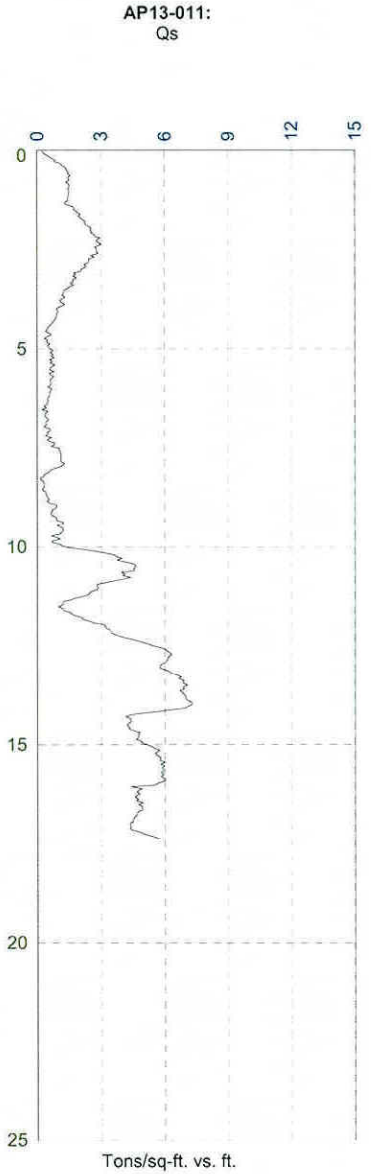

AP13-010:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

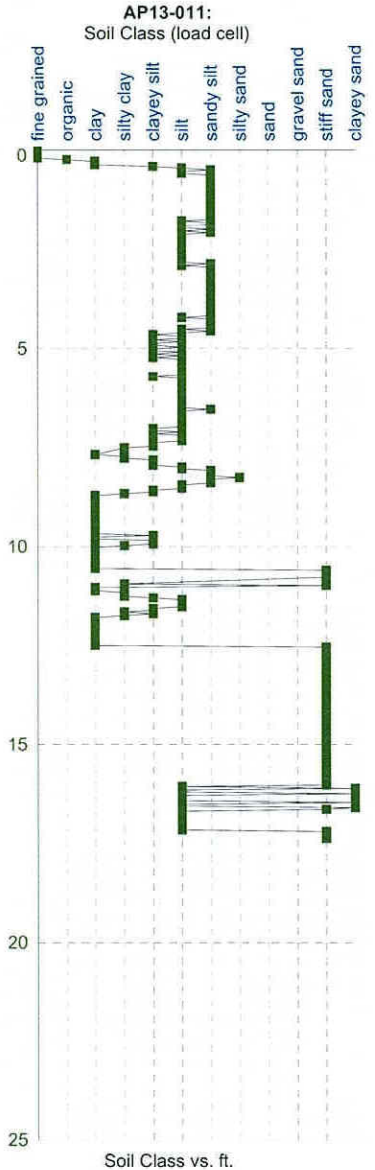

AP13-010:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

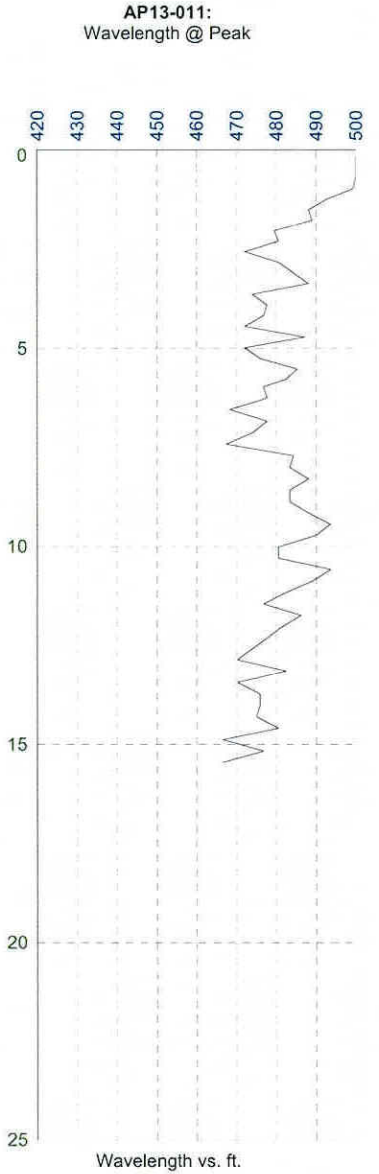

AP13-010:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

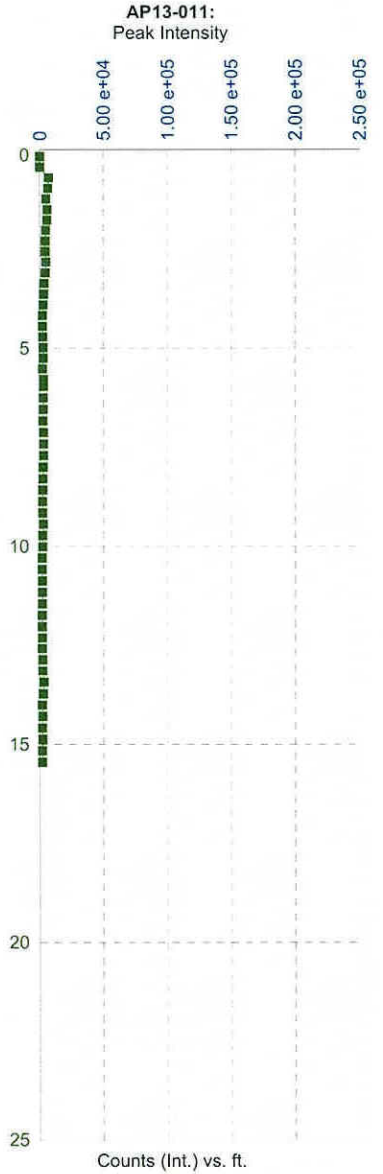

AP13-010:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

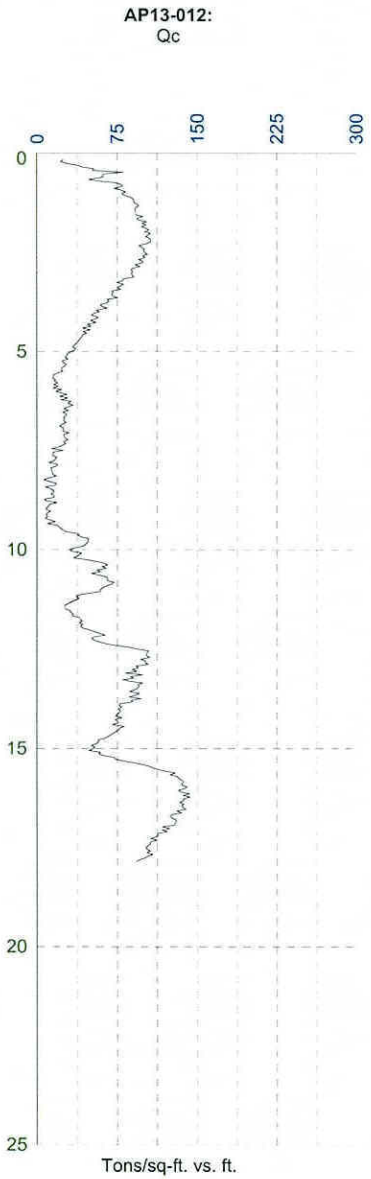

AP13-011:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

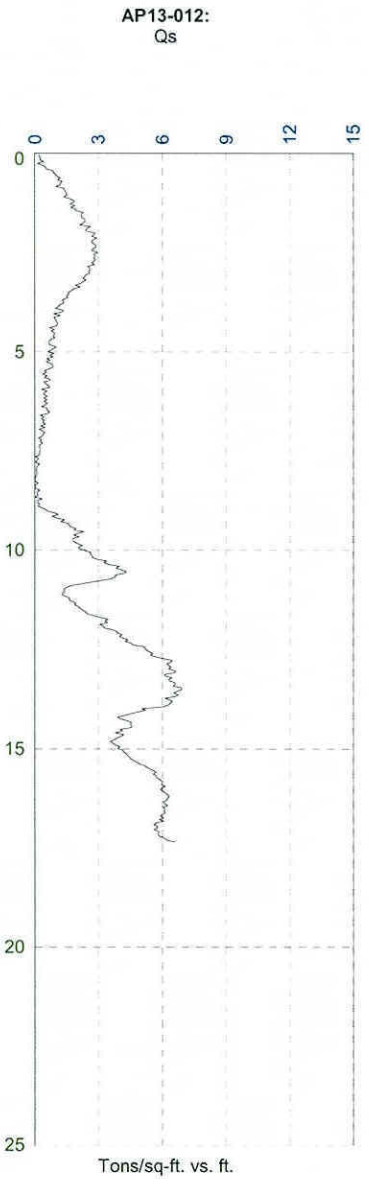

AP13-011:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

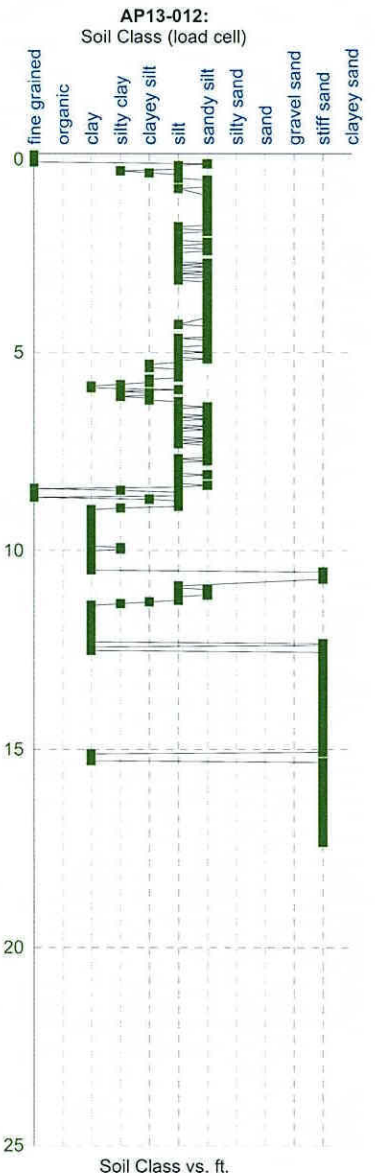

AP13-011:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

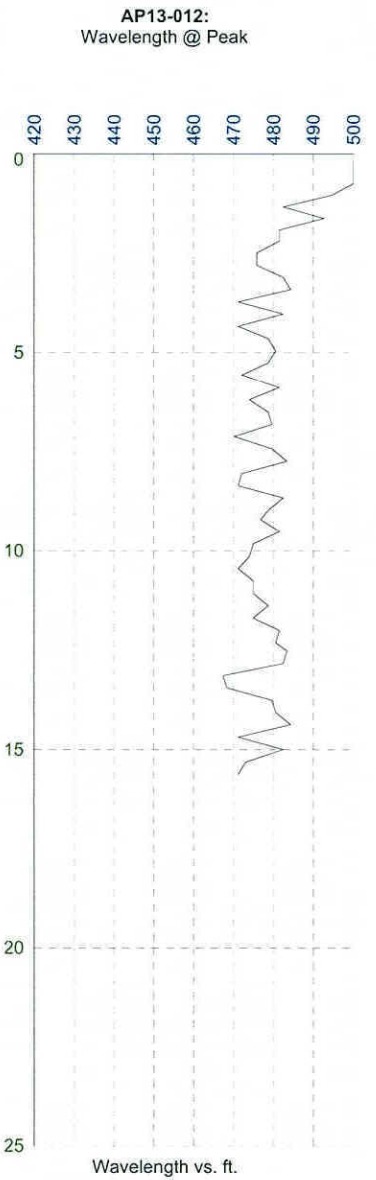

AP13-011:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

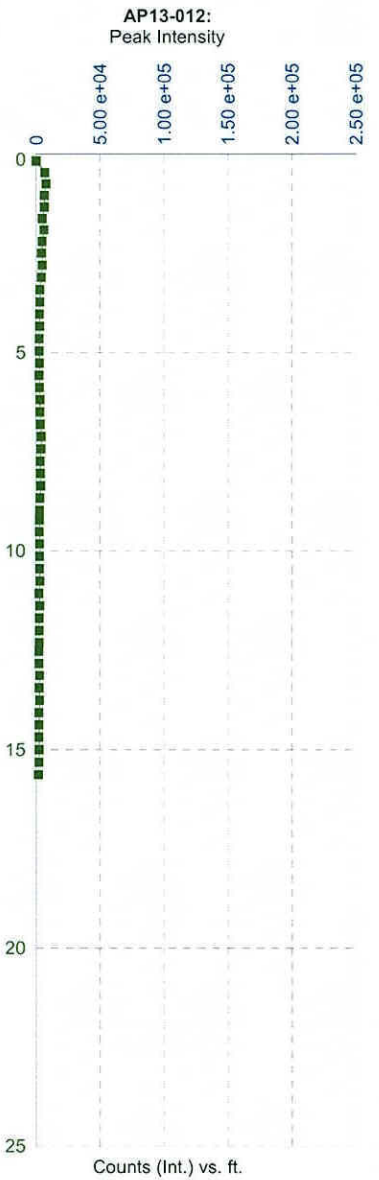

AP13-011:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

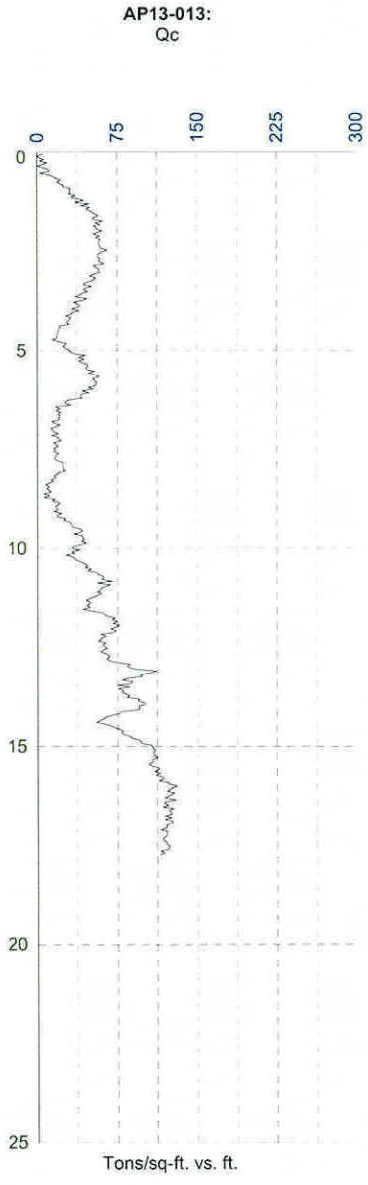

AP13-012:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

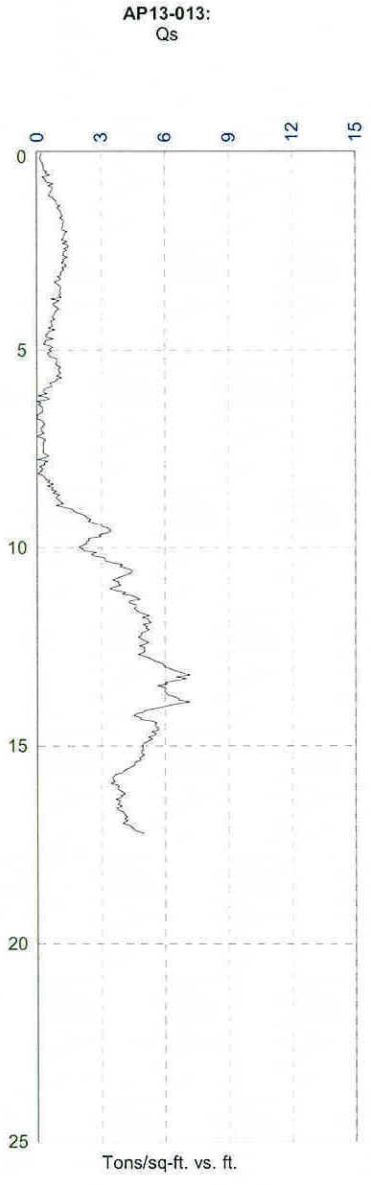

AP13-012:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

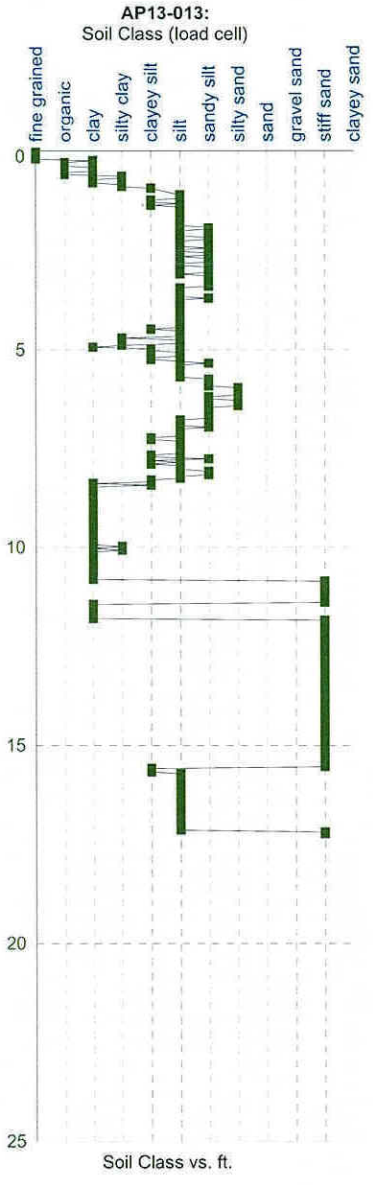

AP13-012:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

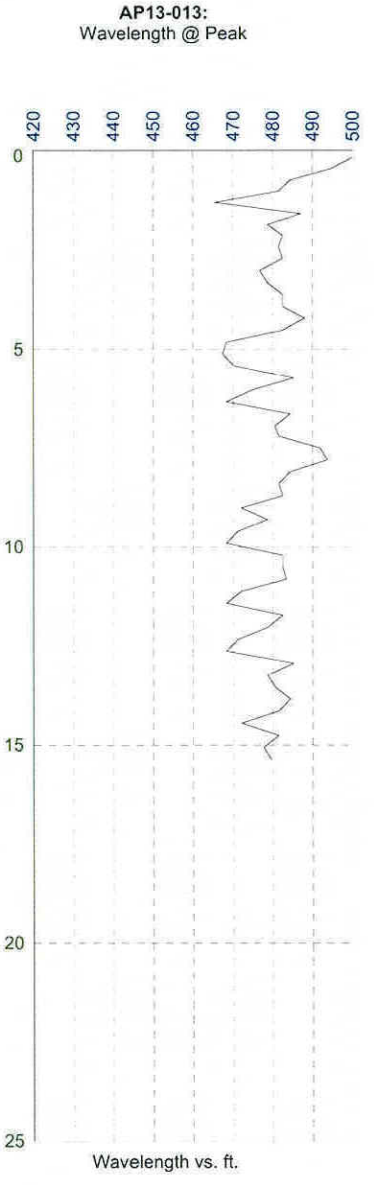

AP13-012:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

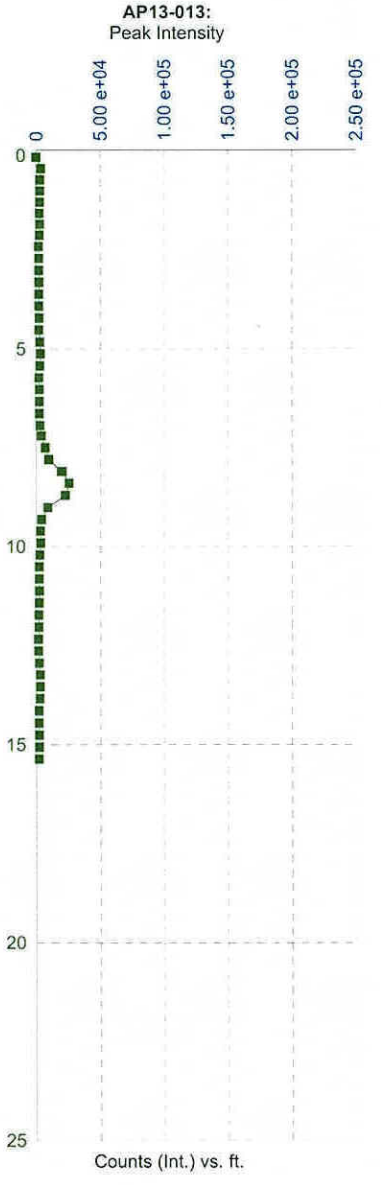

AP13-012:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

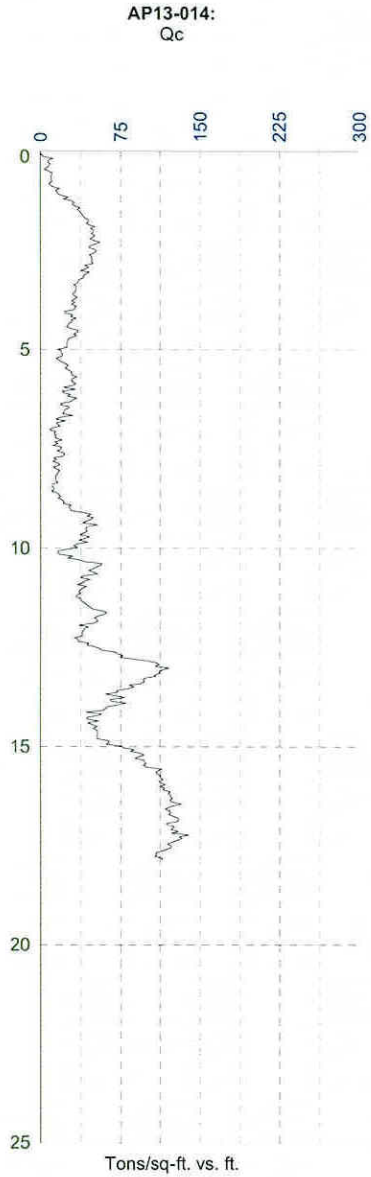

AP13-013:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

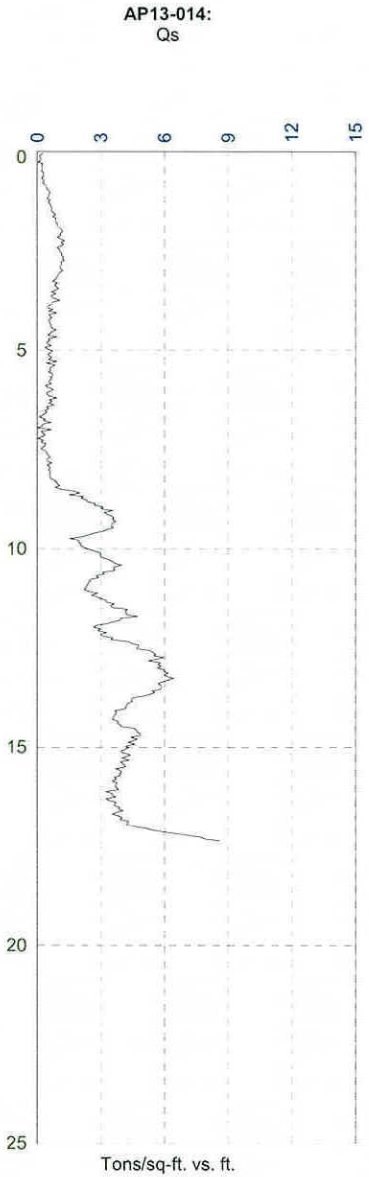

AP13-013:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

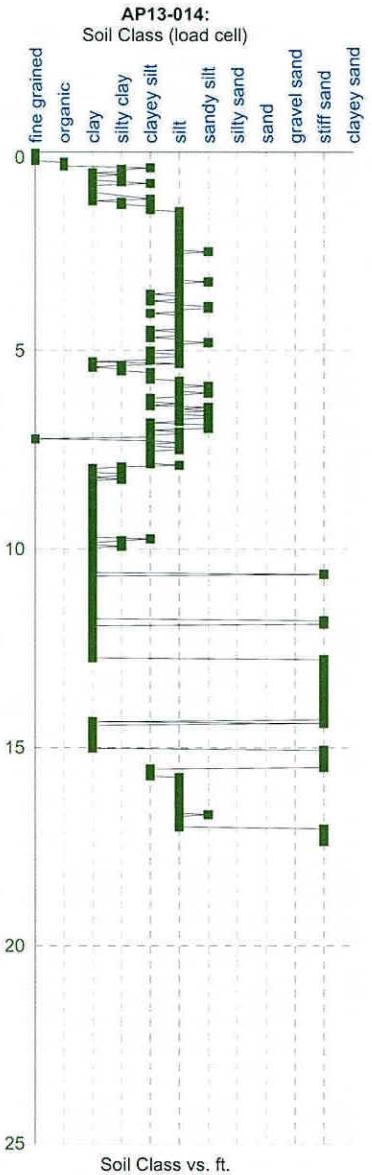

AP13-013:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

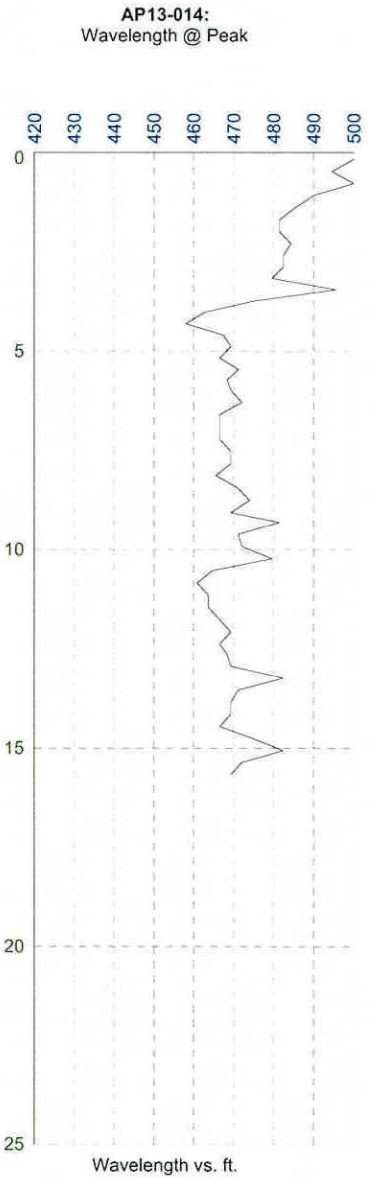

AP13-013:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

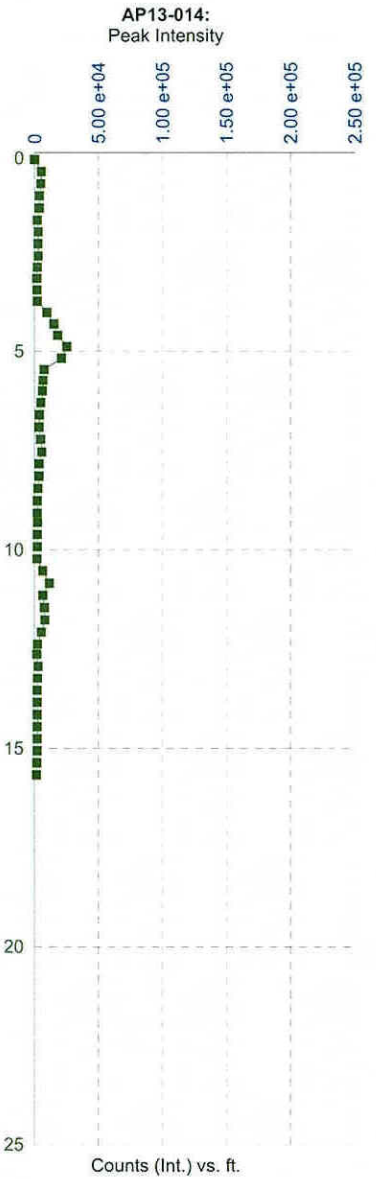

AP13-013:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

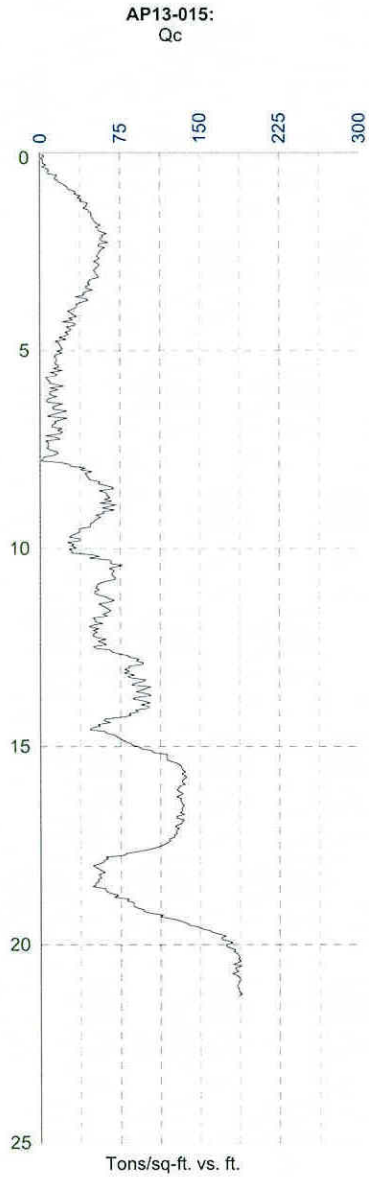

AP13-014:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

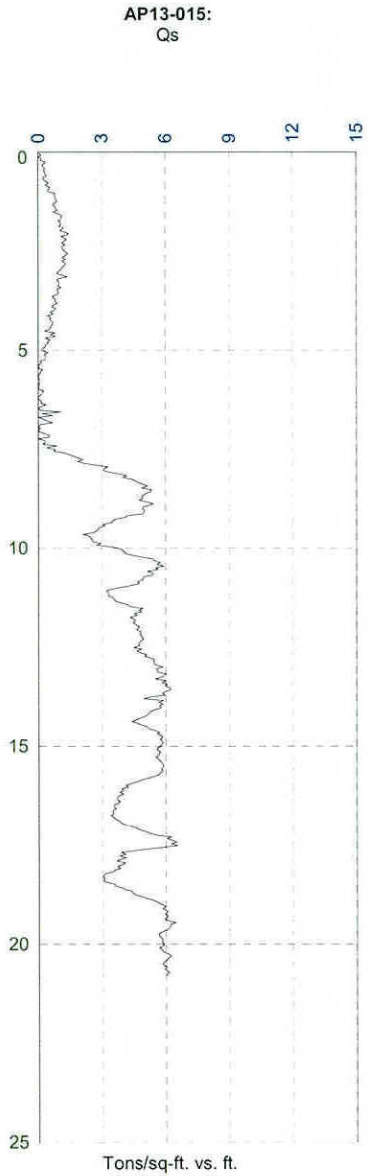

AP13-014:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

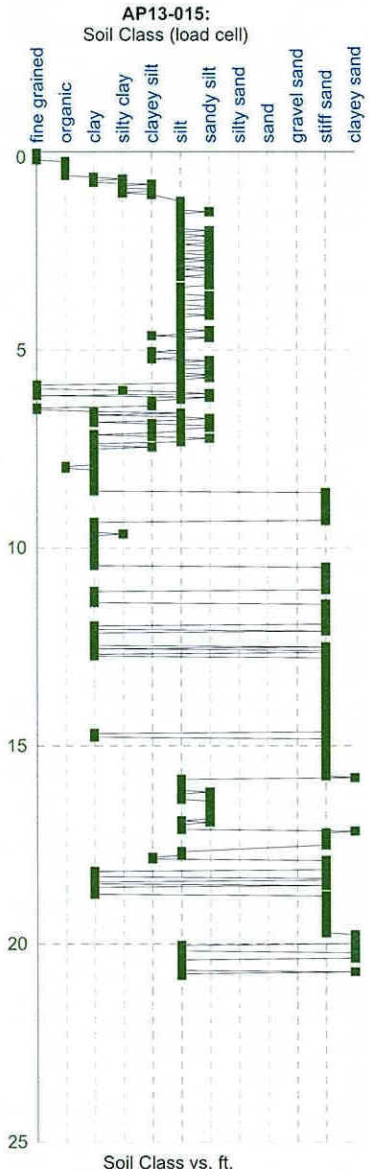

AP13-014:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

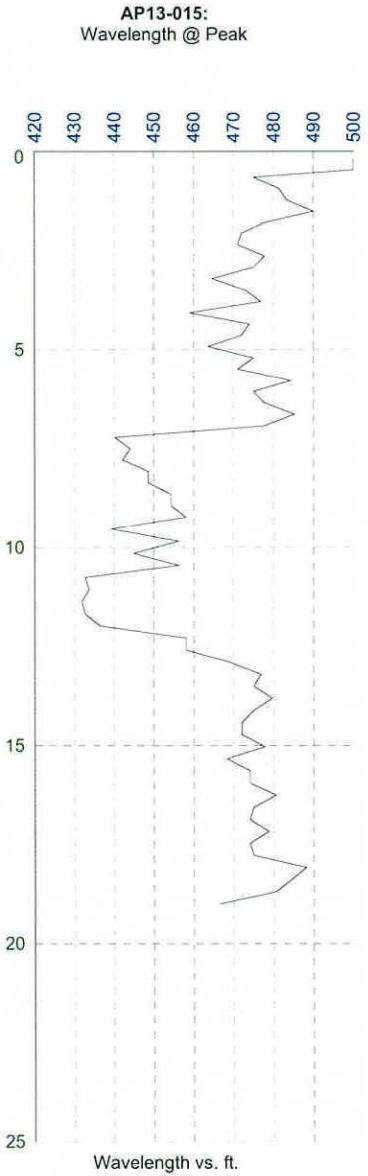

AP13-014:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

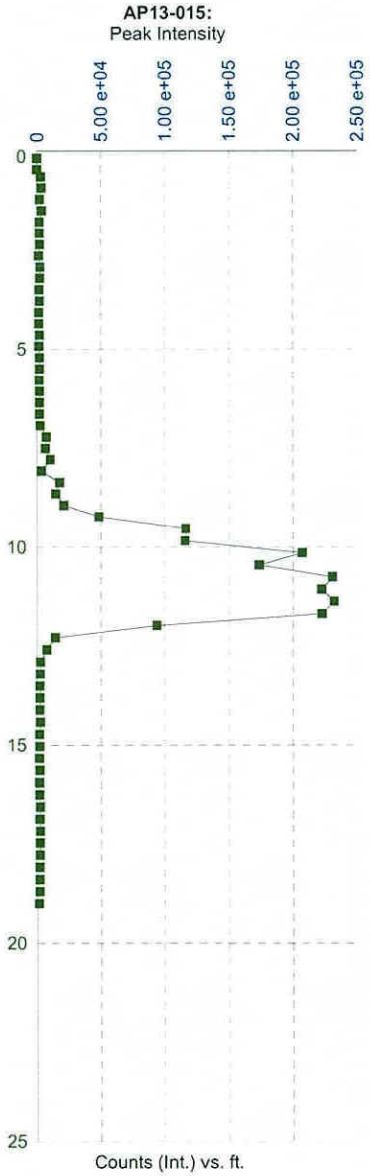

AP13-014:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

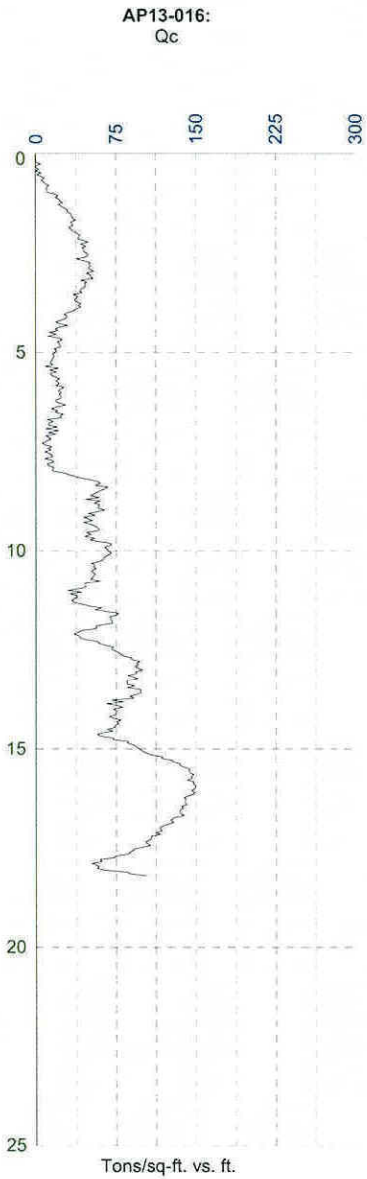

AP13-015:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

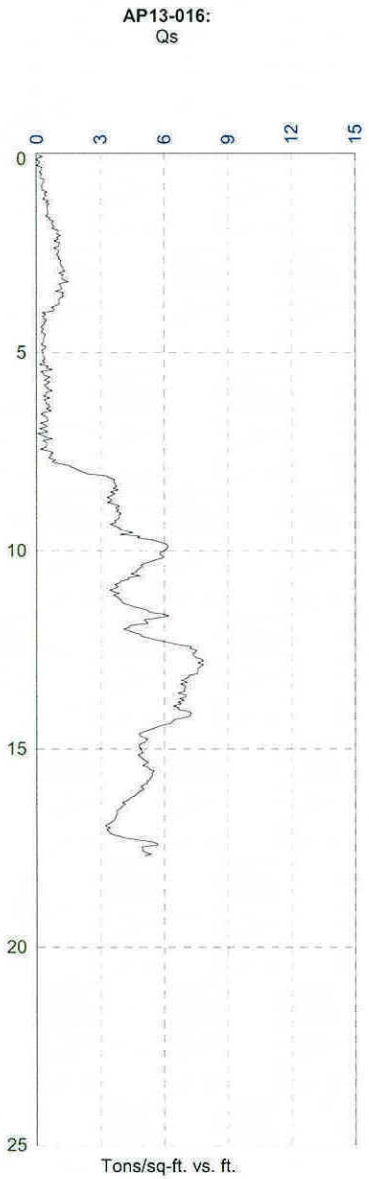

AP13-015:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

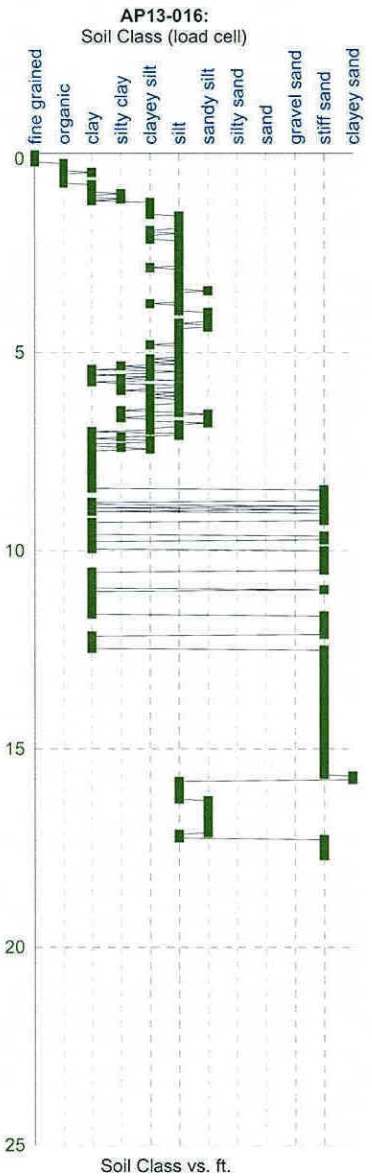

AP13-015:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

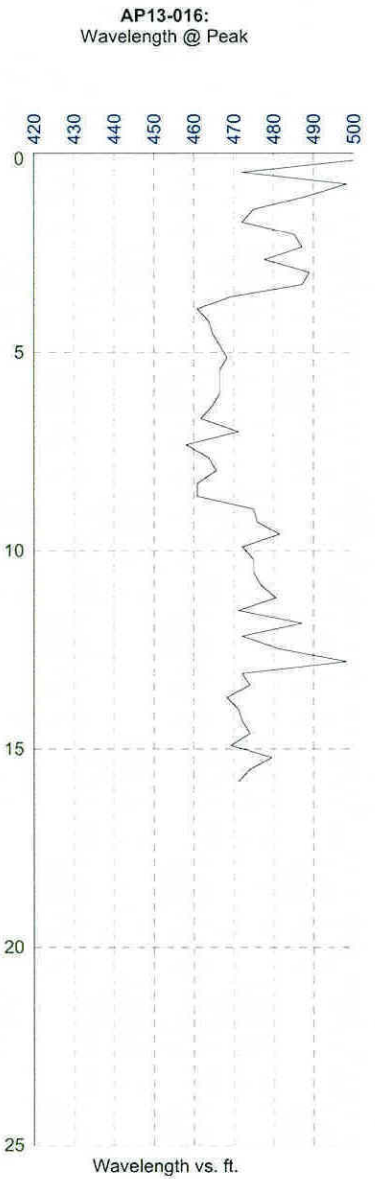

AP13-015:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

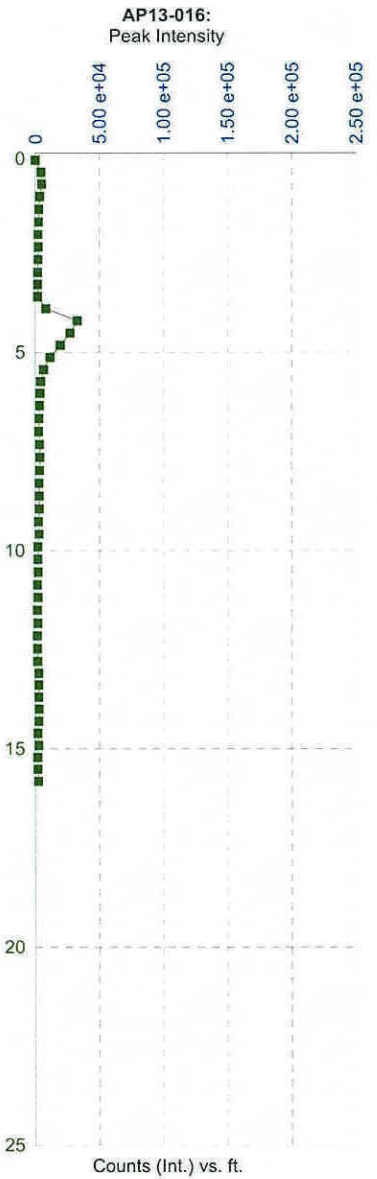

AP13-015:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

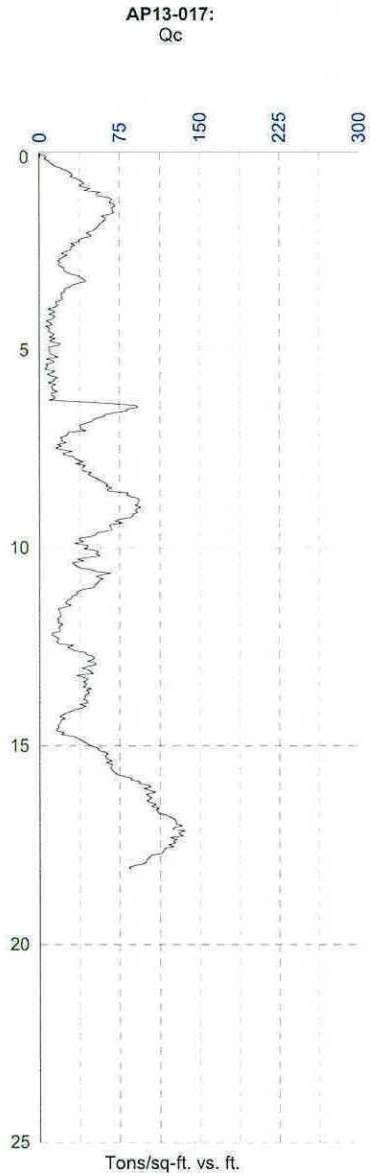

AP13-016:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

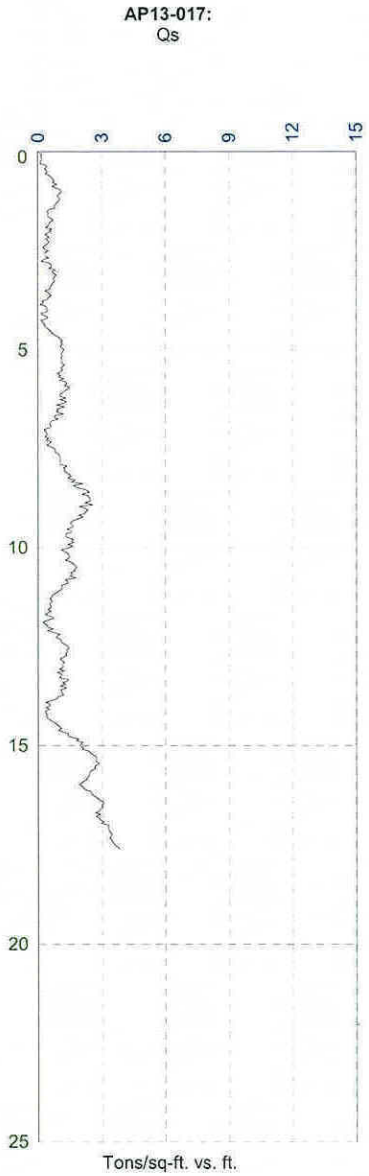

AP13-016:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

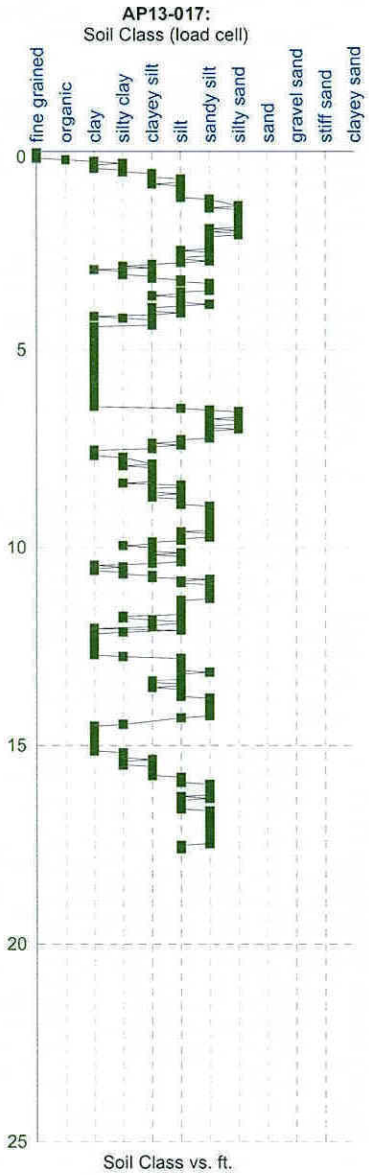

AP13-016:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

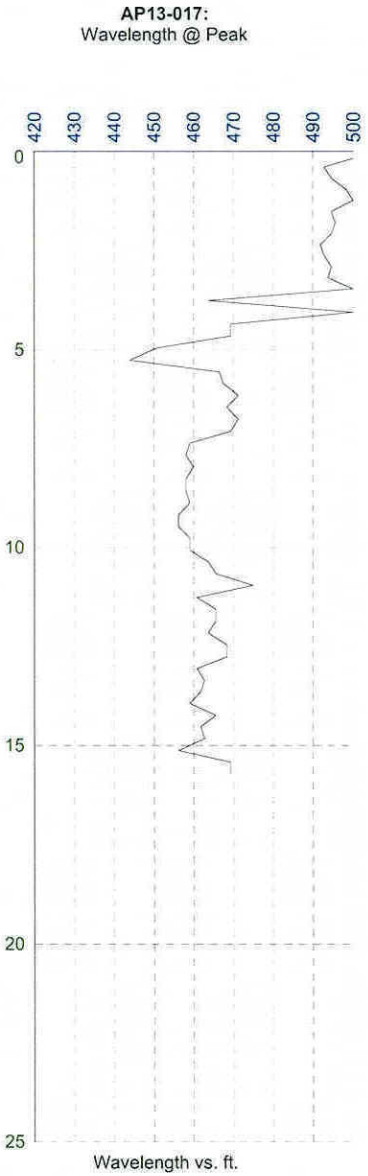

AP13-016:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

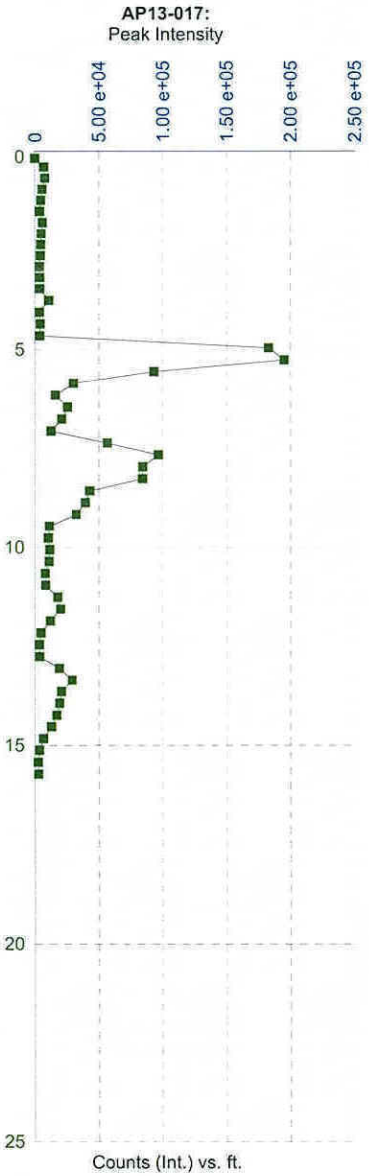

AP13-016:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

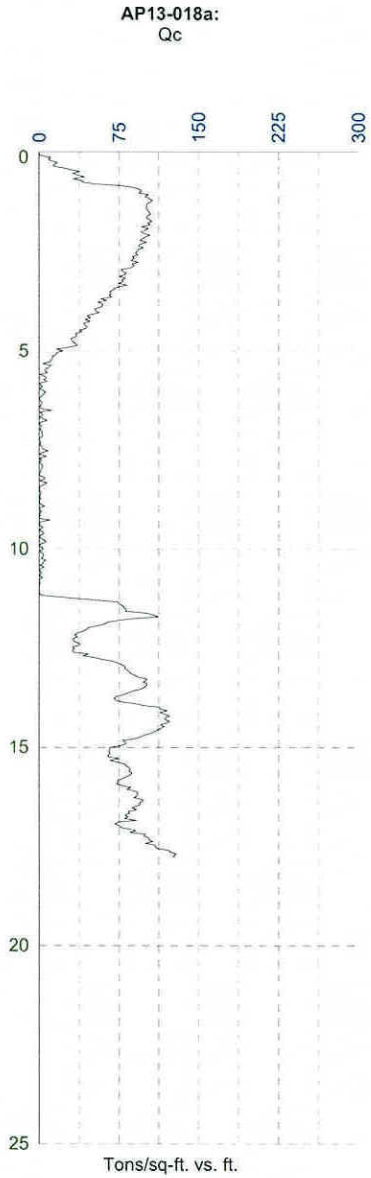

AP13-017:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

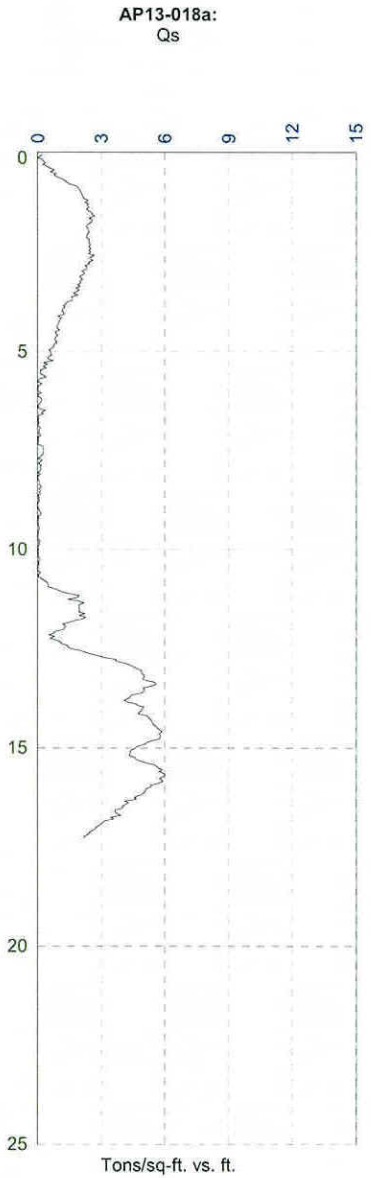

AP13-017:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

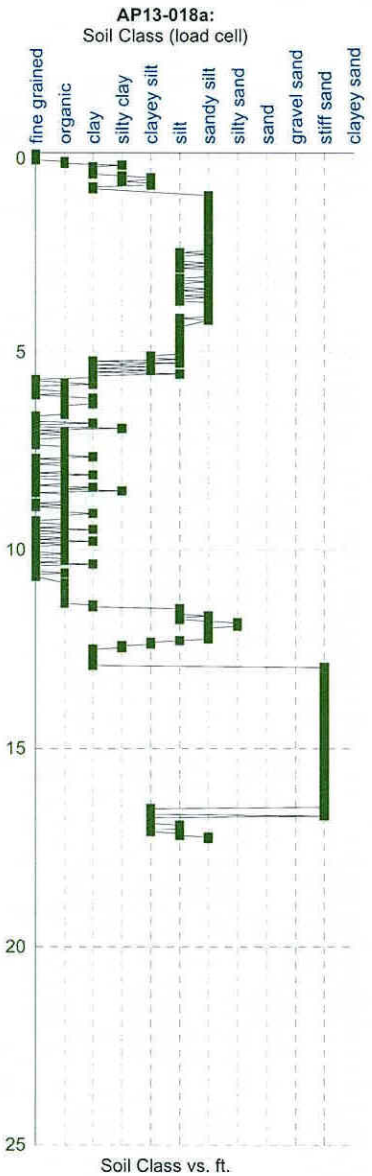

AP13-017:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

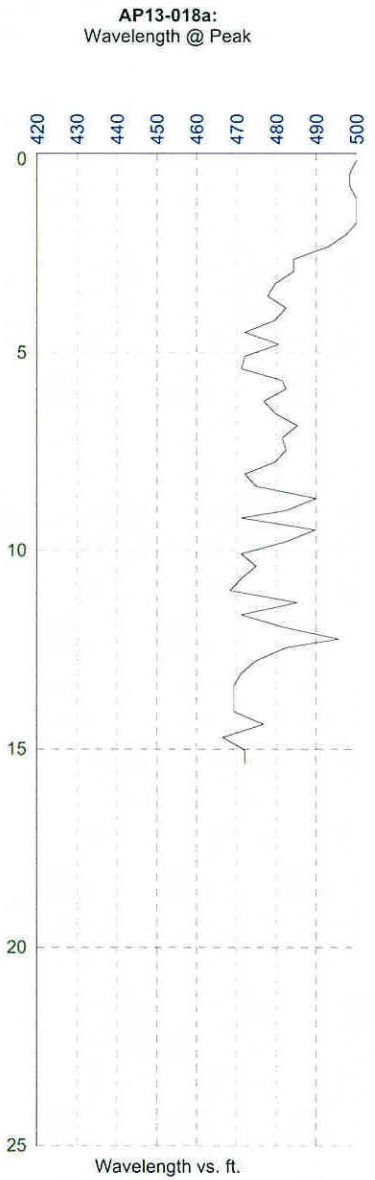

AP13-017:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

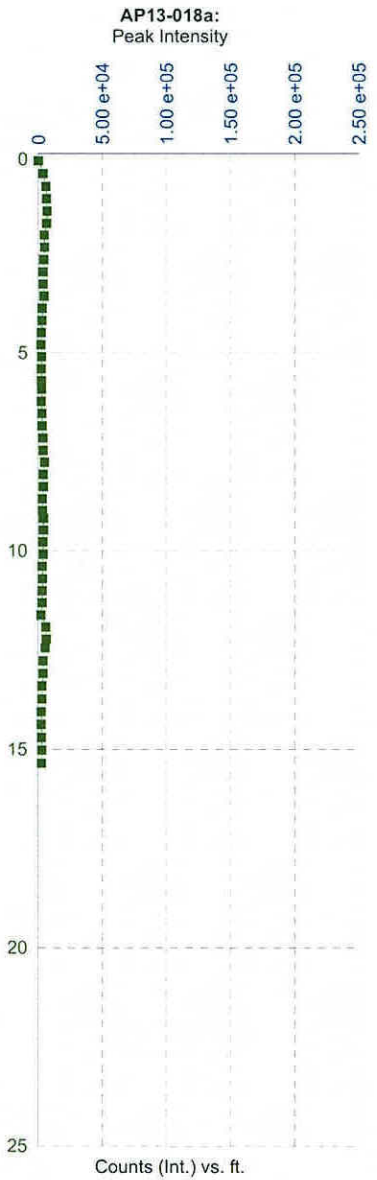

AP13-017:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

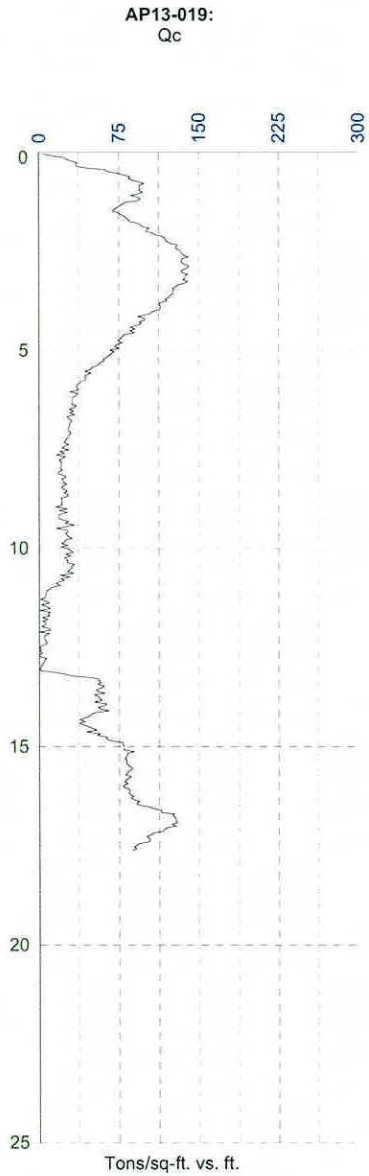

AP13-018a:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

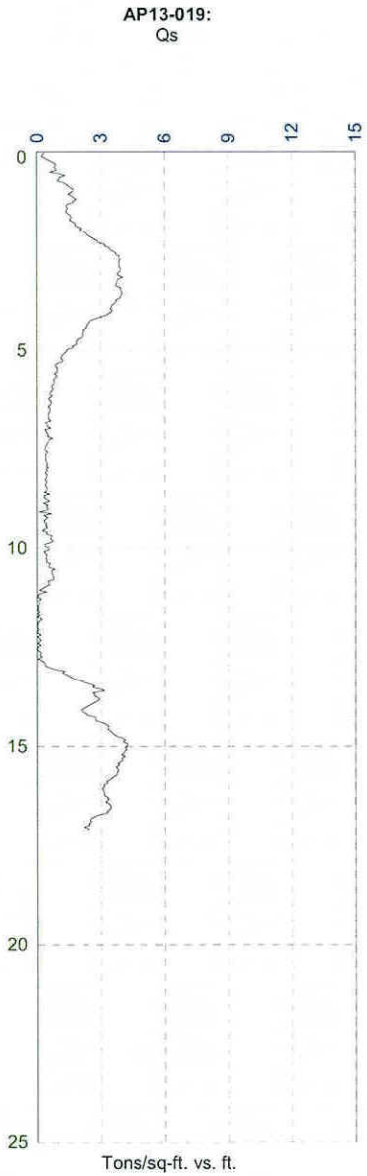

AP13-018a:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

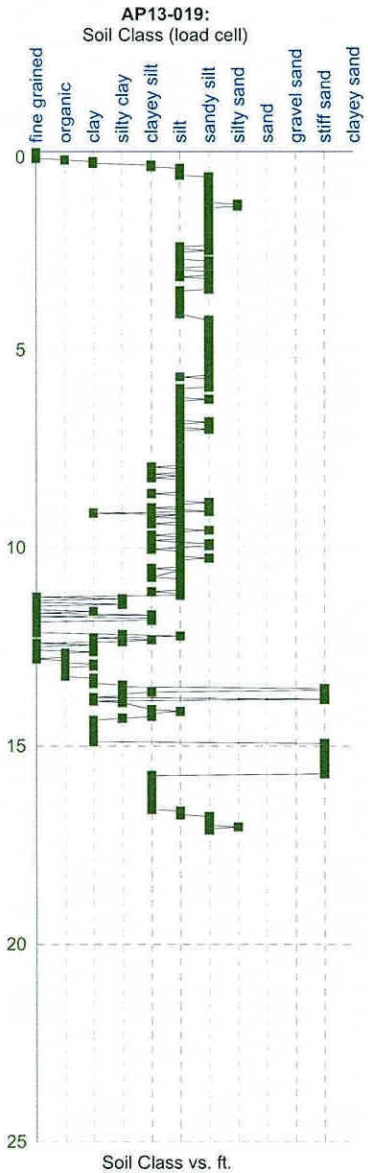

AP13-018a:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

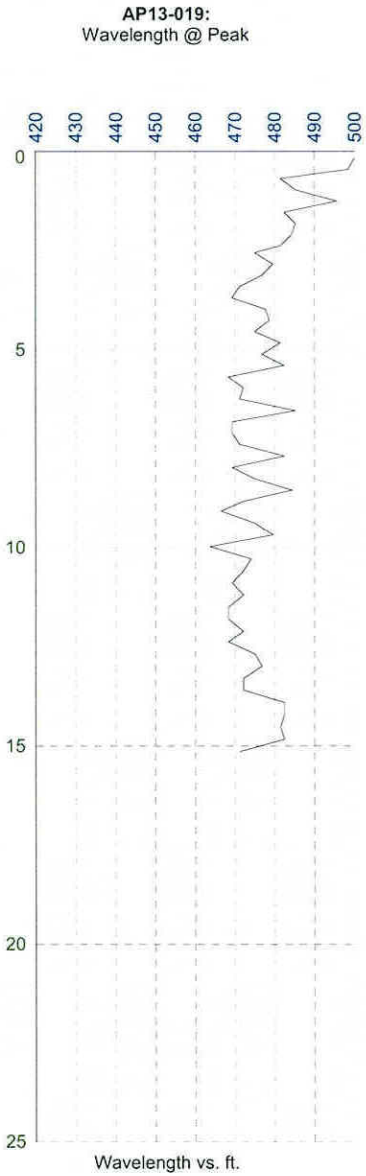

AP13-018a:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

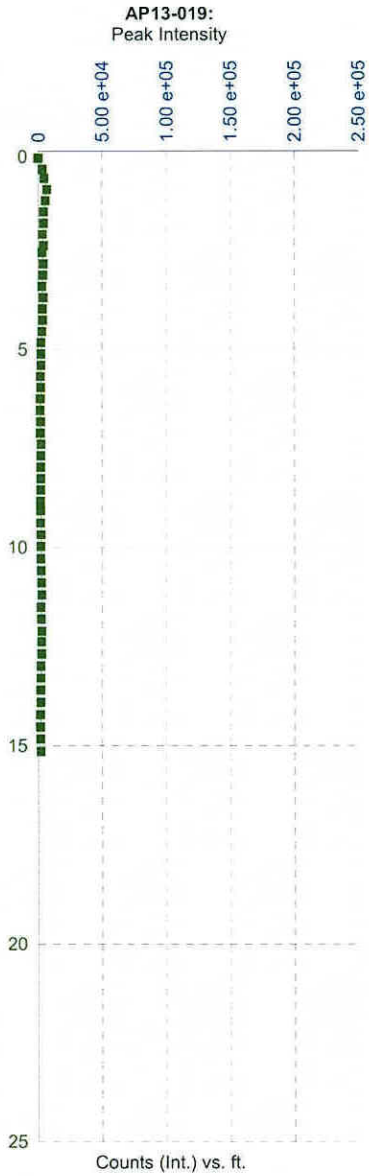

AP13-018a:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

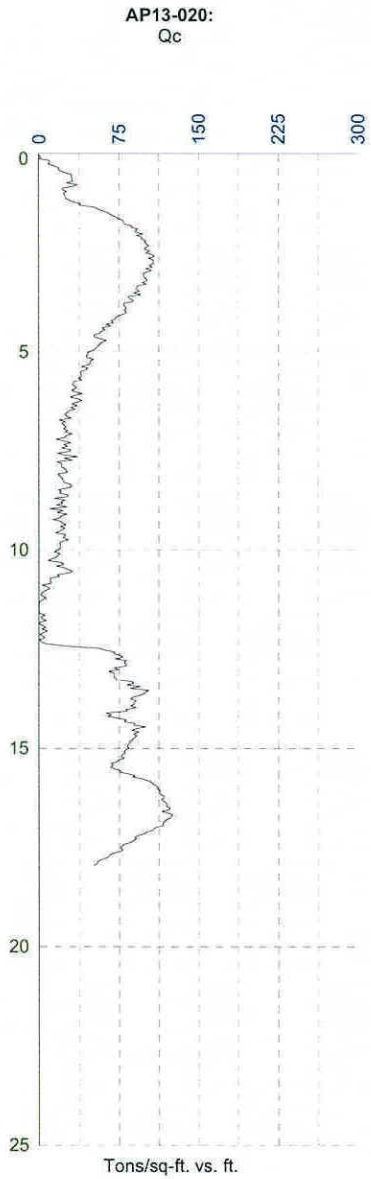

AP13-019:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

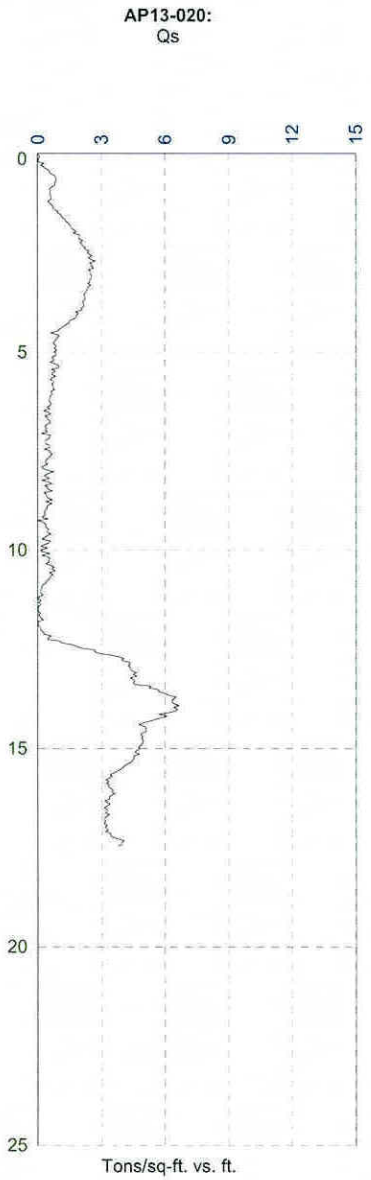

AP13-019:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

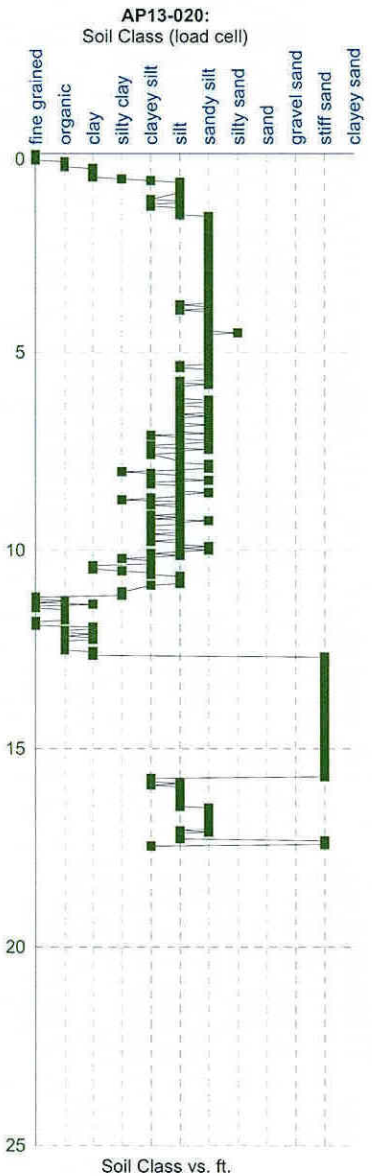

AP13-019:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

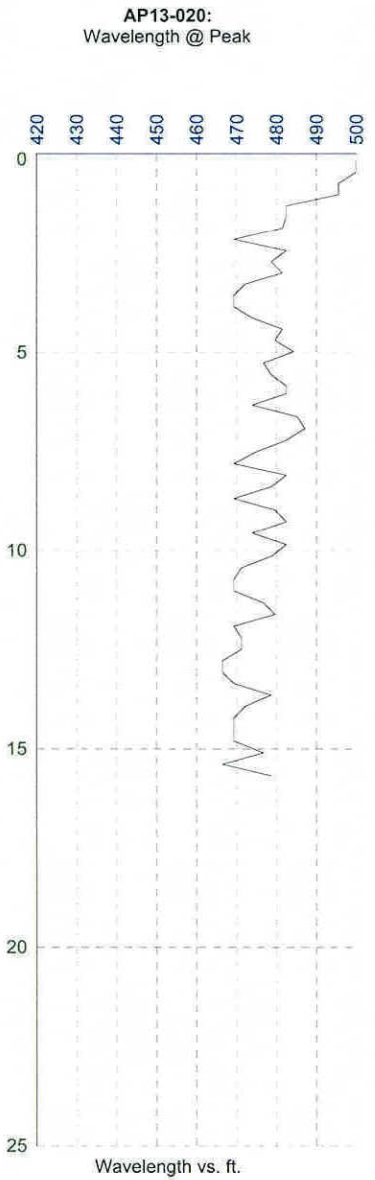

AP13-019:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

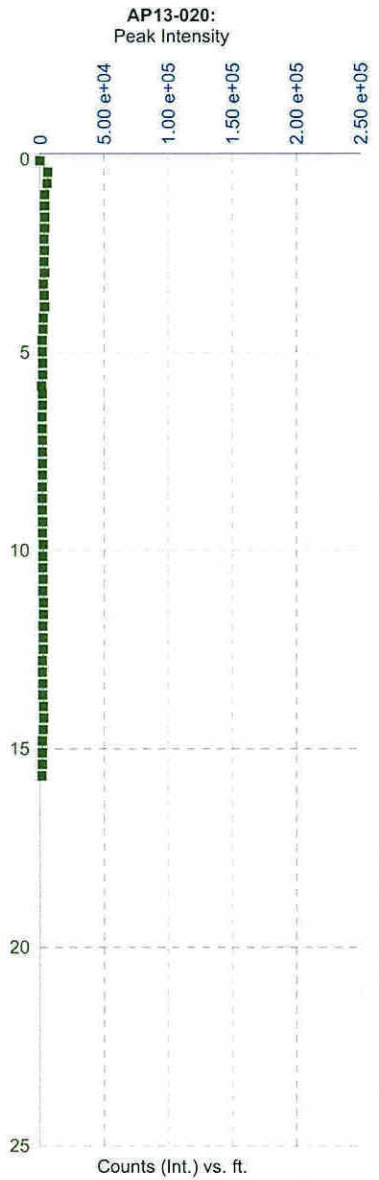

AP13-019:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

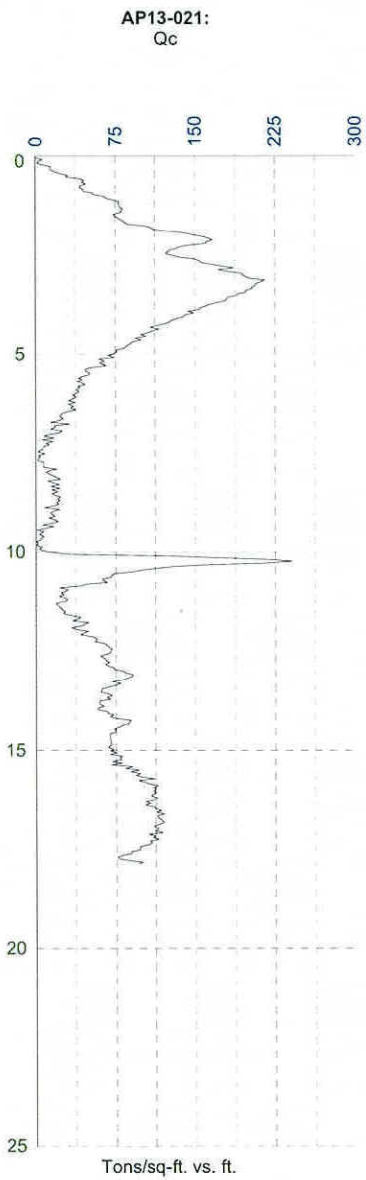

AP13-020:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

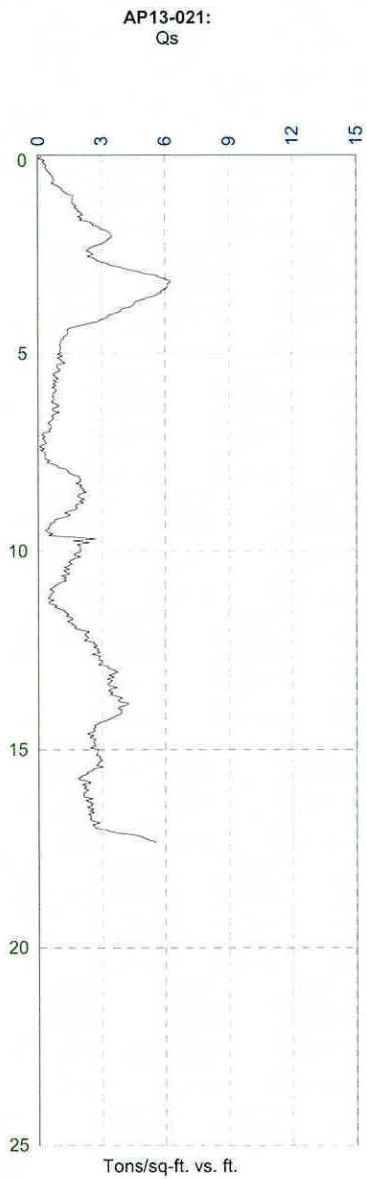

AP13-020:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

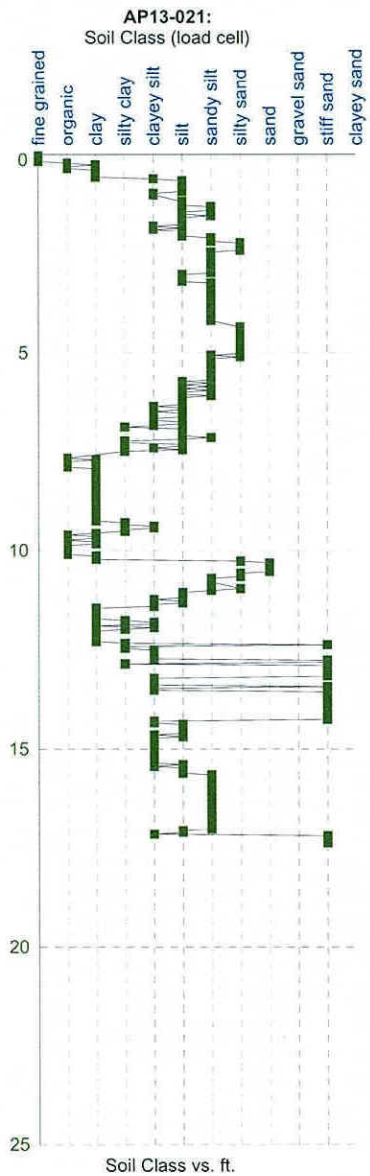

AP13-020:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

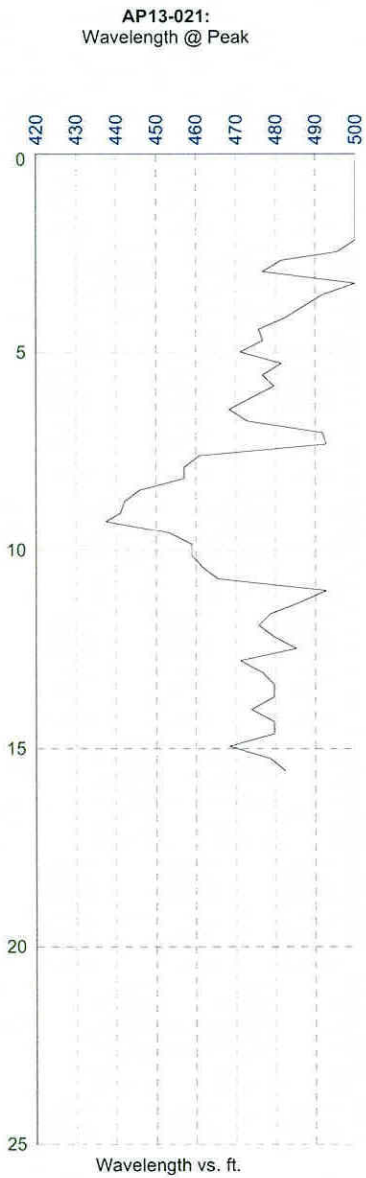

AP13-020:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

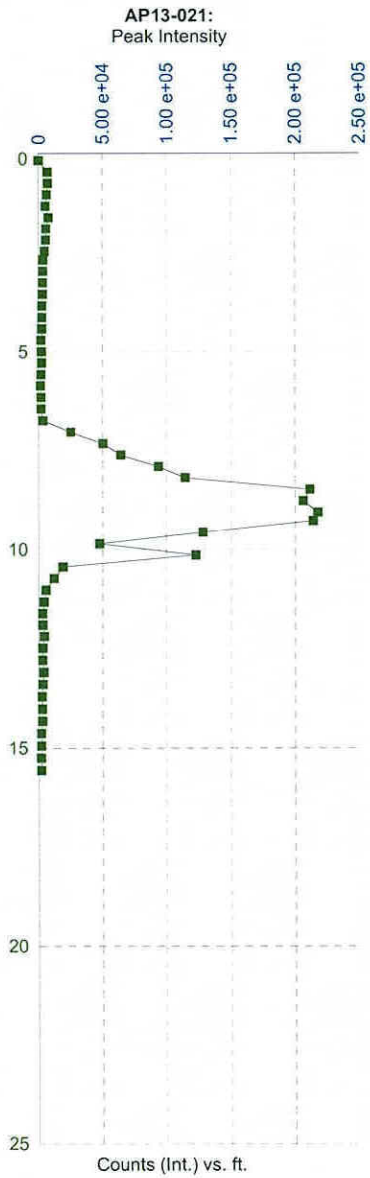

AP13-020:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

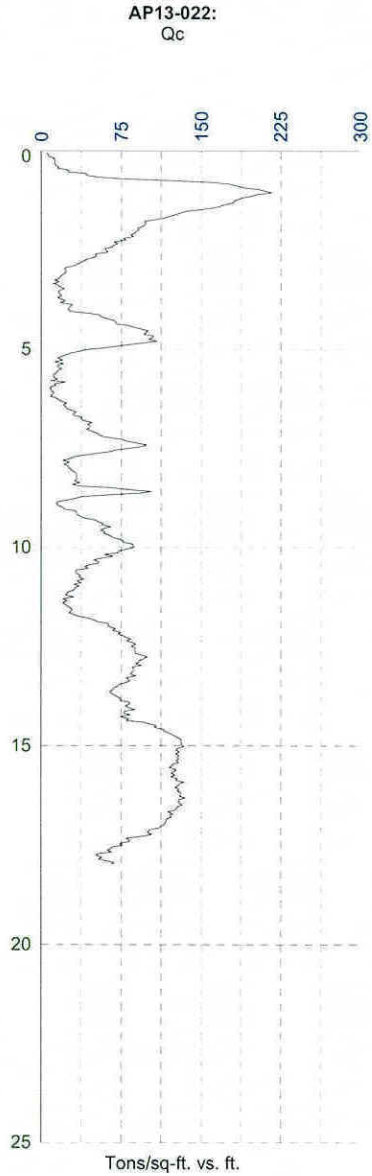

AP13-021:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

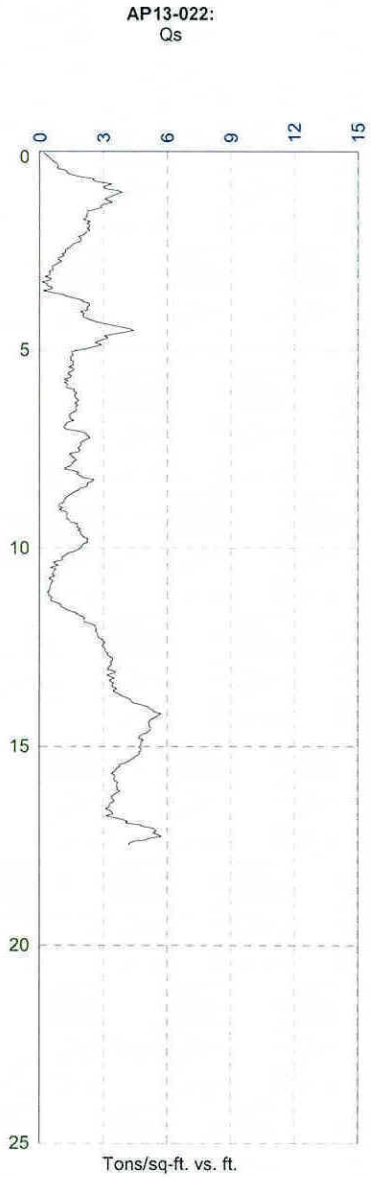

AP13-021:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

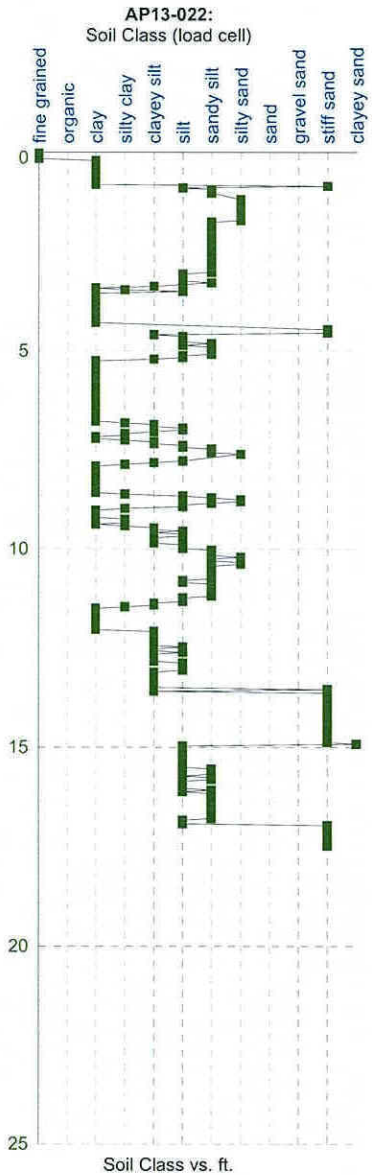

AP13-021:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

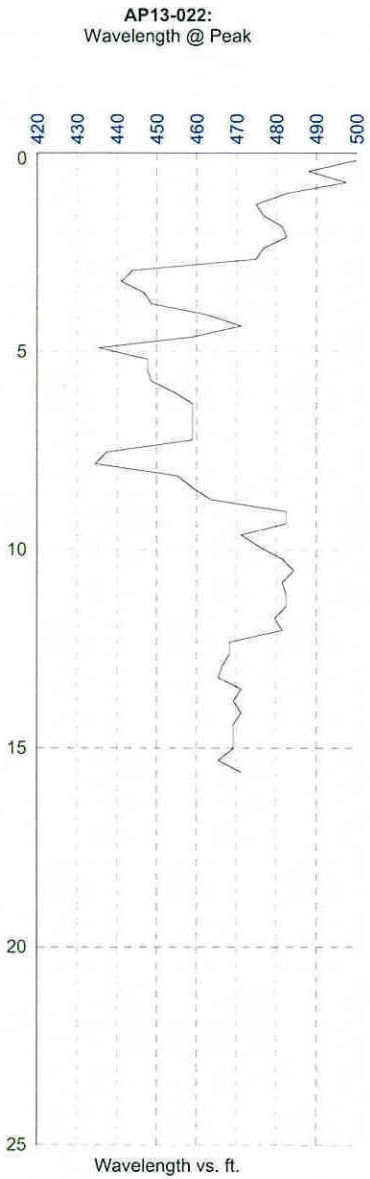

AP13-021:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

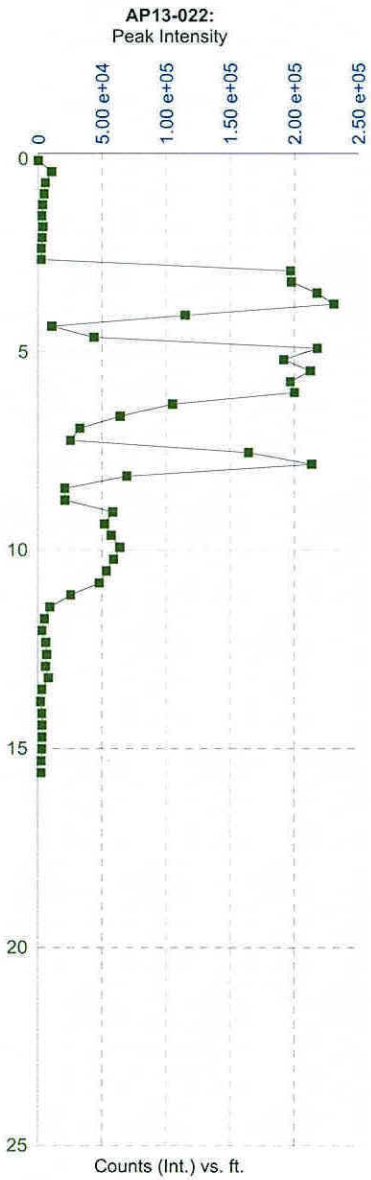

AP13-021:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

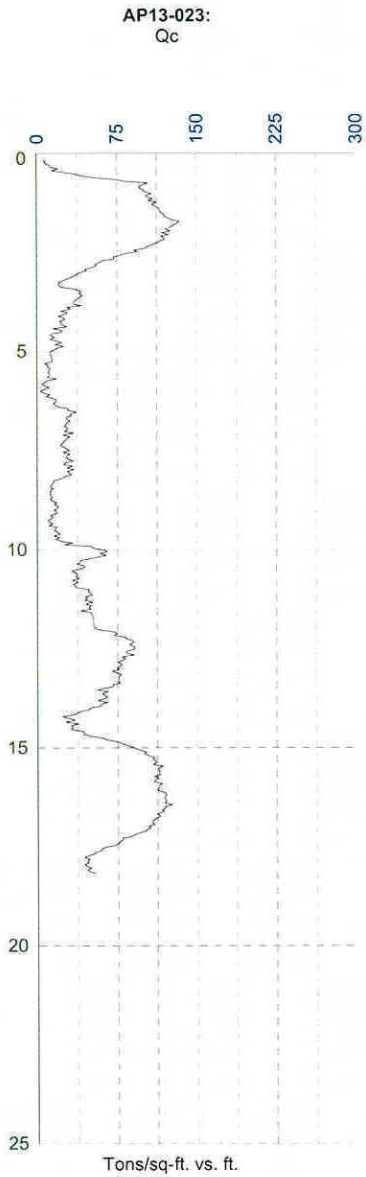

AP13-022:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

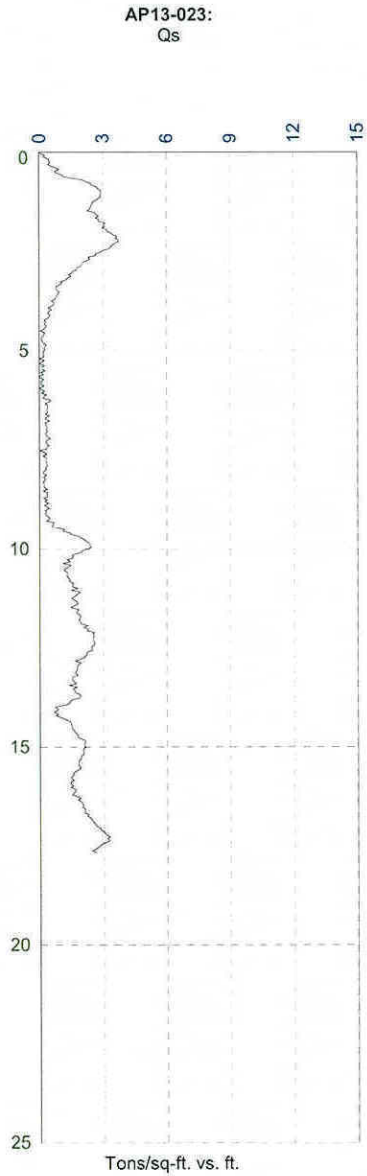

AP13-022:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

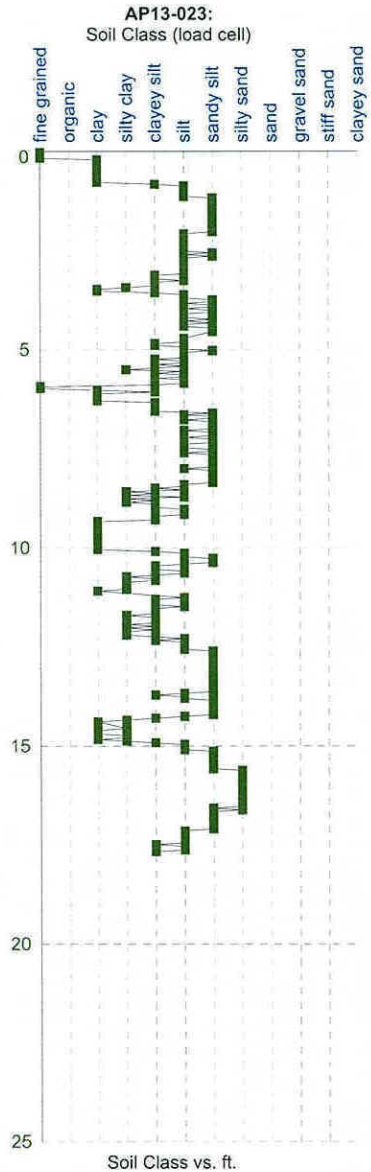

AP13-022:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

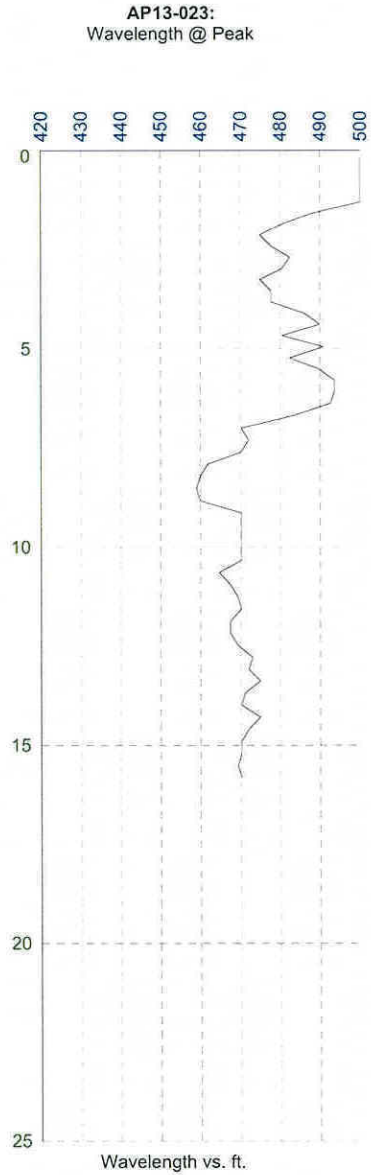

AP13-022:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

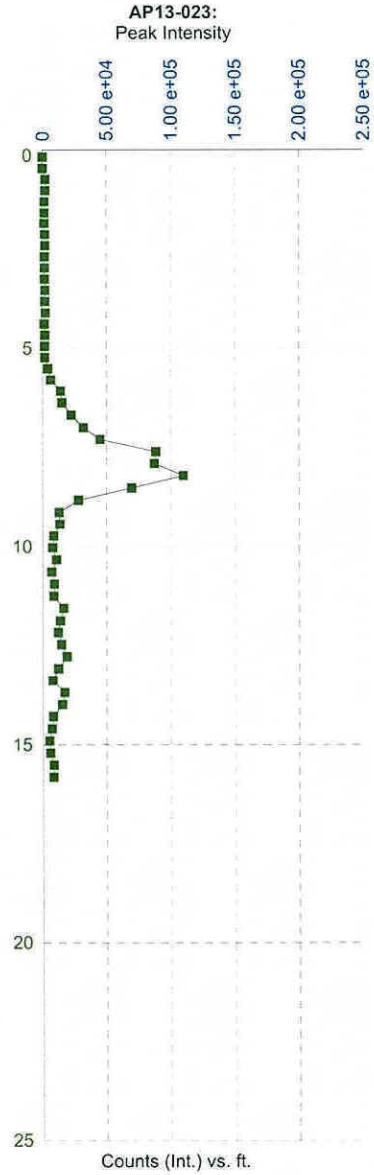

AP13-022:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

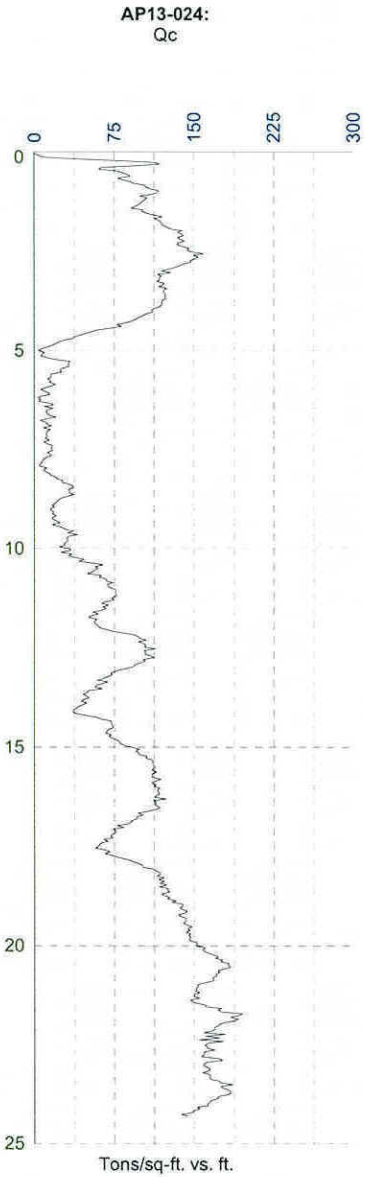

AP13-023:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

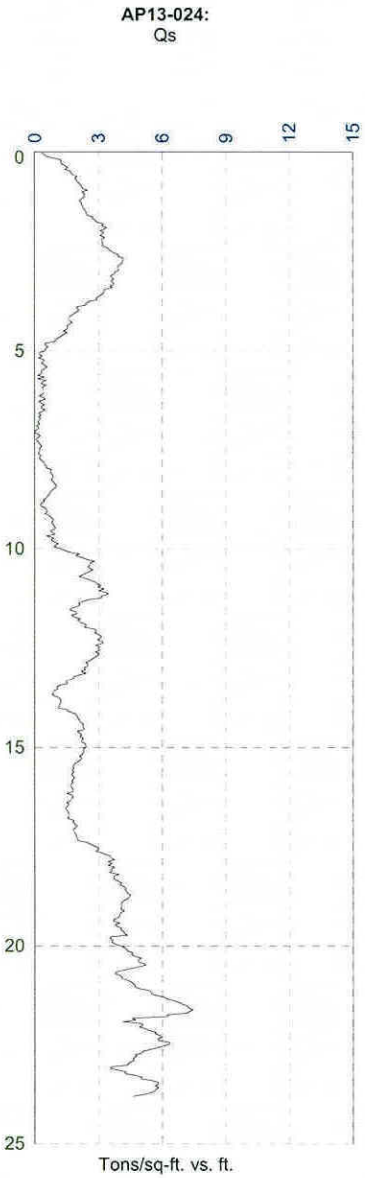

AP13-023:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

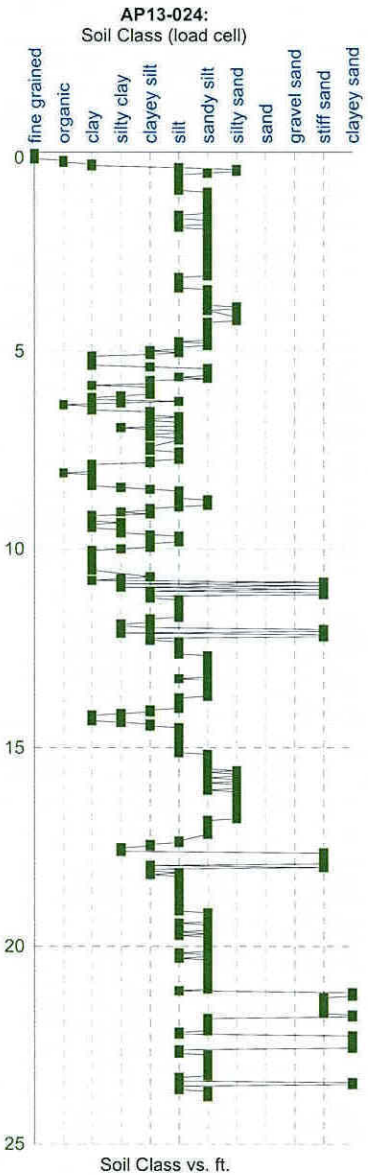

AP13-023:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

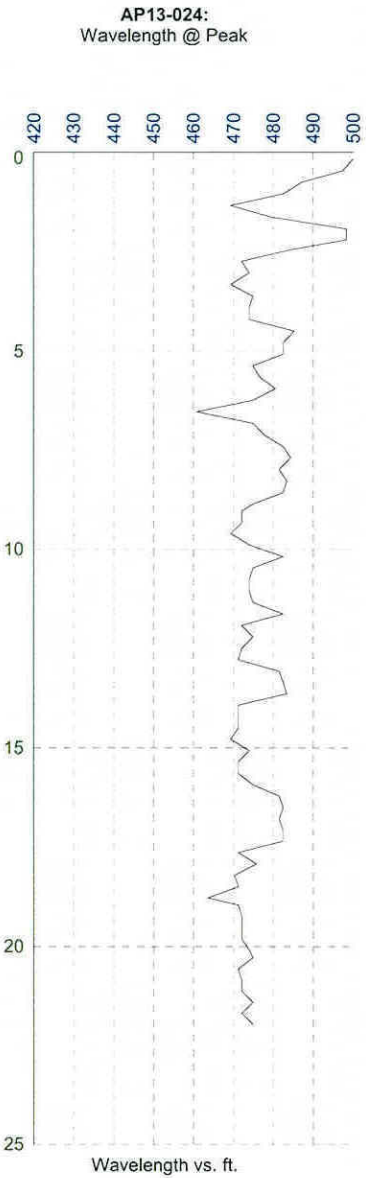

AP13-023:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

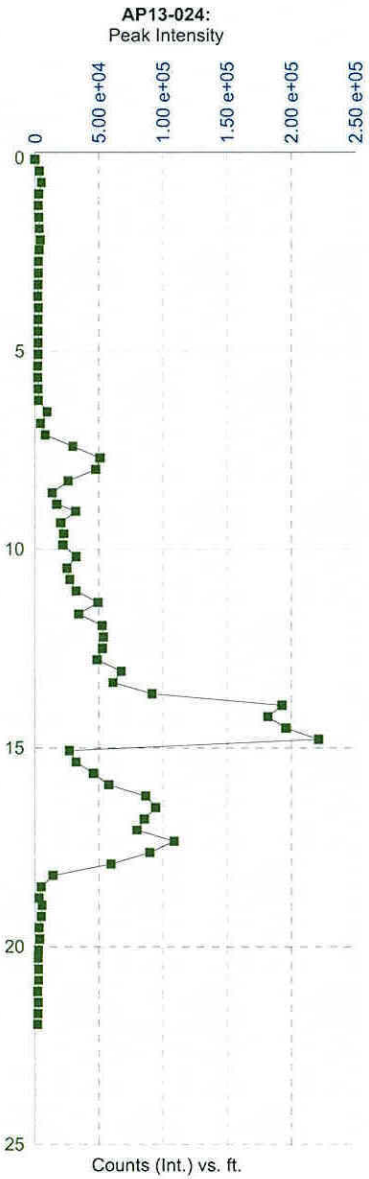

AP13-023:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

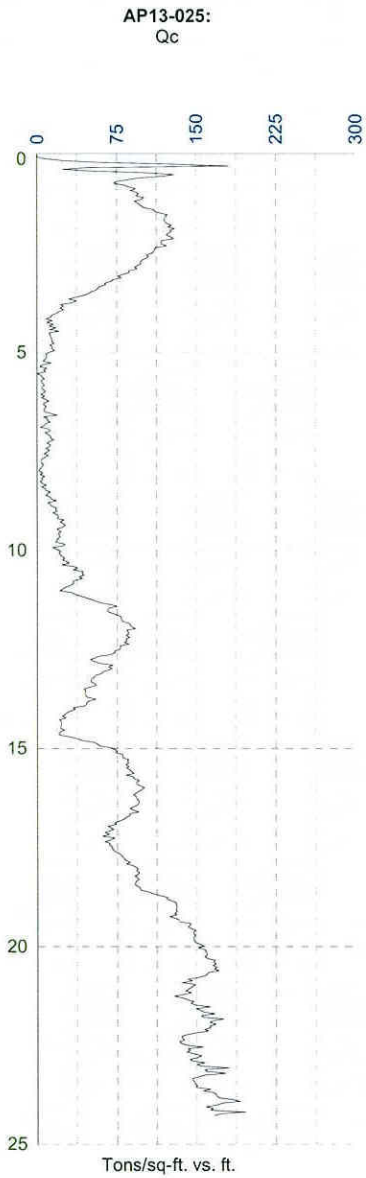

AP13-024:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

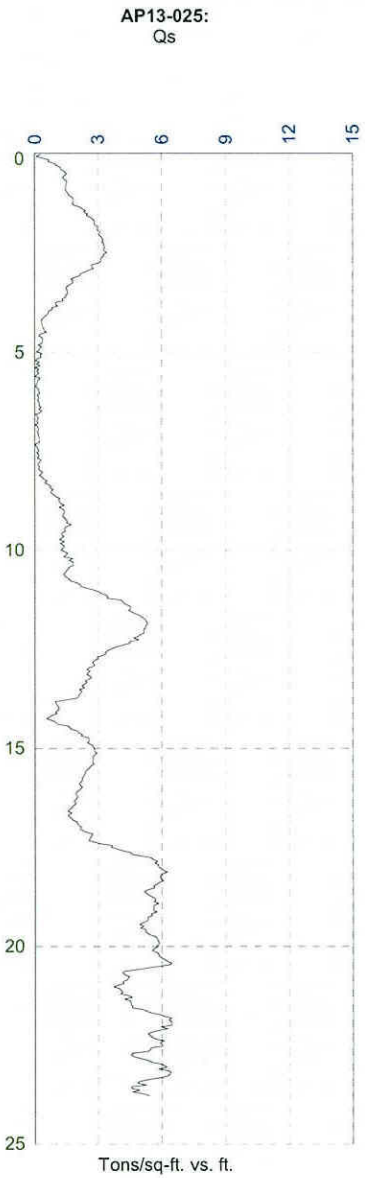

AP13-024:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

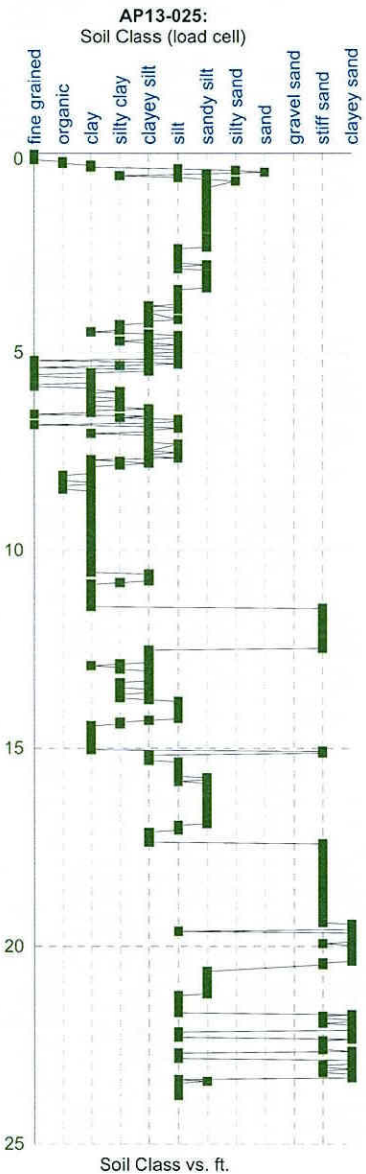

AP13-024:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

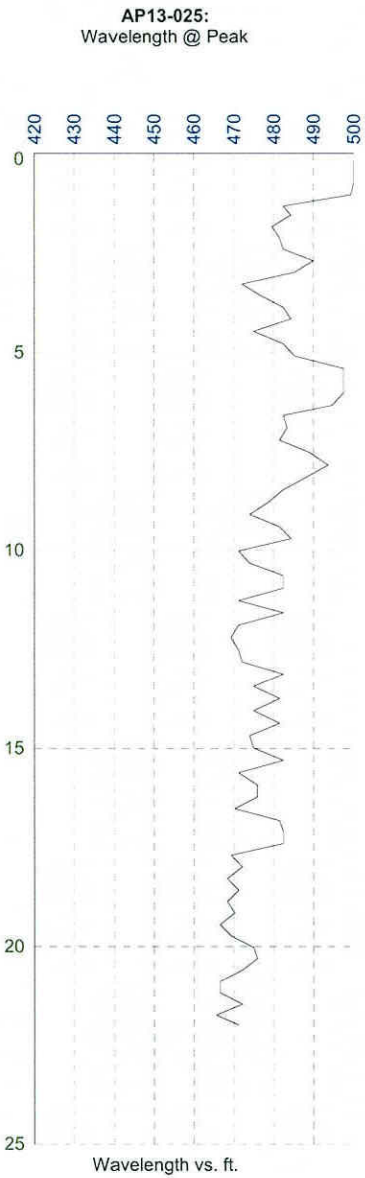

AP13-024:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

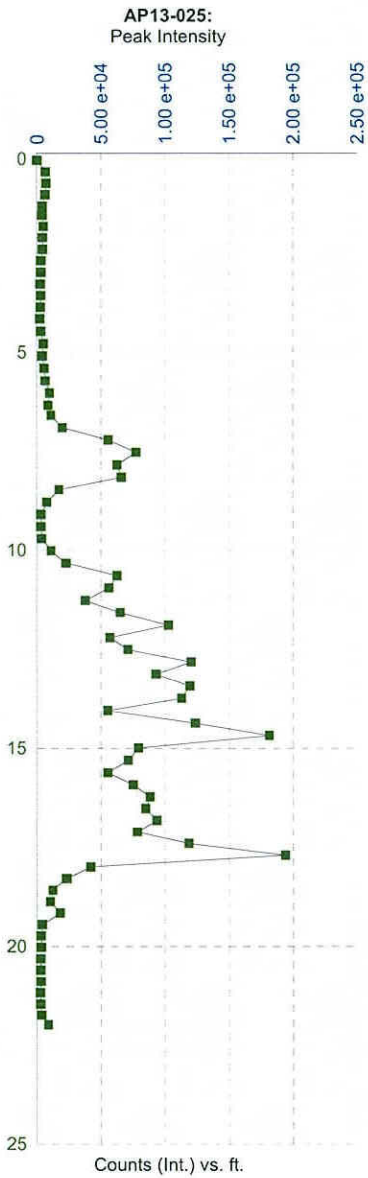

AP13-024:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

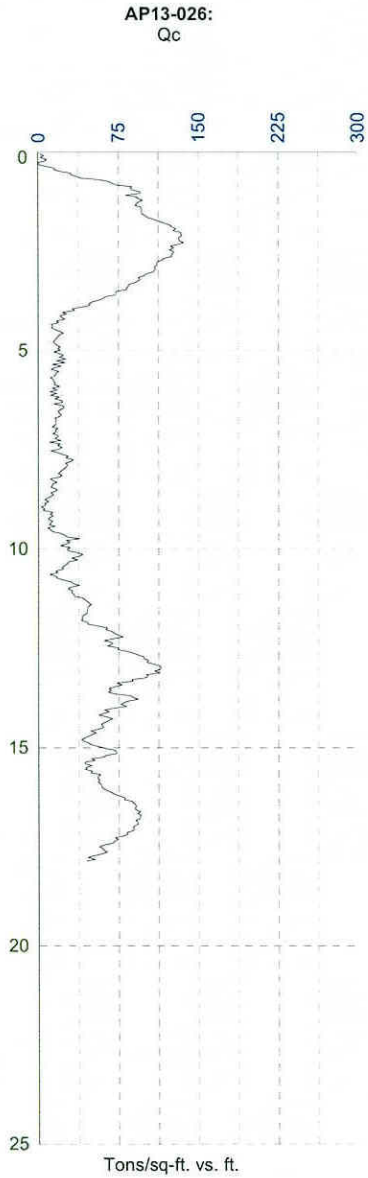

AP13-025:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

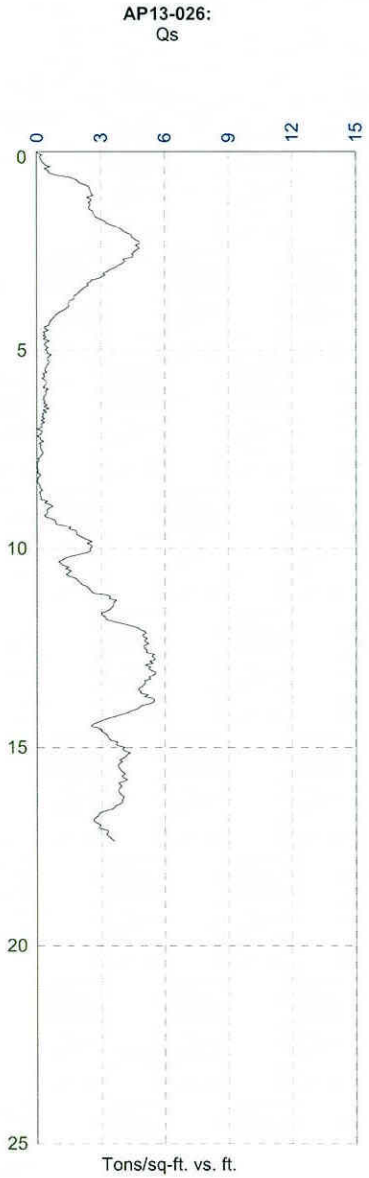

AP13-025:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

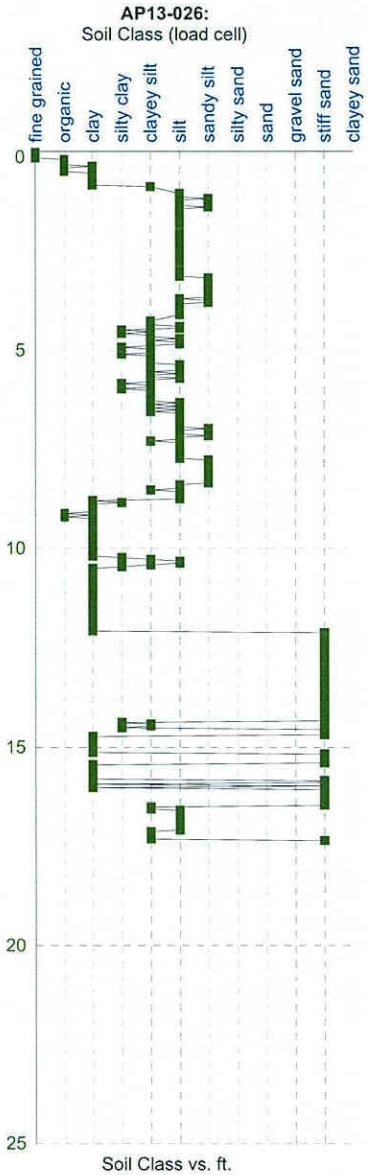

AP13-025:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

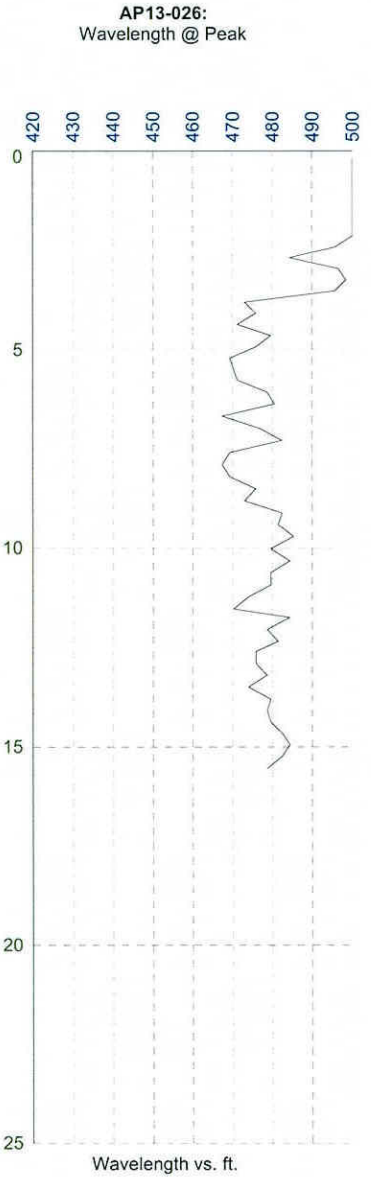

AP13-025:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

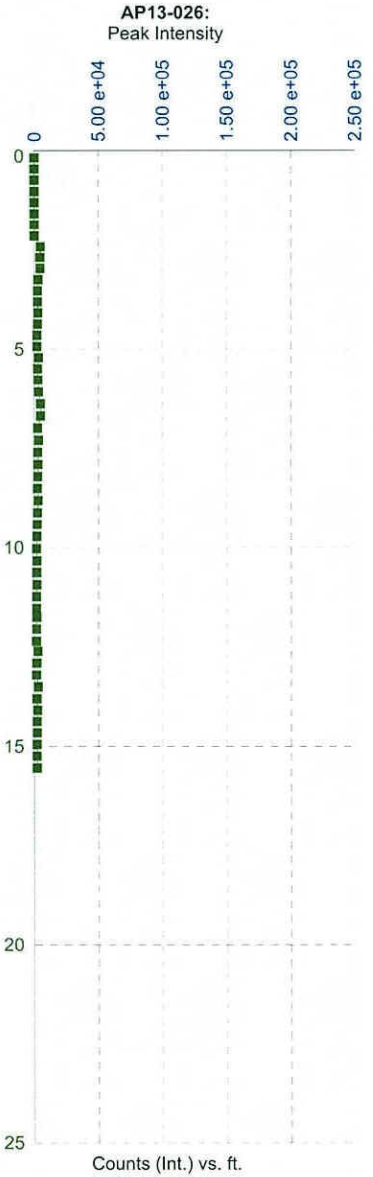

AP13-025:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

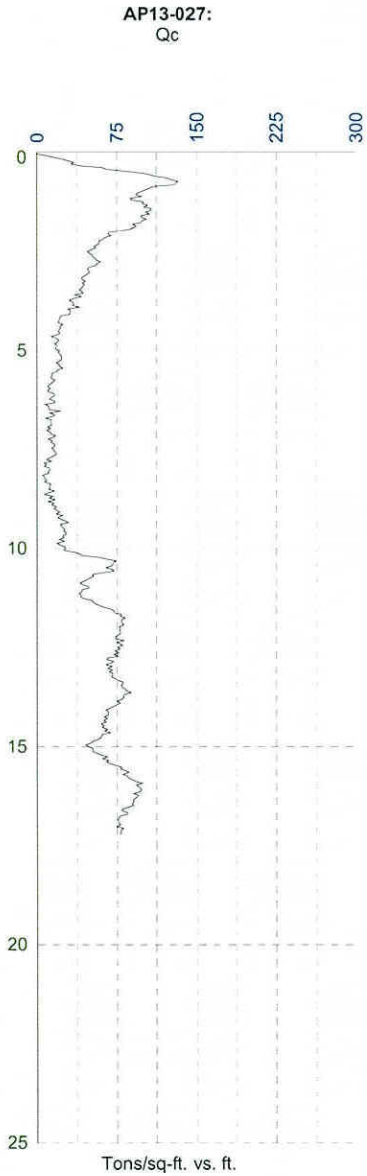

AP13-026:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

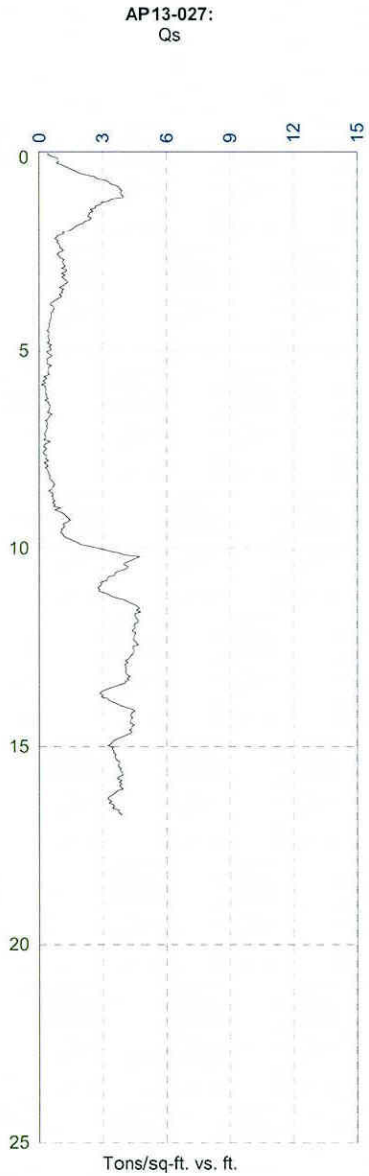

AP13-026:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

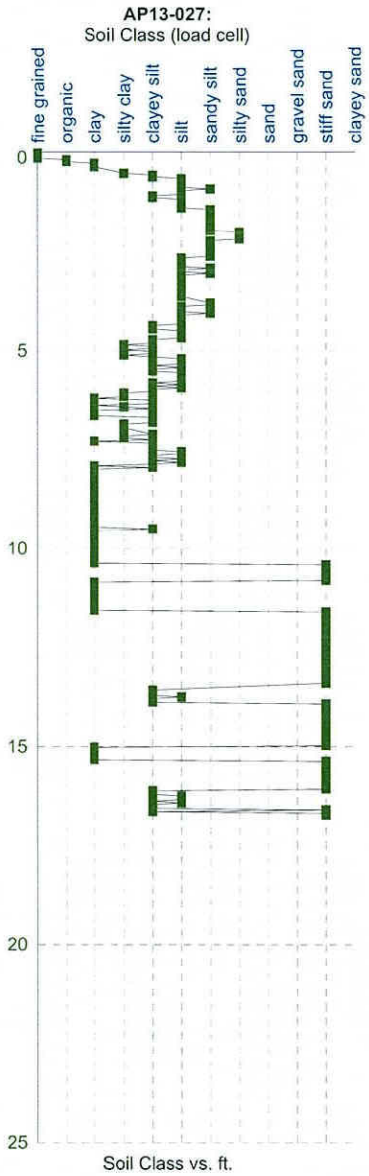

AP13-026:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

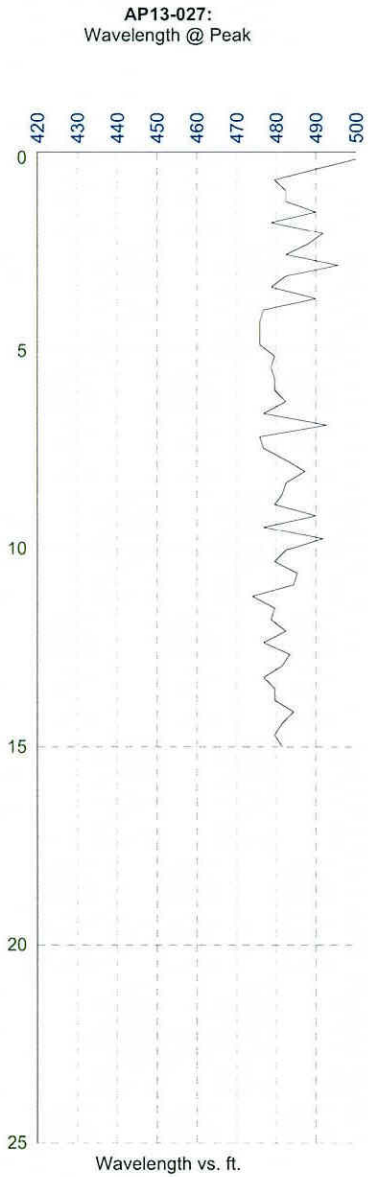

AP13-026:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

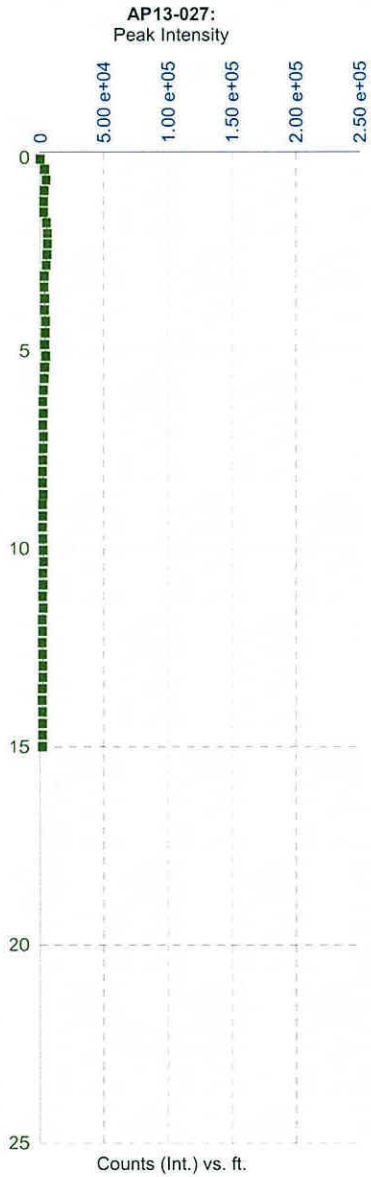

AP13-026:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

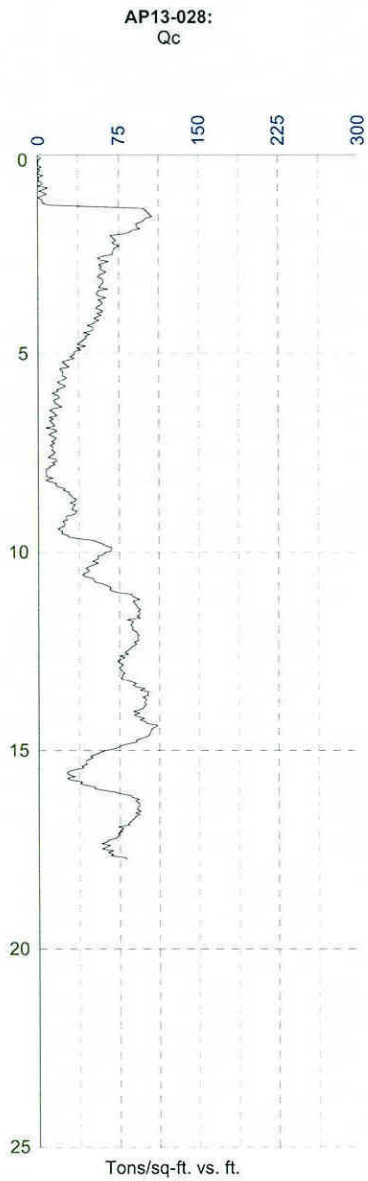

AP13-027:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

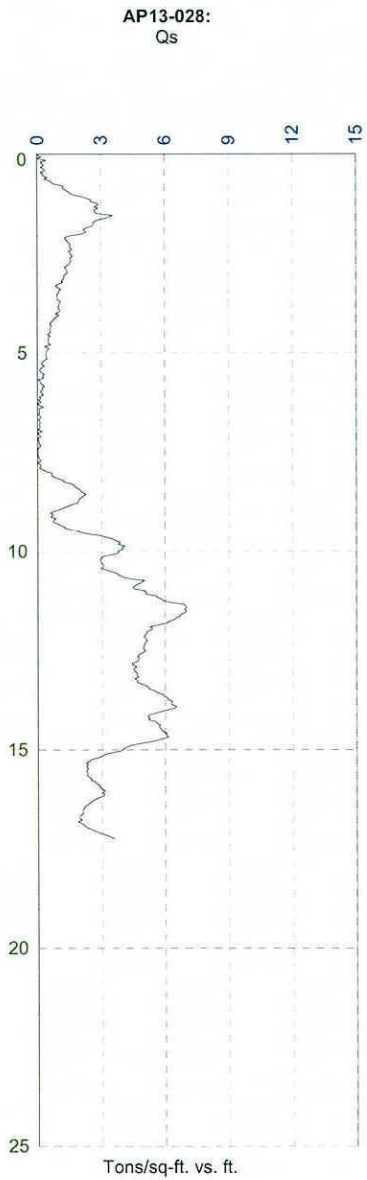

AP13-027:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

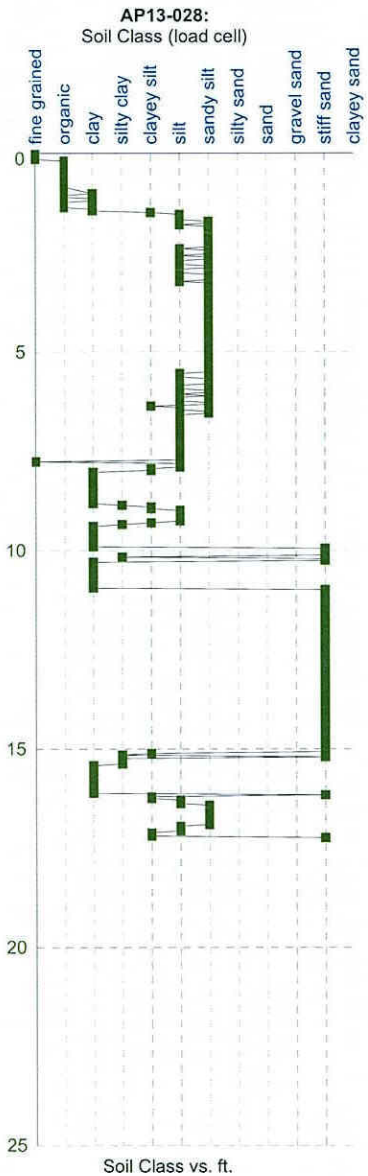

AP13-027:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

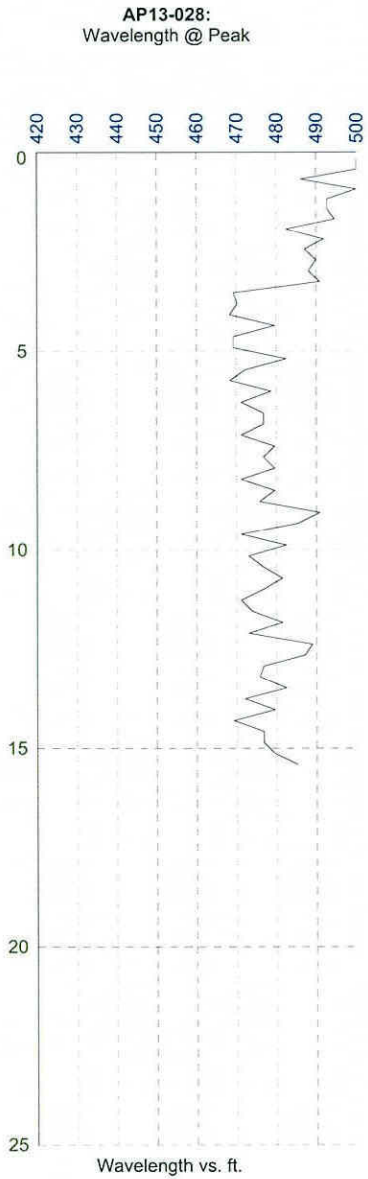

AP13-027:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

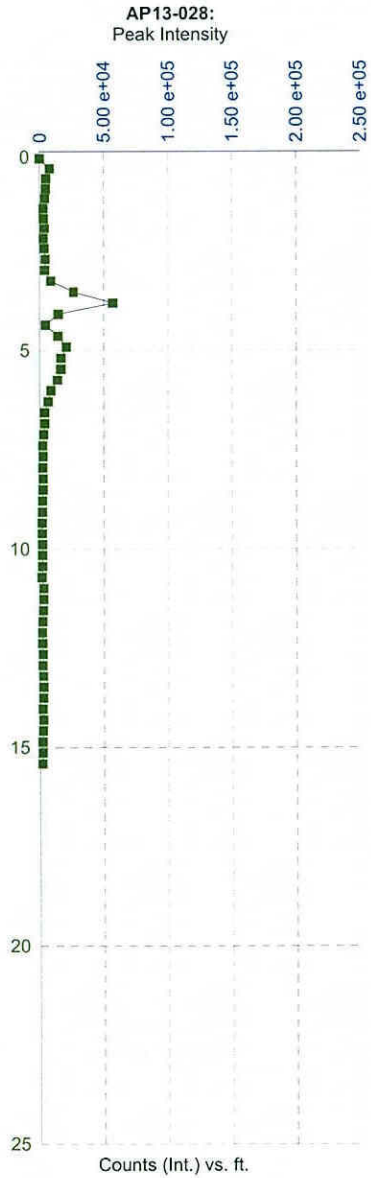

AP13-027:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

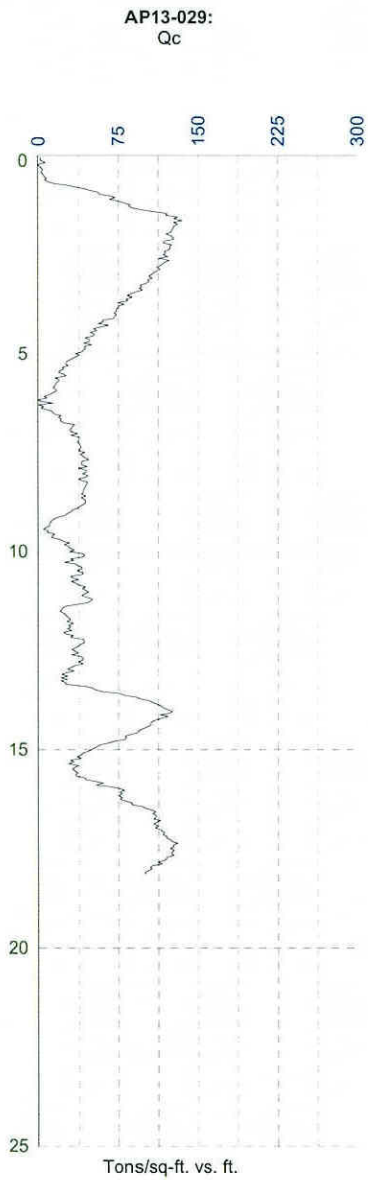

AP13-028:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

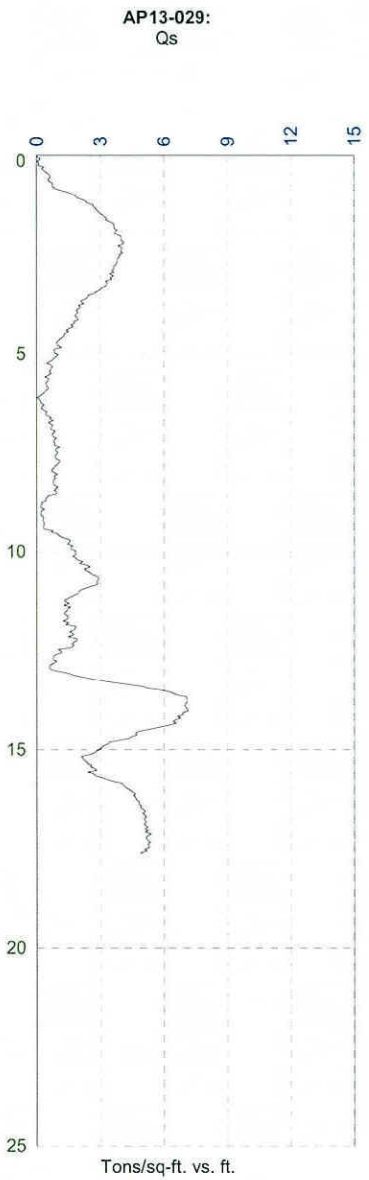

AP13-028:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

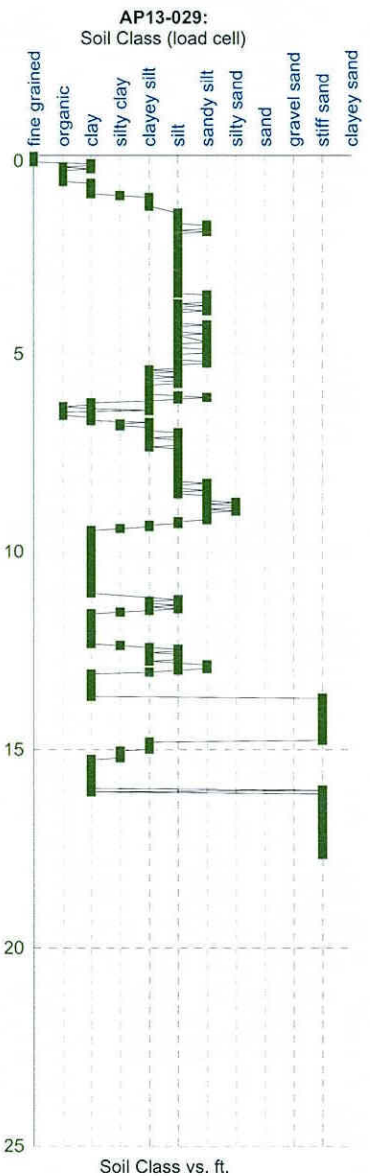

AP13-028:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

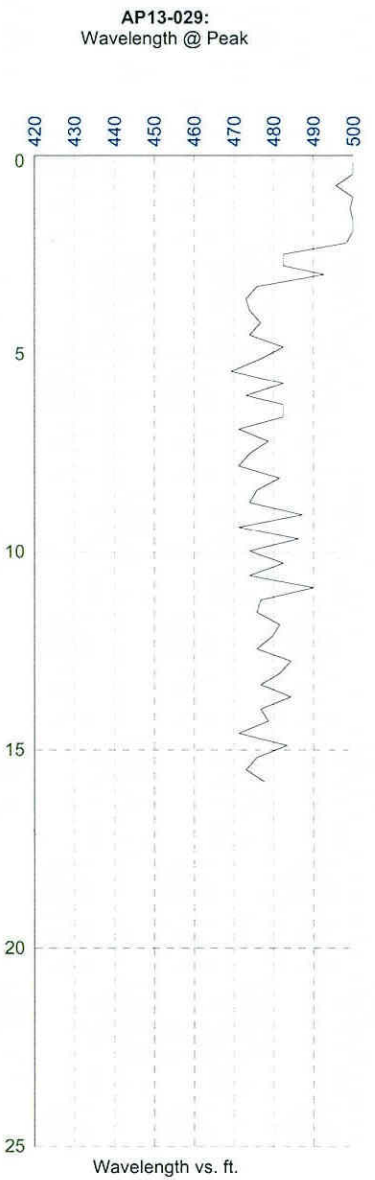

AP13-028:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

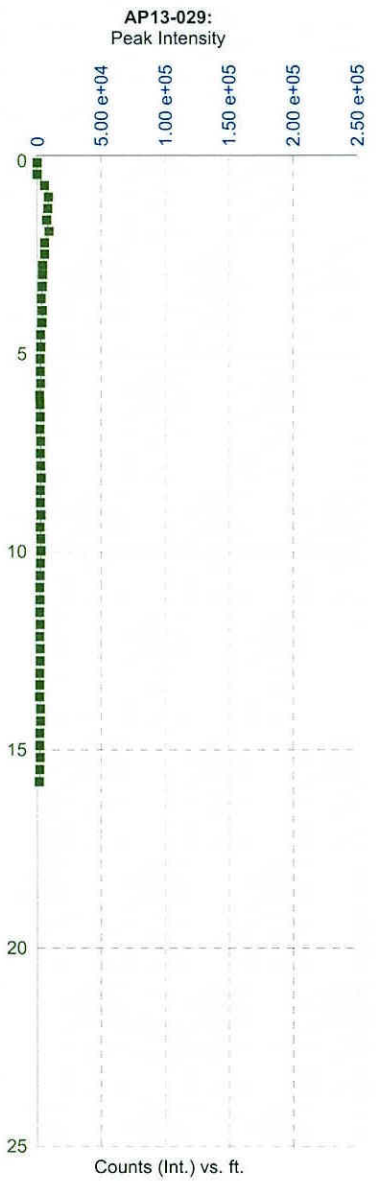

AP13-028:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

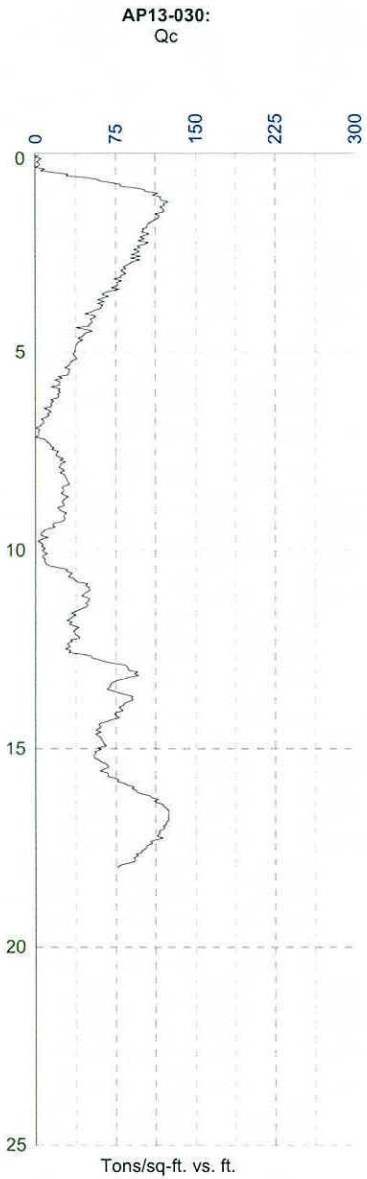

AP13-029:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

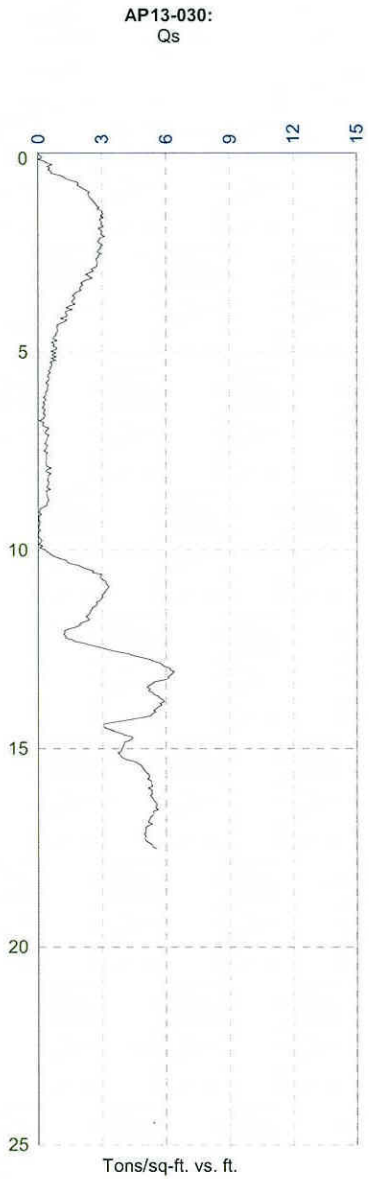

AP13-029:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

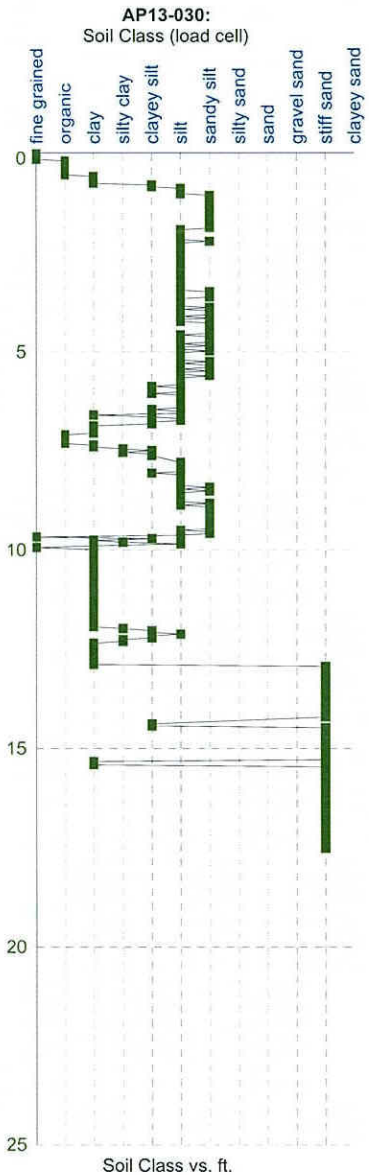

AP13-029:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

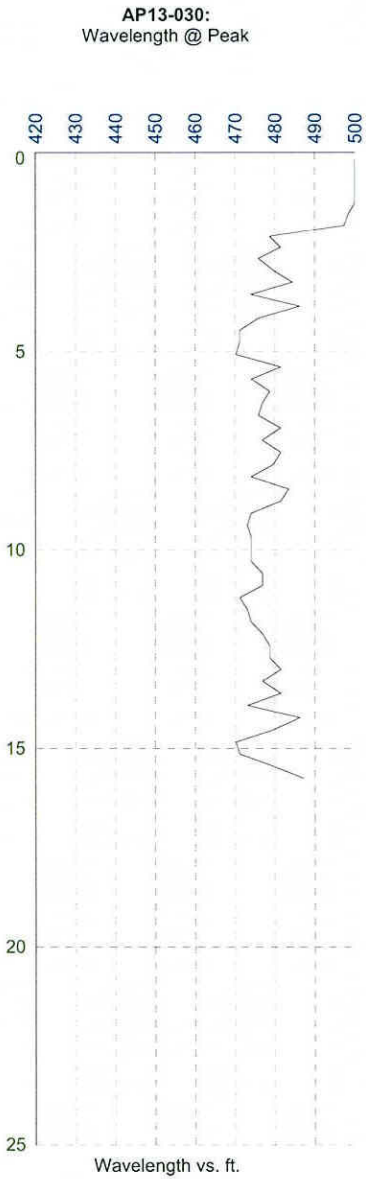

AP13-029:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

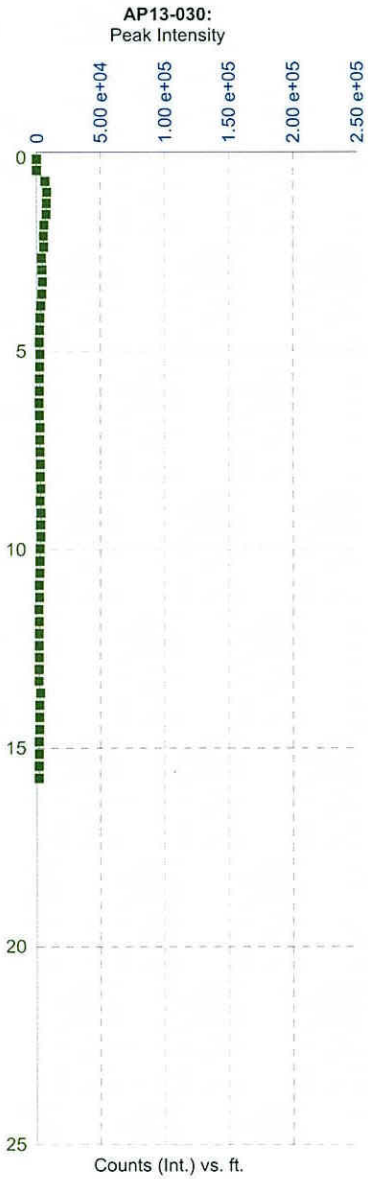

AP13-029:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

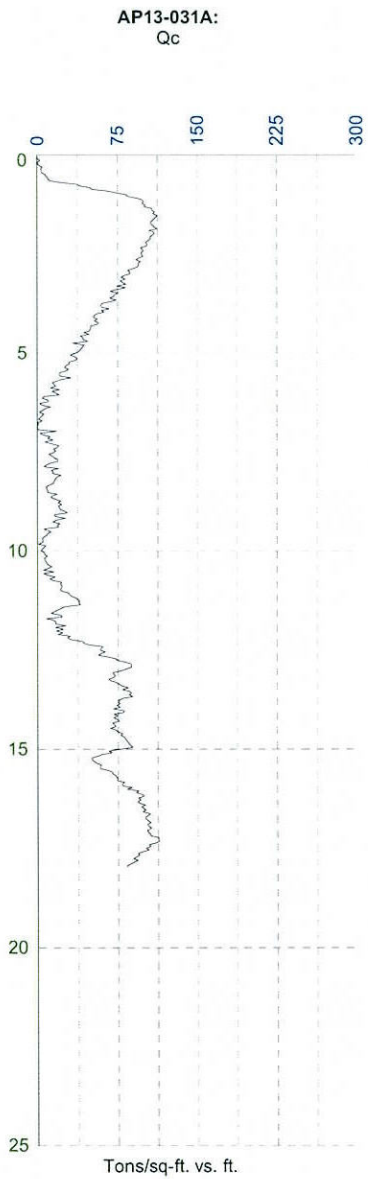

AP13-030:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

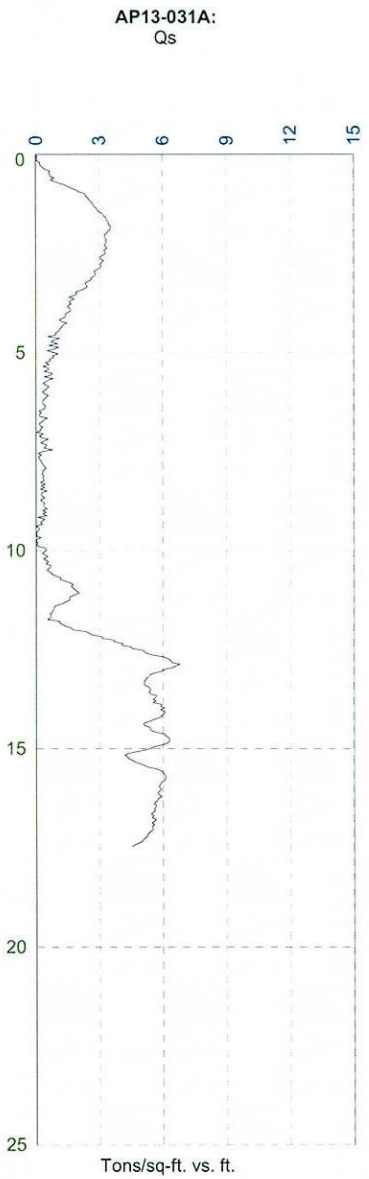

AP13-030:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

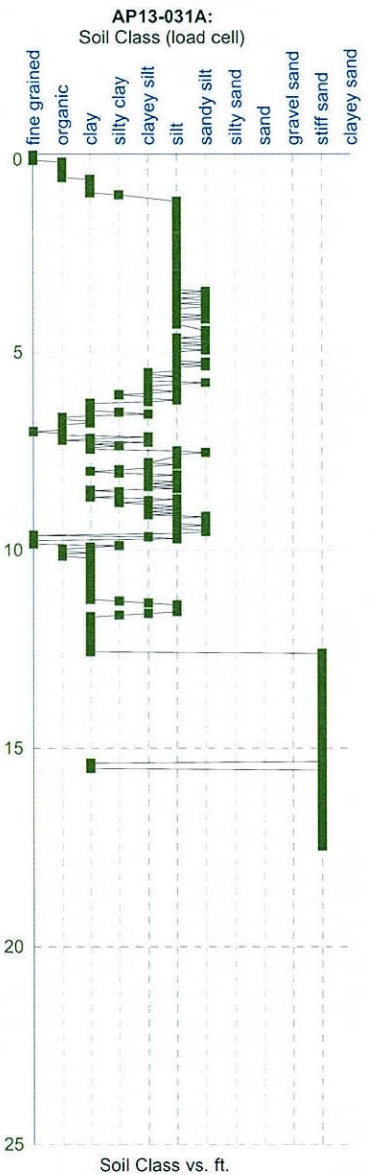

AP13-030:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

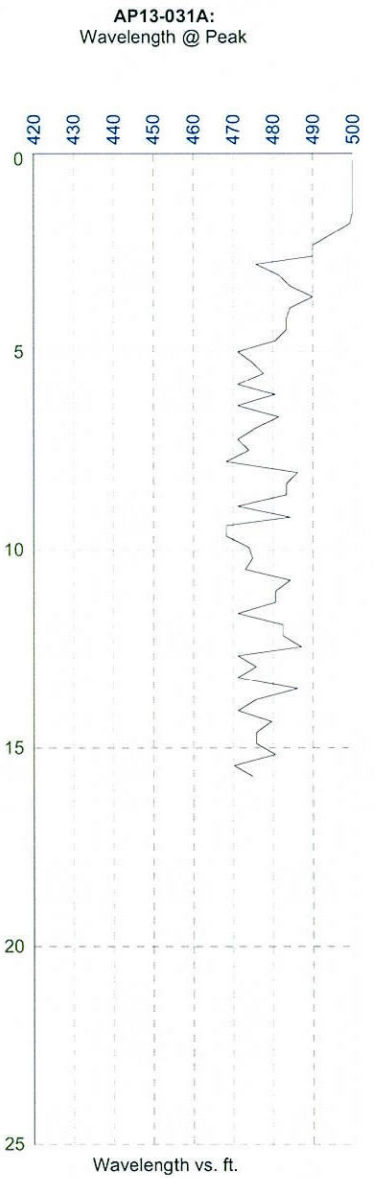

AP13-030:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

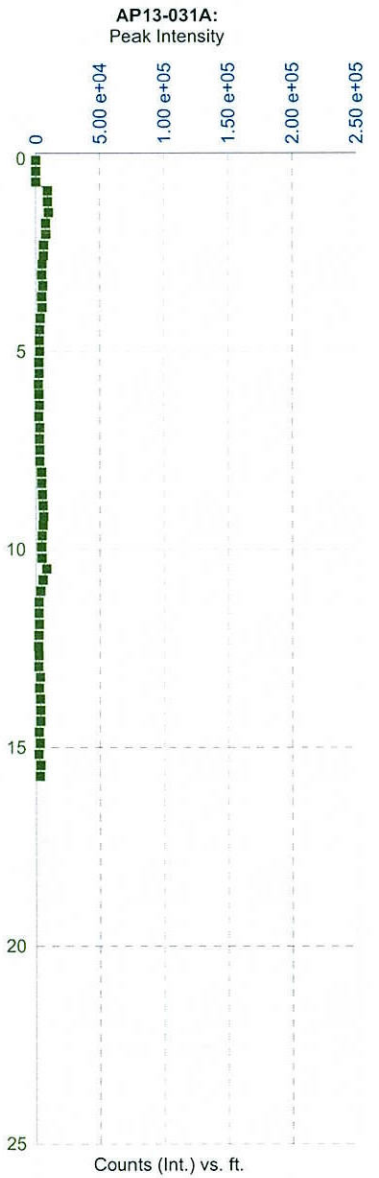

AP13-030:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

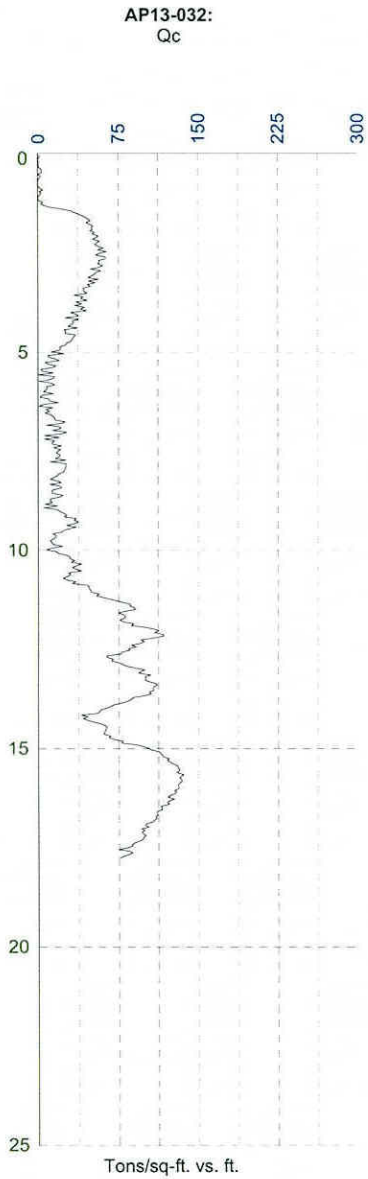

AP13-031A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

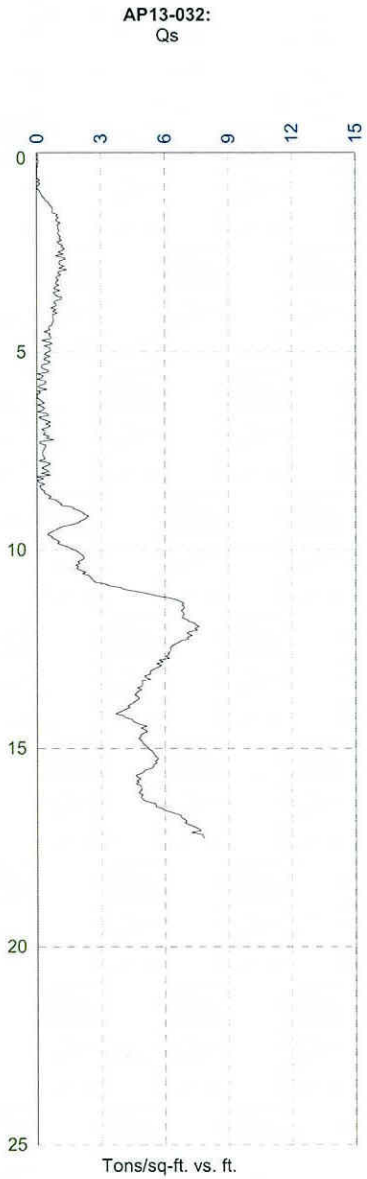

AP13-031A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

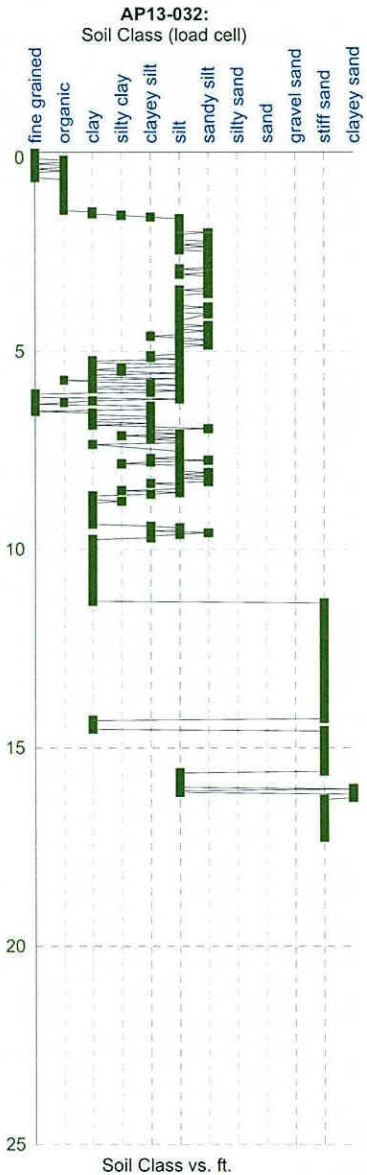

AP13-031A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

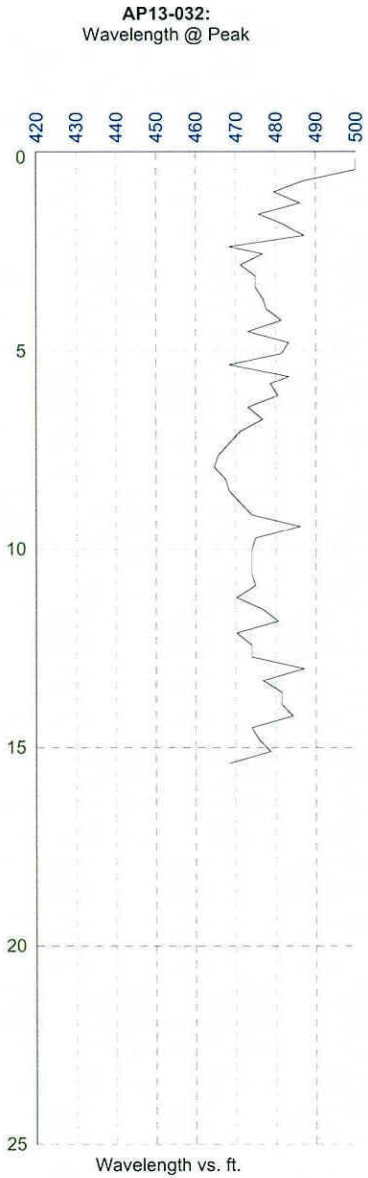

AP13-031A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

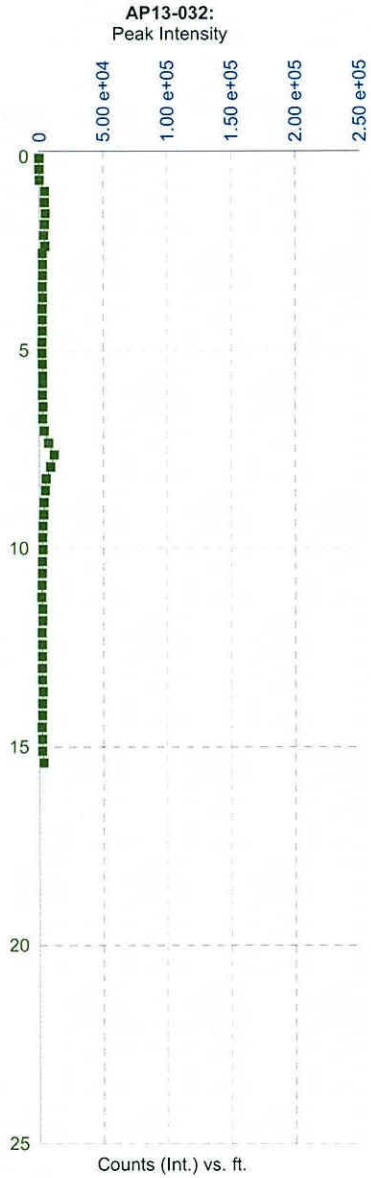

AP13-031A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

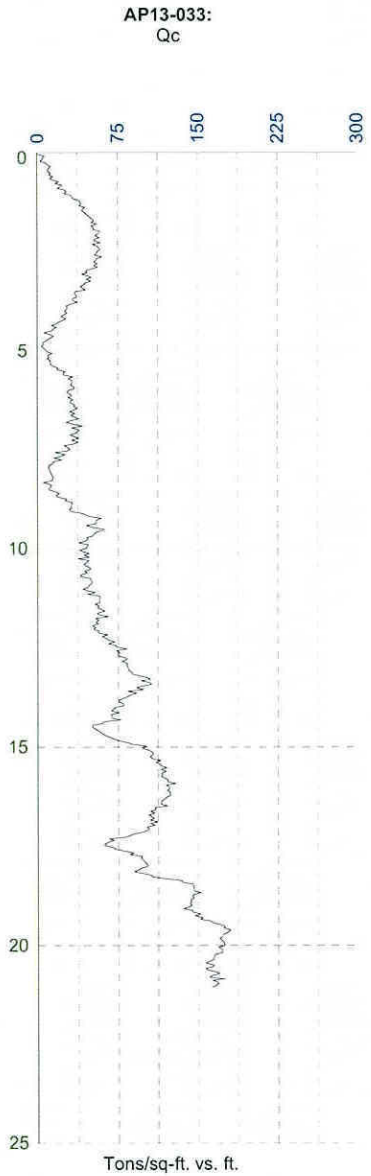

AP13-032:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

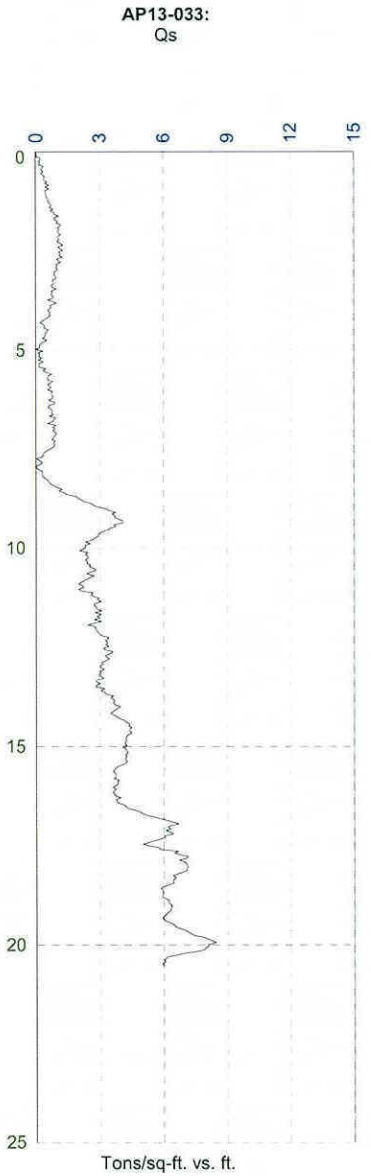

AP13-032:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

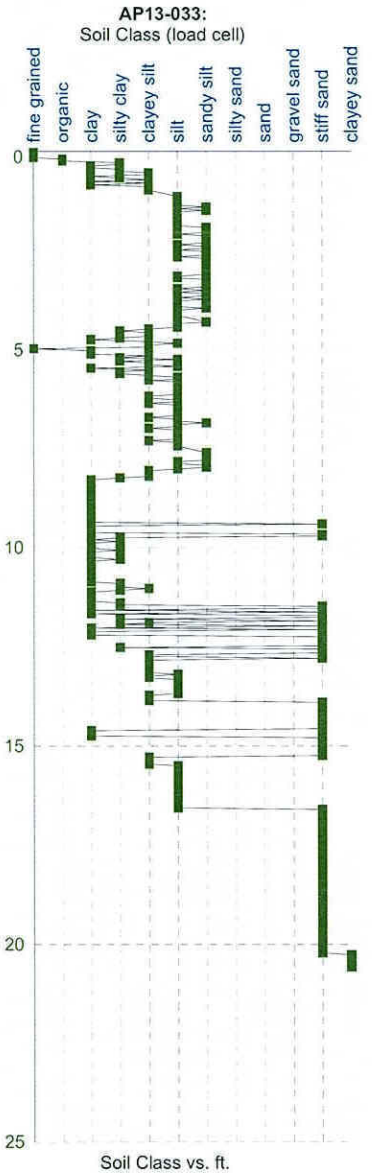

AP13-032:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

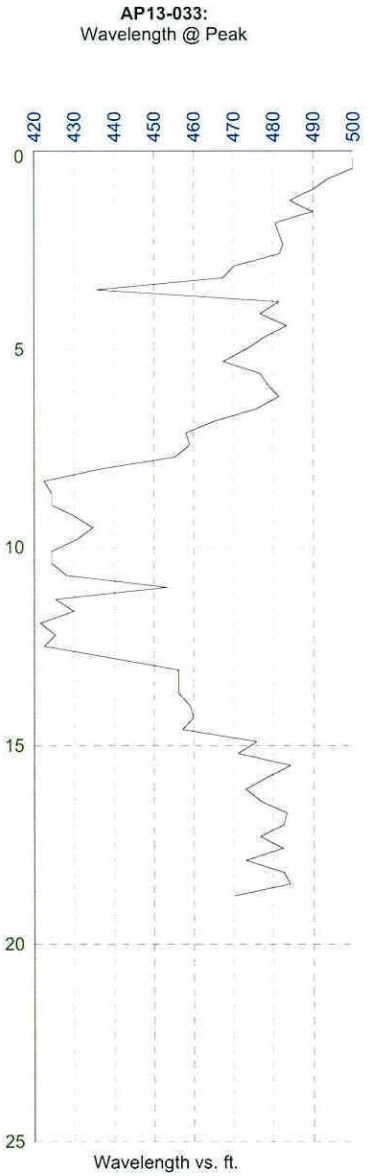

AP13-032:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

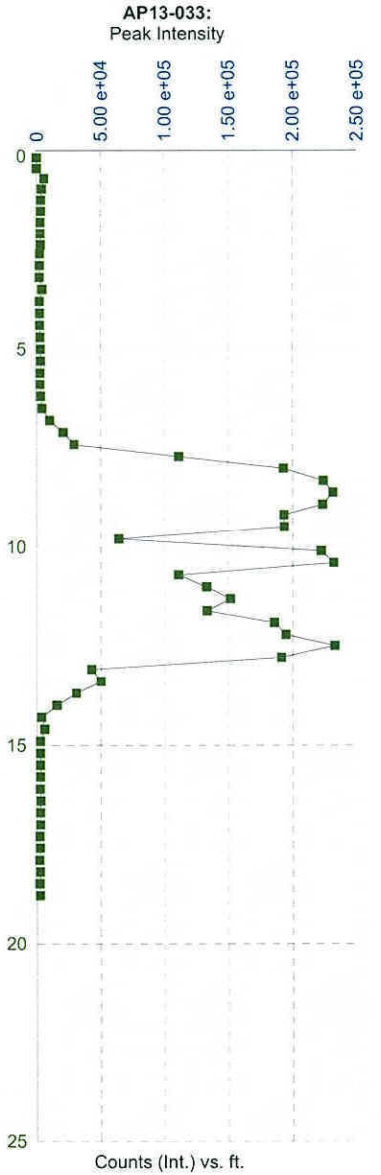

AP13-032:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

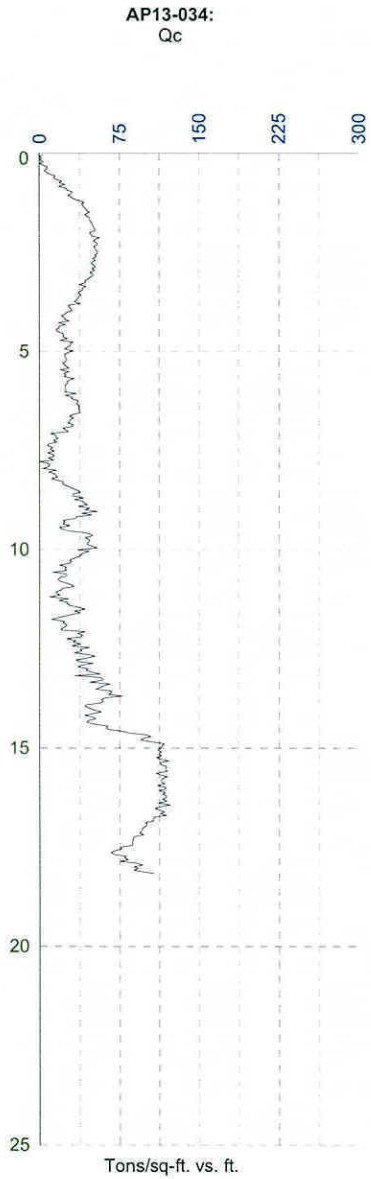

AP13-033:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

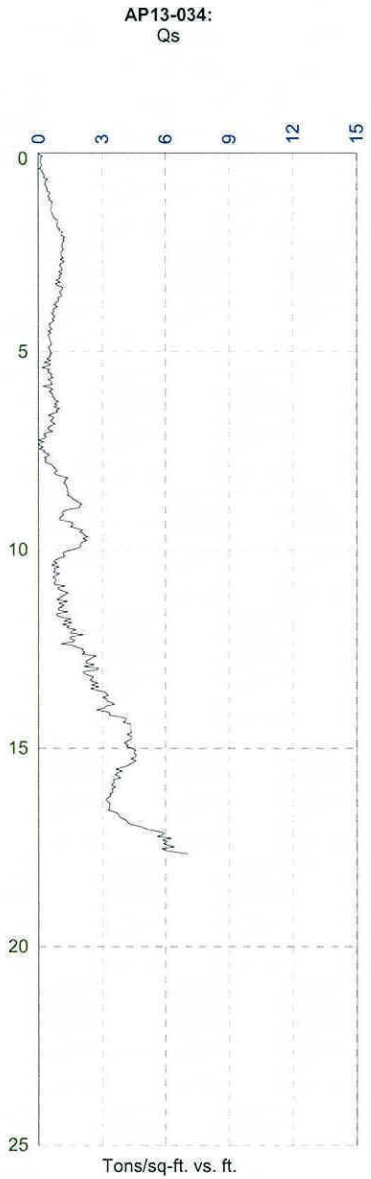

AP13-033:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

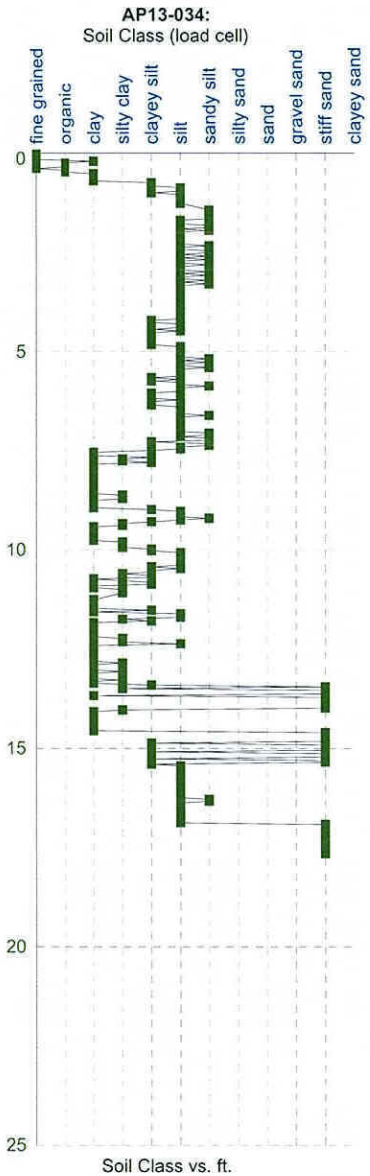

AP13-033:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

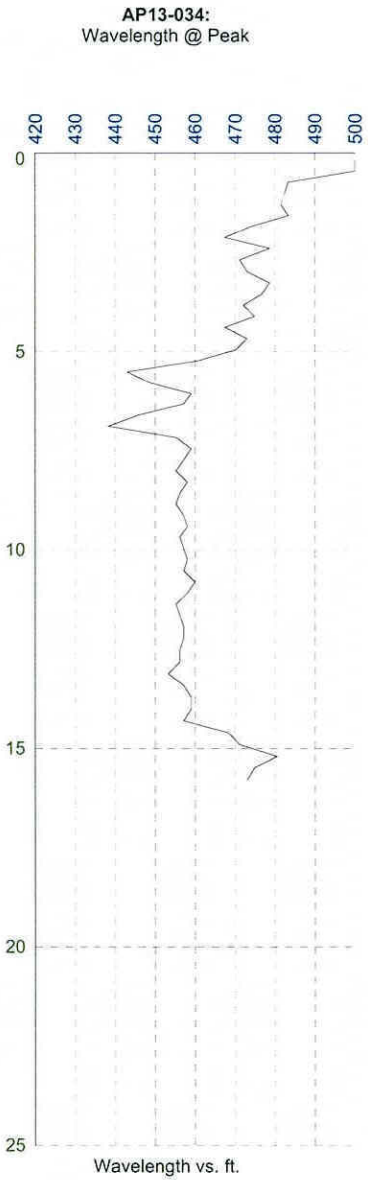

AP13-033:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

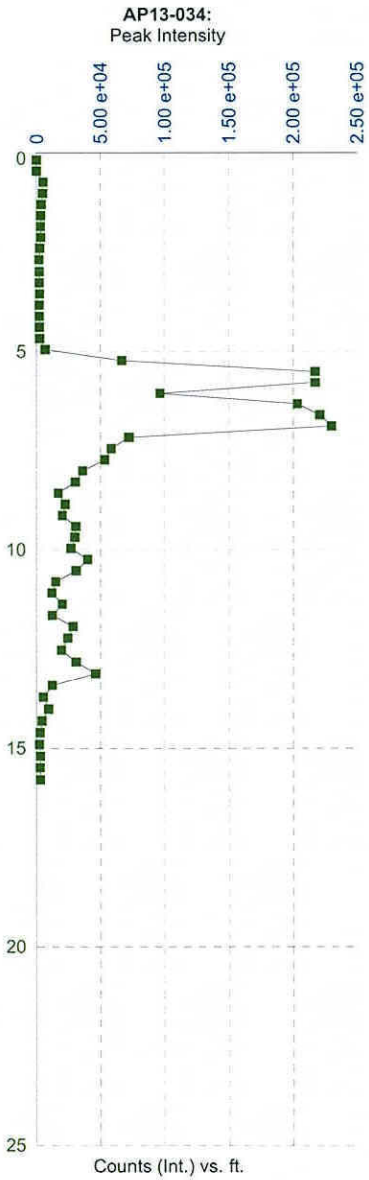

AP13-033:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

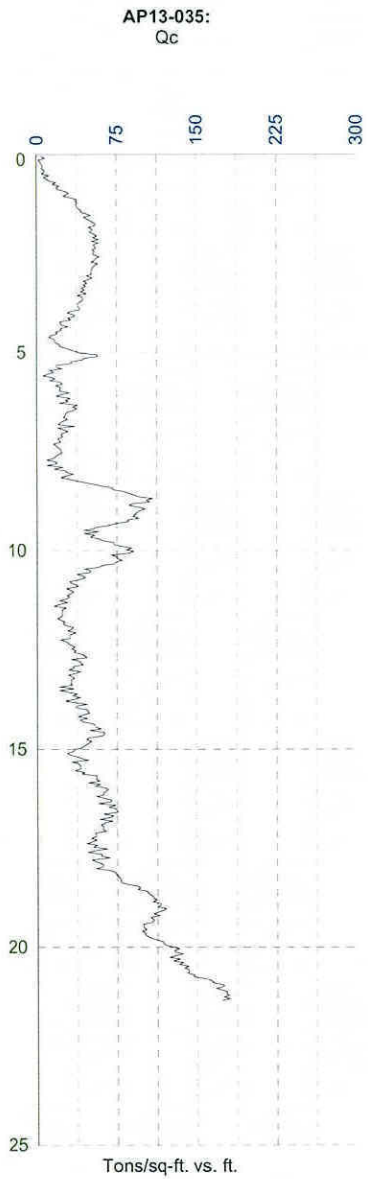

AP13-034:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

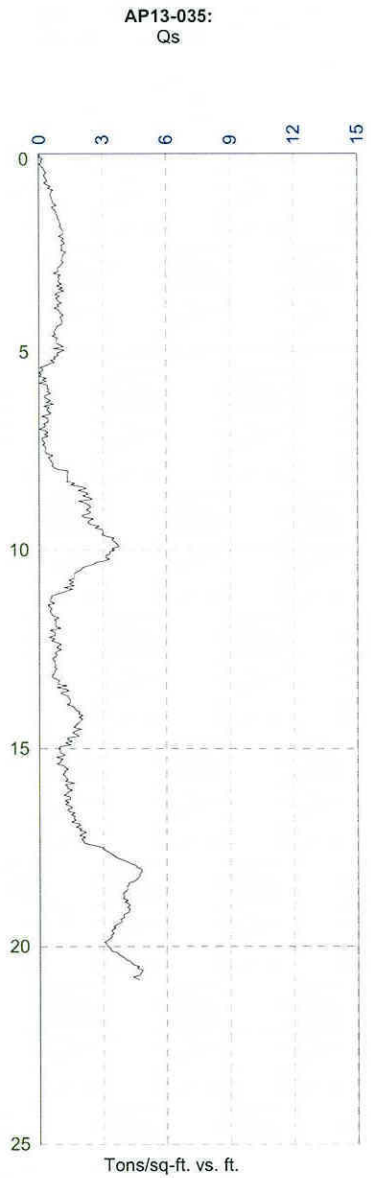

AP13-034:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

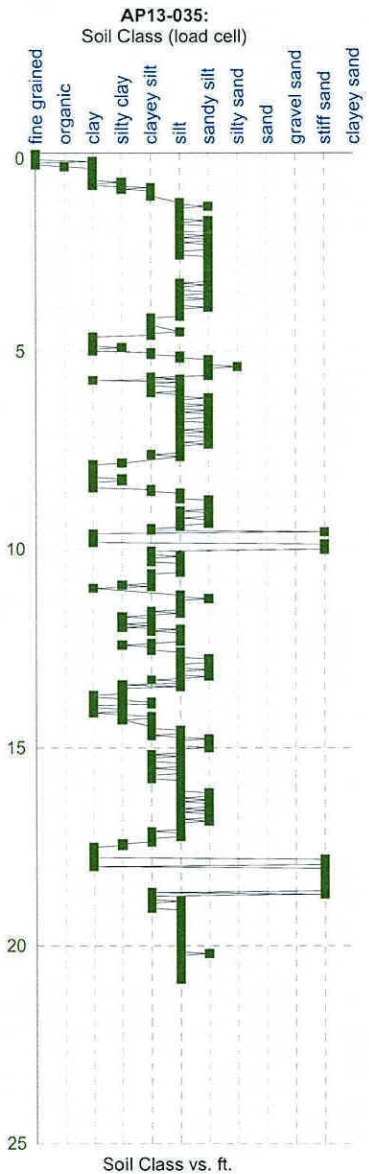

AP13-034:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

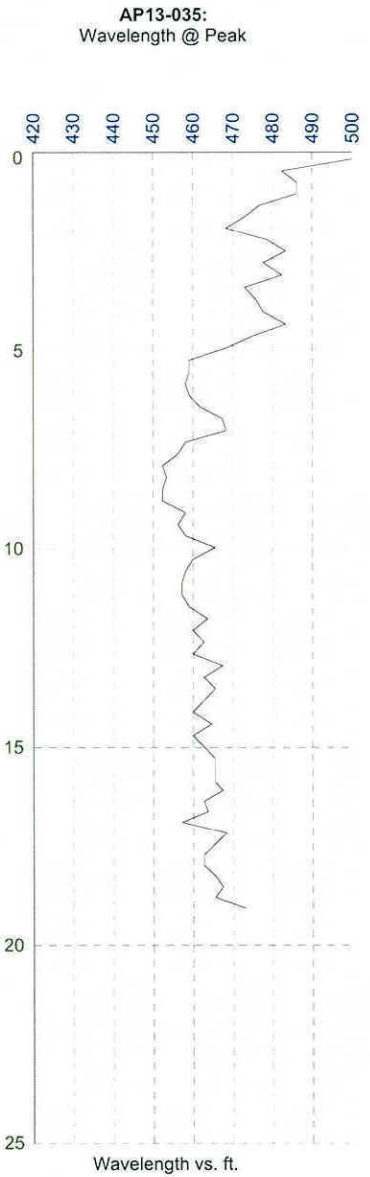

AP13-034:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

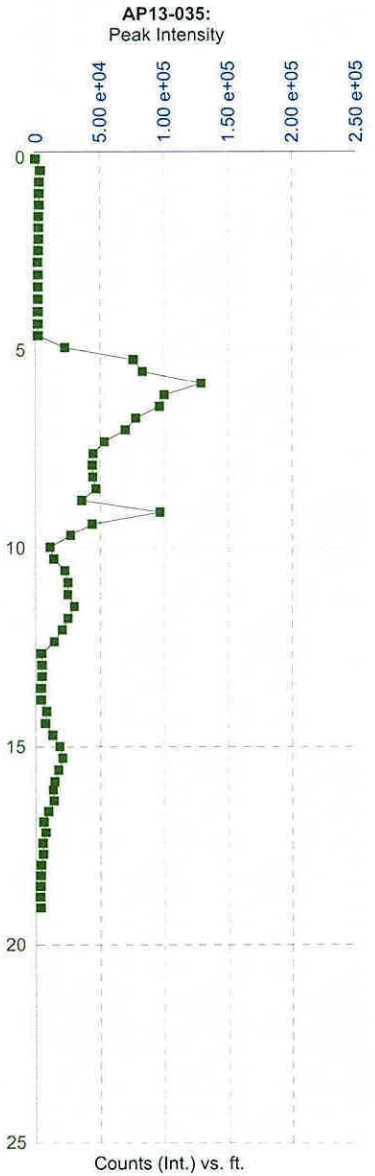

AP13-034:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

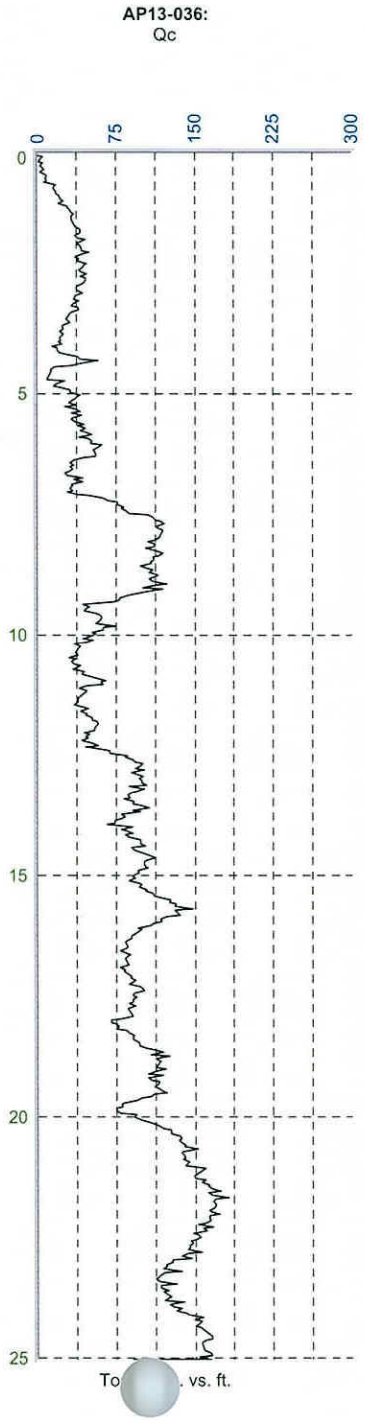

AP13-035:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

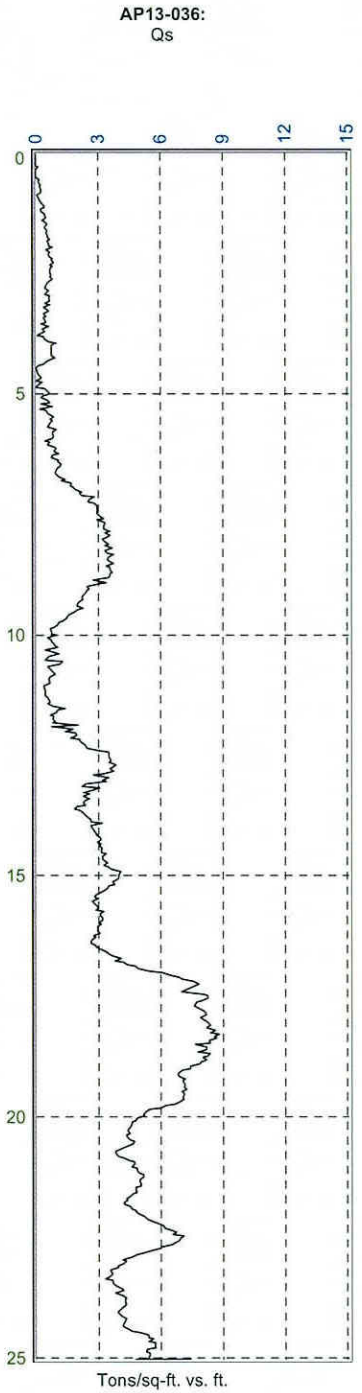

AP13-035:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

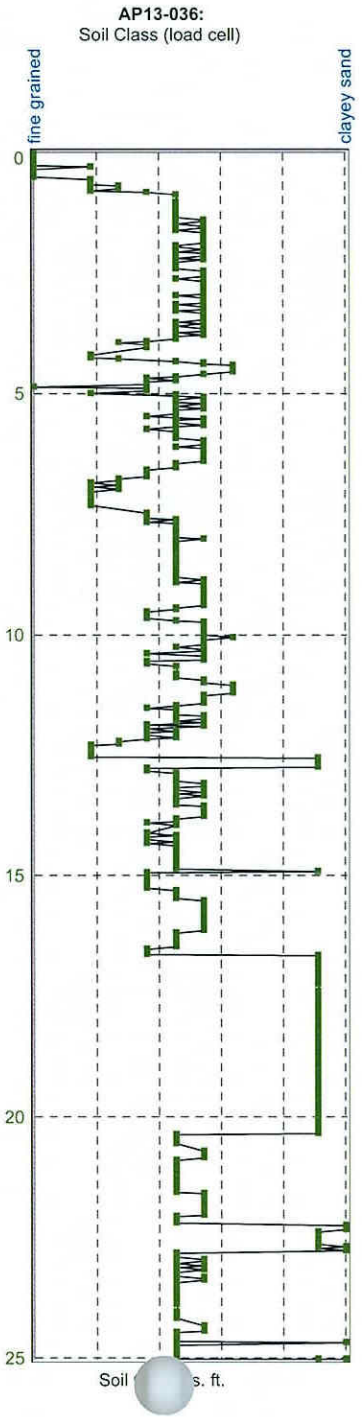

AP13-035:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

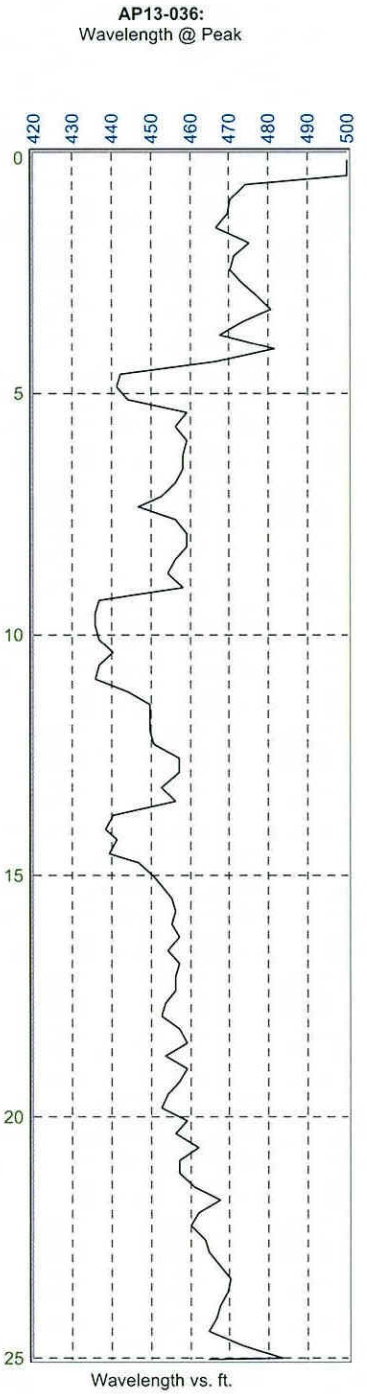

AP13-035:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

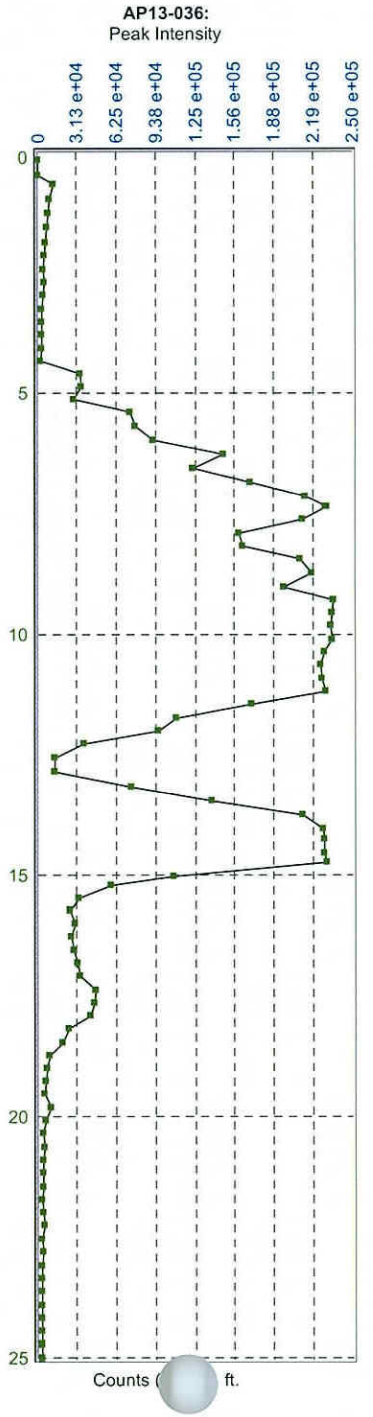

AP13-035:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

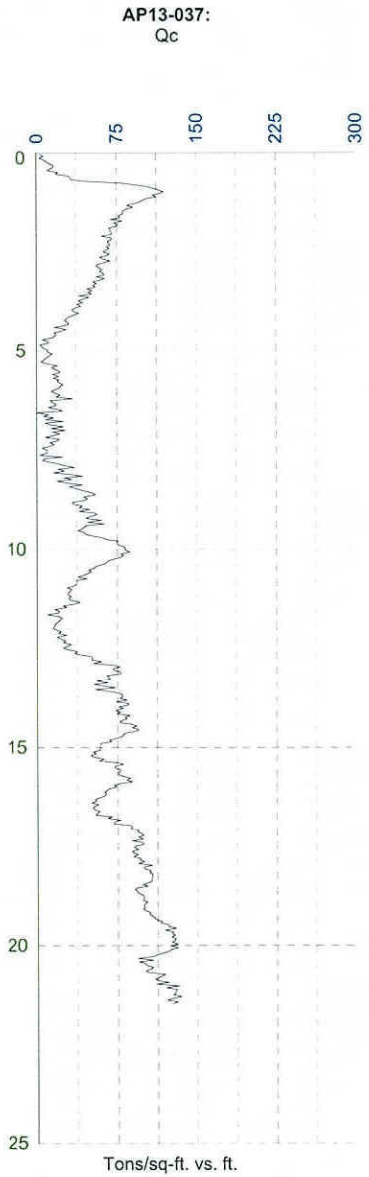

AP13-036:
Qc
0
75
150
225
300
0
5
10
15
20
25
To . vs. ft.

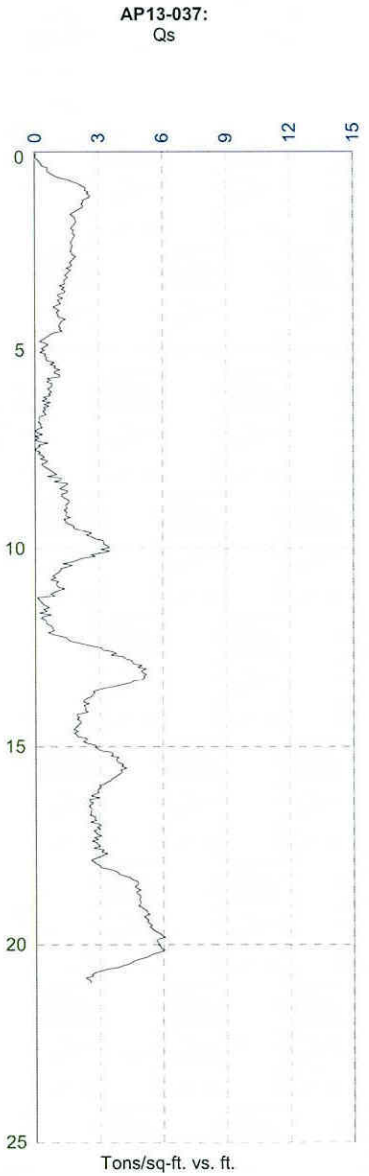

AP13-036:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

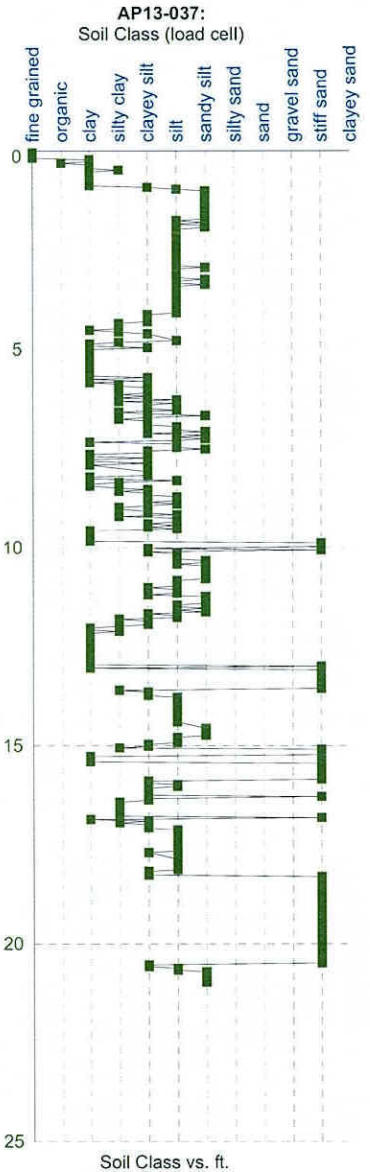

AP13-036:
Soil Class (load cell)
fine grained
clayey sand
0
5
10
15
20
25
Soil s. ft.

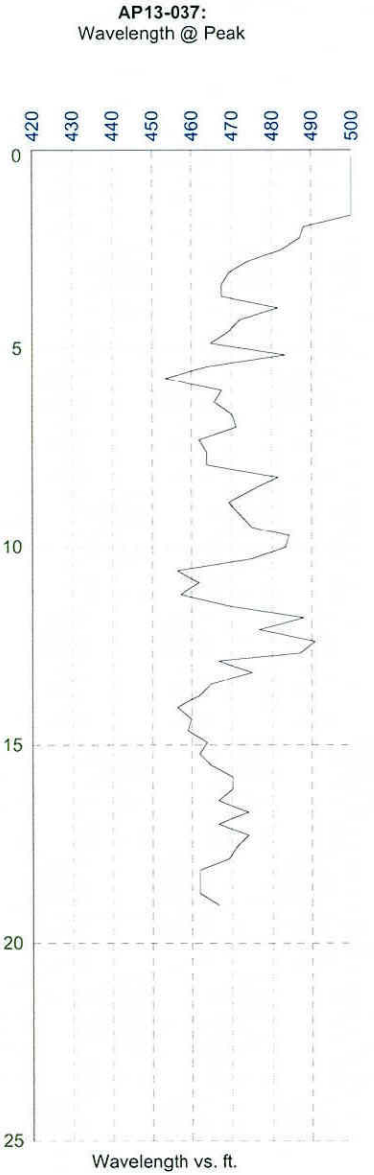

AP13-036:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

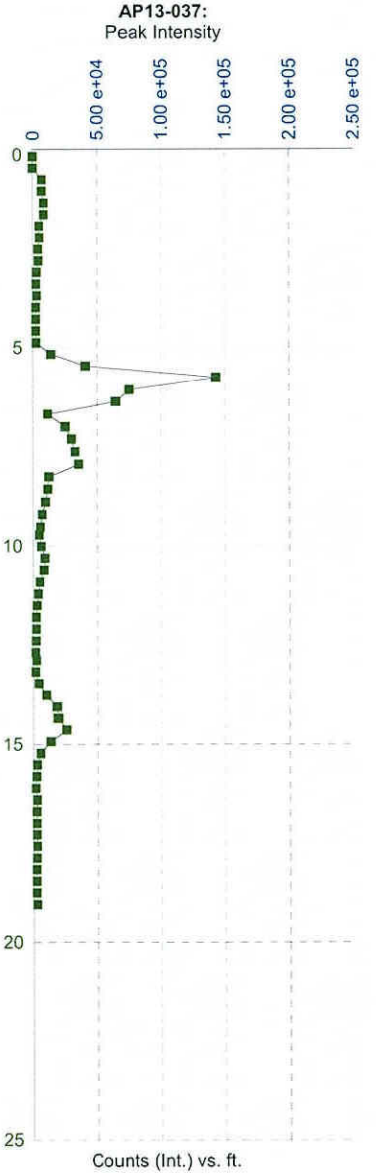

AP13-036:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts ( ft.

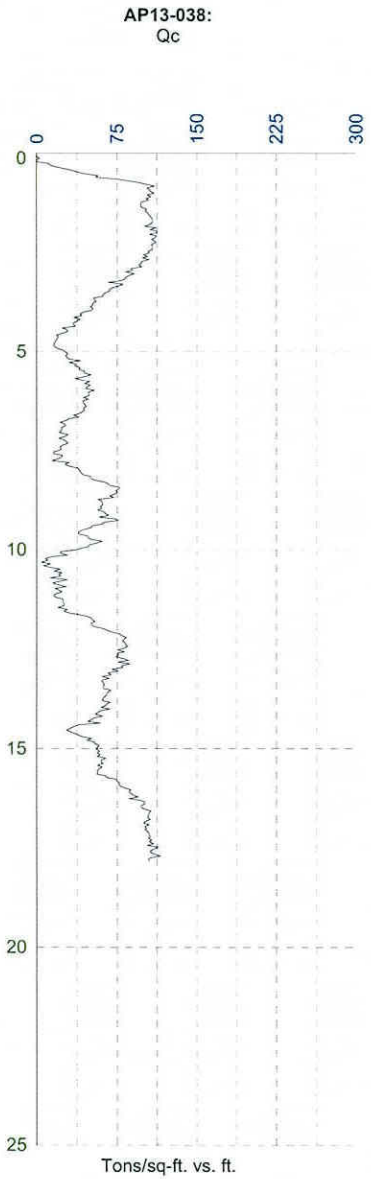

AP13-037:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

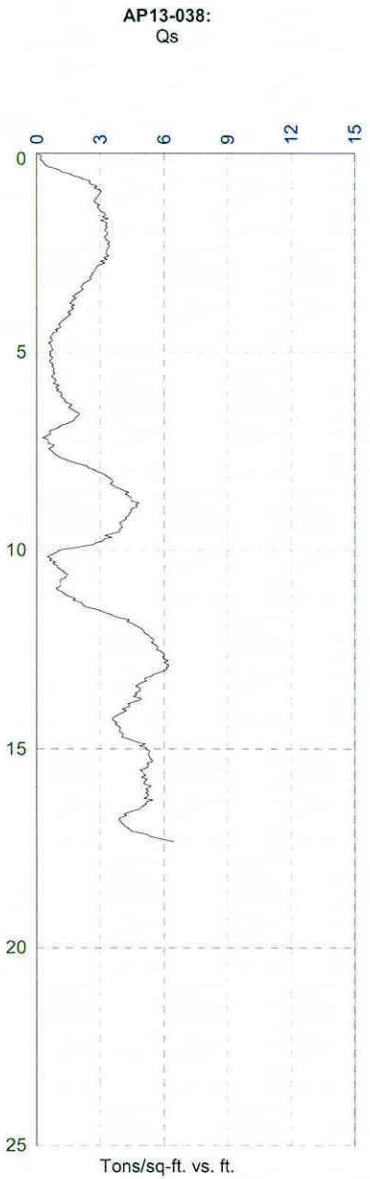

AP13-037:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

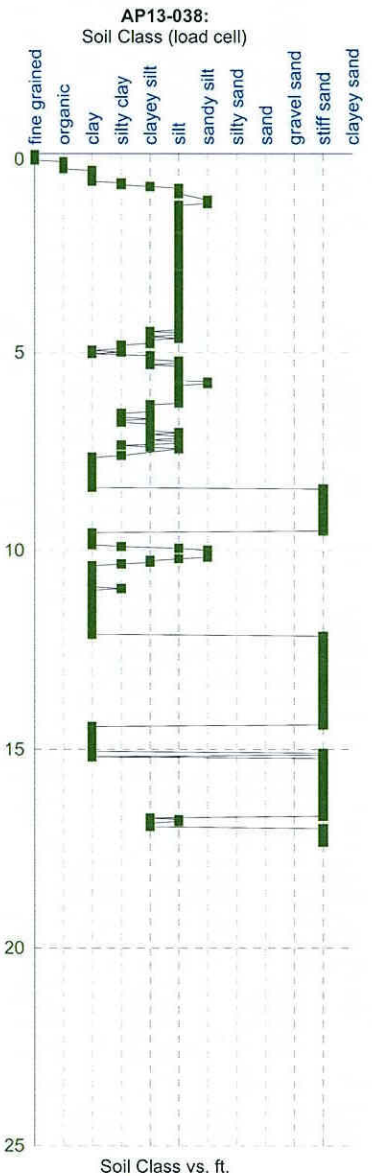

AP13-037:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

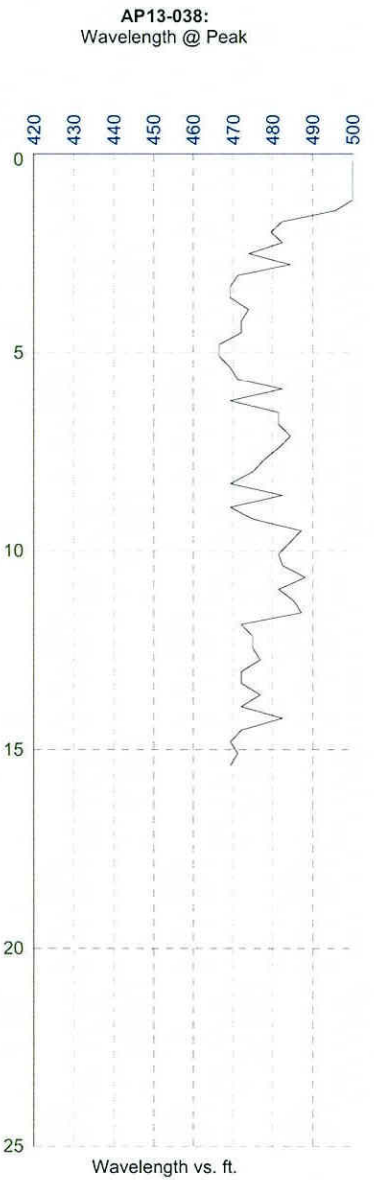

AP13-037:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

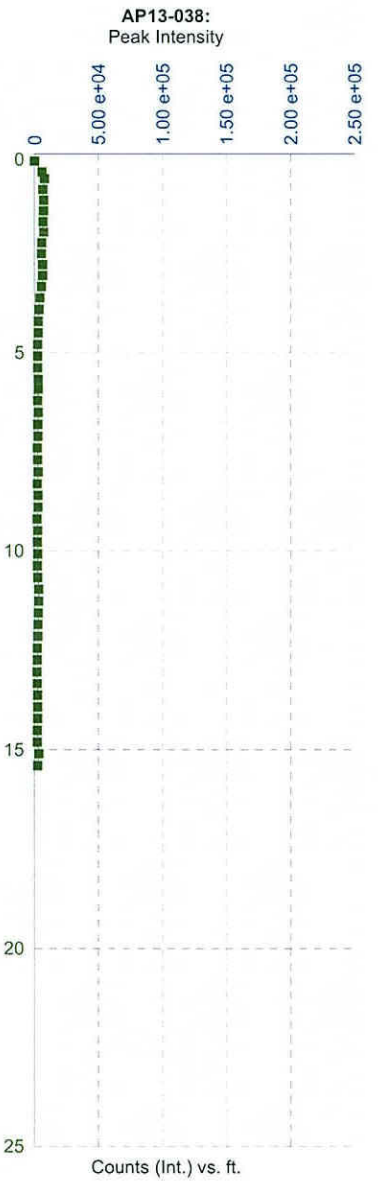

AP13-037:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

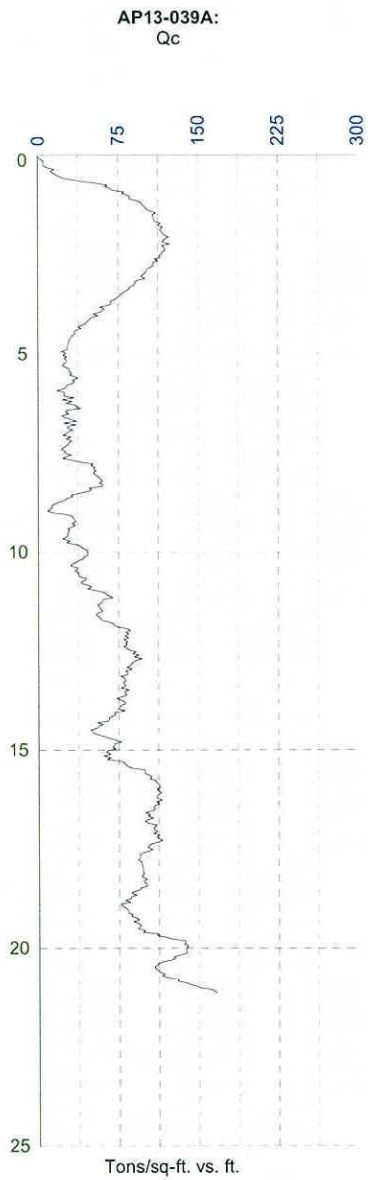

AP13-038:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

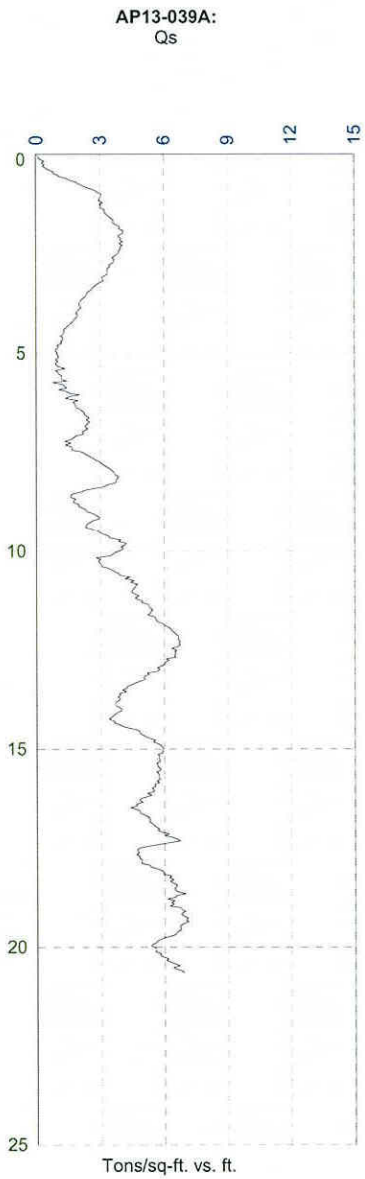

AP13-038:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

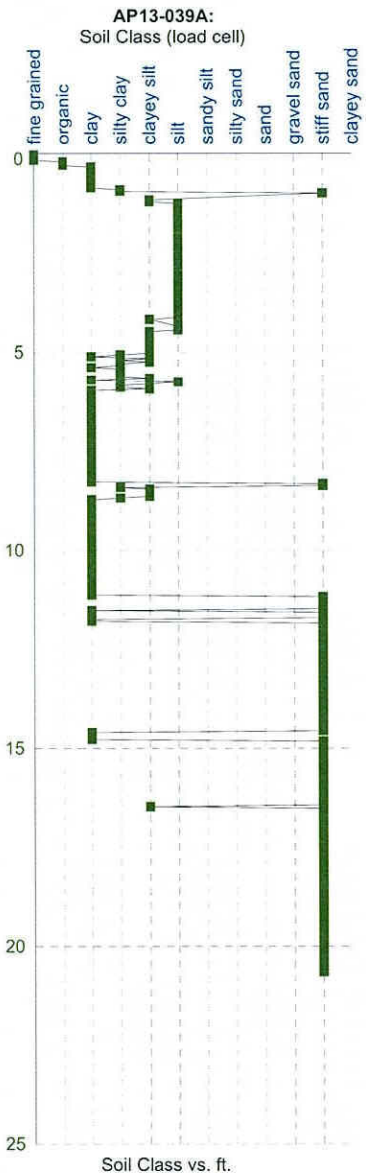

AP13-038:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

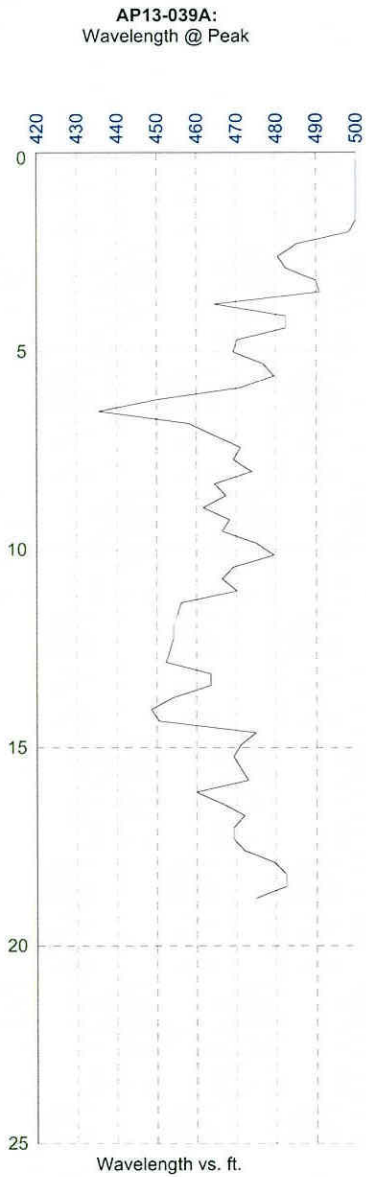

AP13-038:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

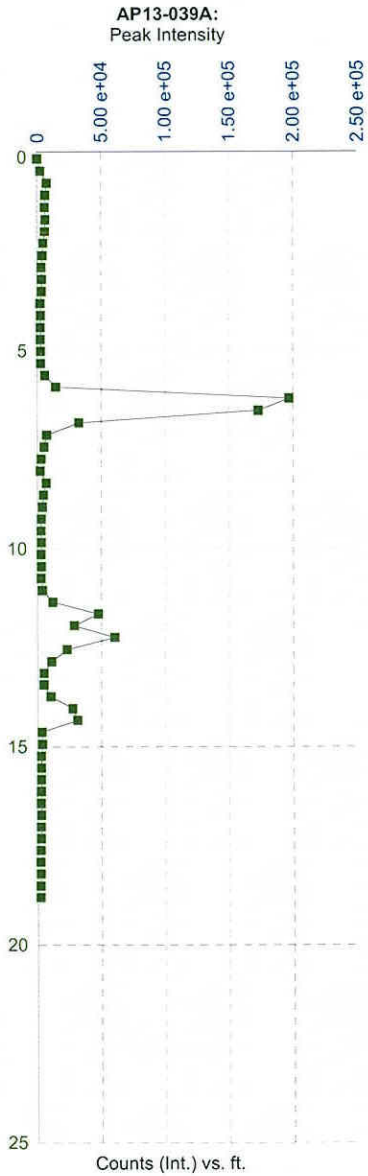

AP13-038:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

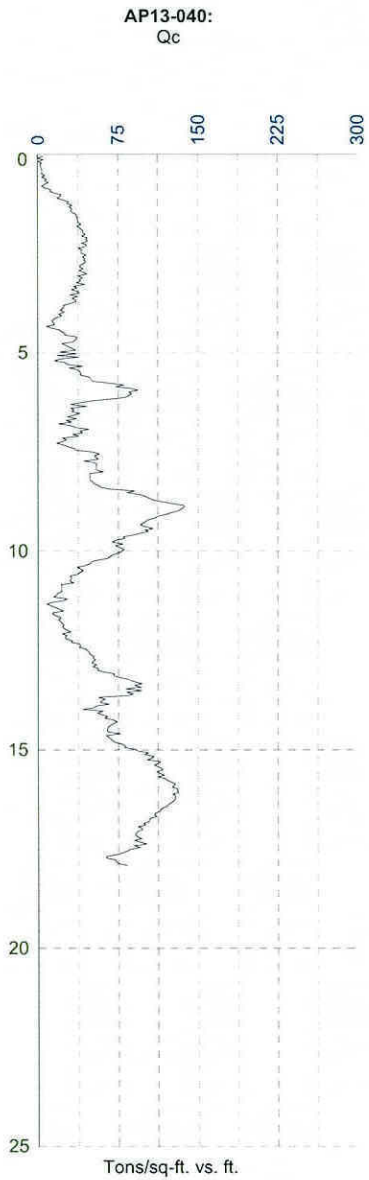

AP13-039A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

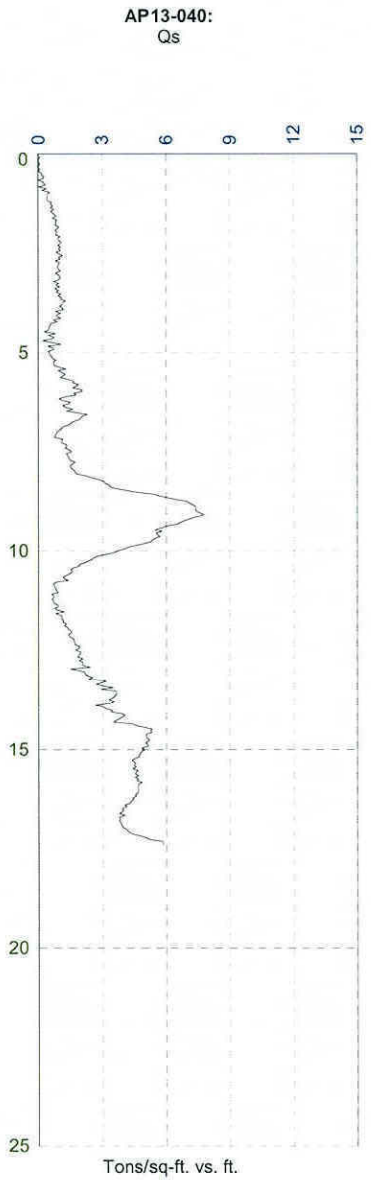

AP13-039A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

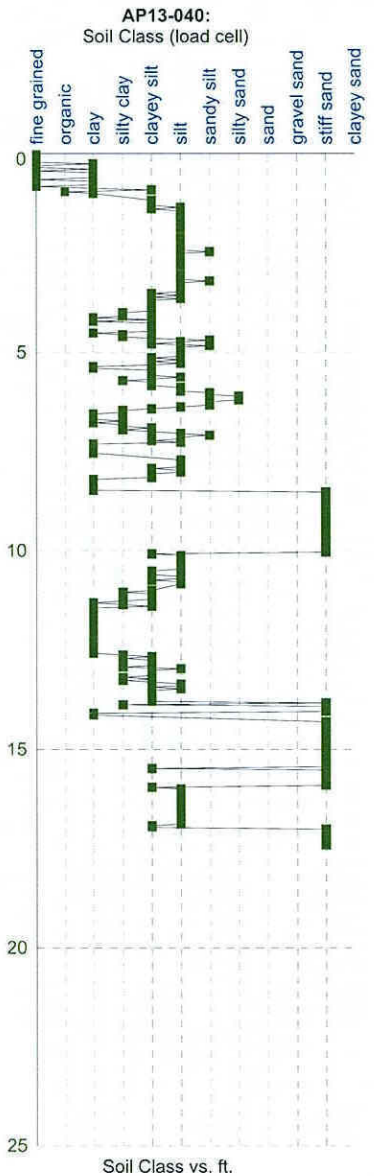

AP13-039A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

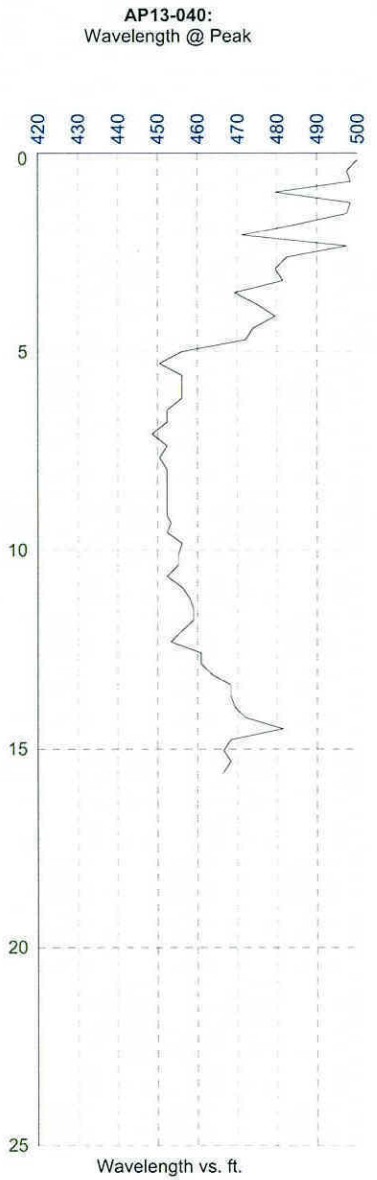

AP13-039A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

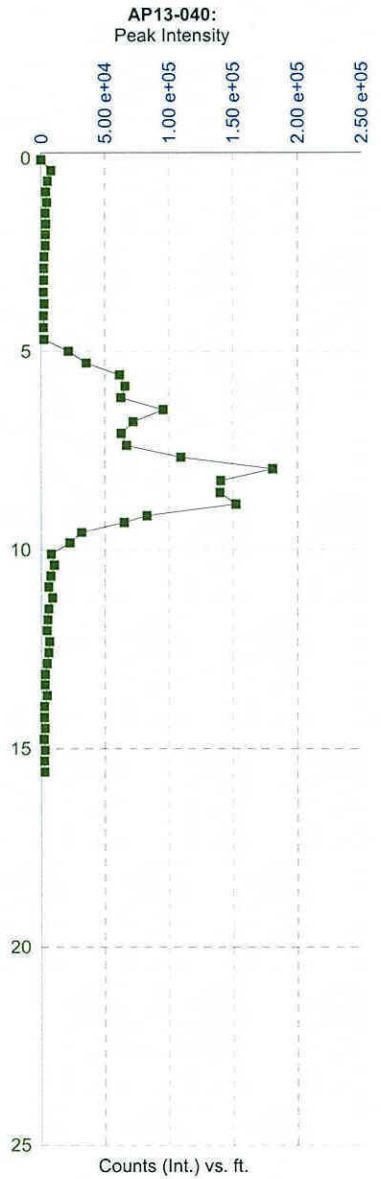

AP13-039A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

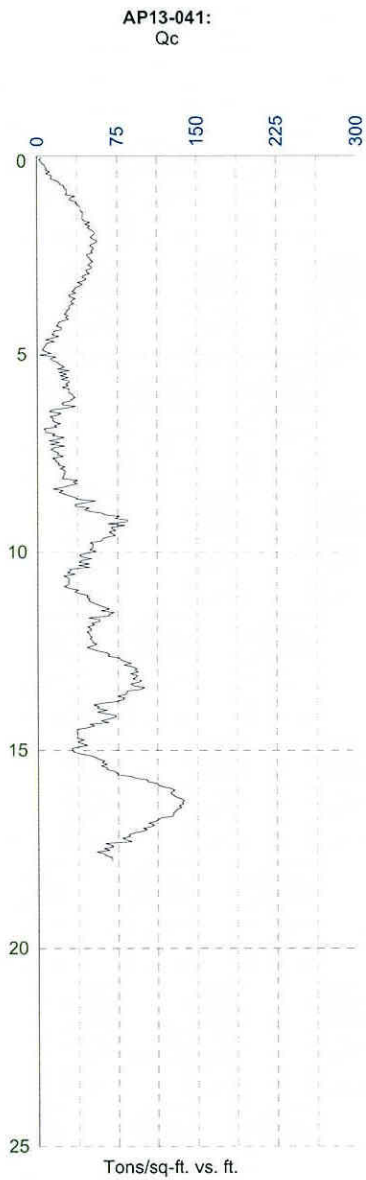

AP13-040:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

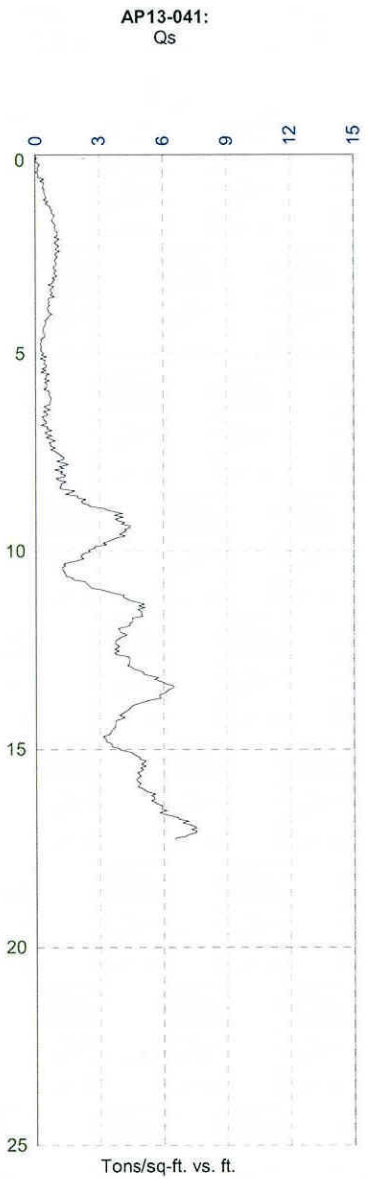

AP13-040:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

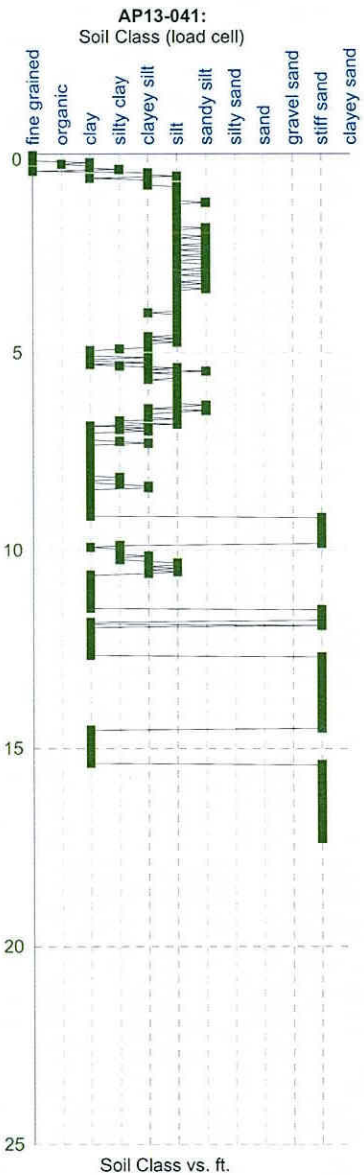

AP13-040:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

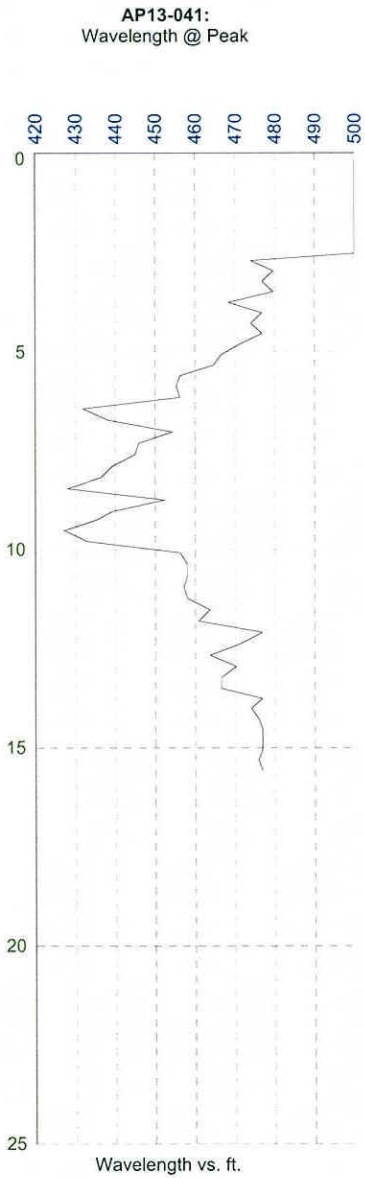

AP13-040:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

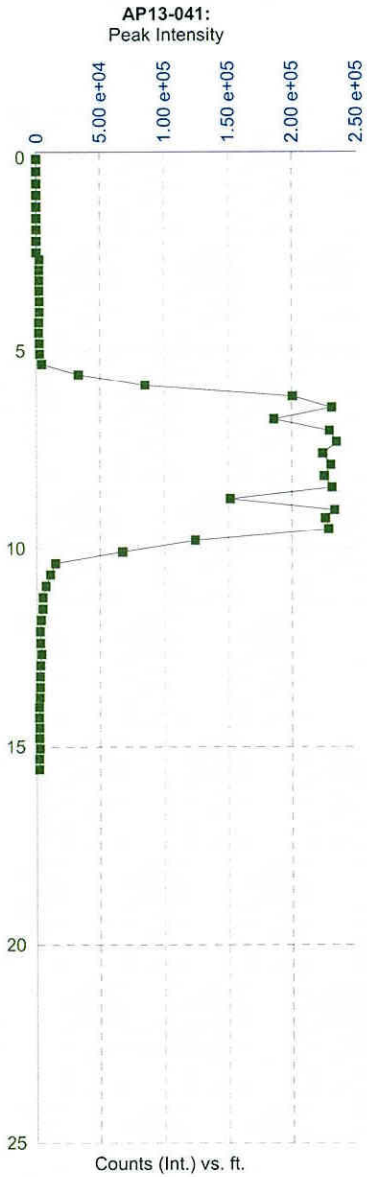

AP13-040:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

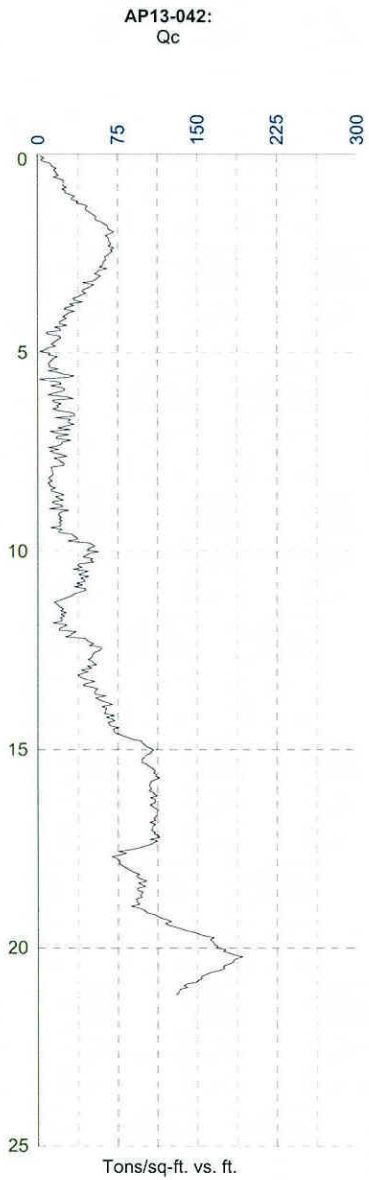

AP13-041:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

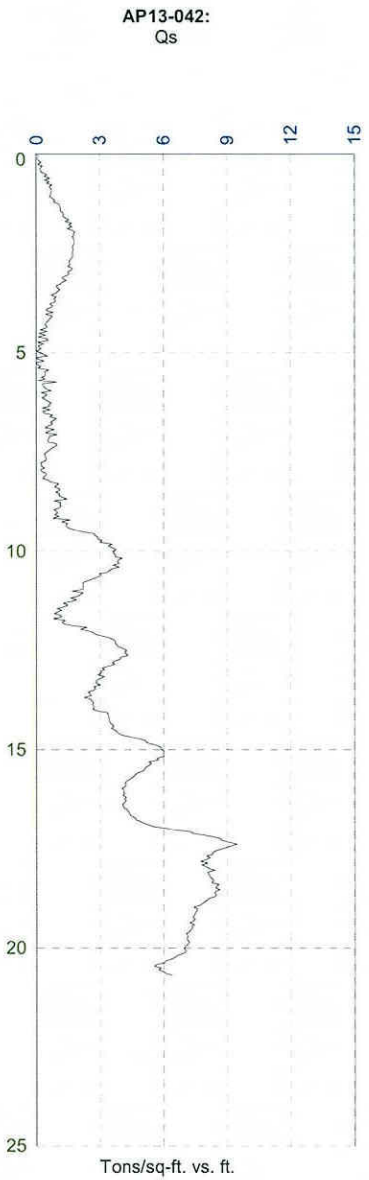

AP13-041:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

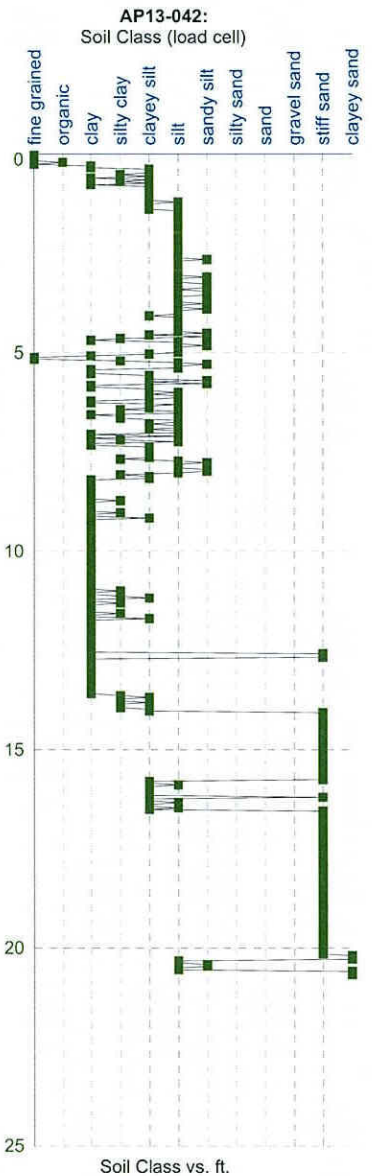

AP13-041:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

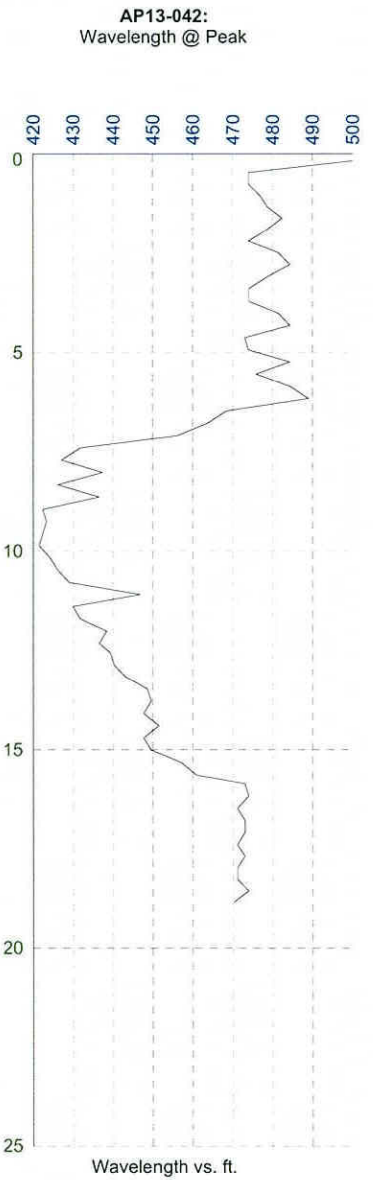

AP13-041:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

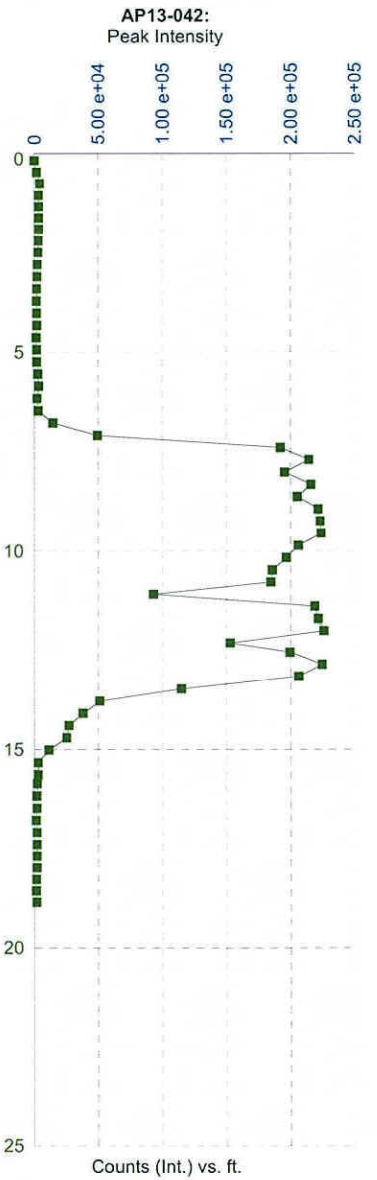

AP13-041:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

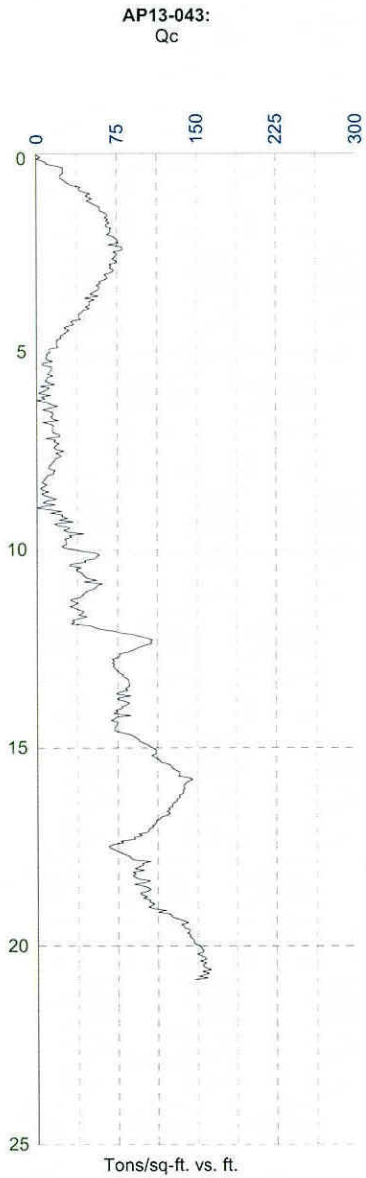

AP13-042:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

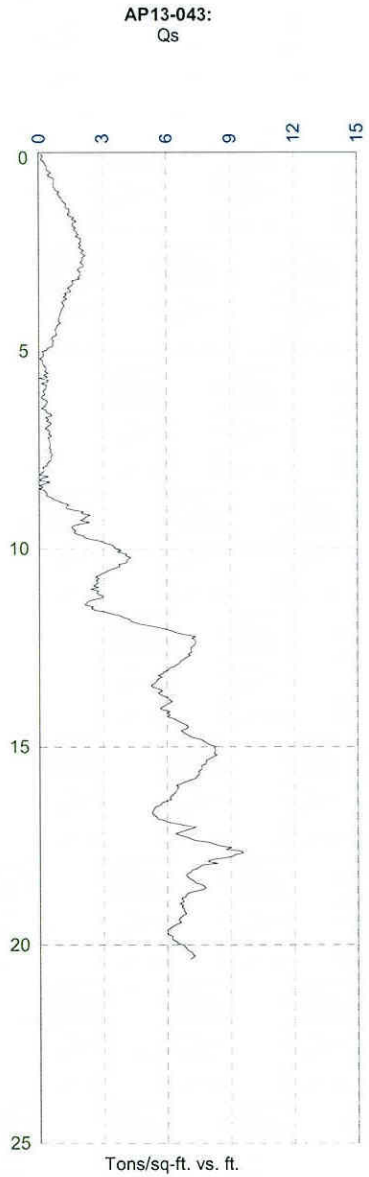

AP13-042:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

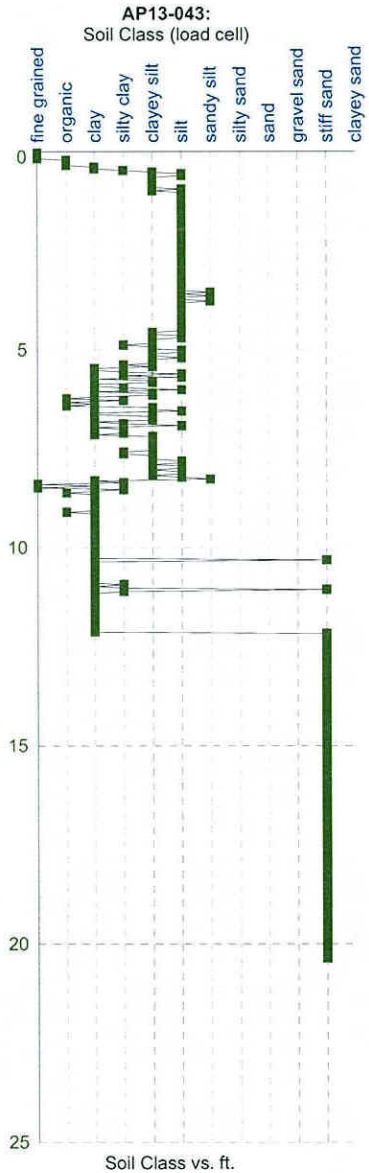

AP13-042:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

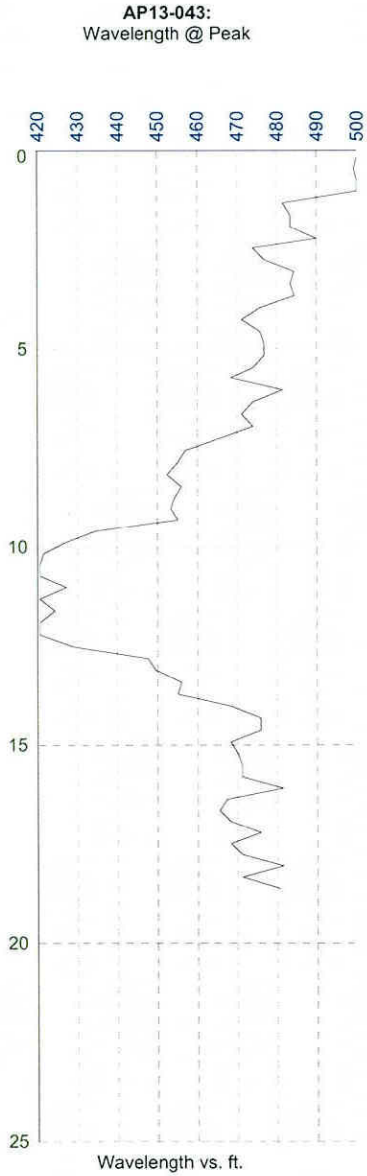

AP13-042:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

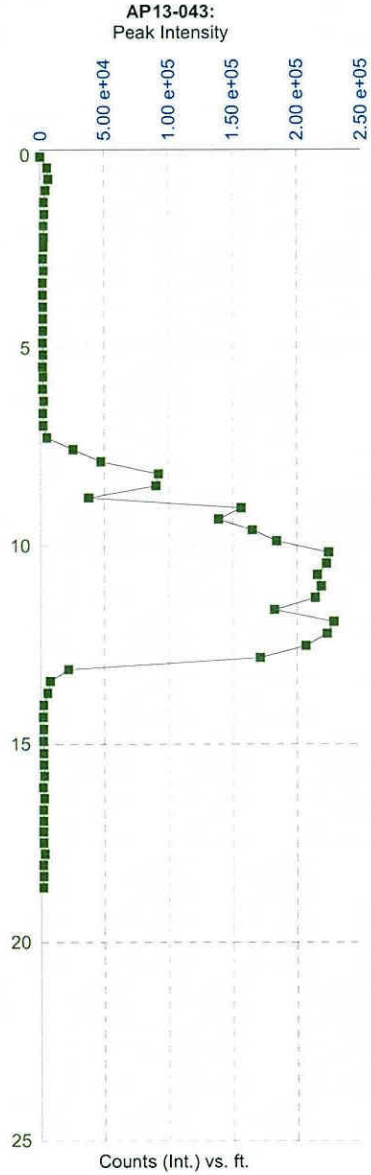

AP13-042:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

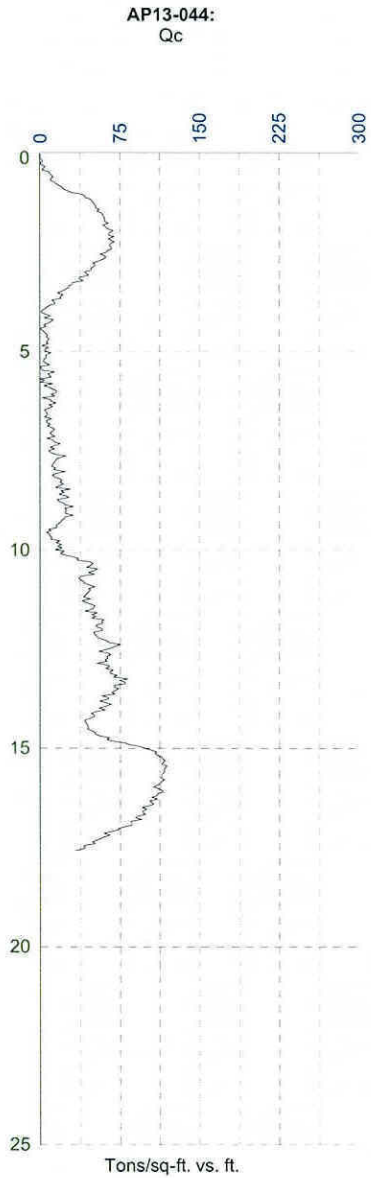

AP13-043:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

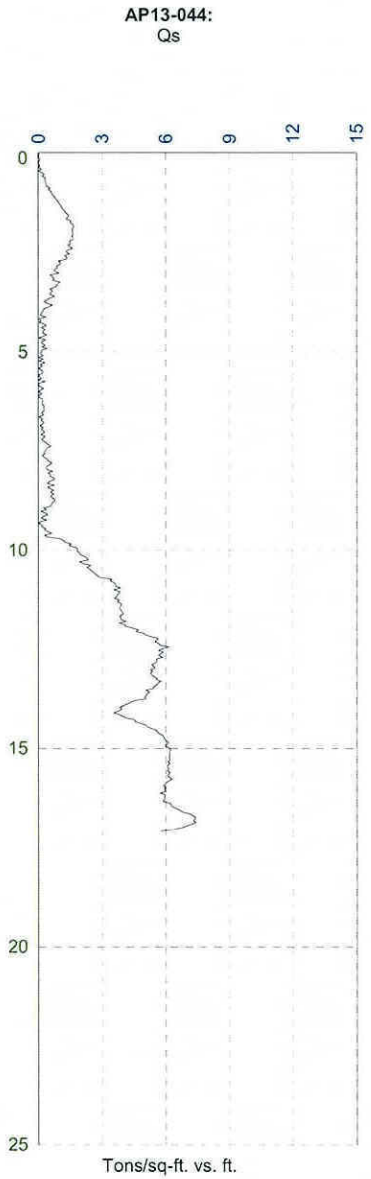

AP13-043:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

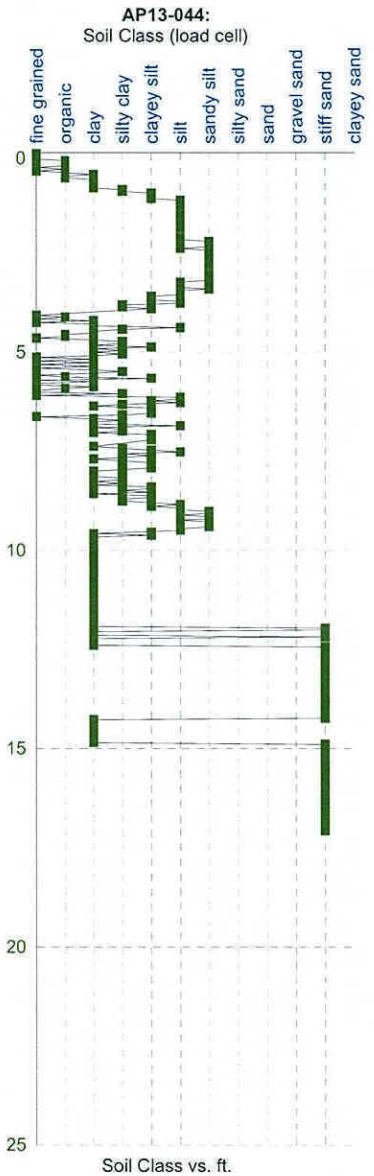

AP13-043:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

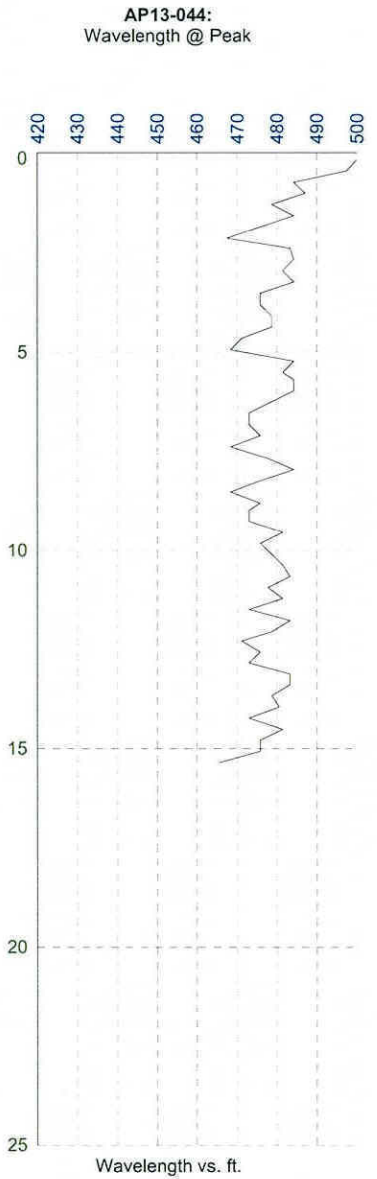

AP13-043:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

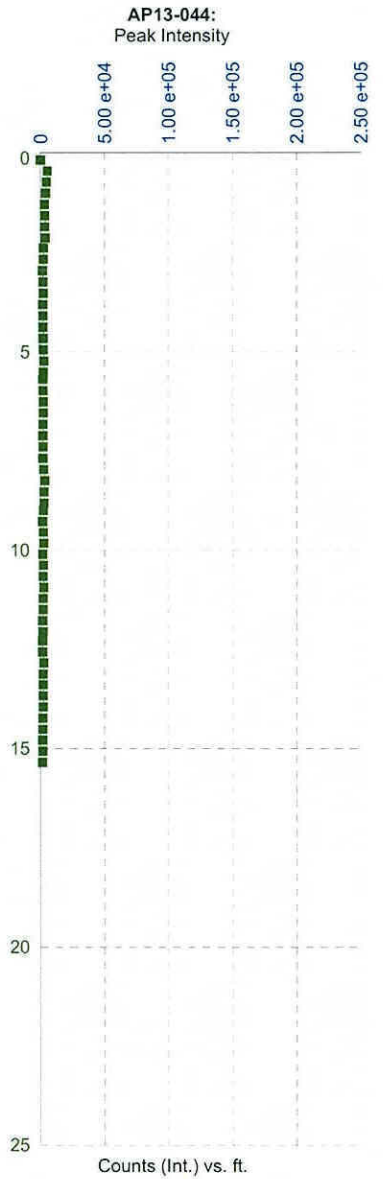

AP13-043:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

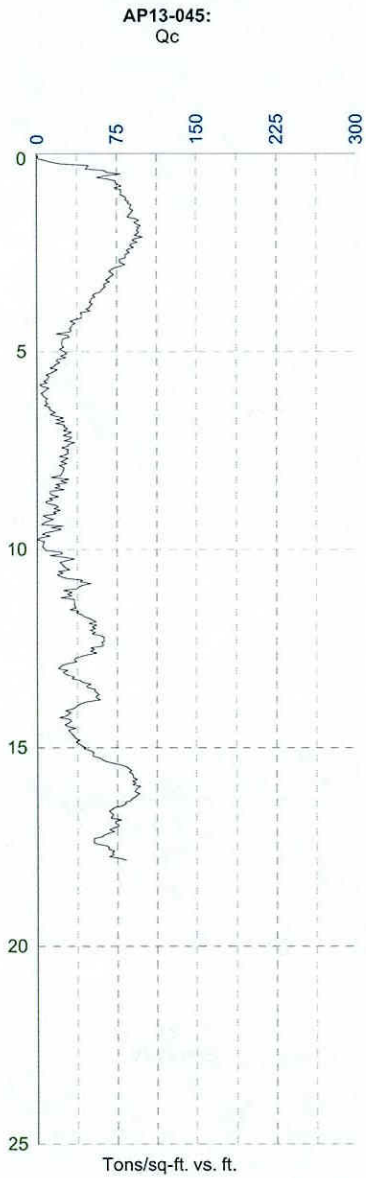

AP13-044:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

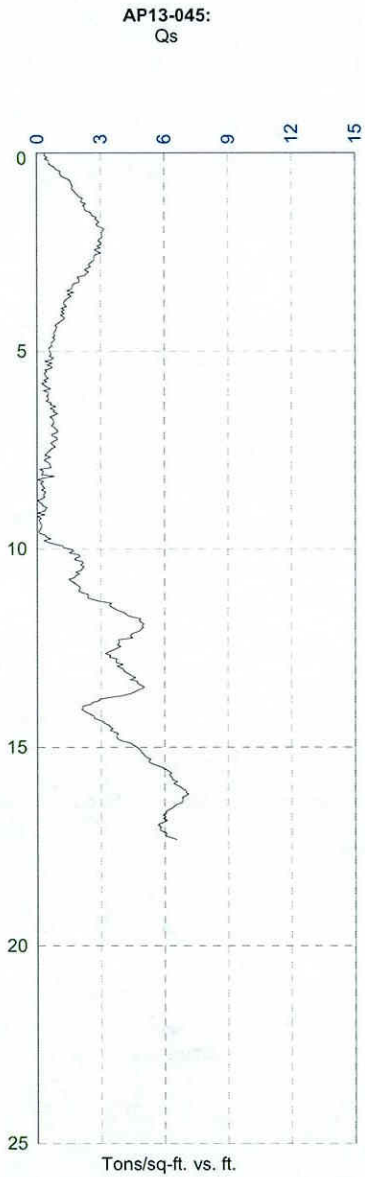

AP13-044:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

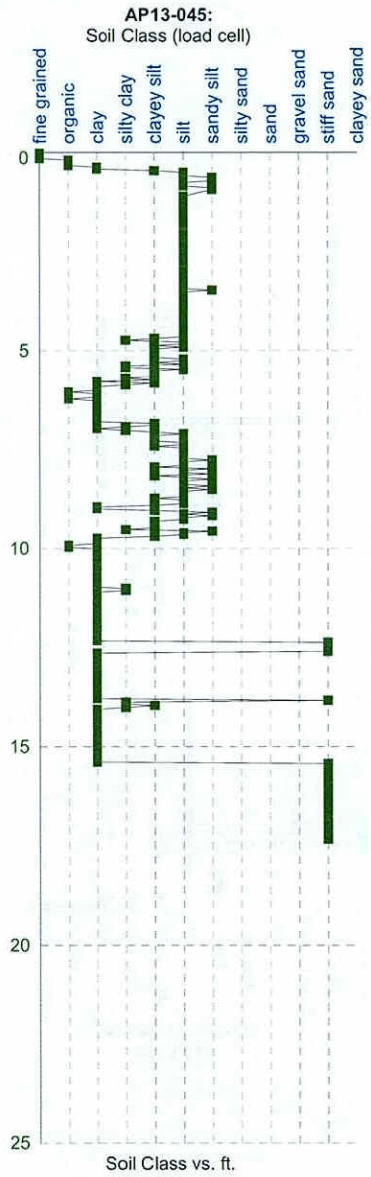

AP13-044:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

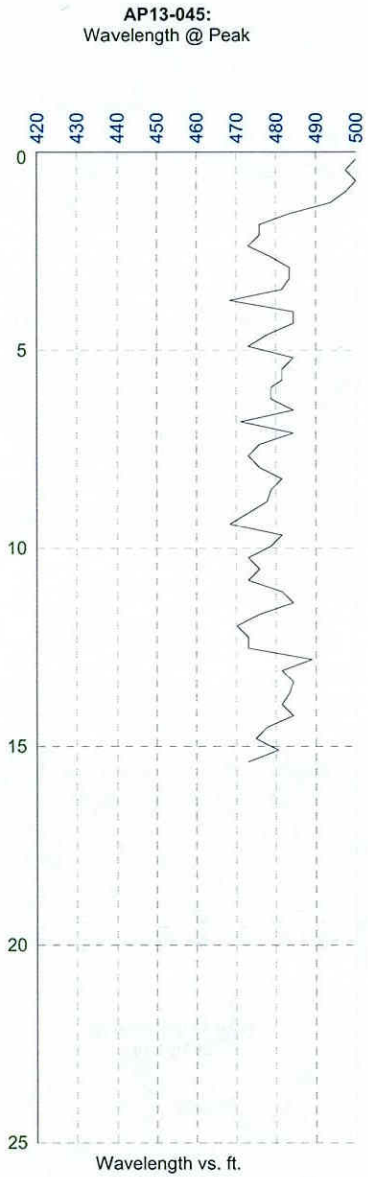

AP13-044:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

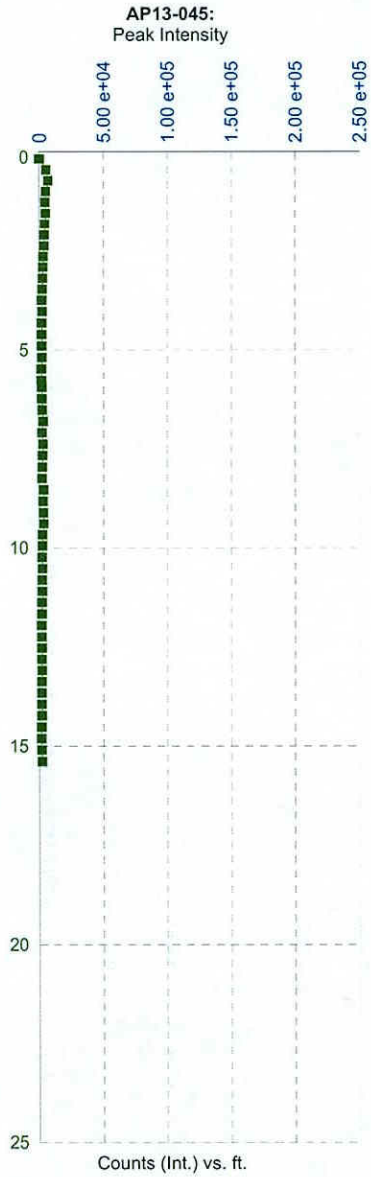

AP13-044:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

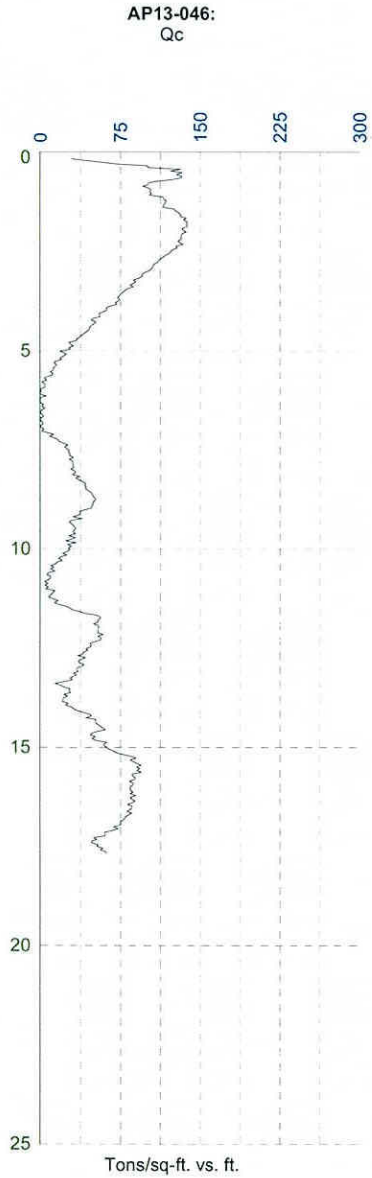

AP13-045:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

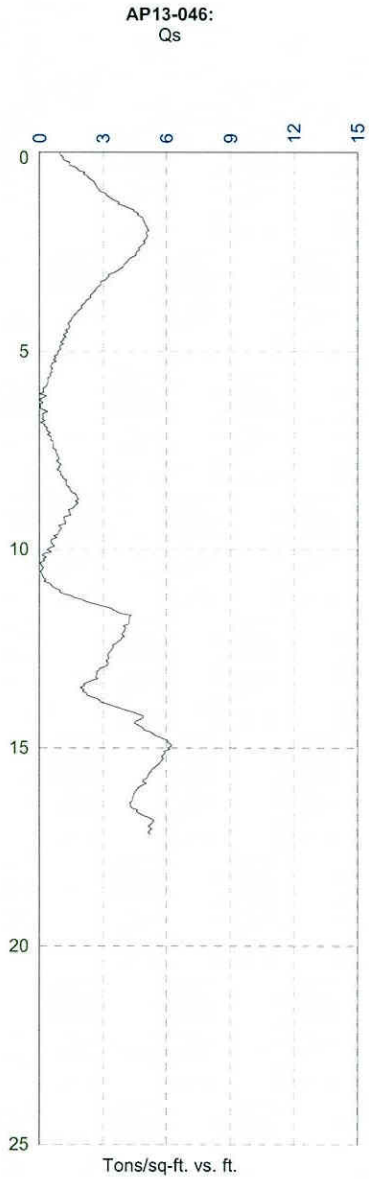

AP13-045:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

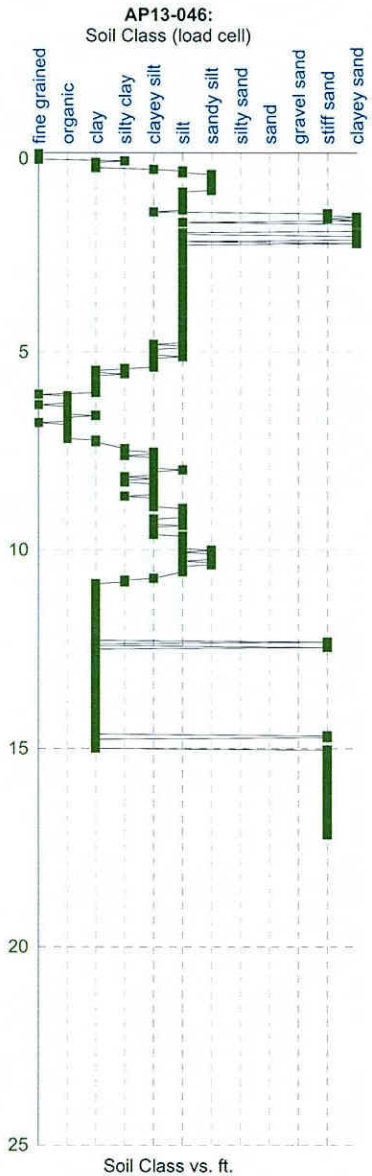

AP13-045:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

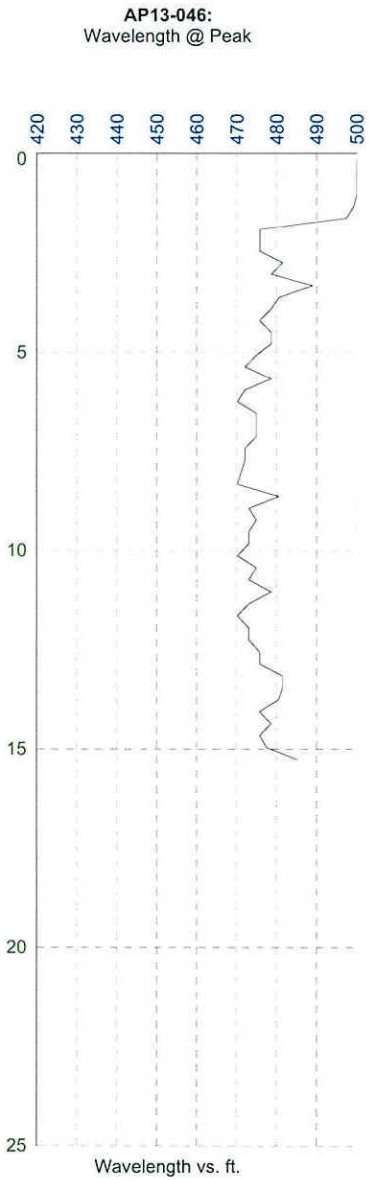

AP13-045:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

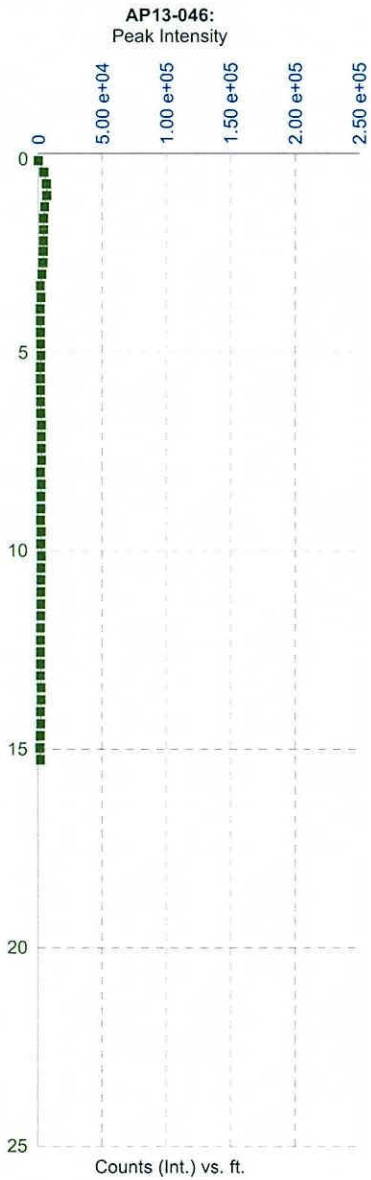

AP13-045:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

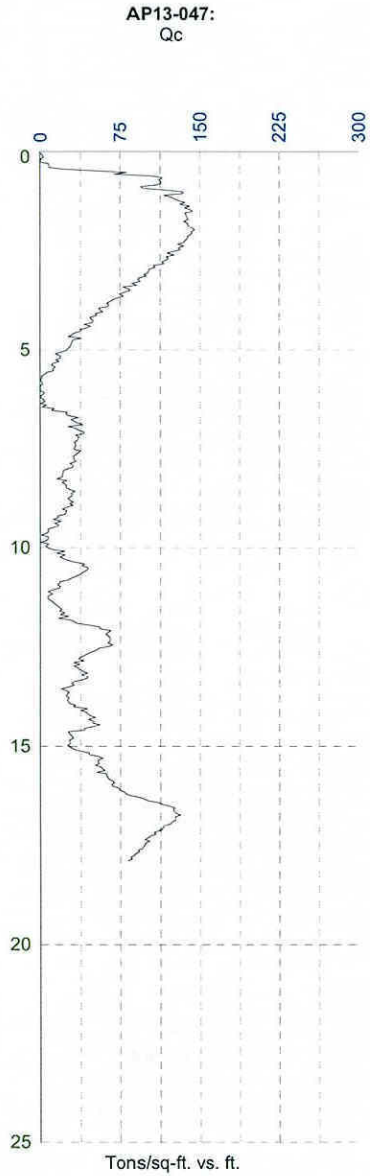

AP13-046:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

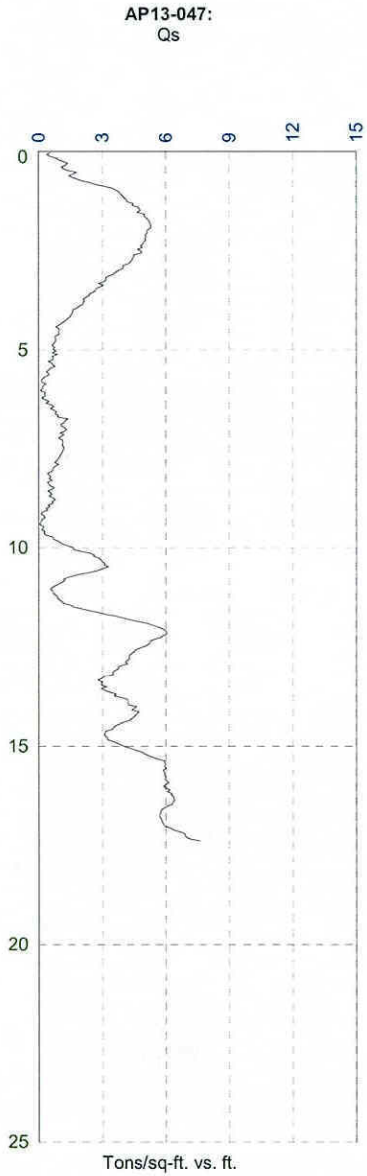

AP13-046:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

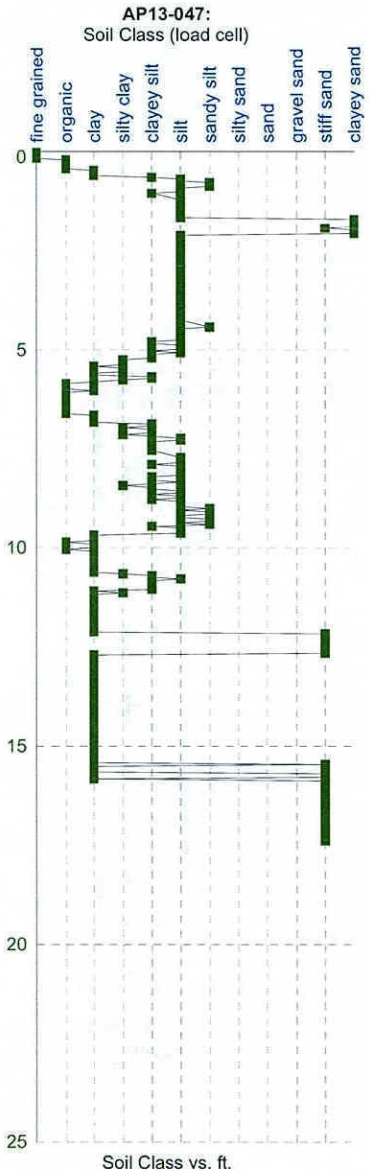

AP13-046:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

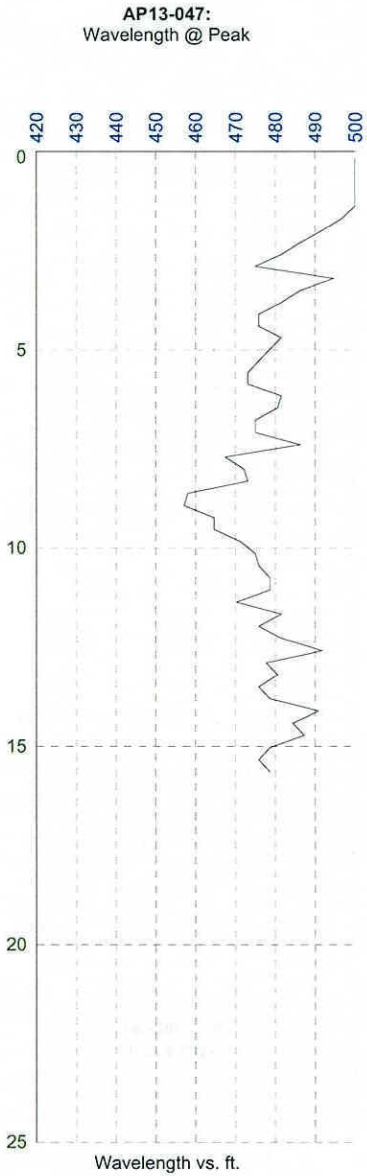

AP13-046:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

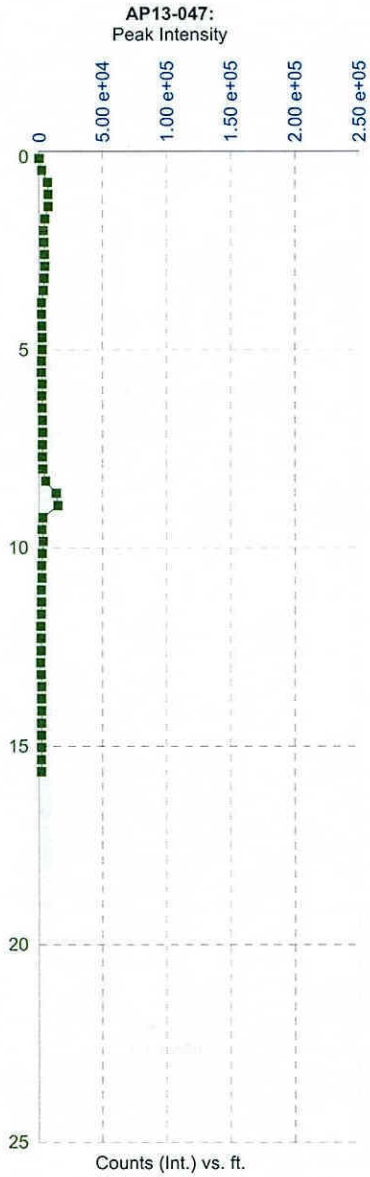

AP13-046:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

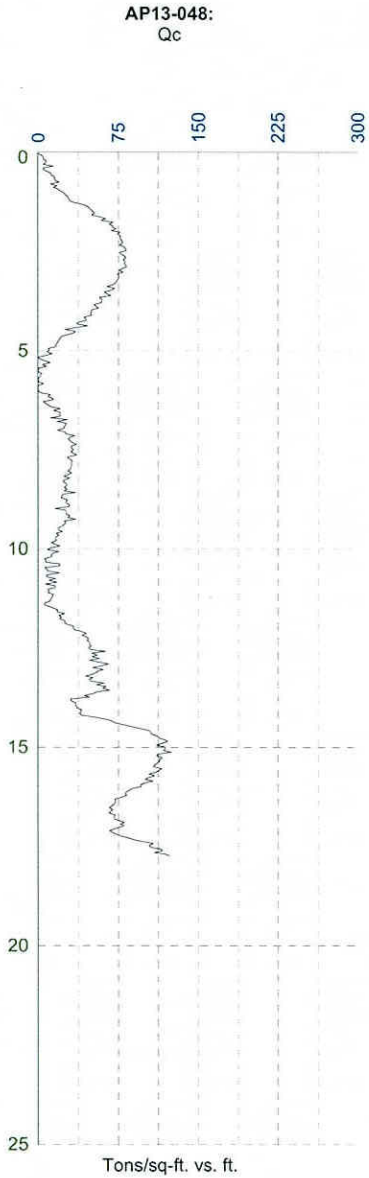

AP13-047:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

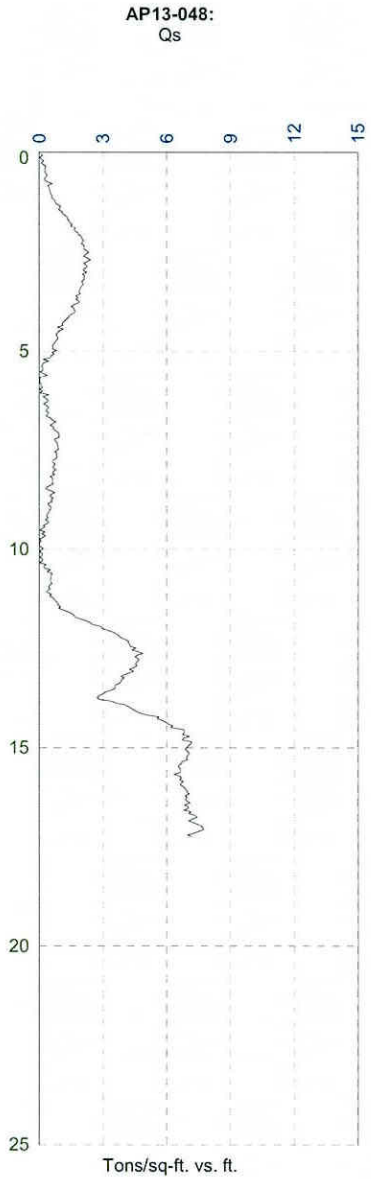

AP13-047:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

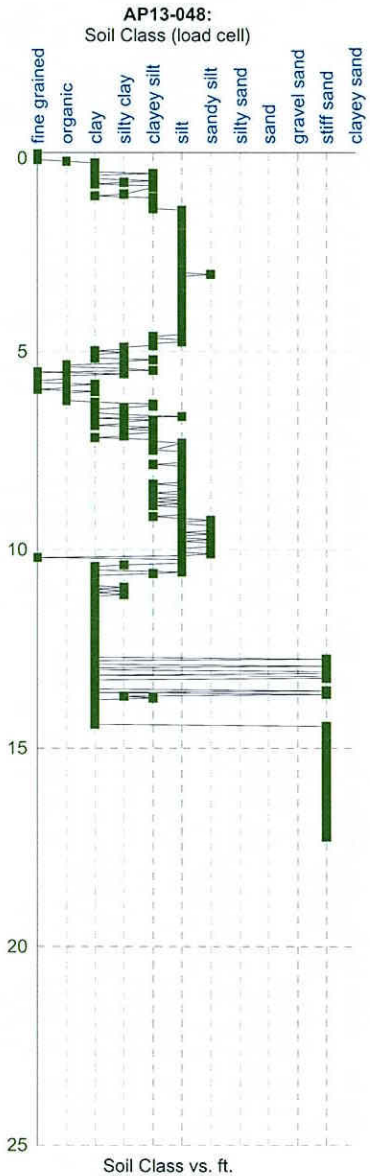

AP13-047:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

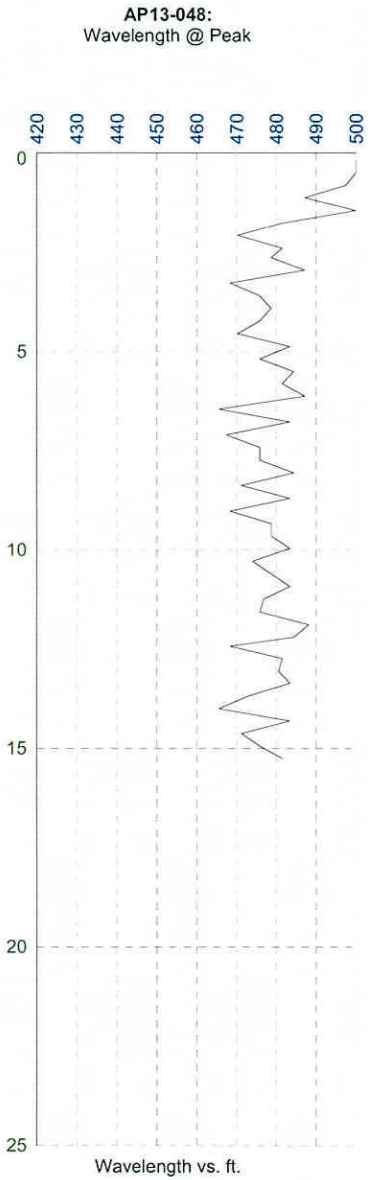

AP13-047:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

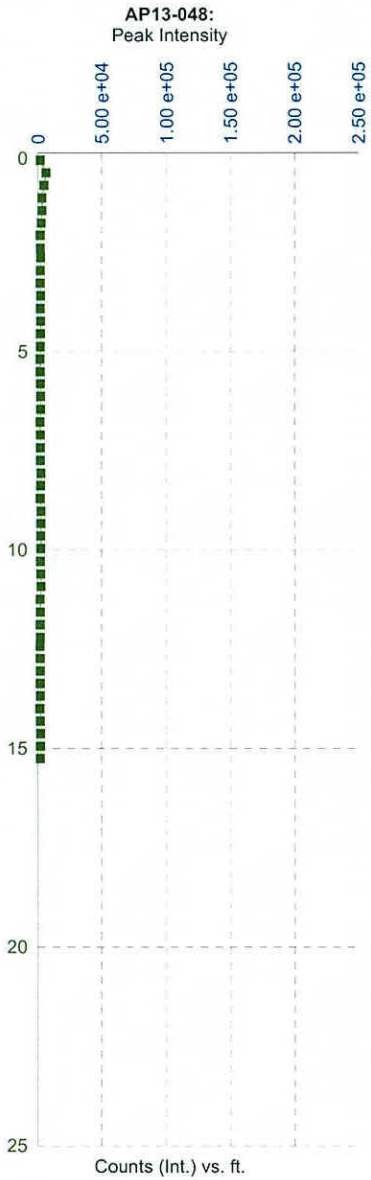

AP13-047:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

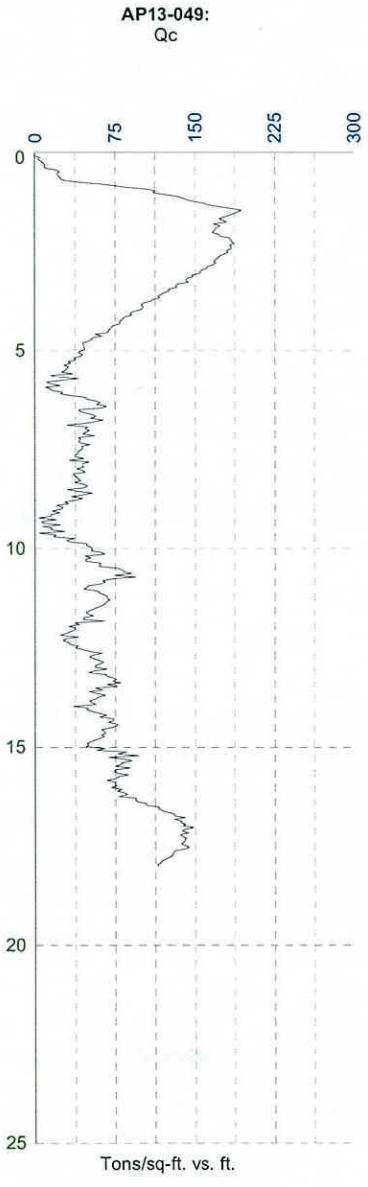

AP13-048:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

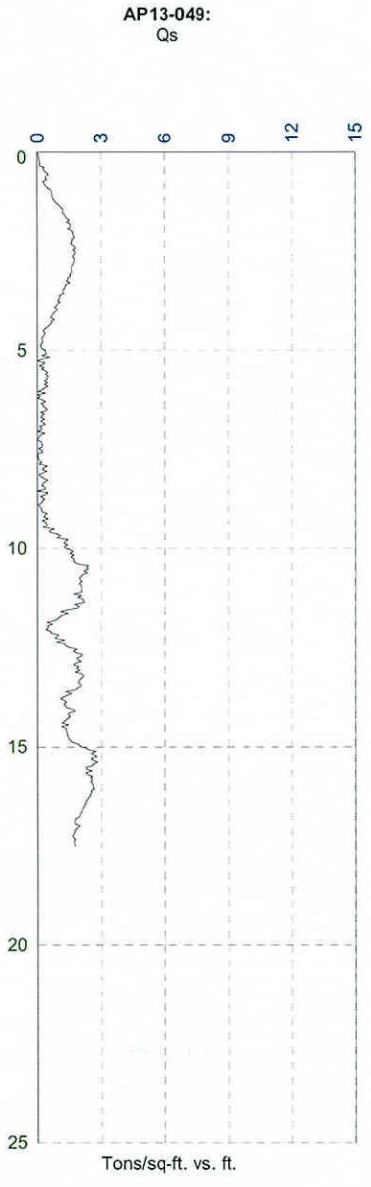

AP13-048:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

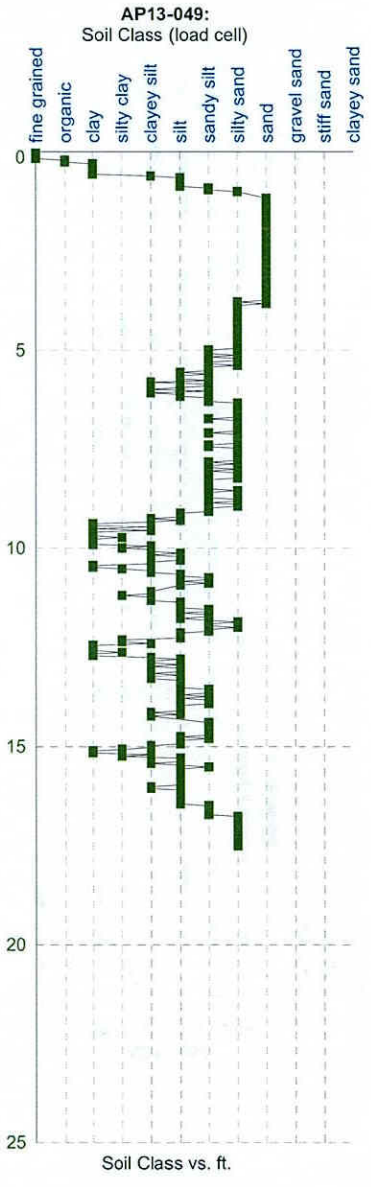

AP13-048:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

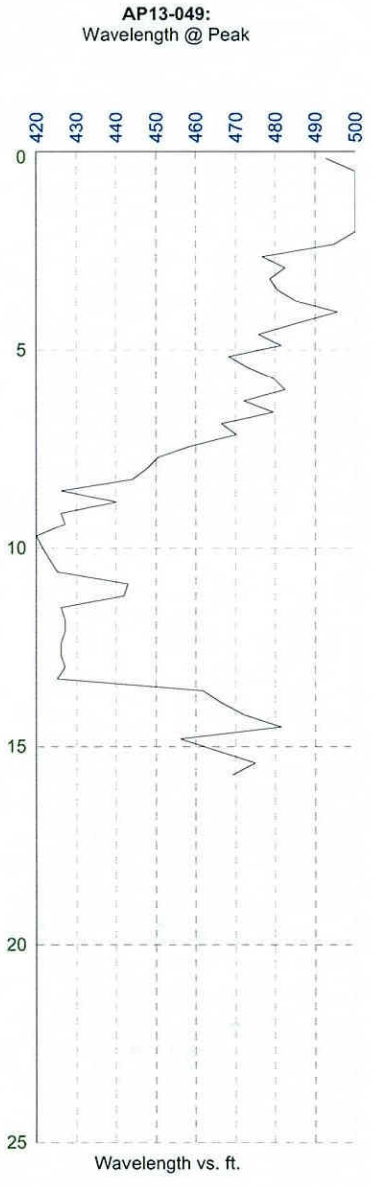

AP13-048:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

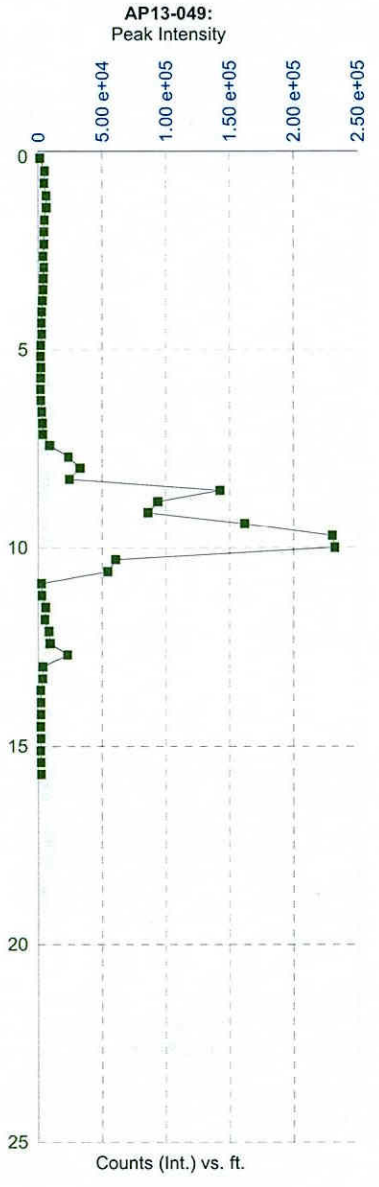

AP13-048:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

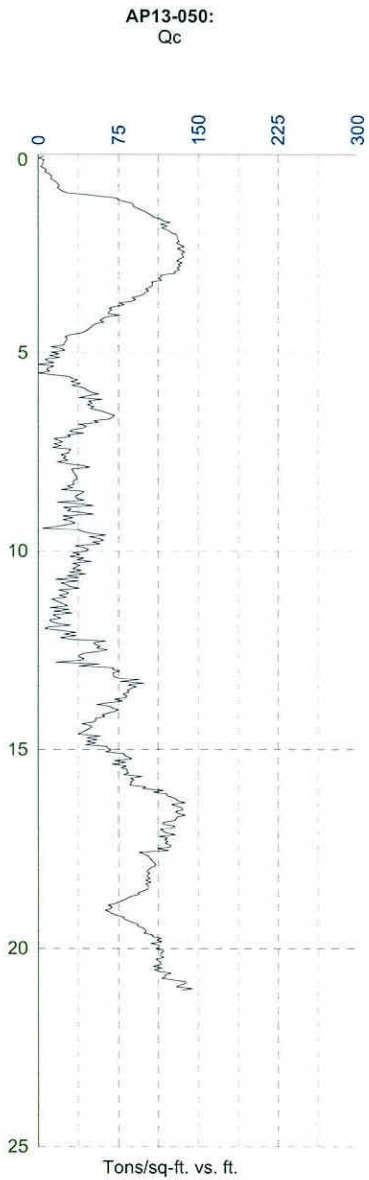

AP13-049:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

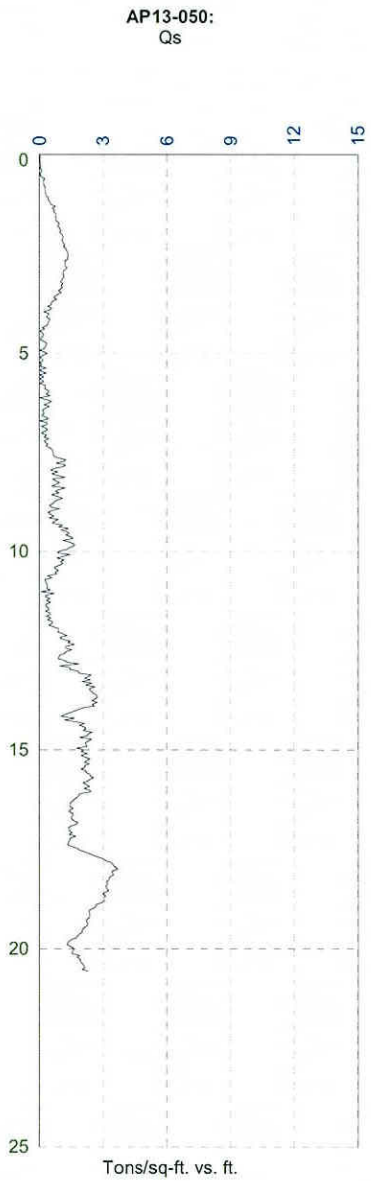

AP13-049:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

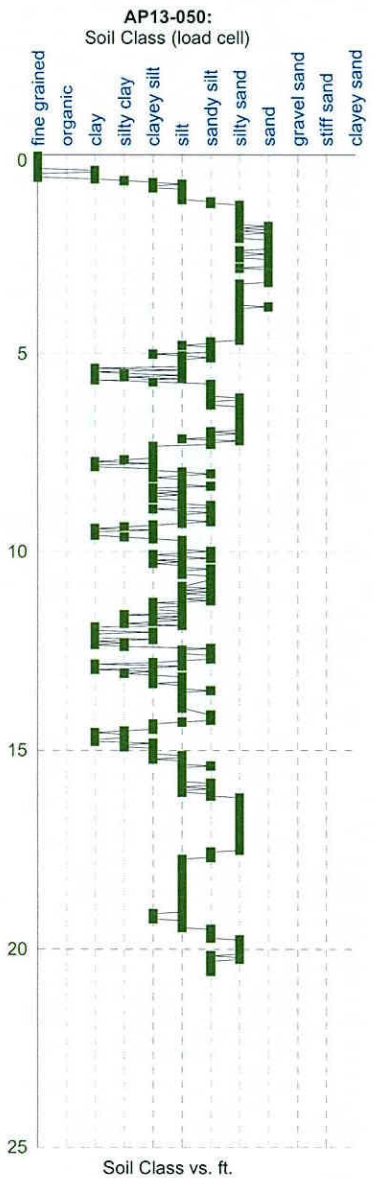

AP13-049:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

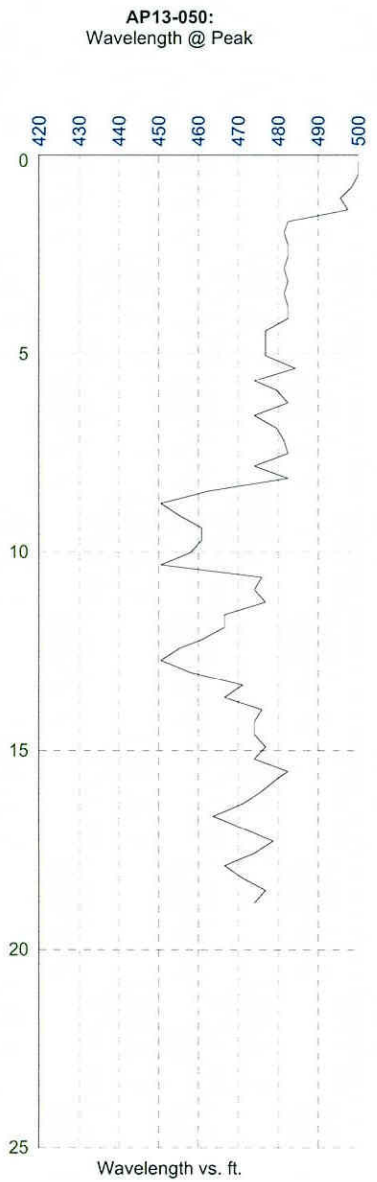

AP13-049:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

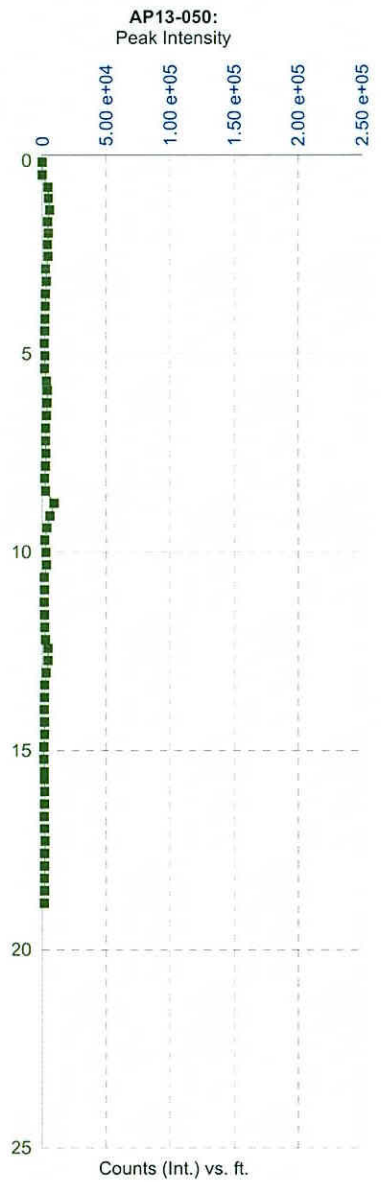

AP13-049:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.


AP13-050:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

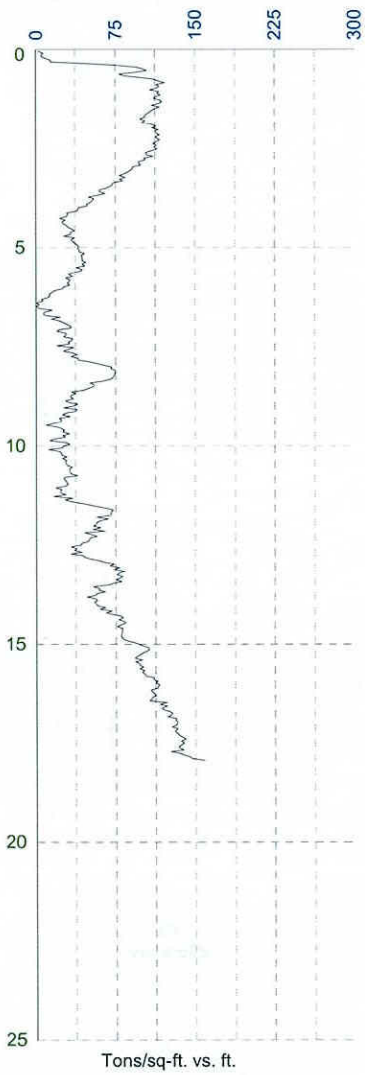

AP13-050:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.


AP13-050:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

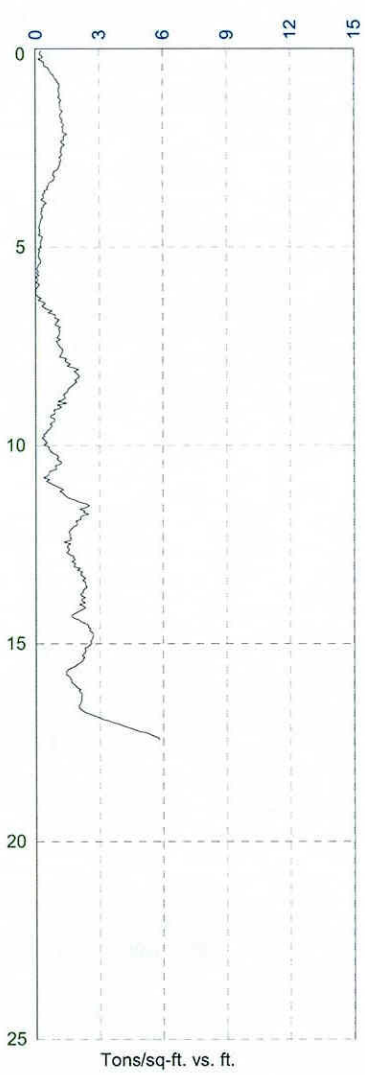

AP13-050:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.


AP13-050:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

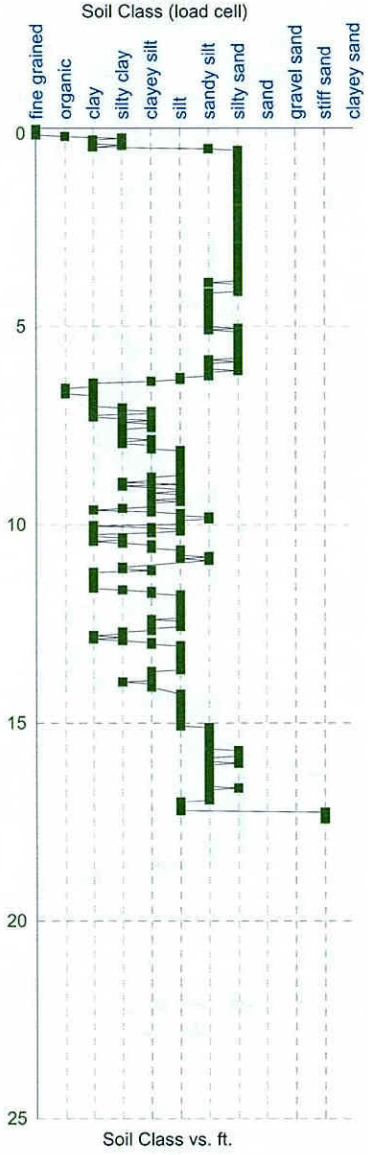
**AP13-051:**
Qc



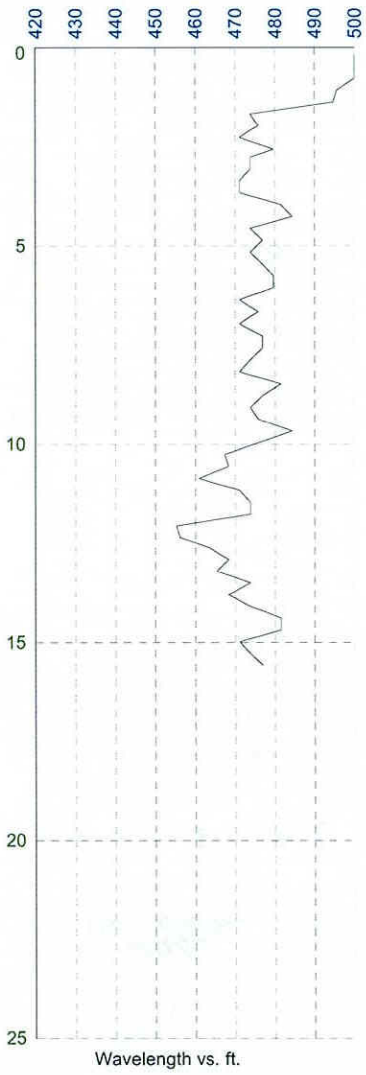

**AP13-051:**
Qs



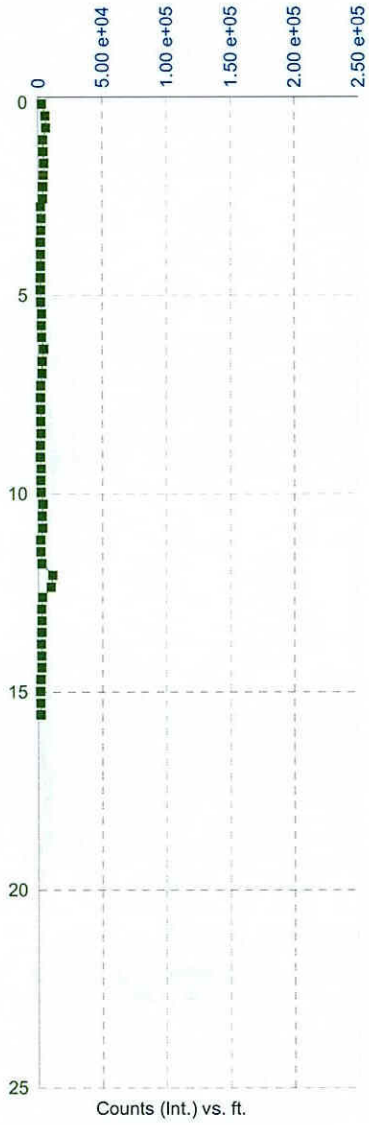

**AP13-051:**
Soil Class (load cell)

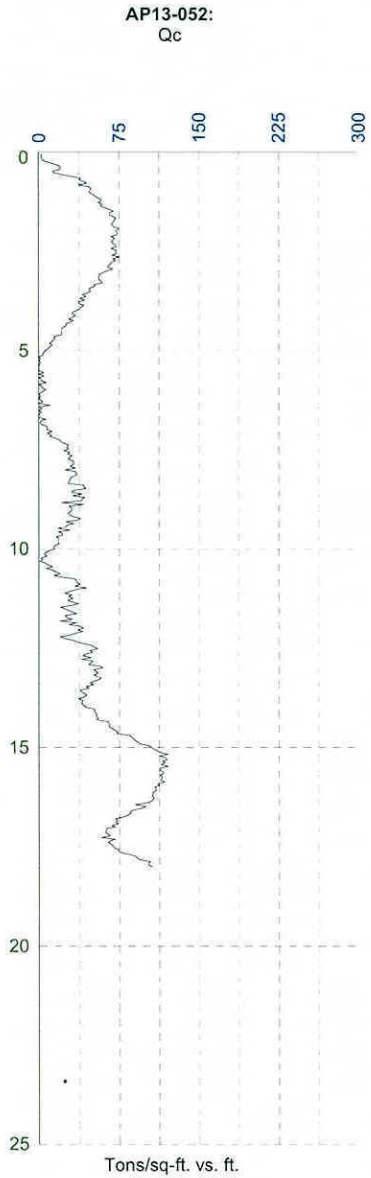


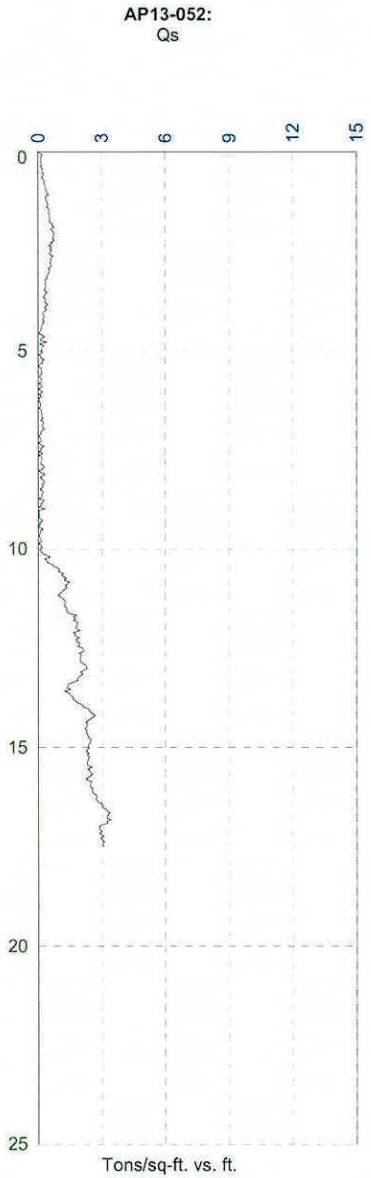

**AP13-051:**
Wavelength @ Peak

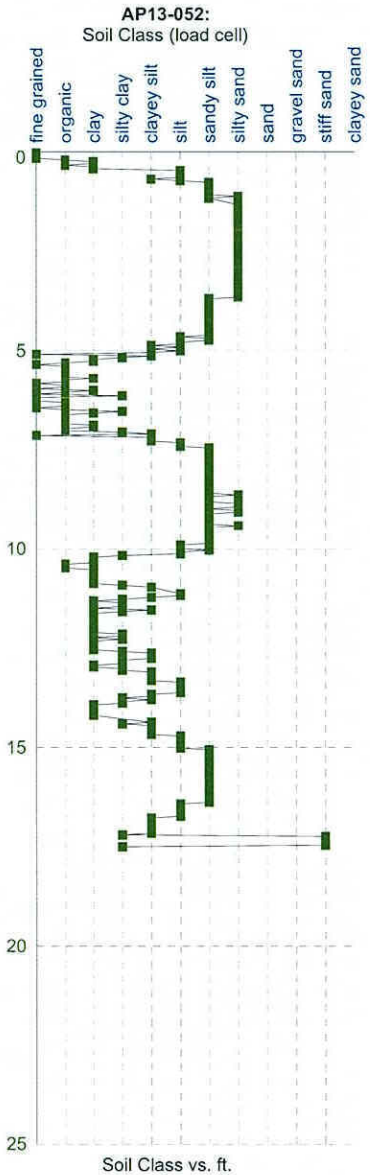


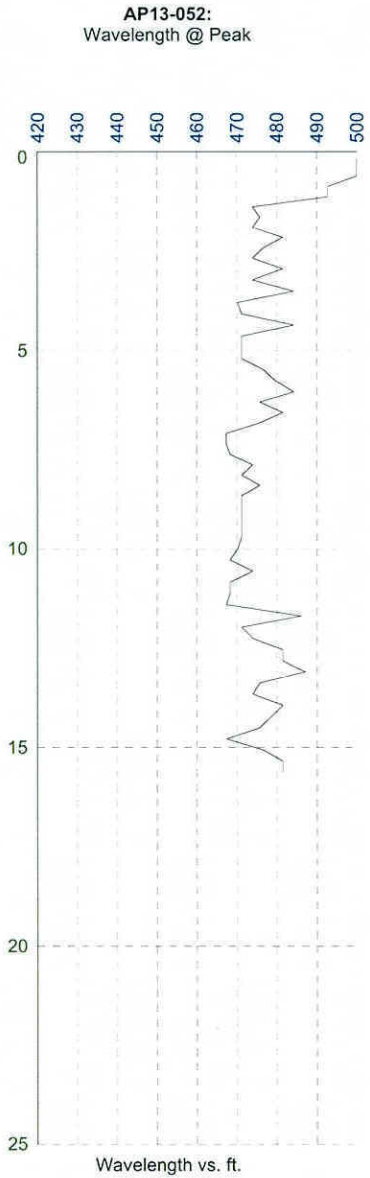

**AP13-051:**
Peak Intensity

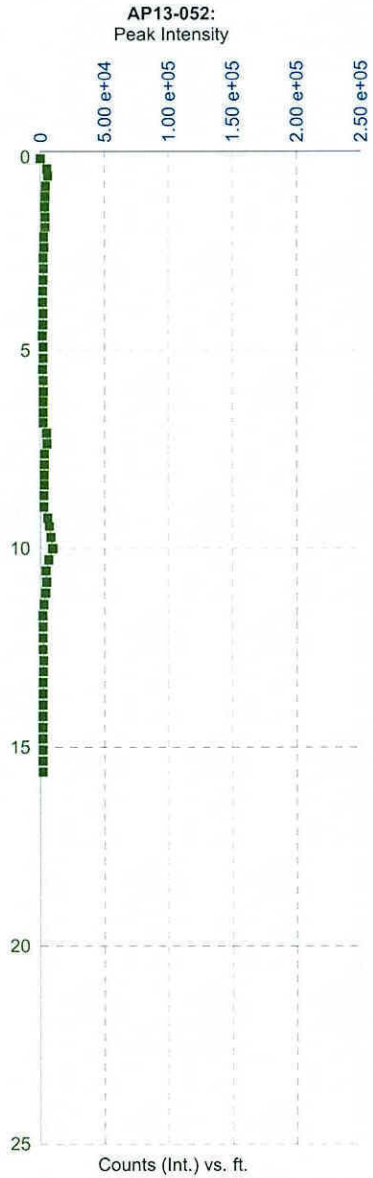


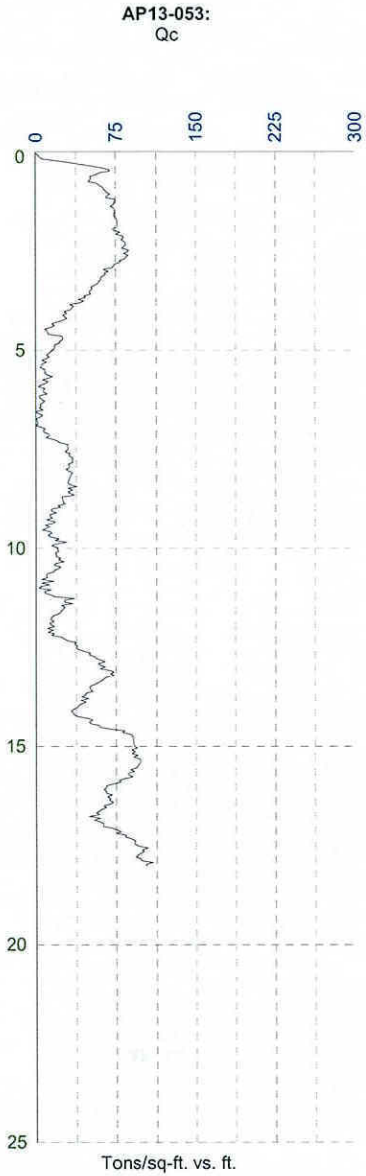

AP13-052:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

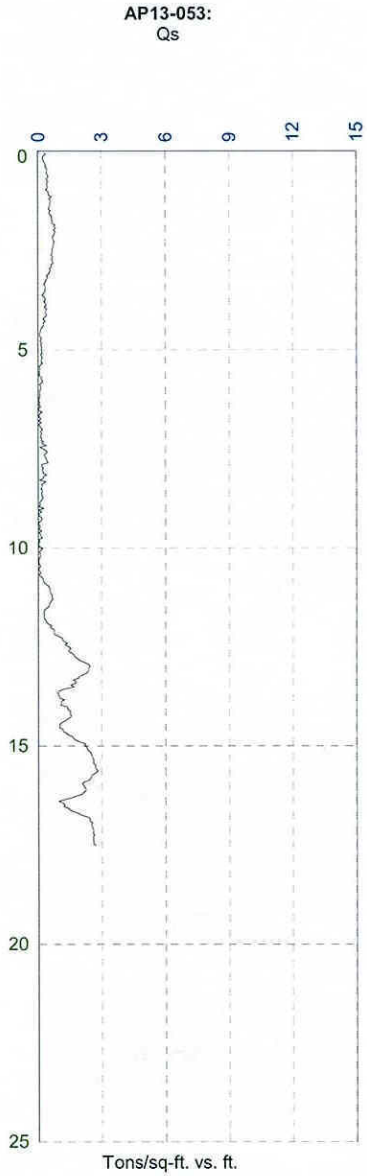

AP13-052:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

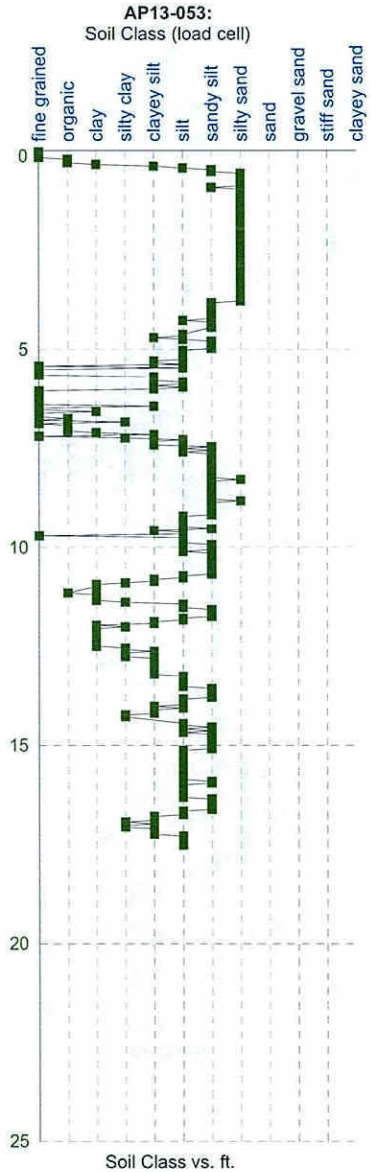

AP13-052:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

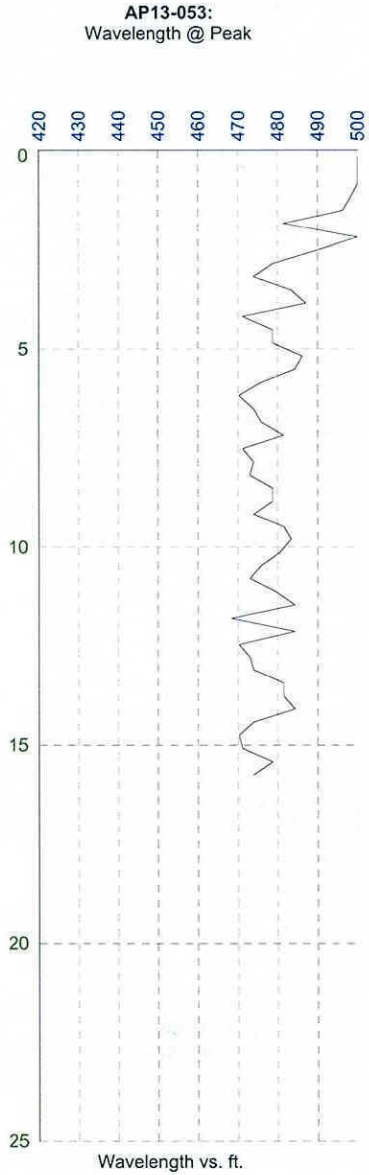

AP13-052:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

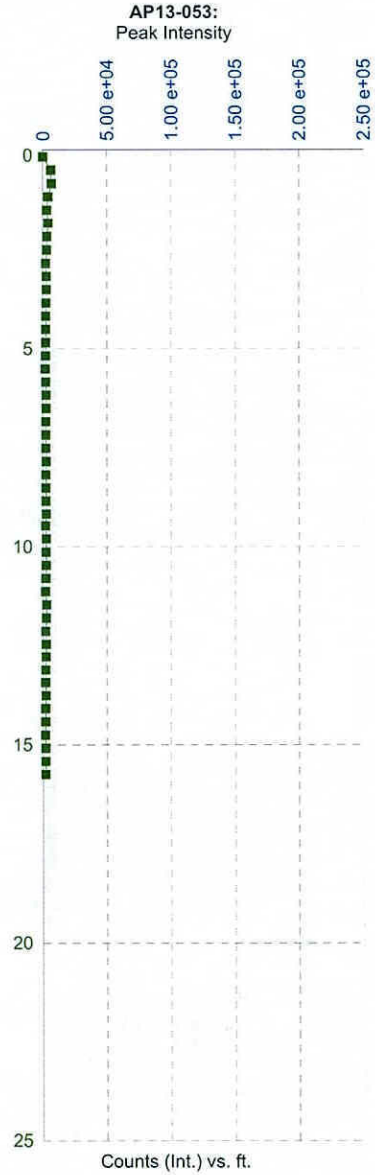

AP13-052:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

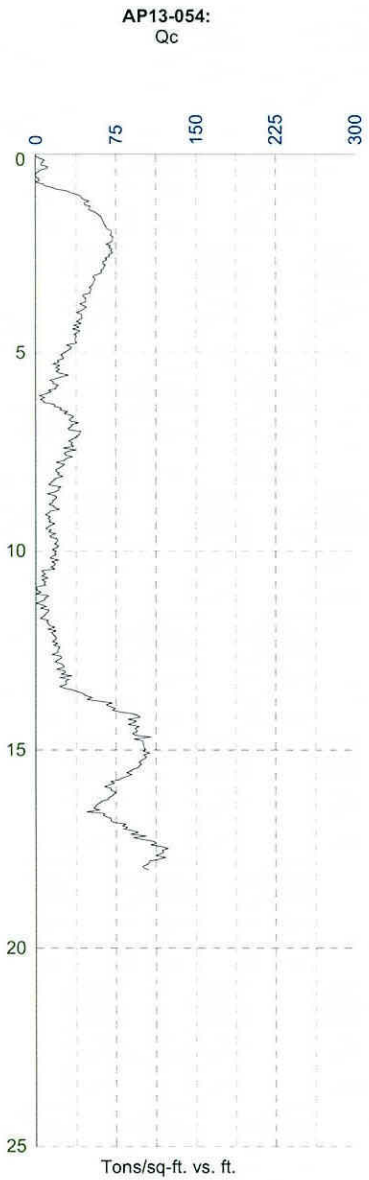

AP13-053:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

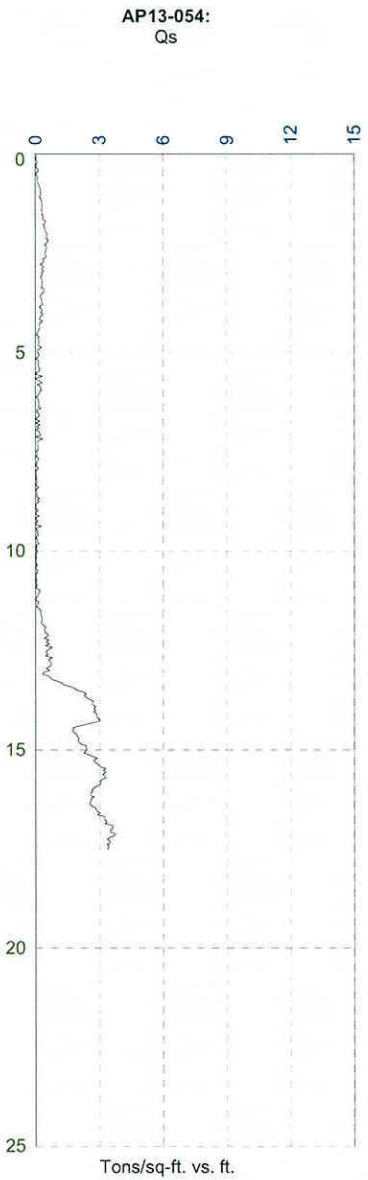

AP13-053:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

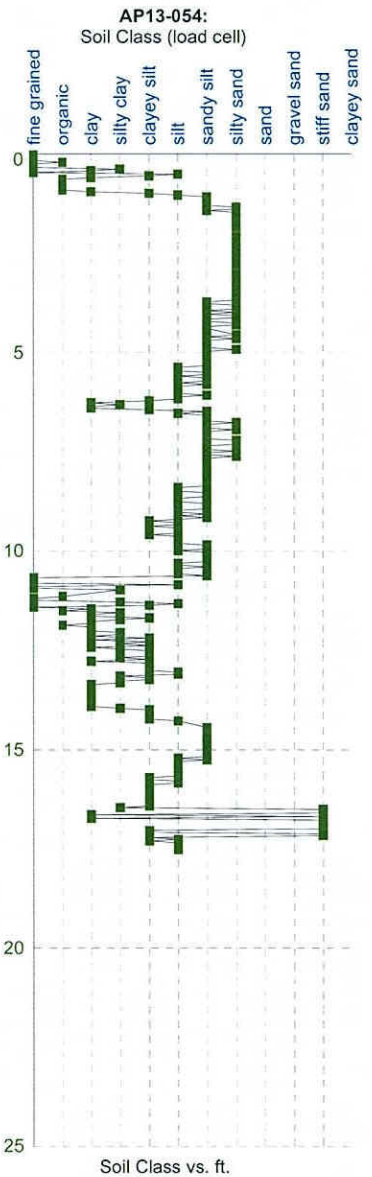

AP13-053:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

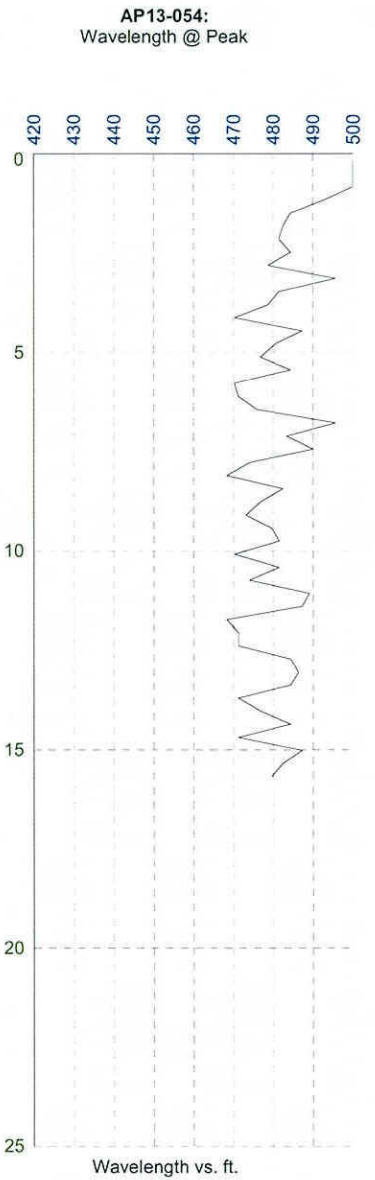

AP13-053:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

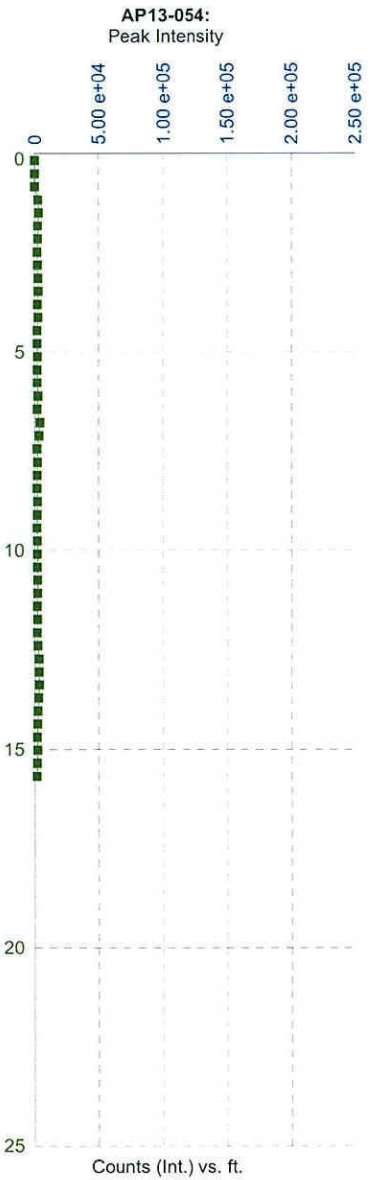

AP13-053:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

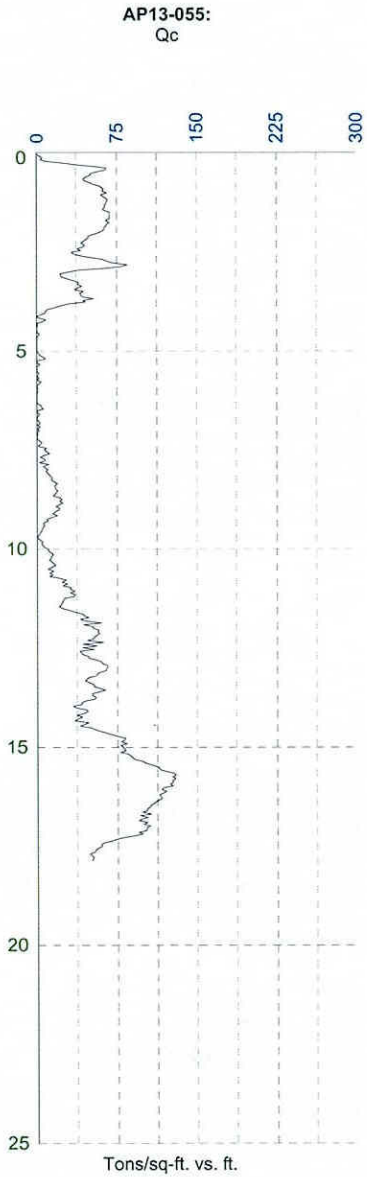

AP13-054:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

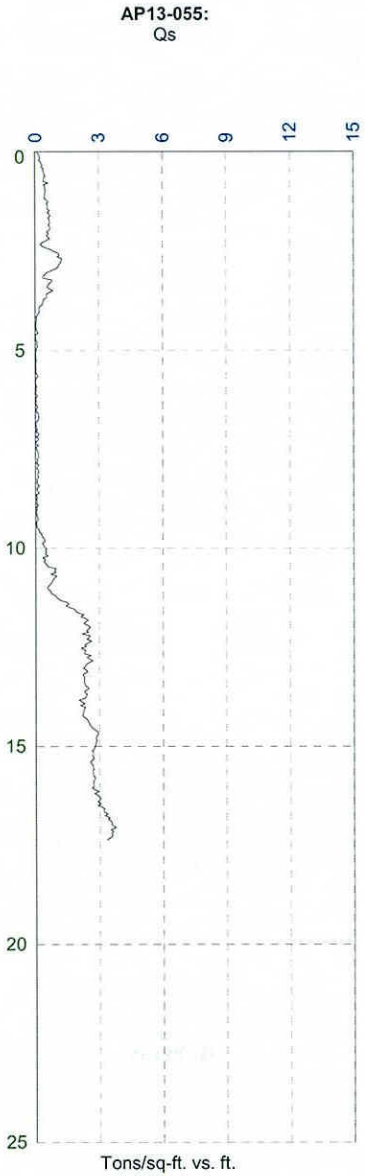

AP13-054:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

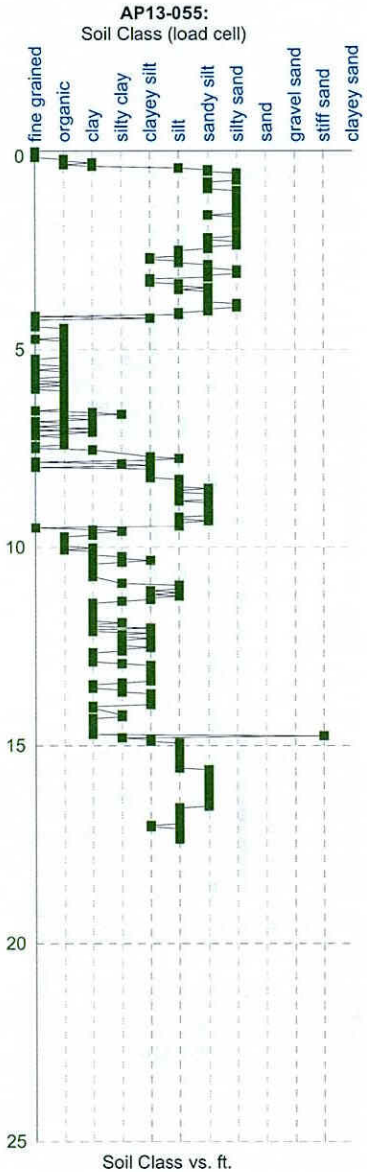

AP13-054:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

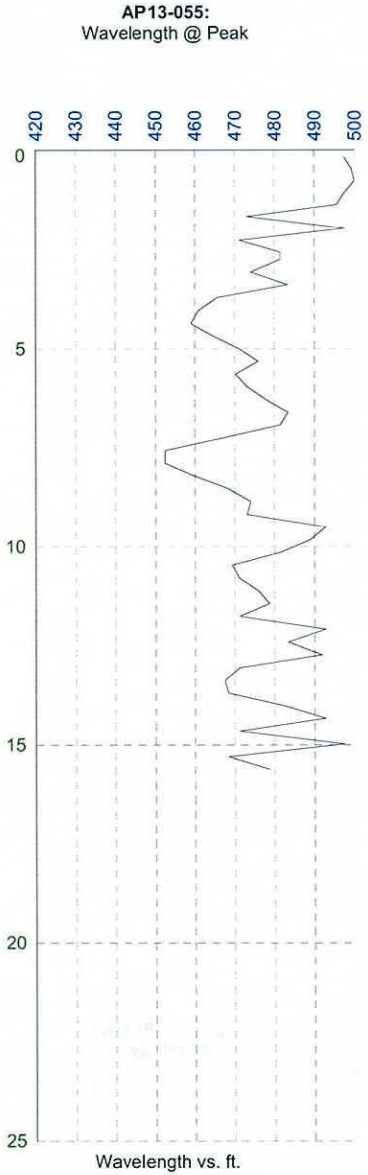

AP13-054:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

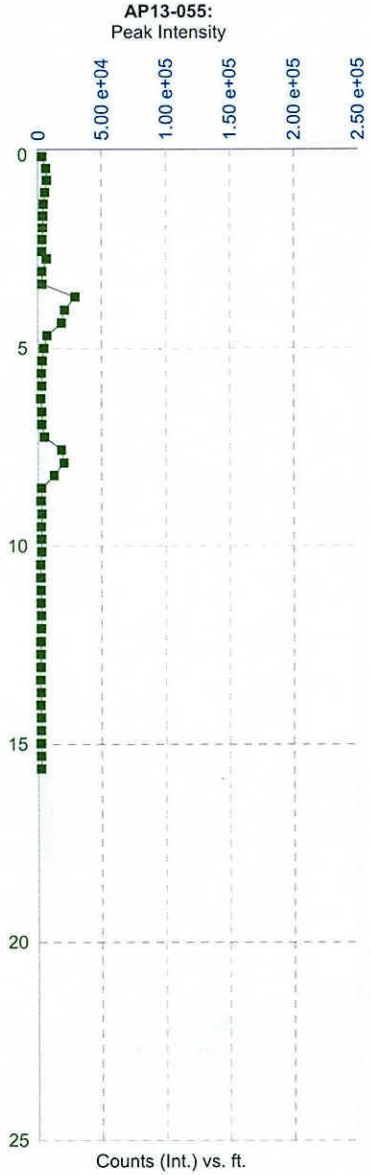

AP13-054:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

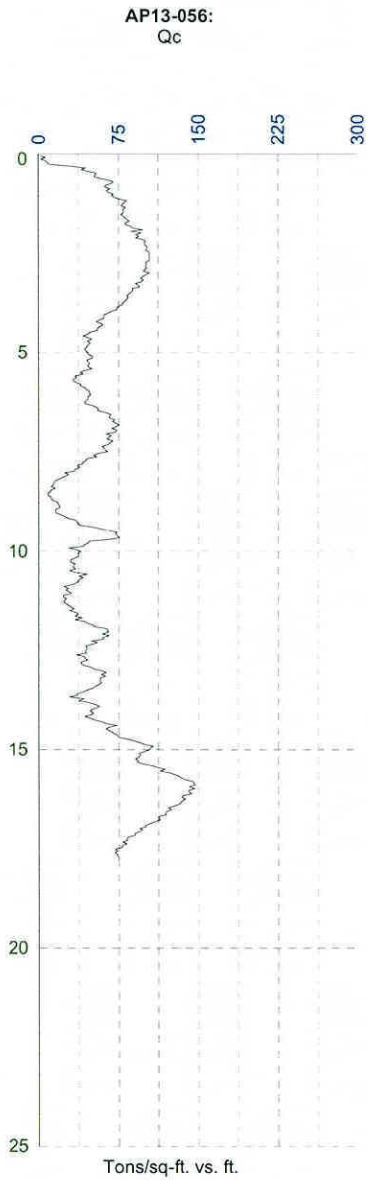

AP13-055:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

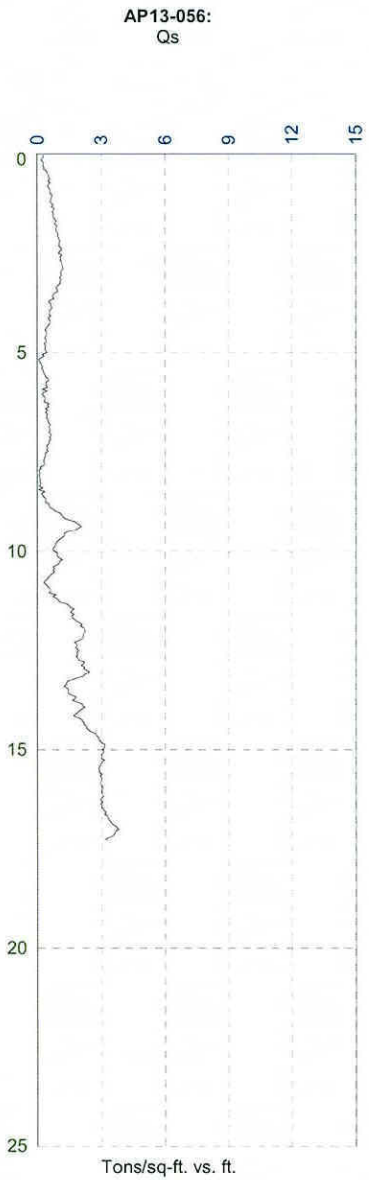

AP13-055:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

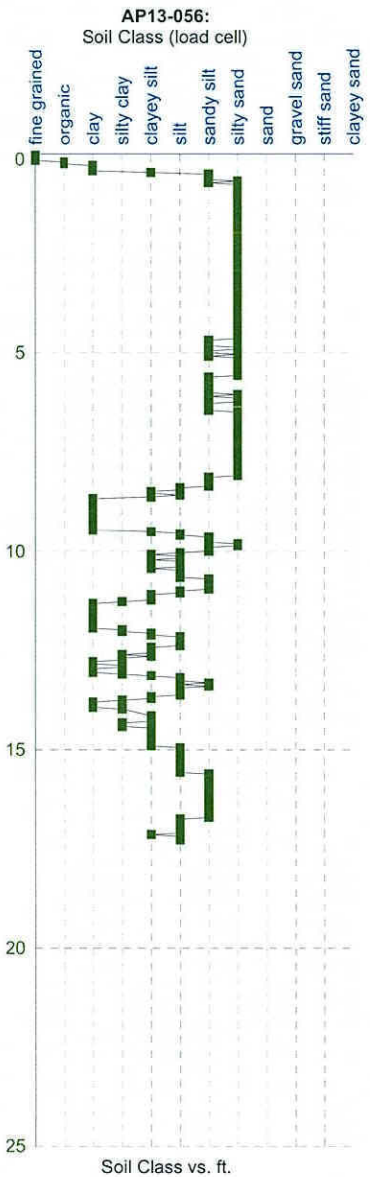

AP13-055:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

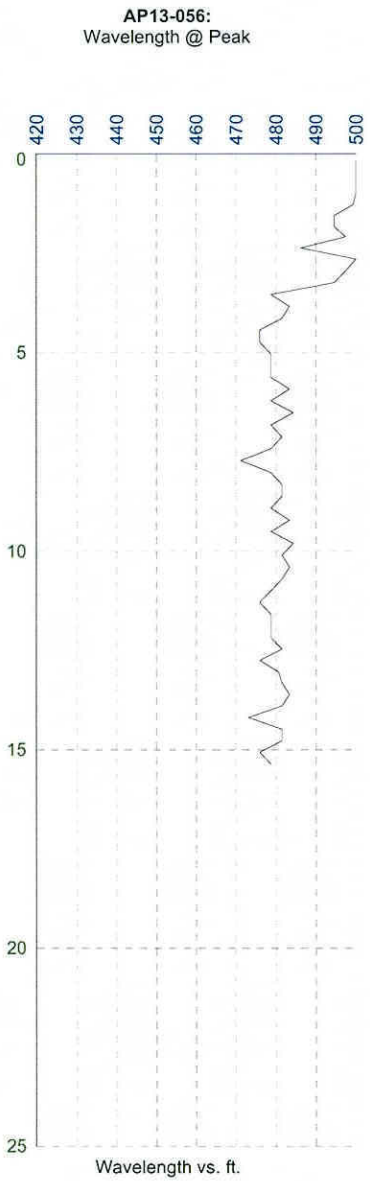

AP13-055:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

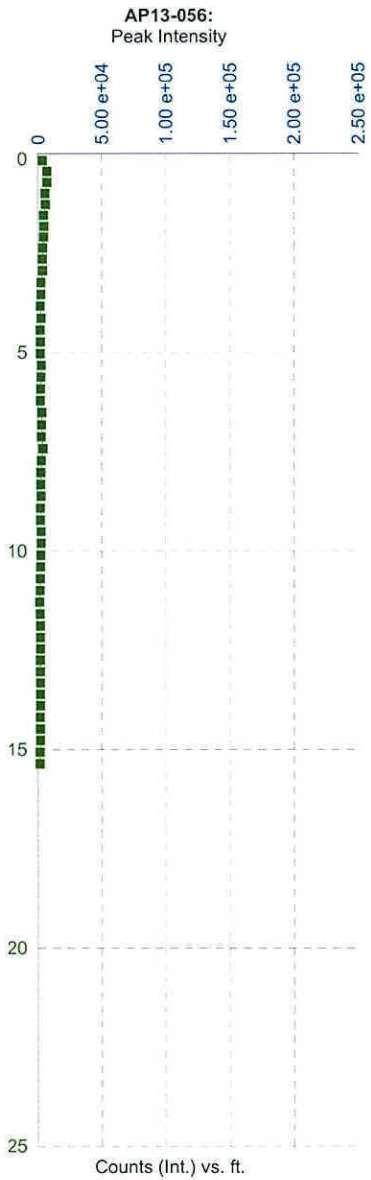

AP13-055:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.


AP13-056:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

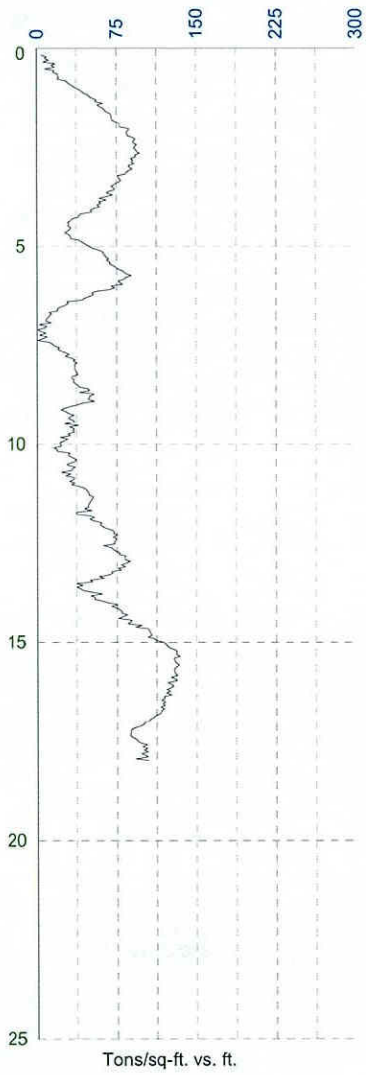

AP13-056:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.


AP13-056:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

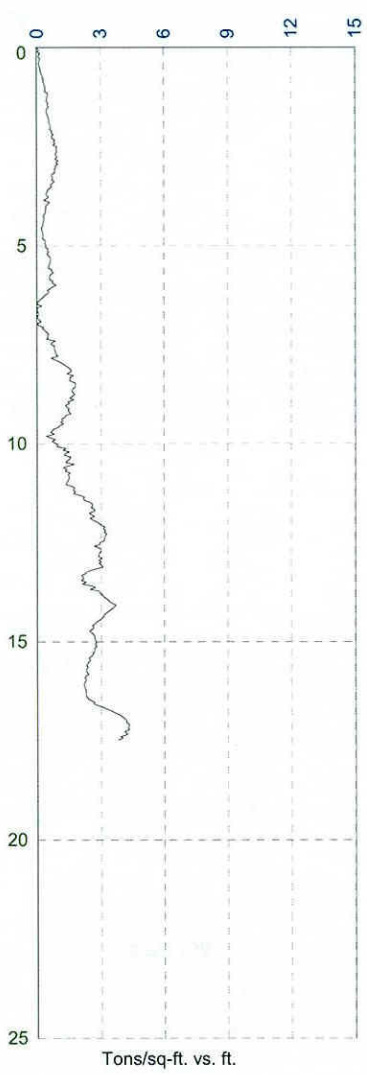

AP13-056:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.


AP13-056:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

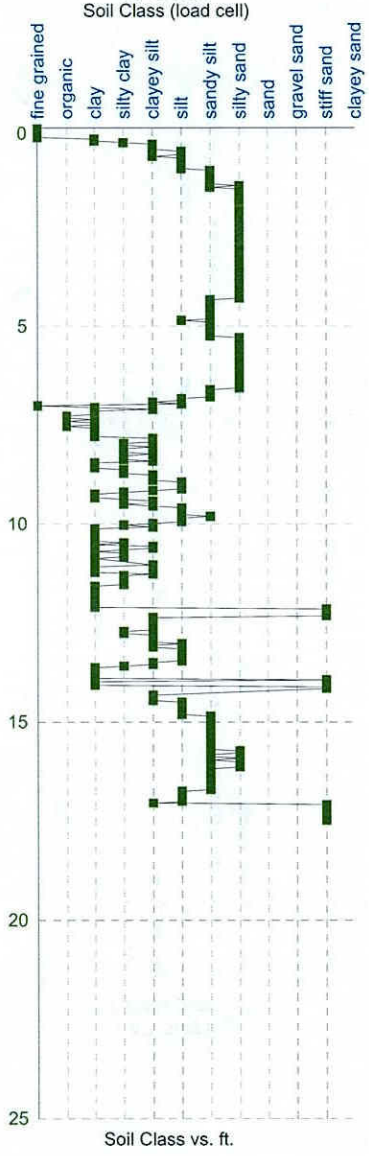
**AP13-057:**
Qc



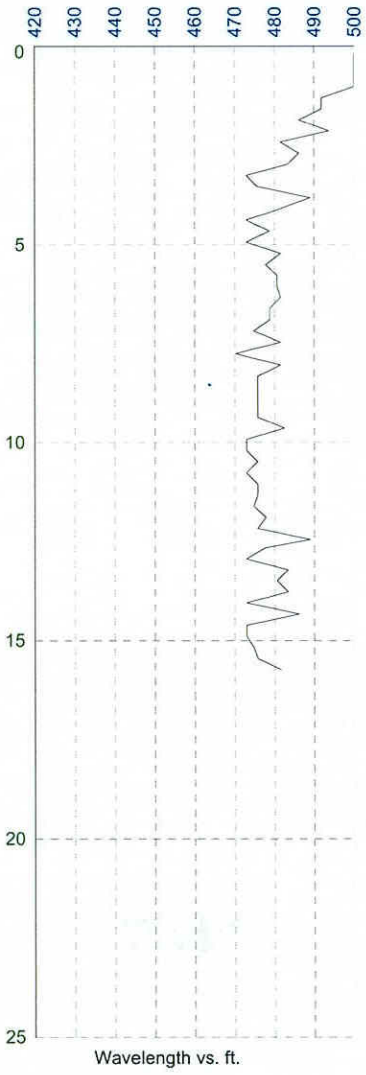

**AP13-057:**
Qs



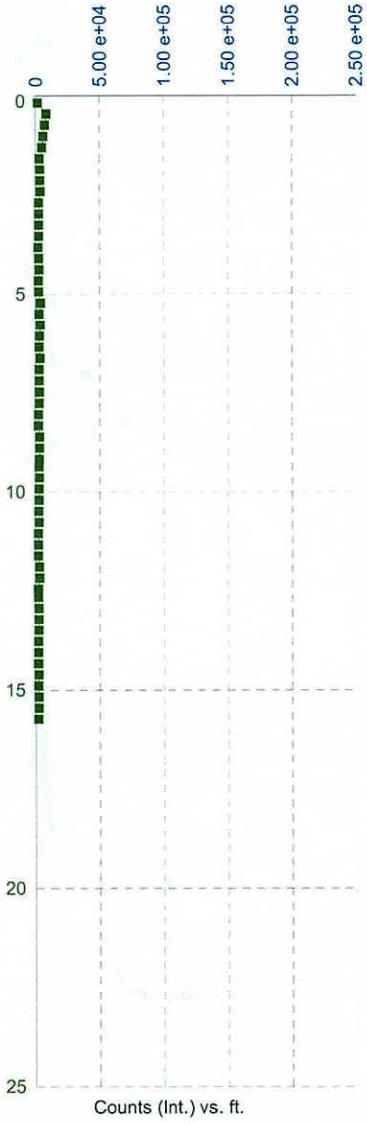

**AP13-057:**
Soil Class (load cell)

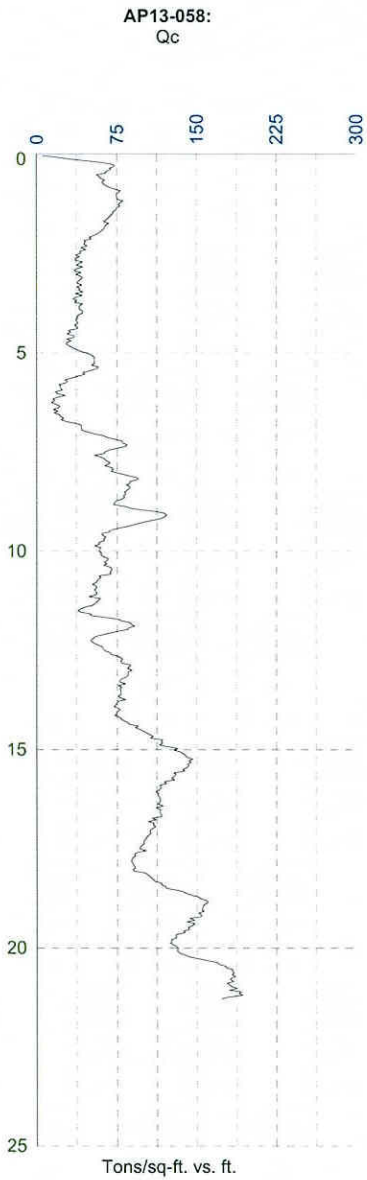


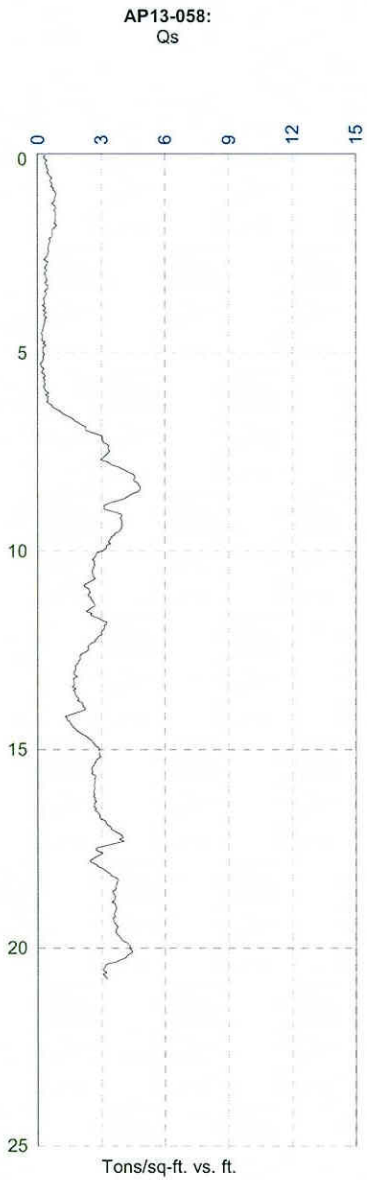

**AP13-057:**
Wavelength @ Peak

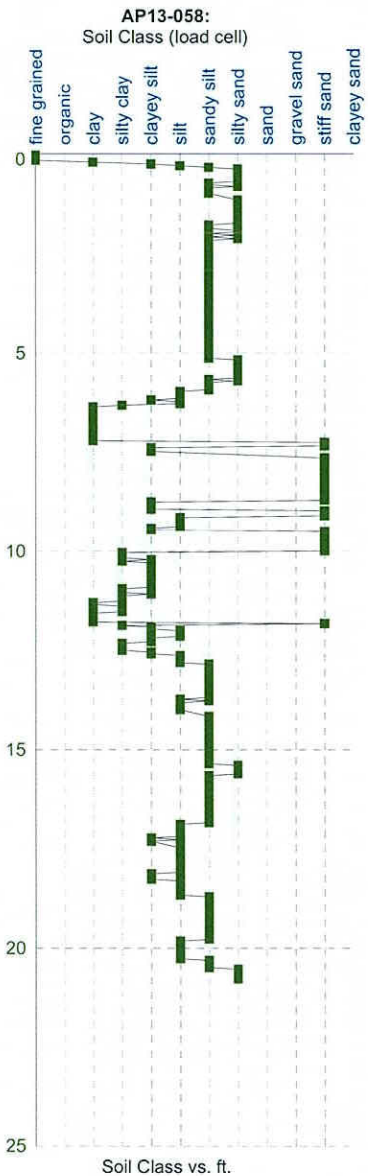


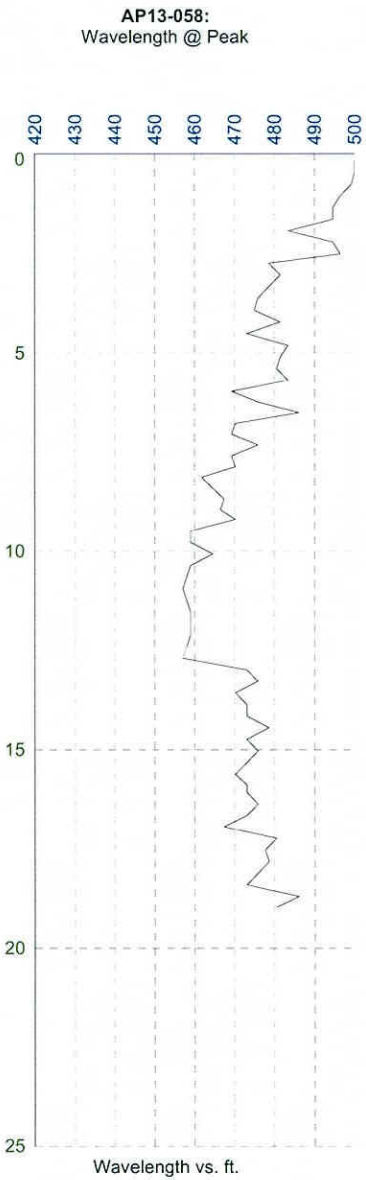

**AP13-057:**
Peak Intensity

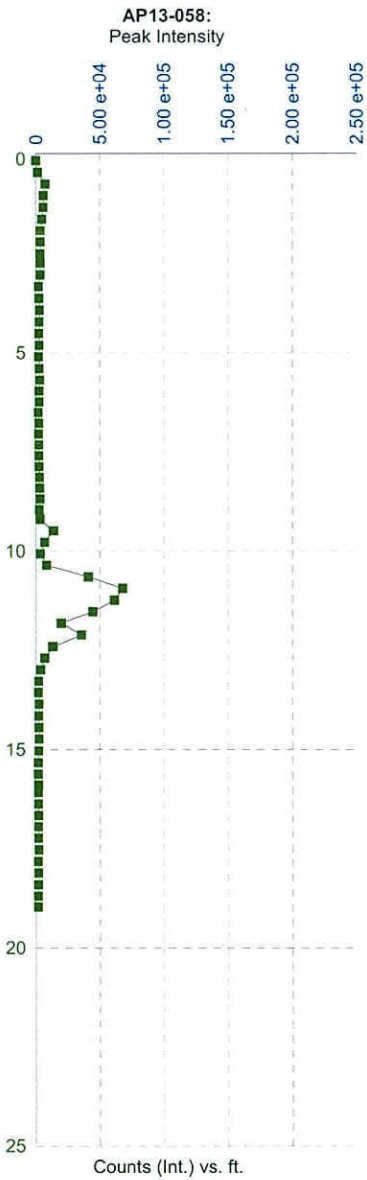


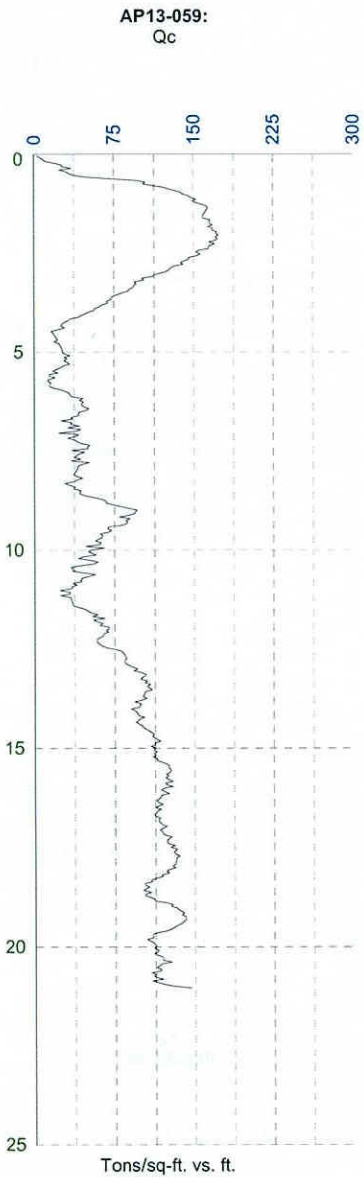

AP13-058:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

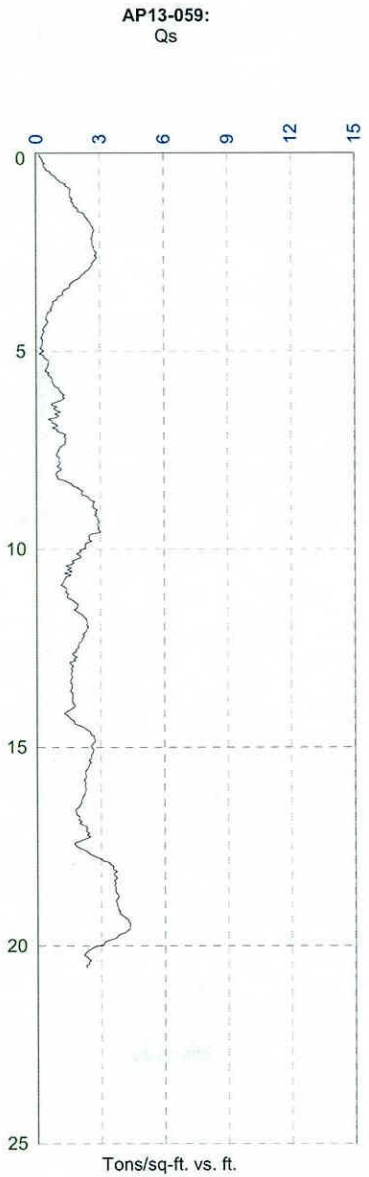

AP13-058:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

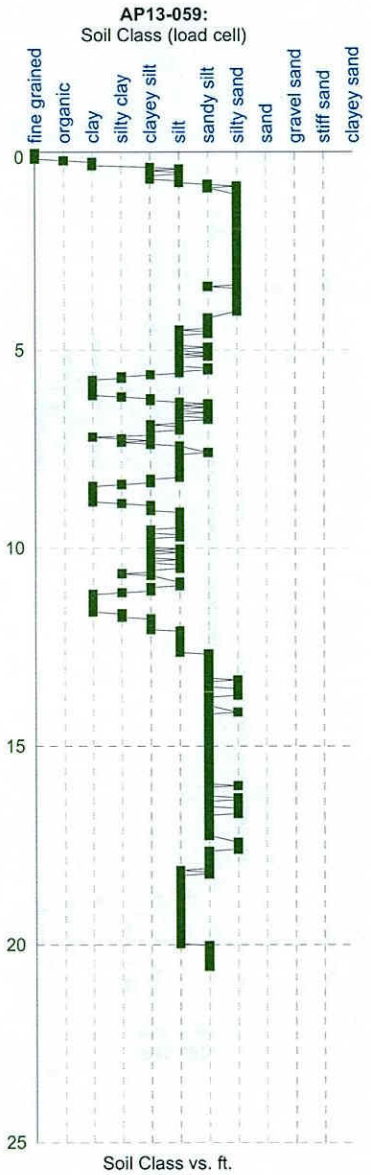

AP13-058:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

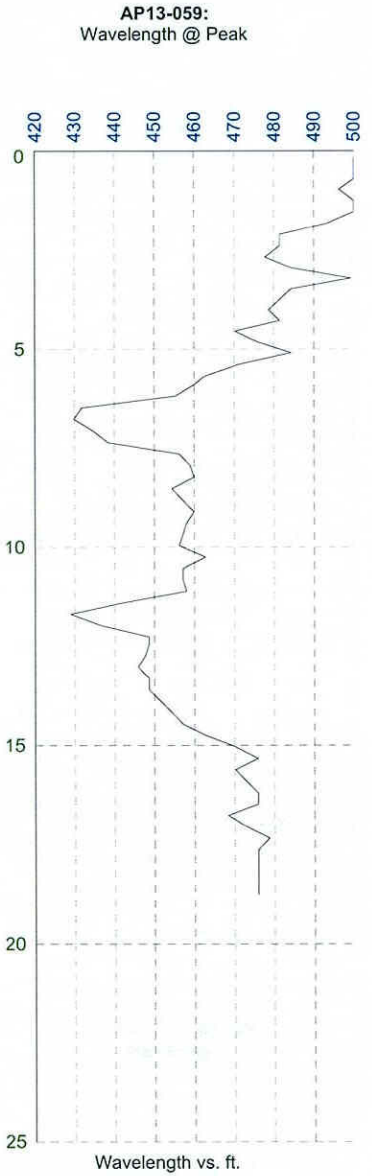

AP13-058:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

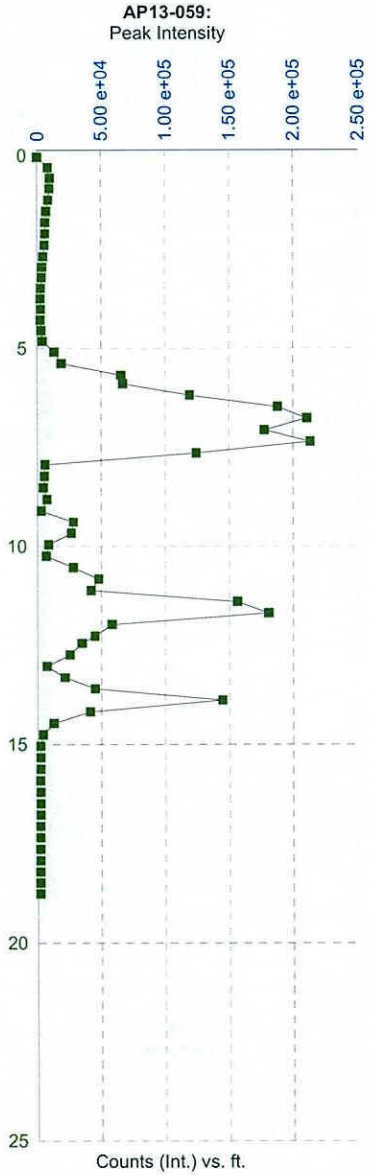

AP13-058:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

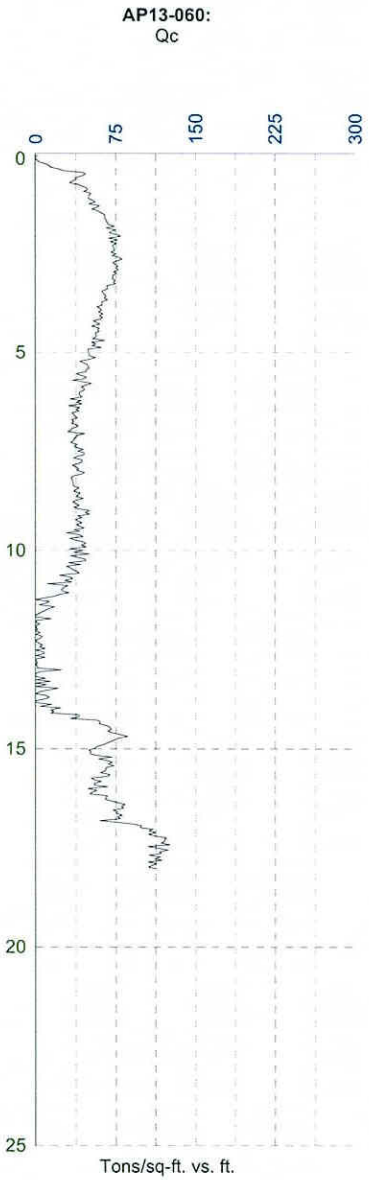

AP13-059:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

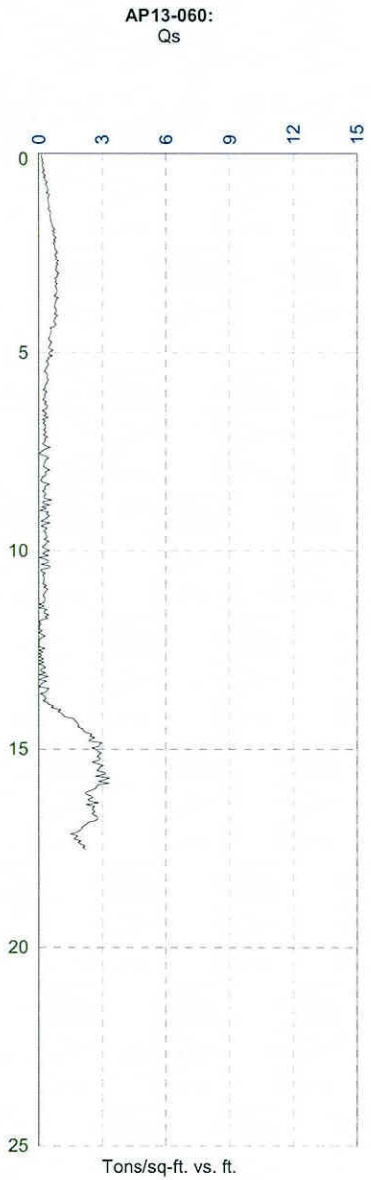

AP13-059:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

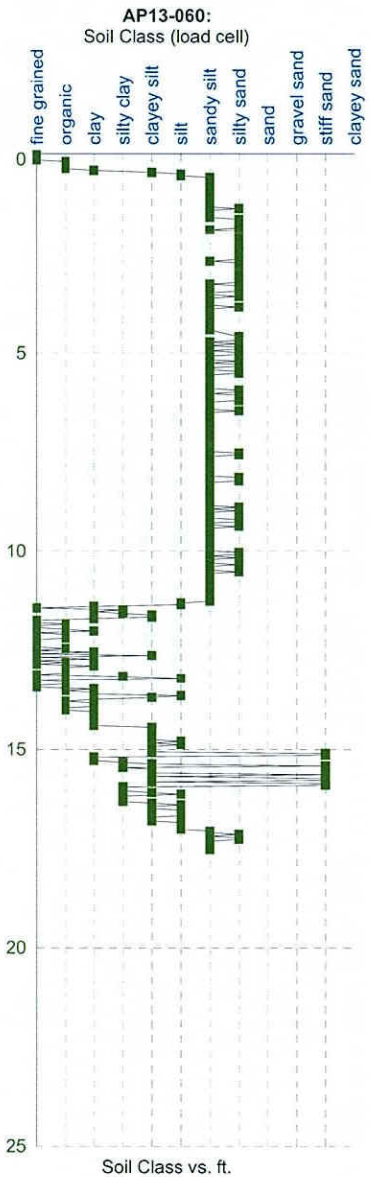

AP13-059:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

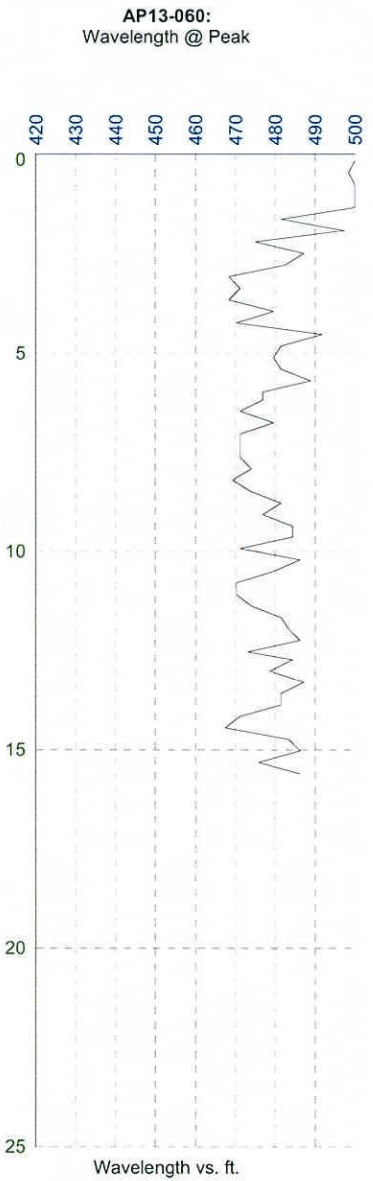

AP13-059:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

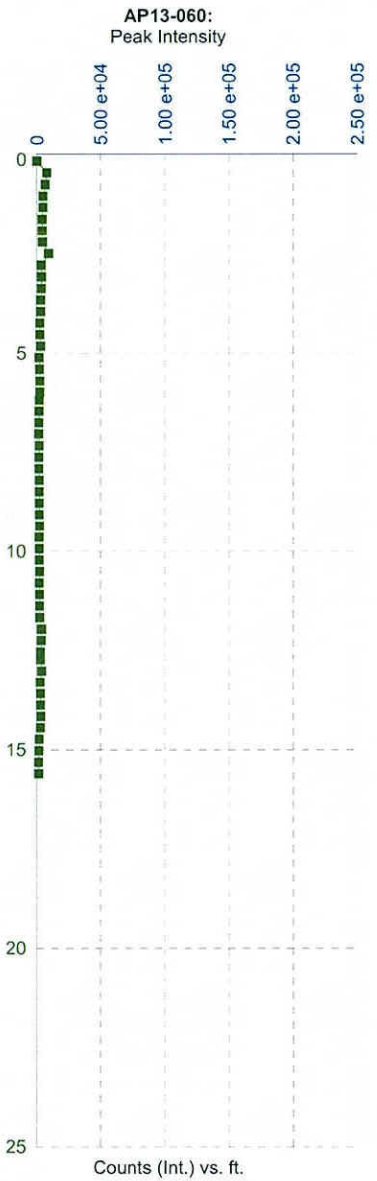

AP13-059:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

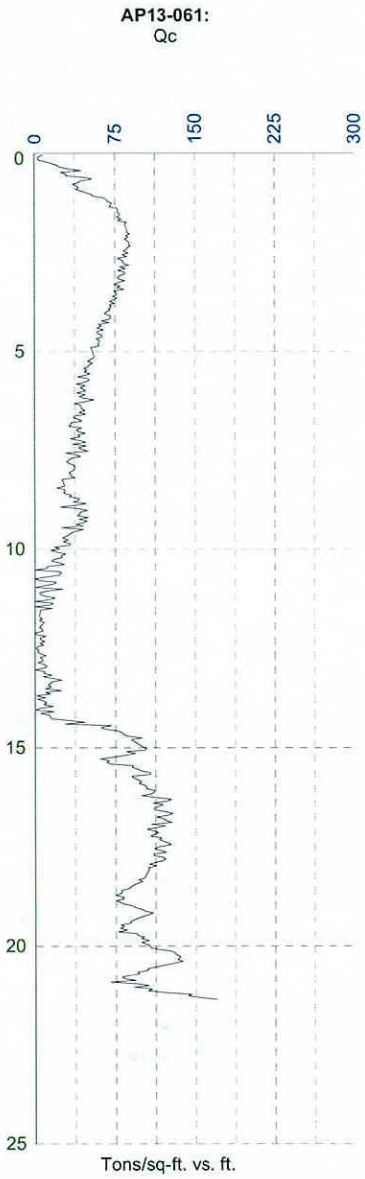

AP13-060:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

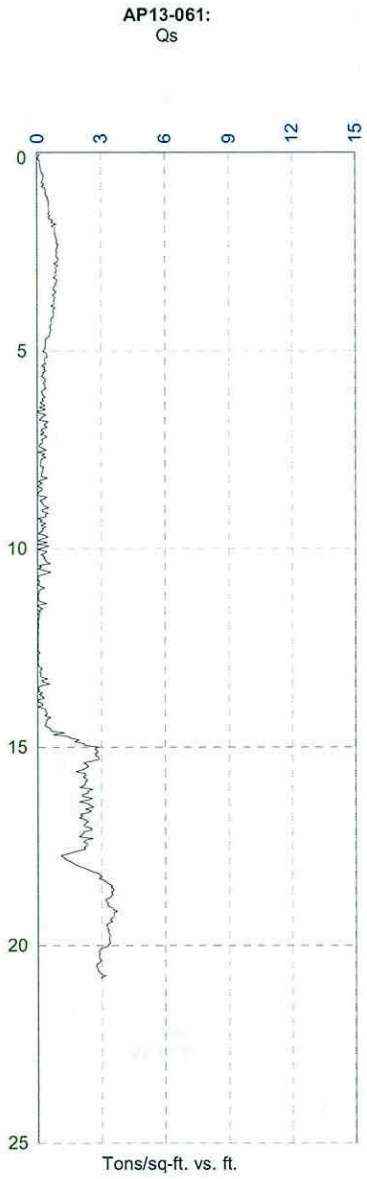

AP13-060:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

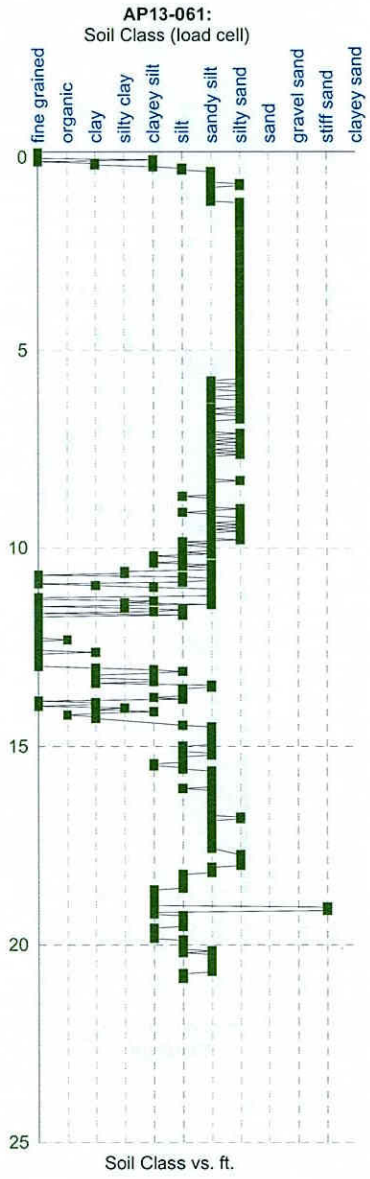

AP13-060:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

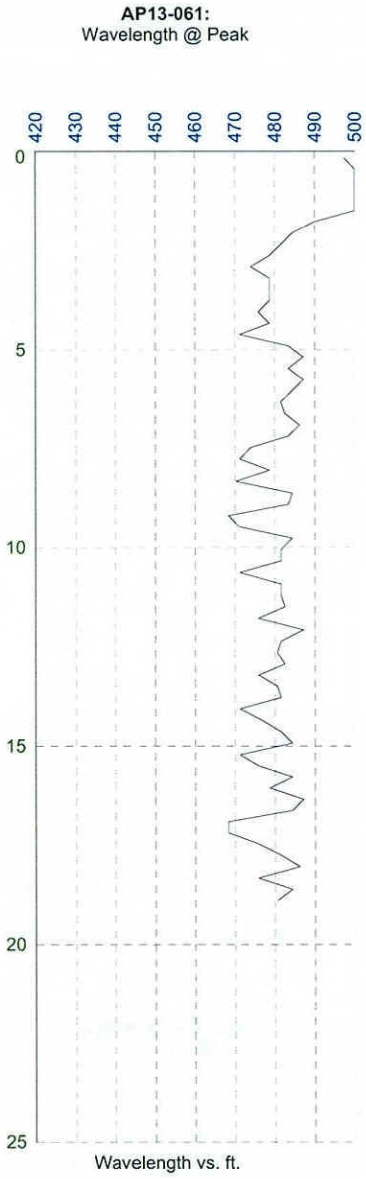

AP13-060:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

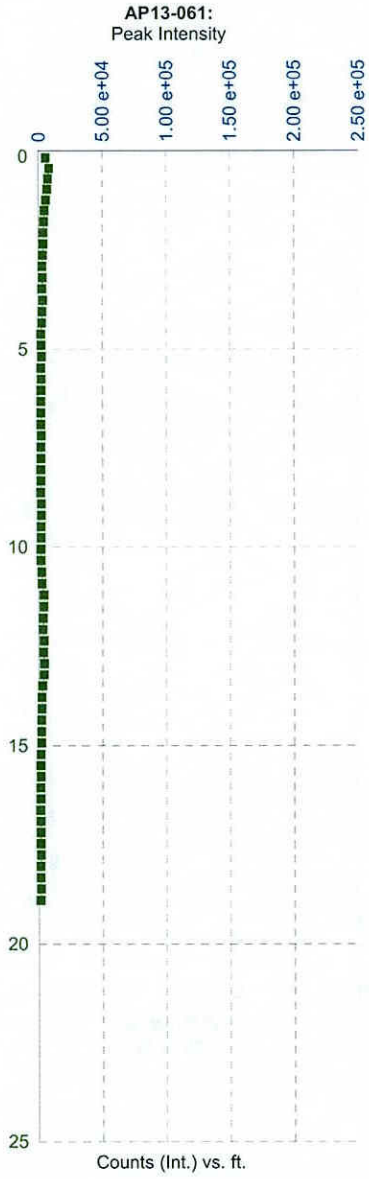

AP13-060:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

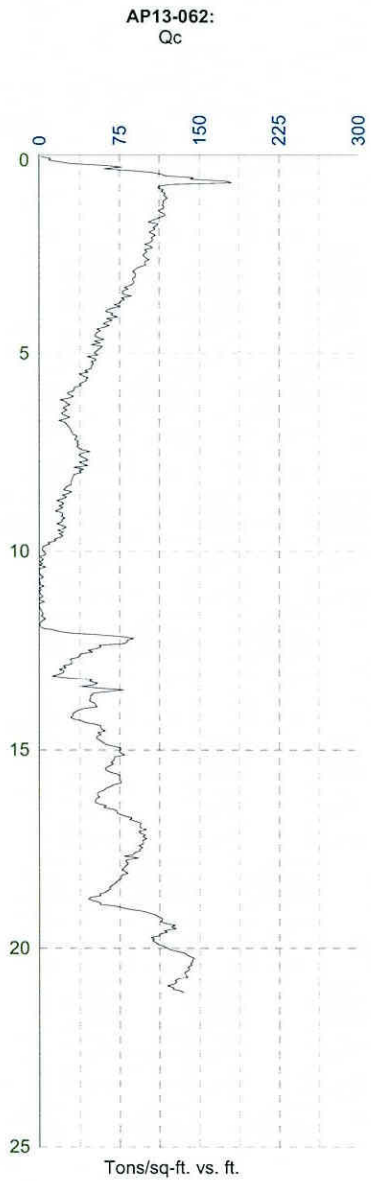

AP13-061:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

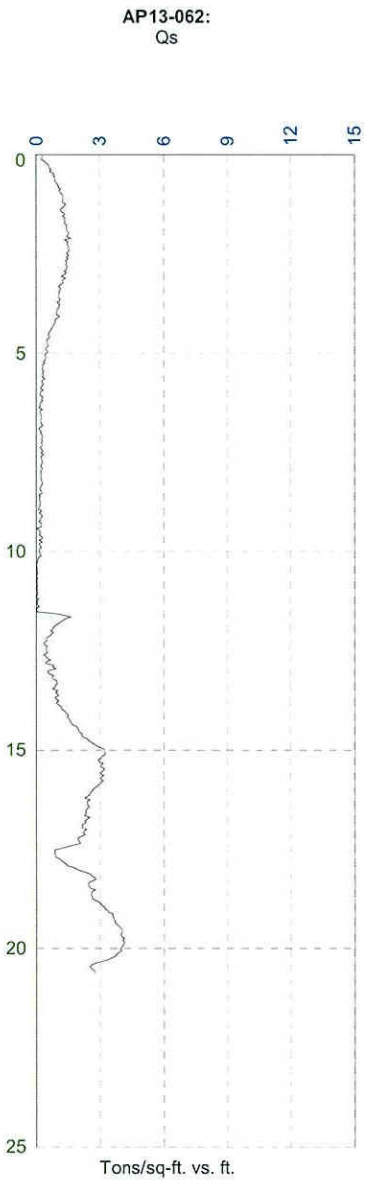

AP13-061:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

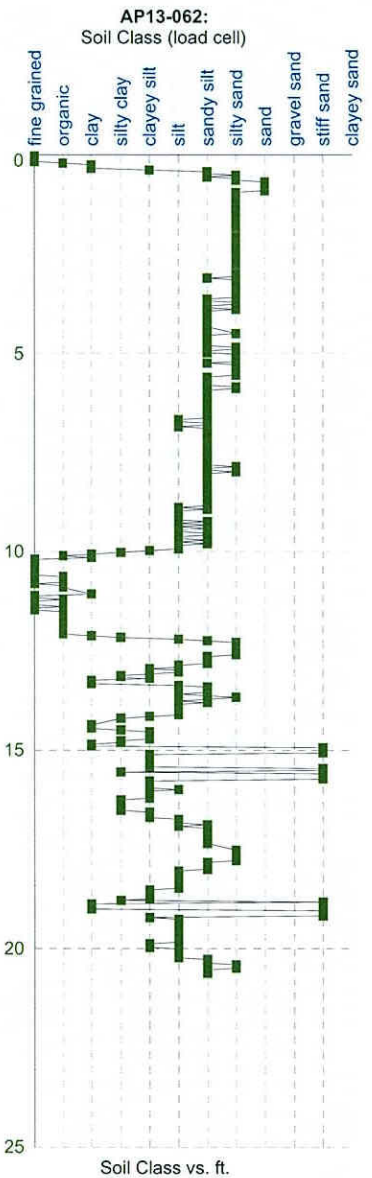

AP13-061:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

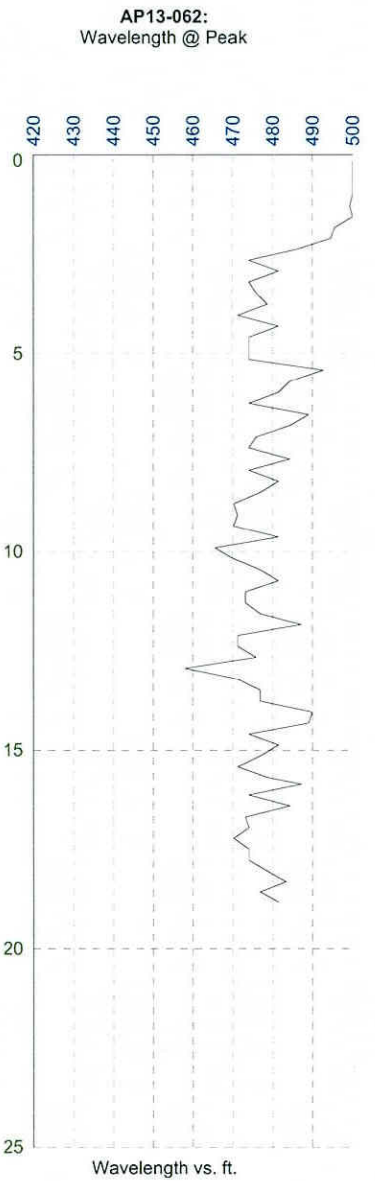

AP13-061:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

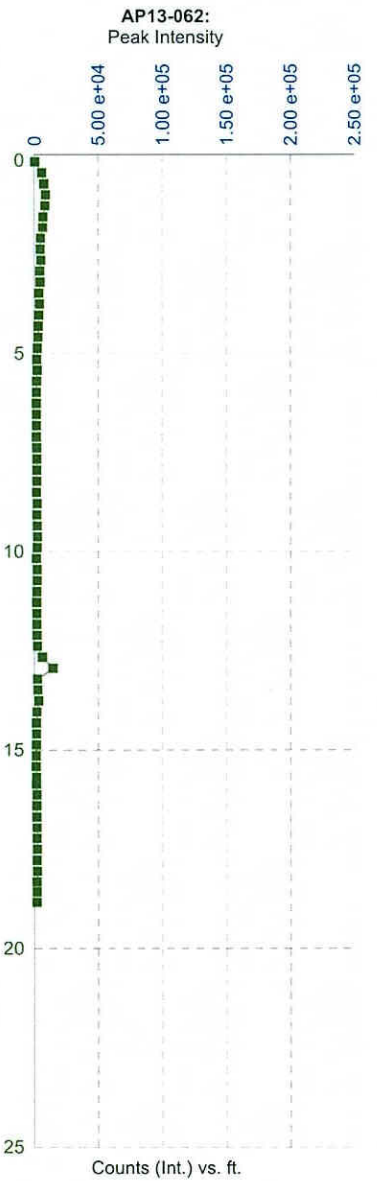

AP13-061:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

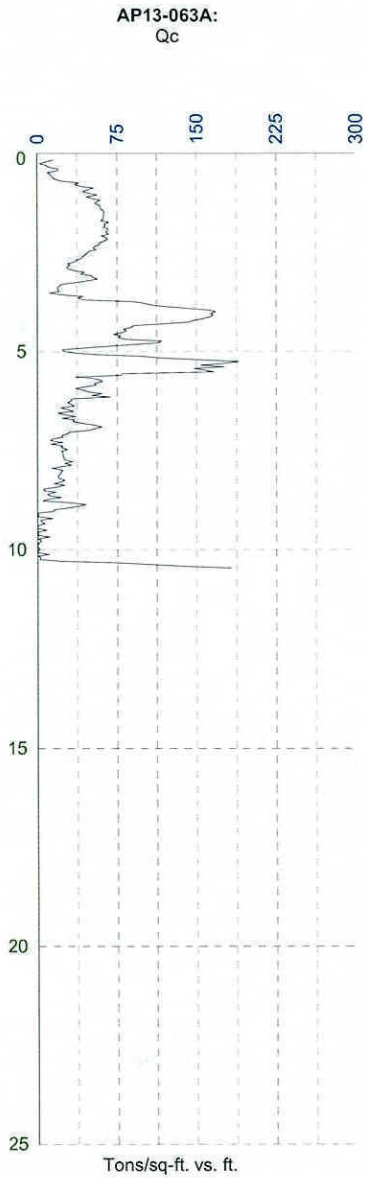

AP13-062:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

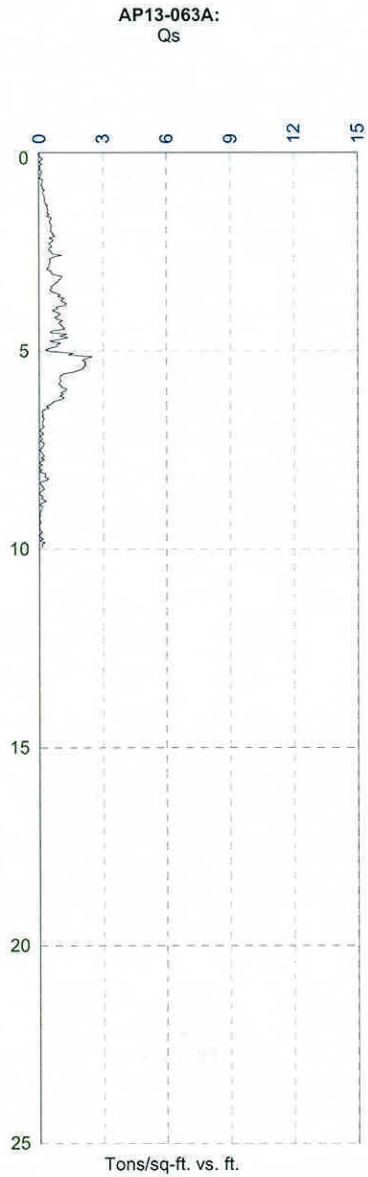

AP13-062:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

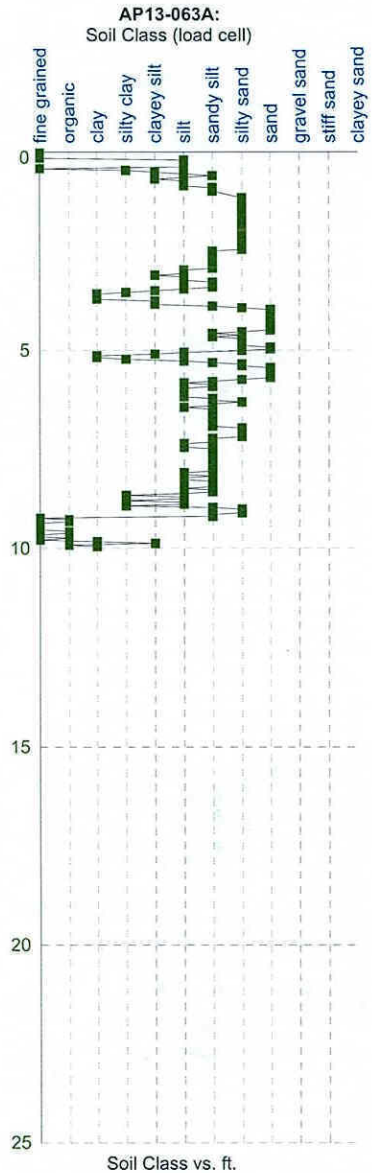

AP13-062:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

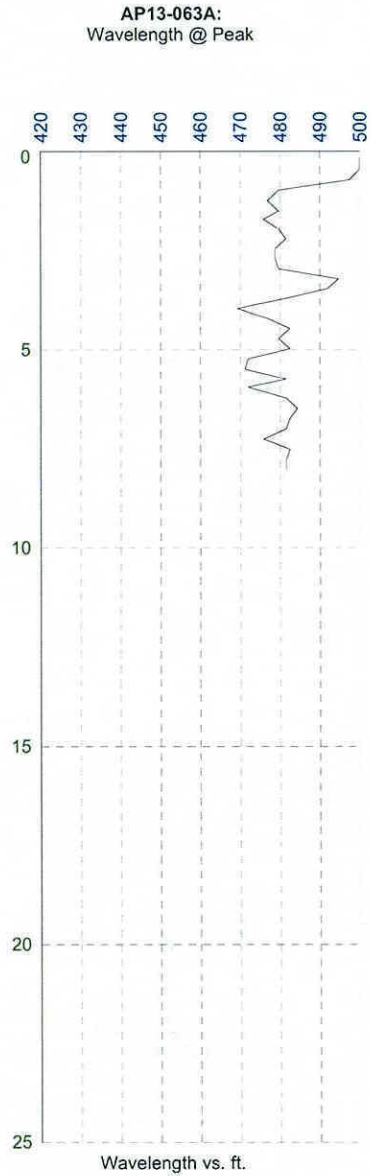

AP13-062:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

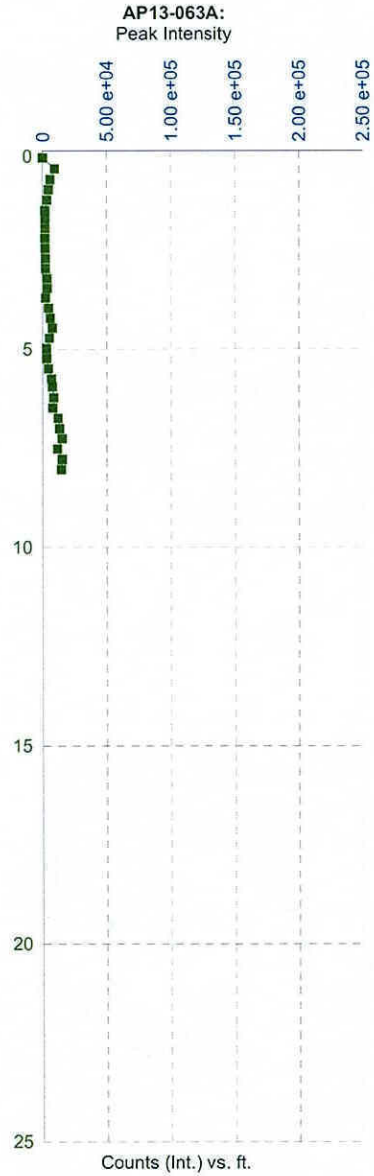

AP13-062:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

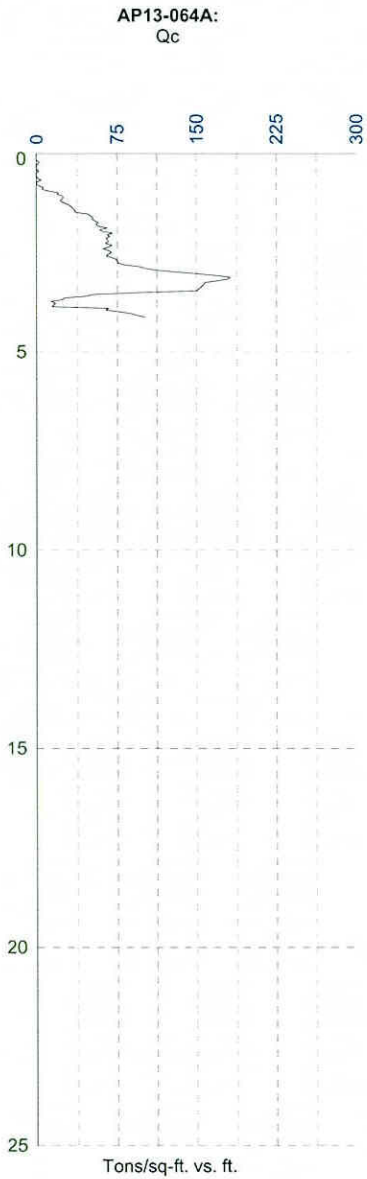

AP13-063A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

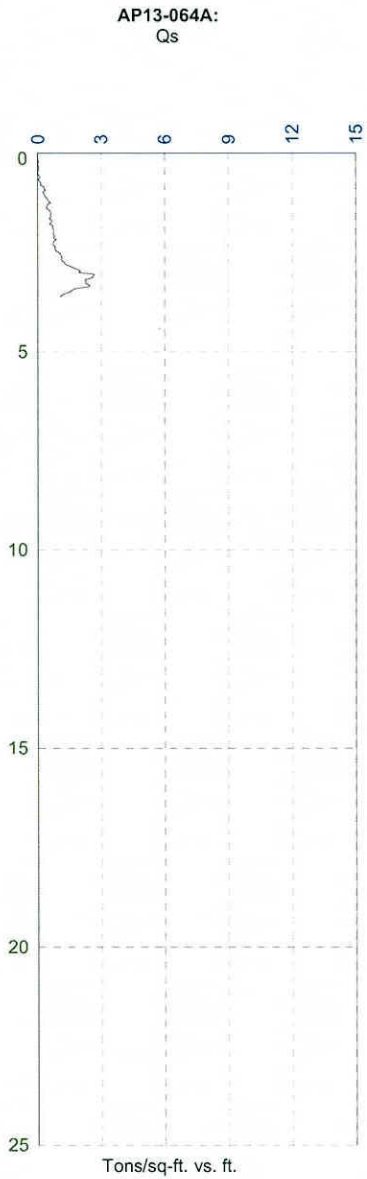

AP13-063A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

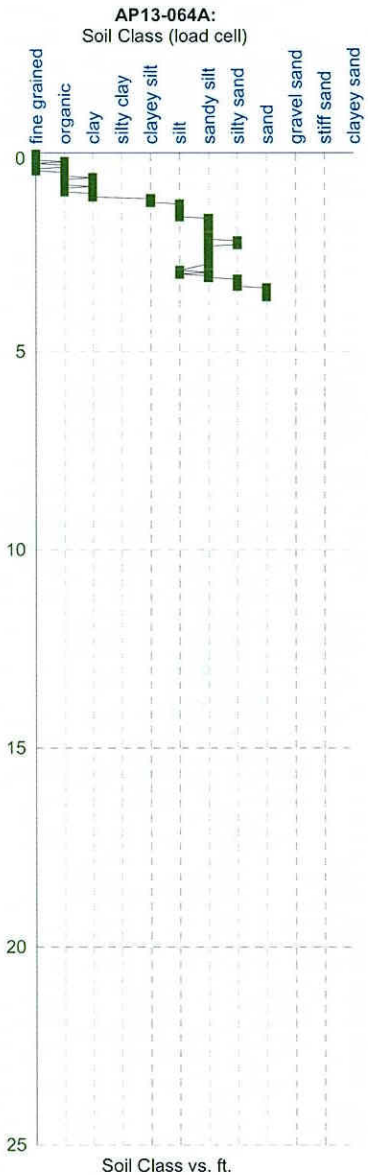

AP13-063A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

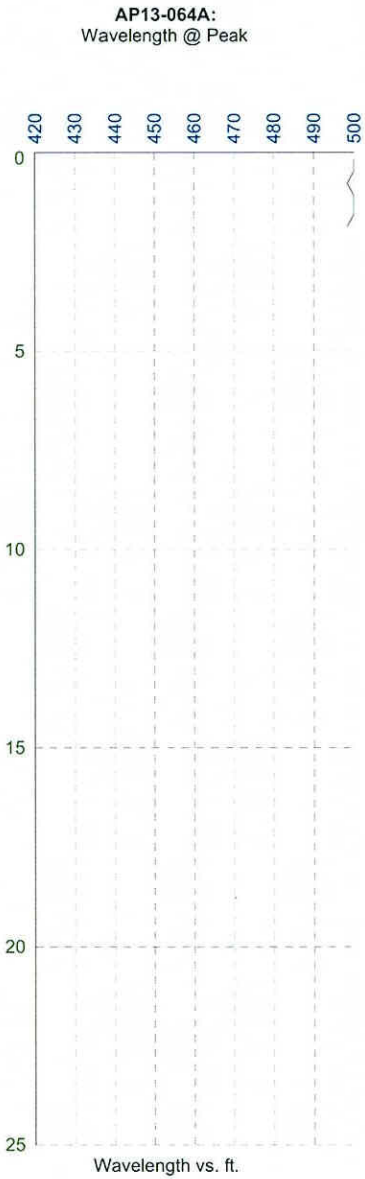

AP13-063A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

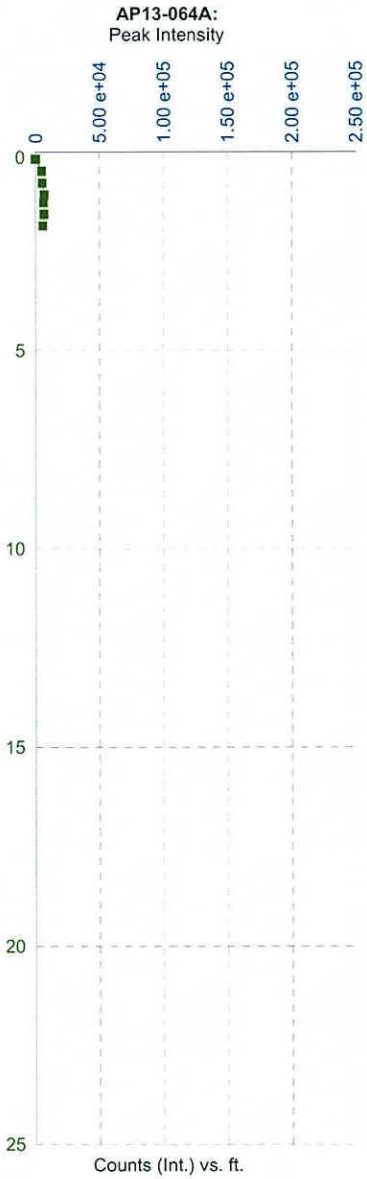

AP13-063A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

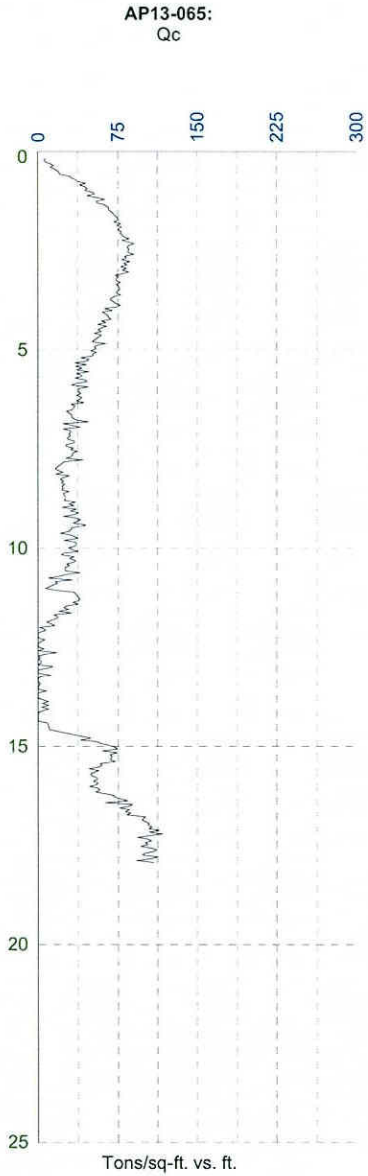

AP13-064A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

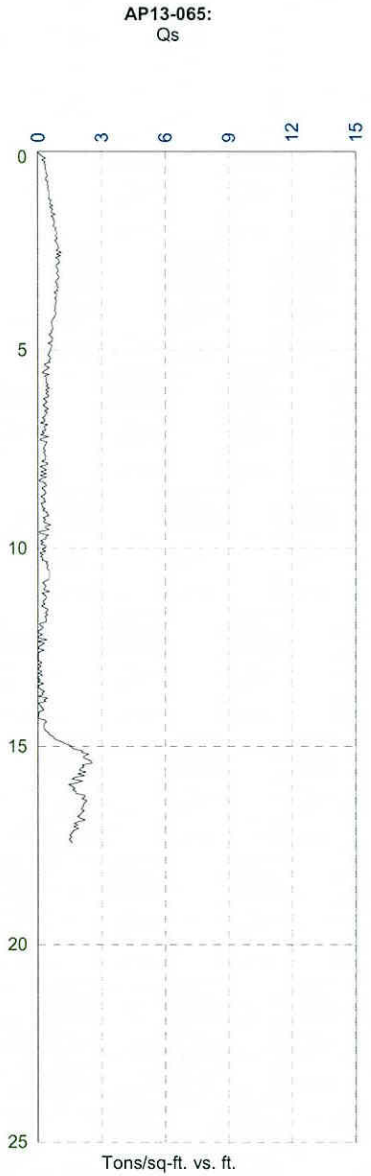

AP13-064A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

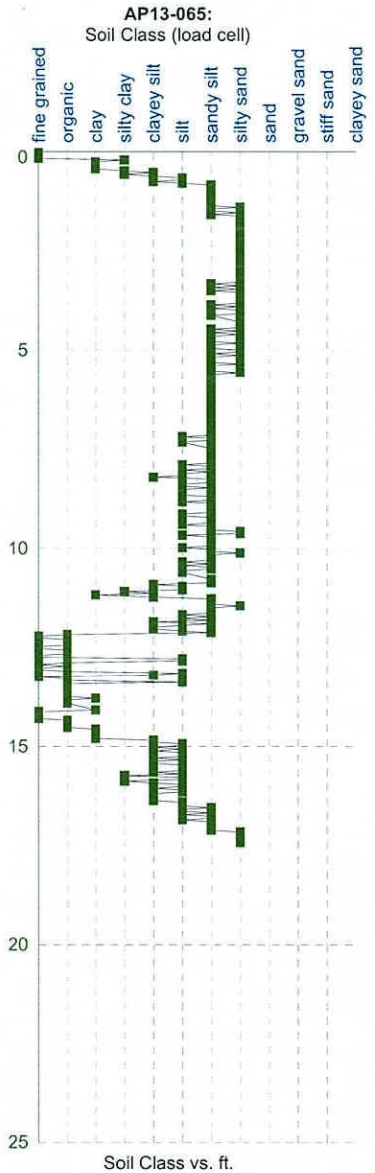

AP13-064A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

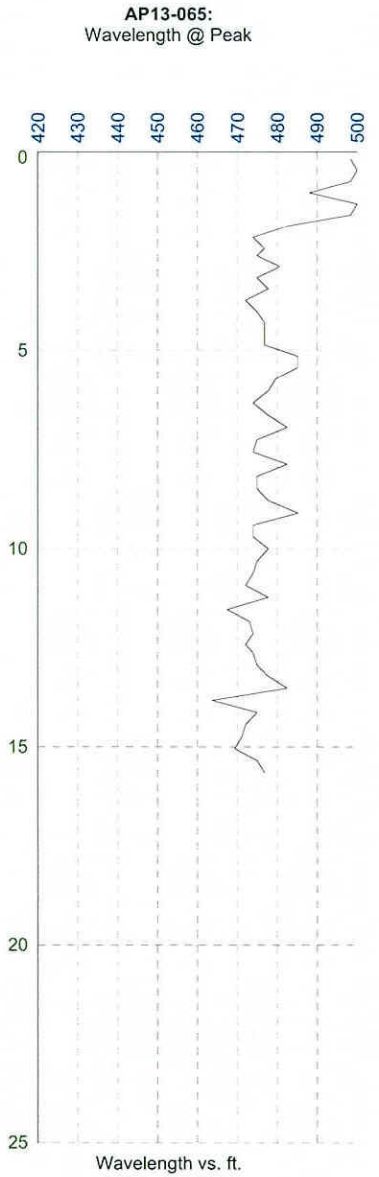

AP13-064A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

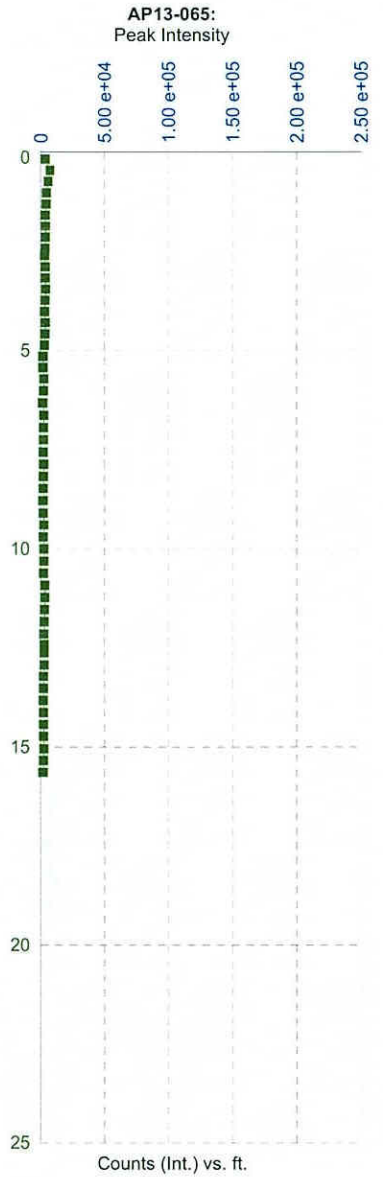

AP13-064A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

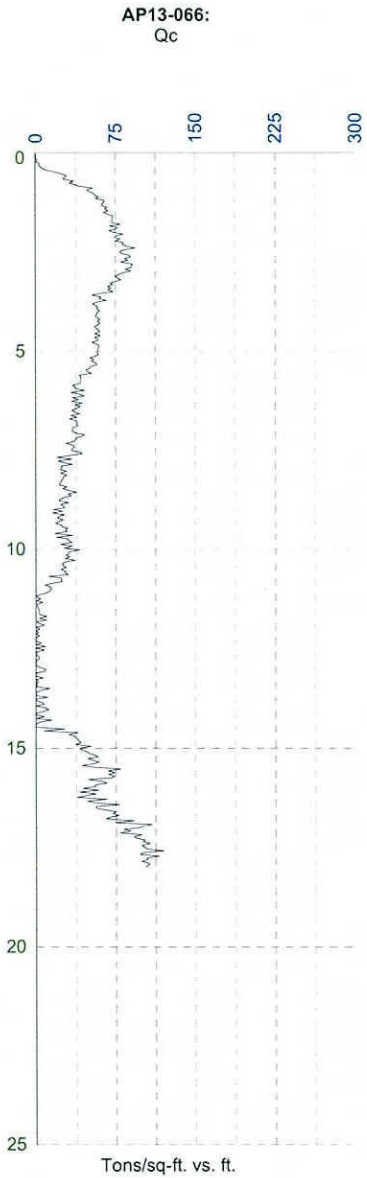

AP13-065:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

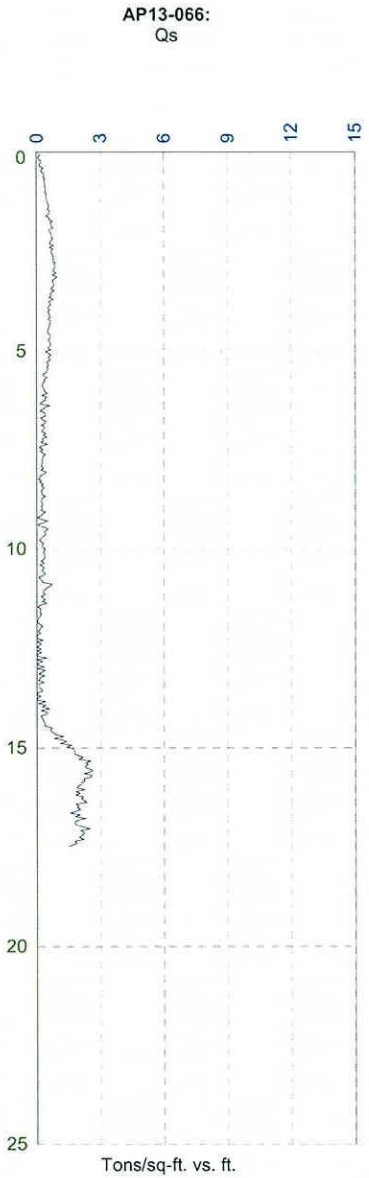

AP13-065:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

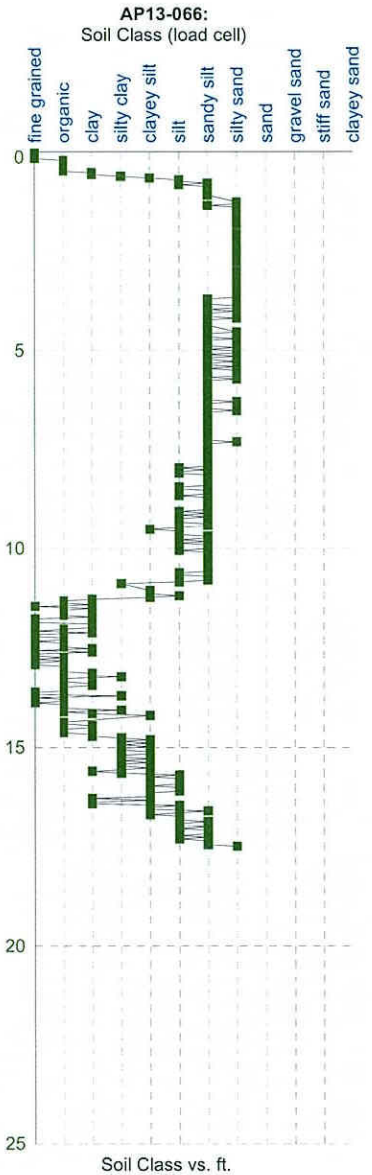

AP13-065:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

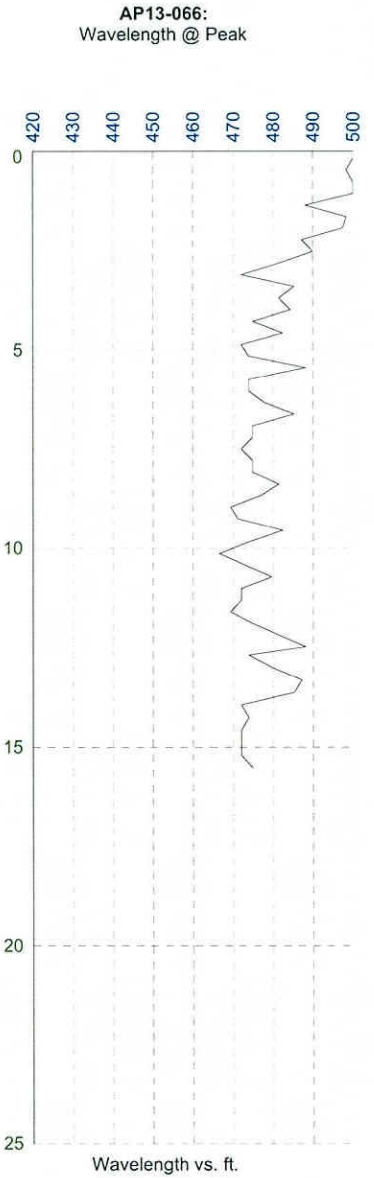

AP13-065:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

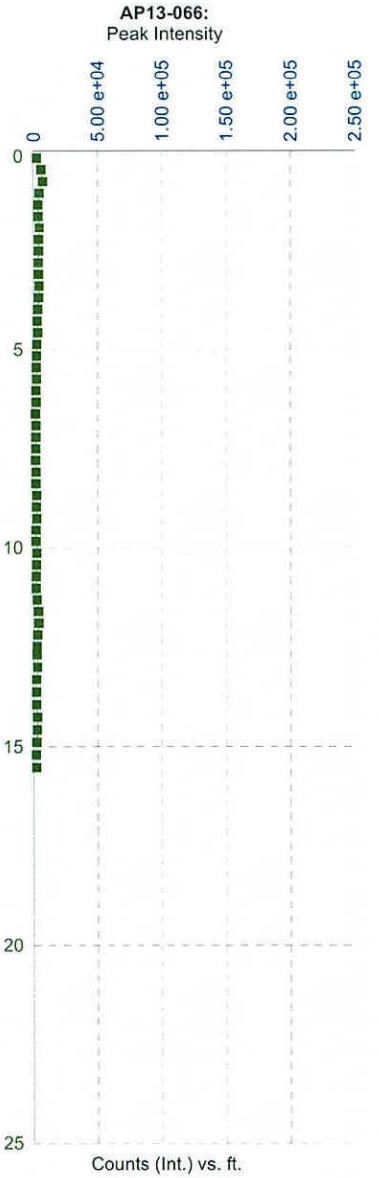

AP13-065:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

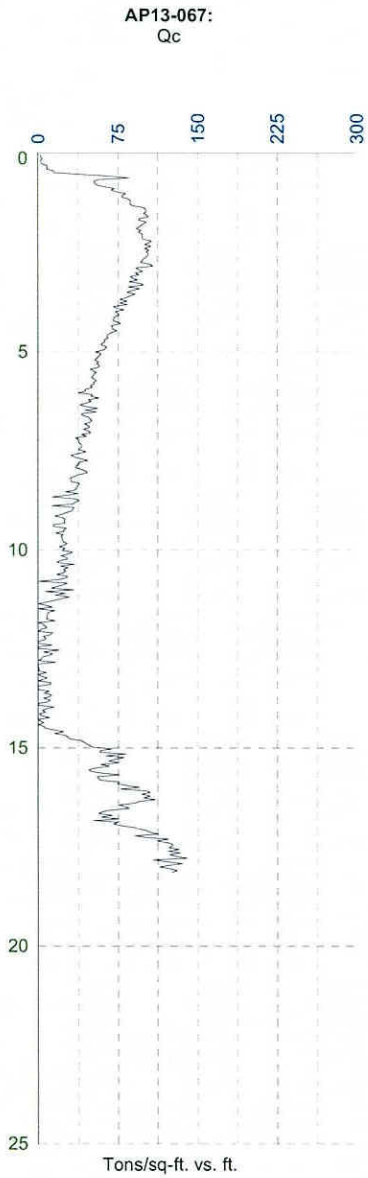

AP13-066:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

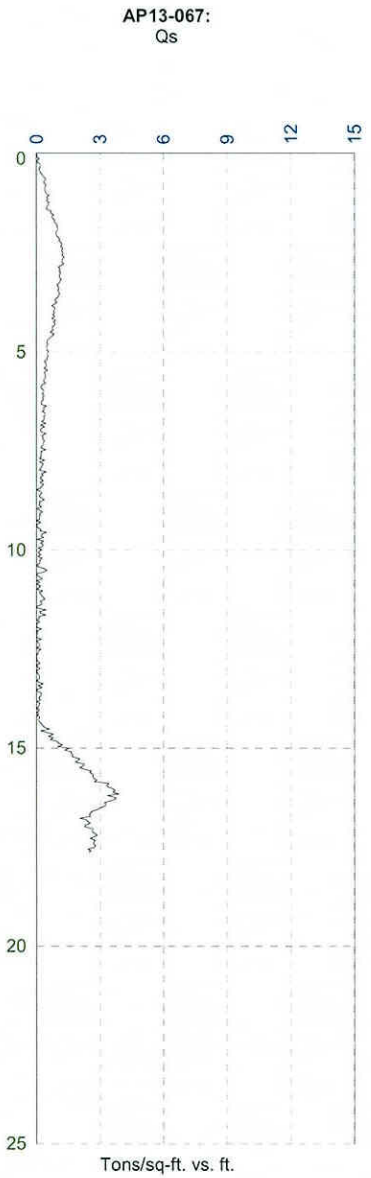

AP13-066:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

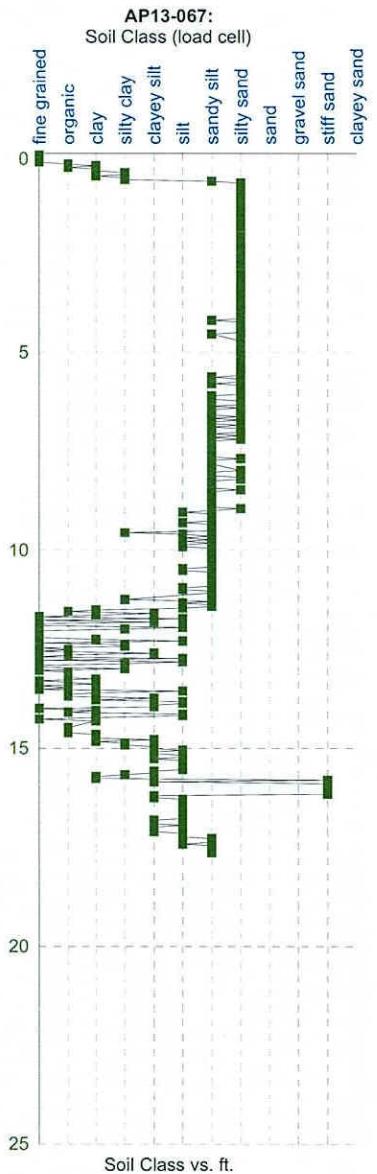

AP13-066:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

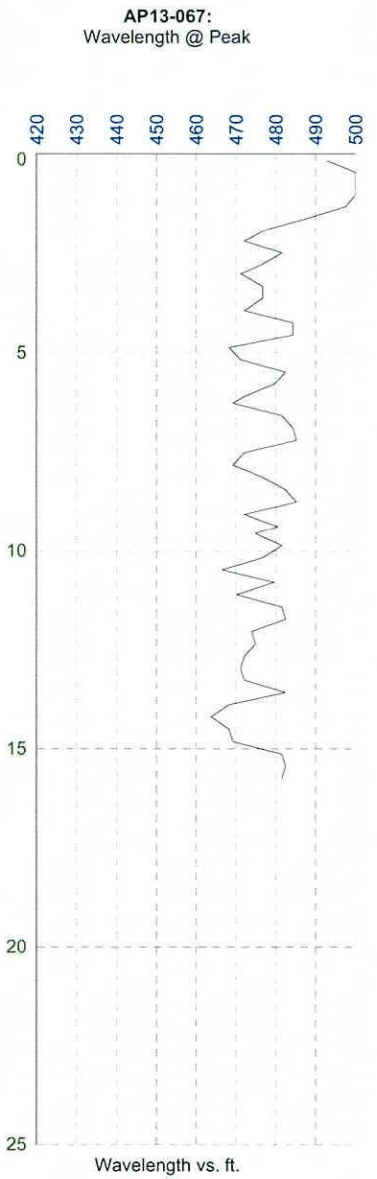

AP13-066:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

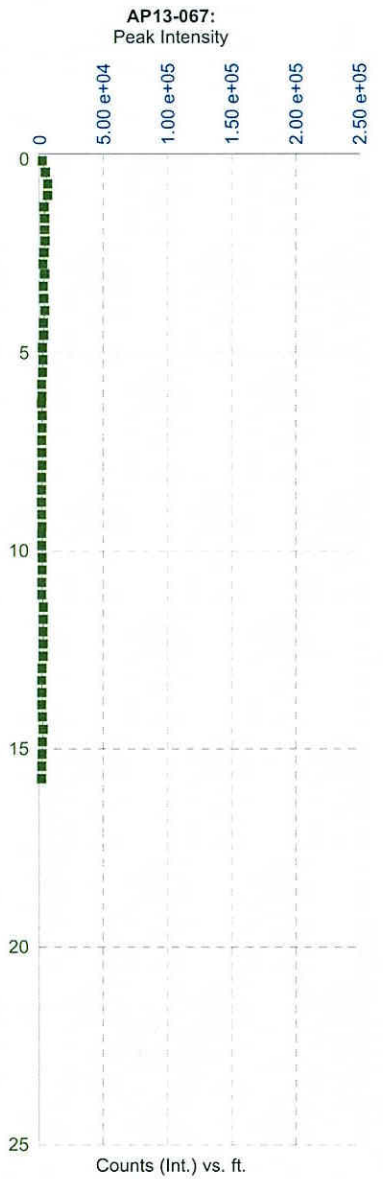

AP13-066:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

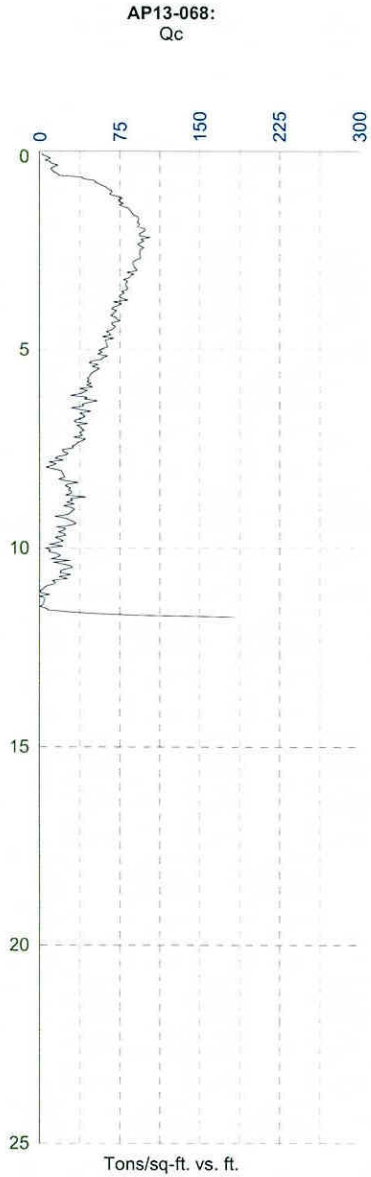

AP13-067:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

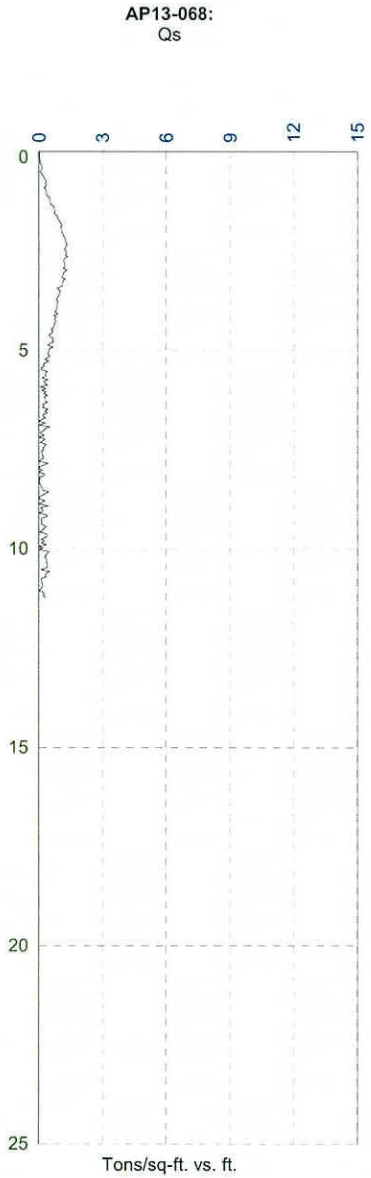

AP13-067:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

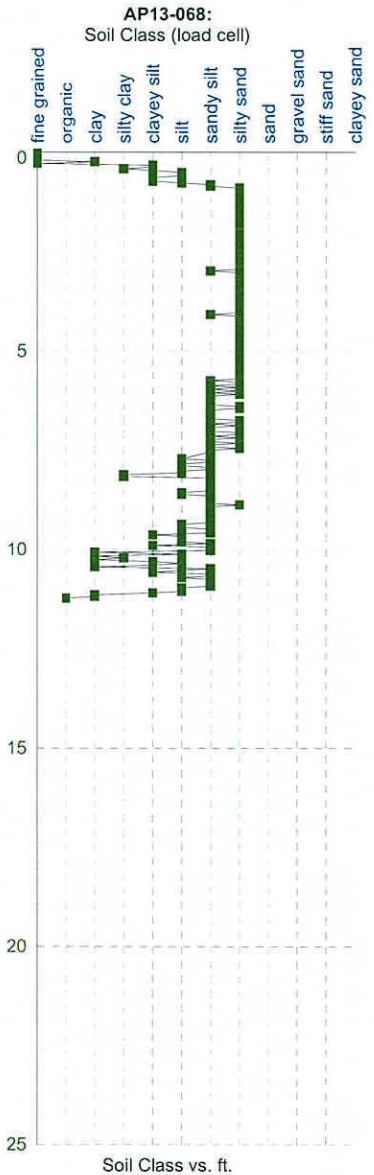

AP13-067:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

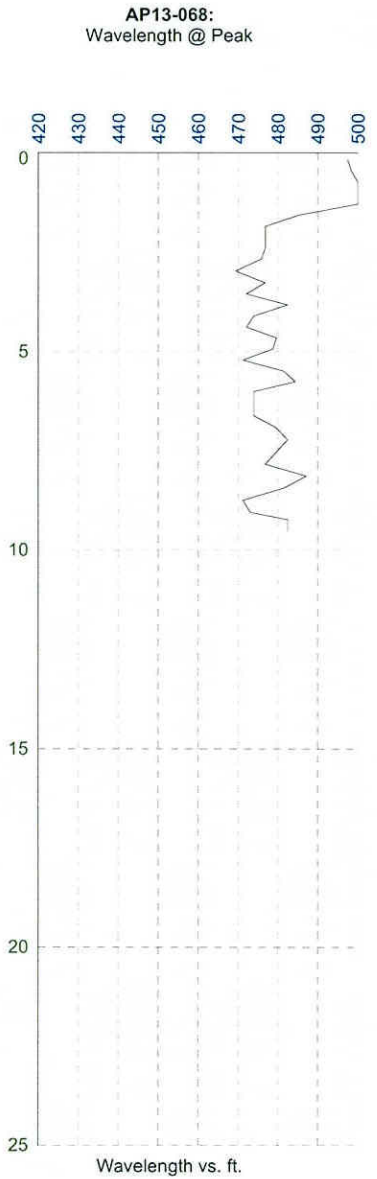

AP13-067:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

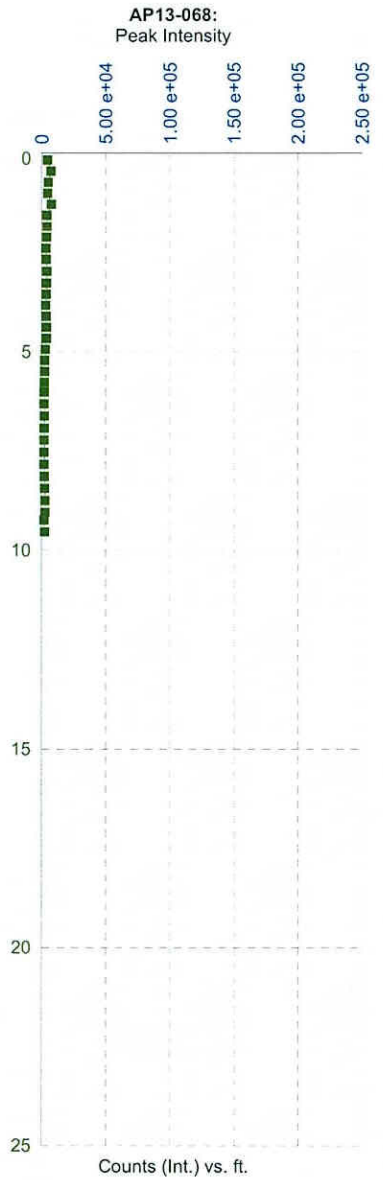

AP13-067:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

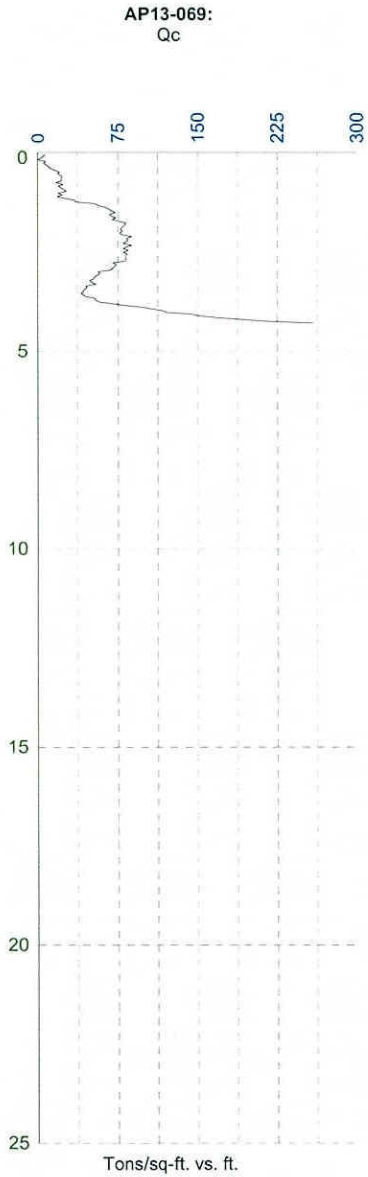

AP13-068:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

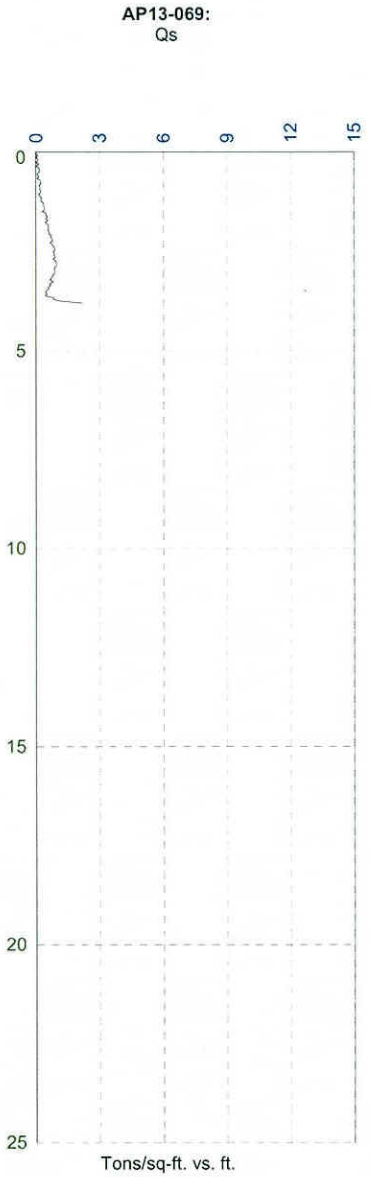

AP13-068:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

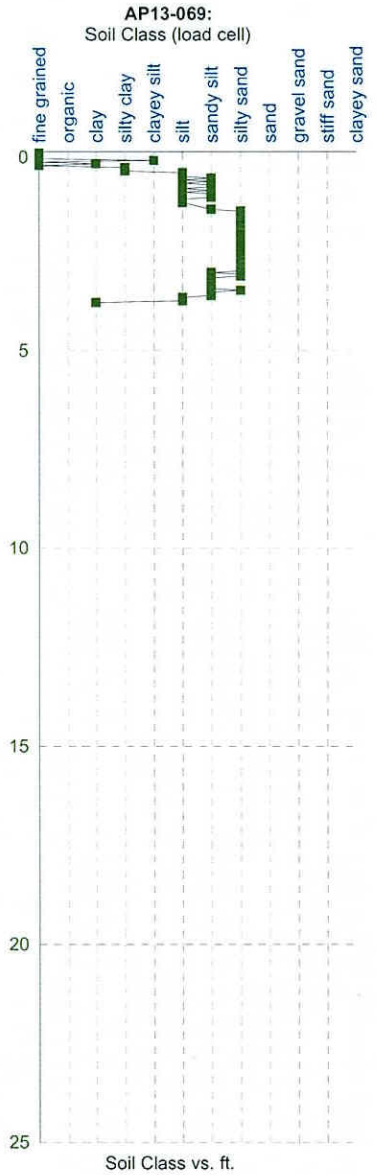

AP13-068:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

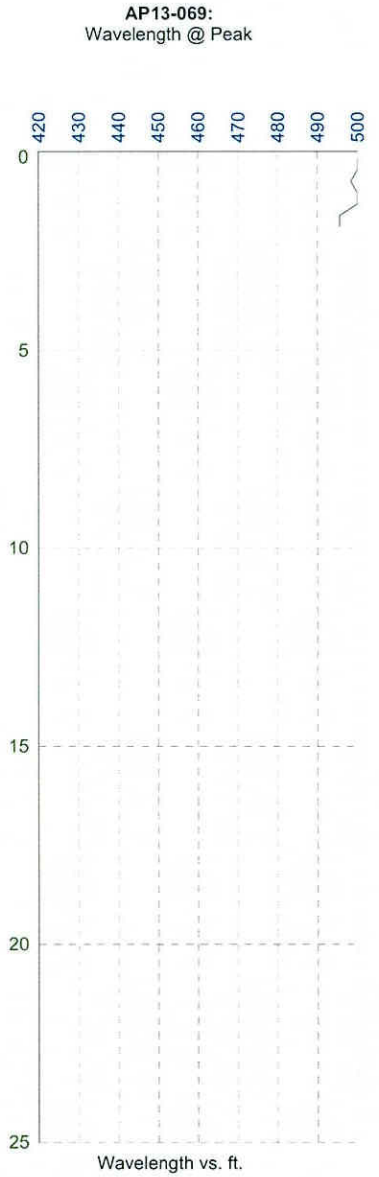

AP13-068:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

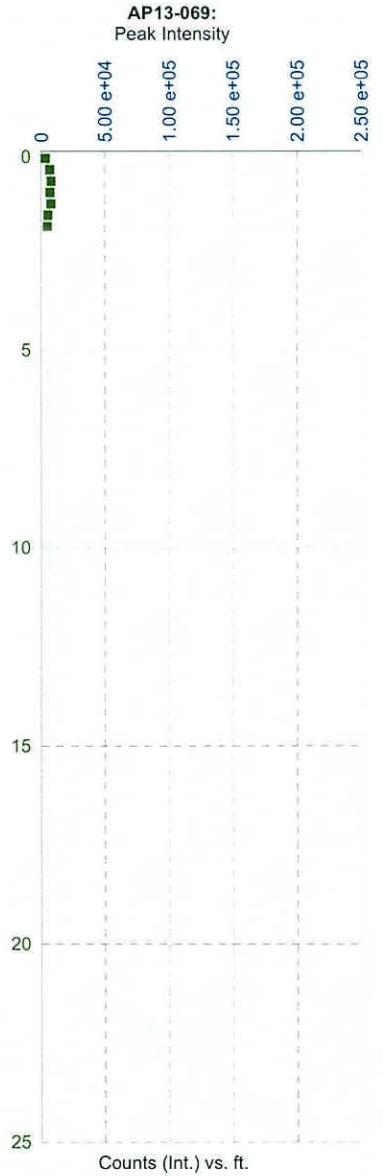

AP13-068:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

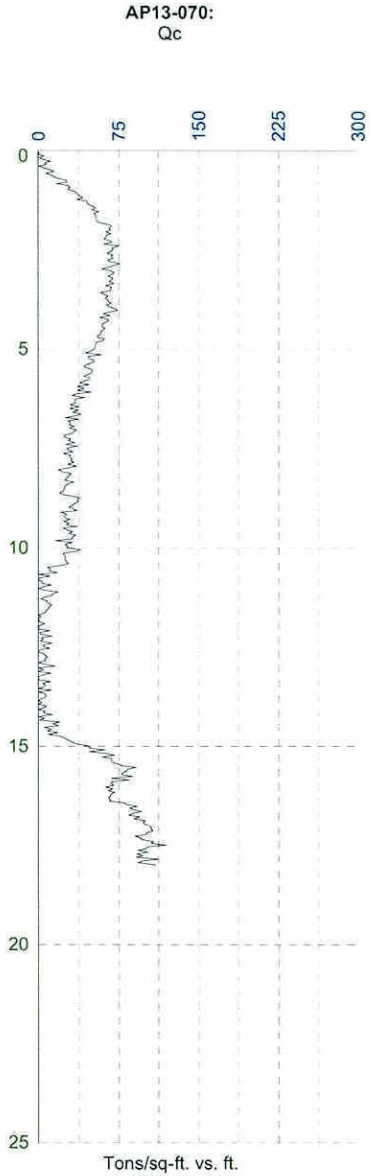

AP13-069:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

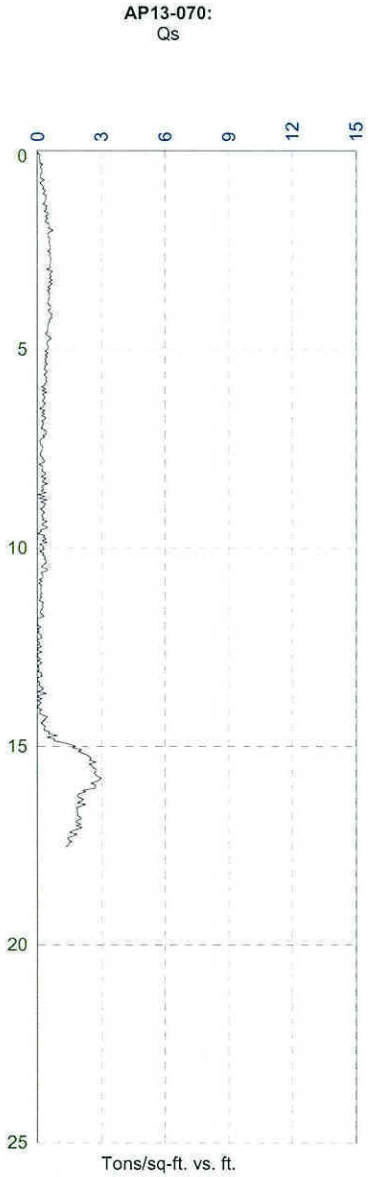

AP13-069:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

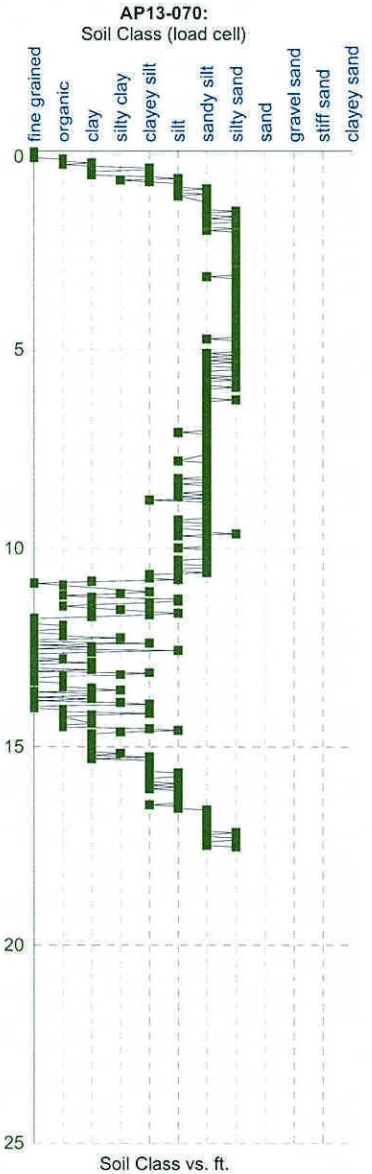

AP13-069:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

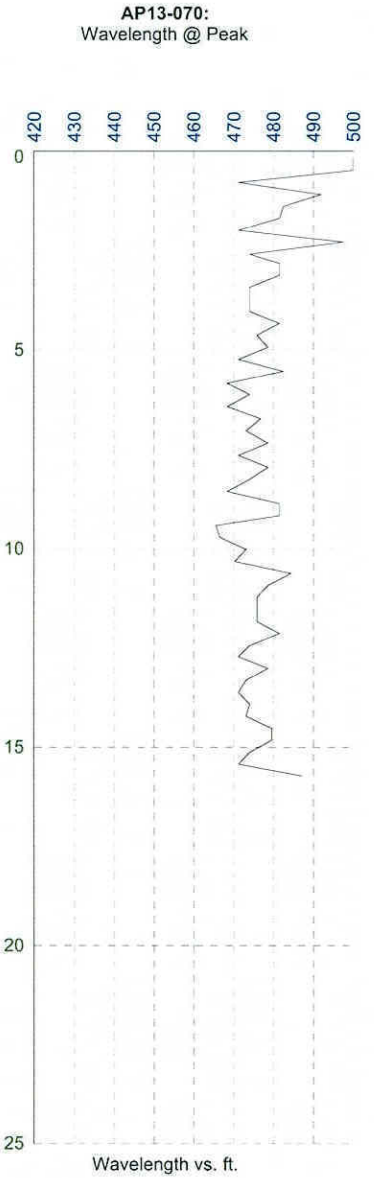

AP13-069:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

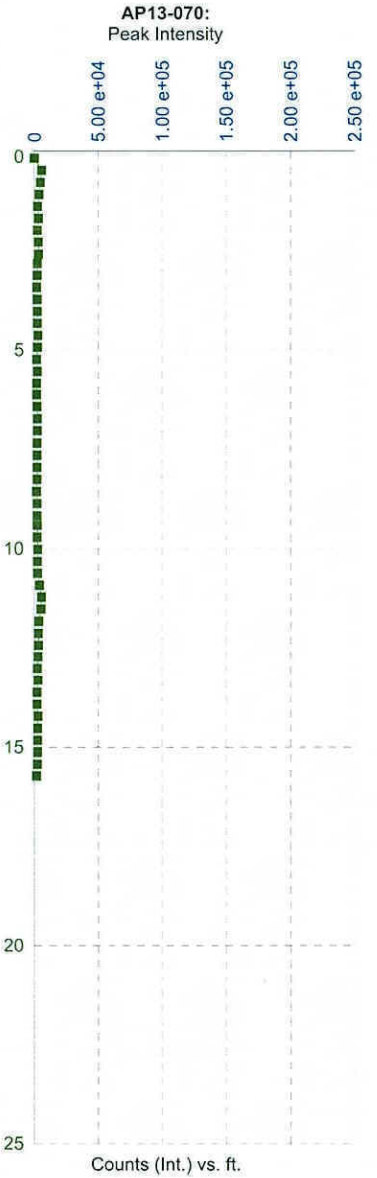

AP13-069:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

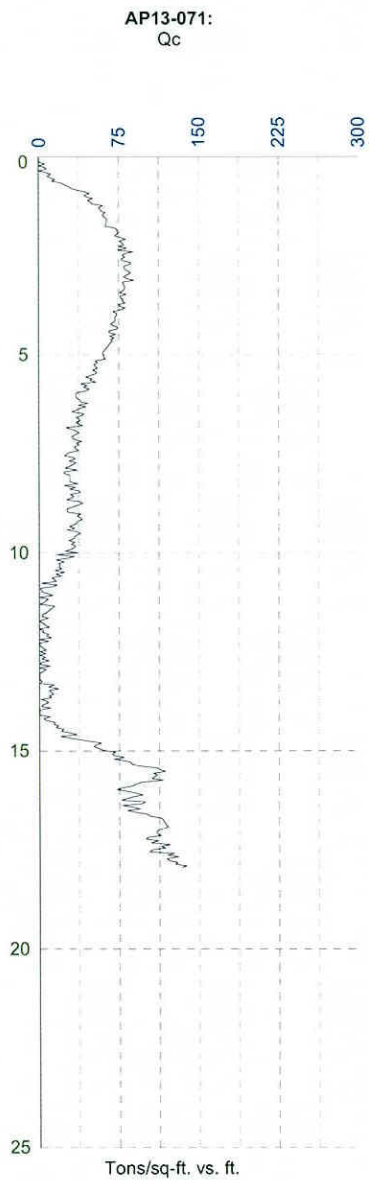

AP13-070:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

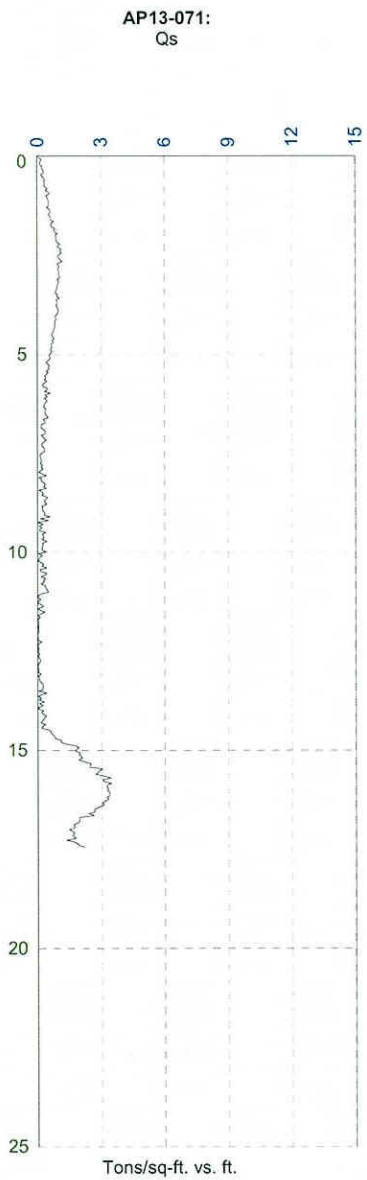

AP13-070:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

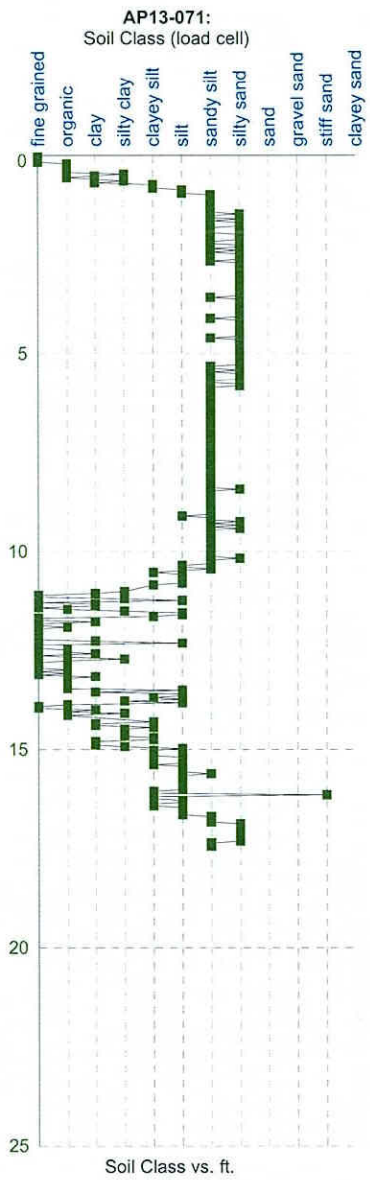

AP13-070:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

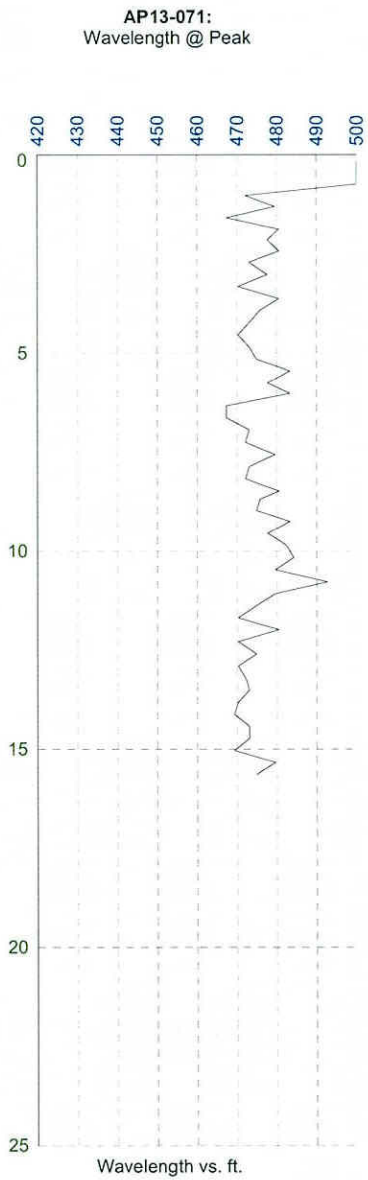

AP13-070:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

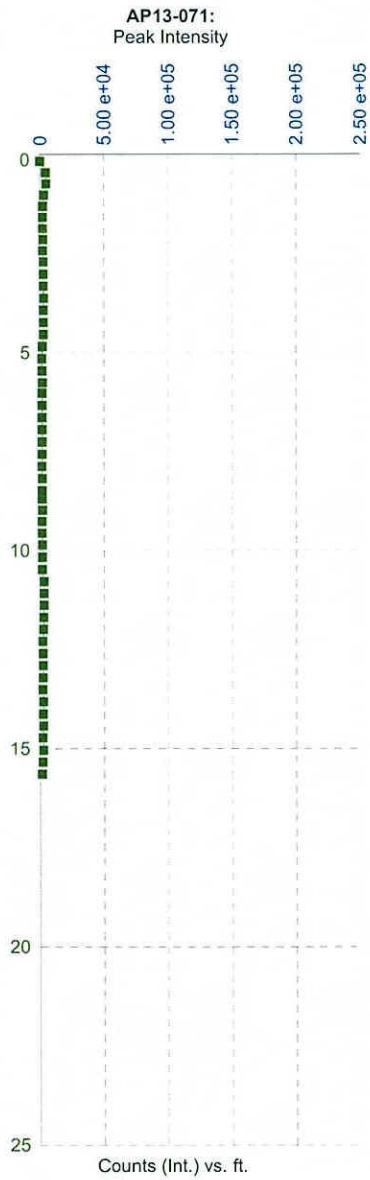

AP13-070:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

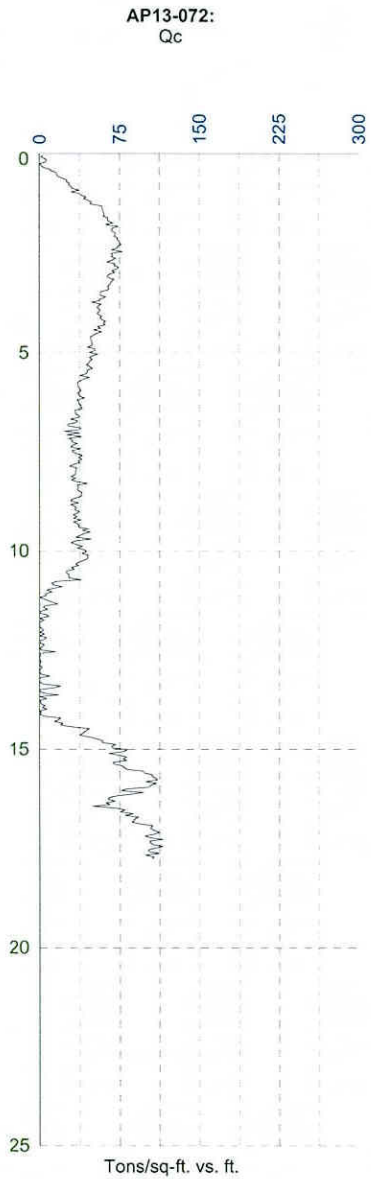

AP13-071:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

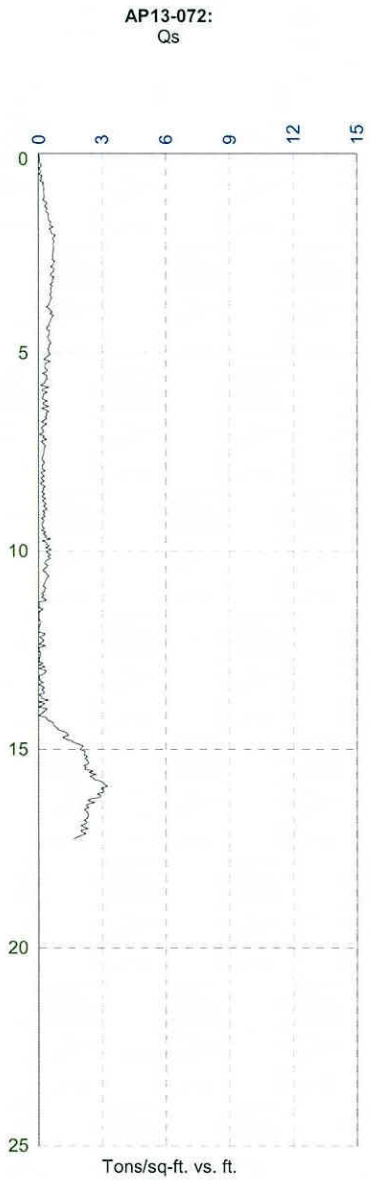

AP13-071:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

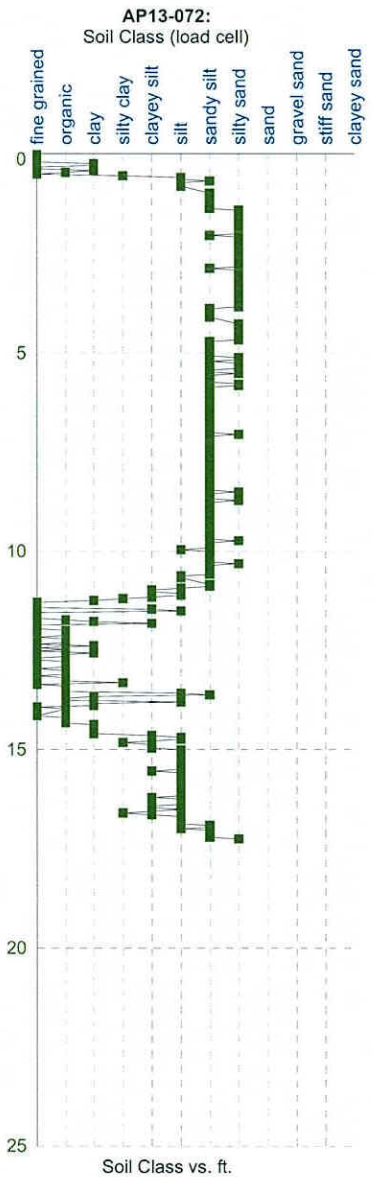

AP13-071:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

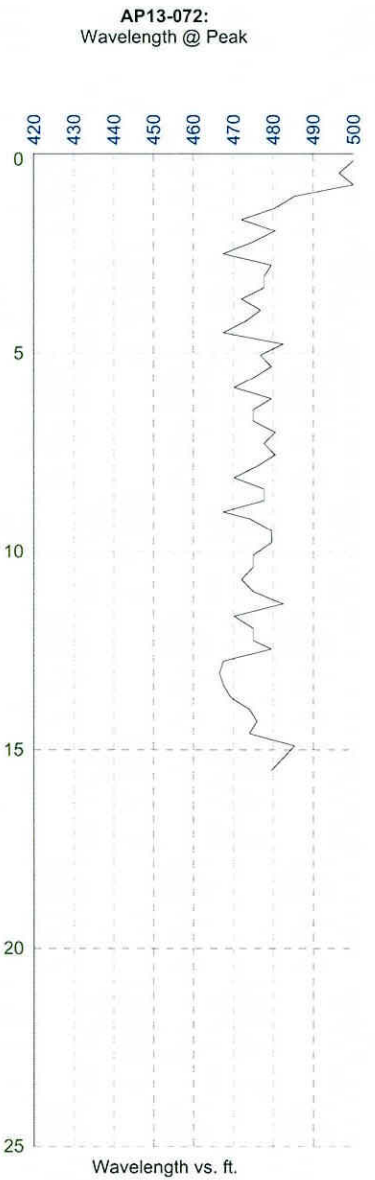

AP13-071:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

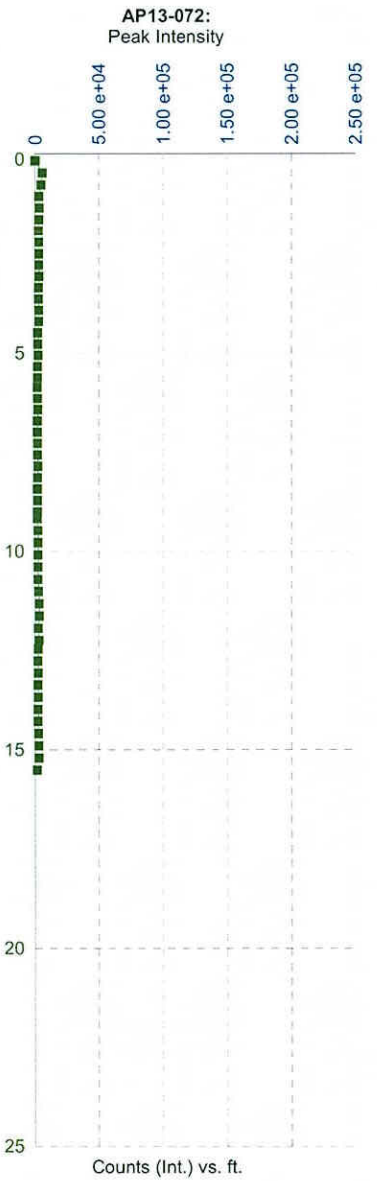

AP13-071:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

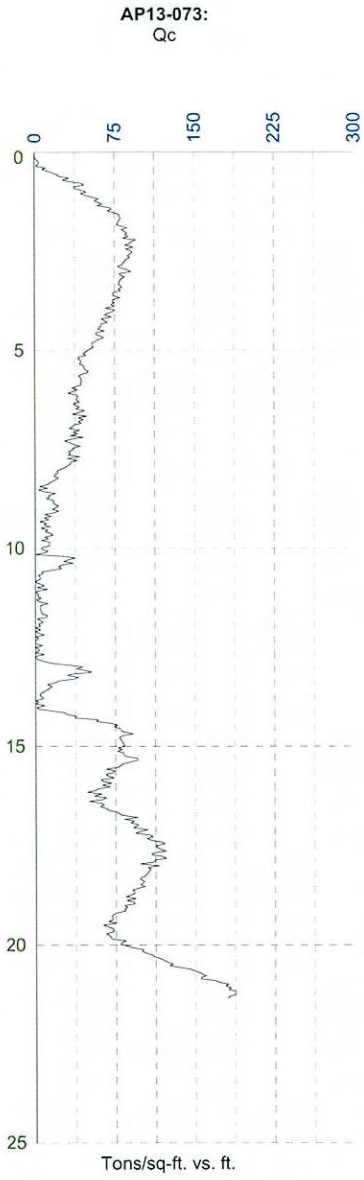

AP13-072:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

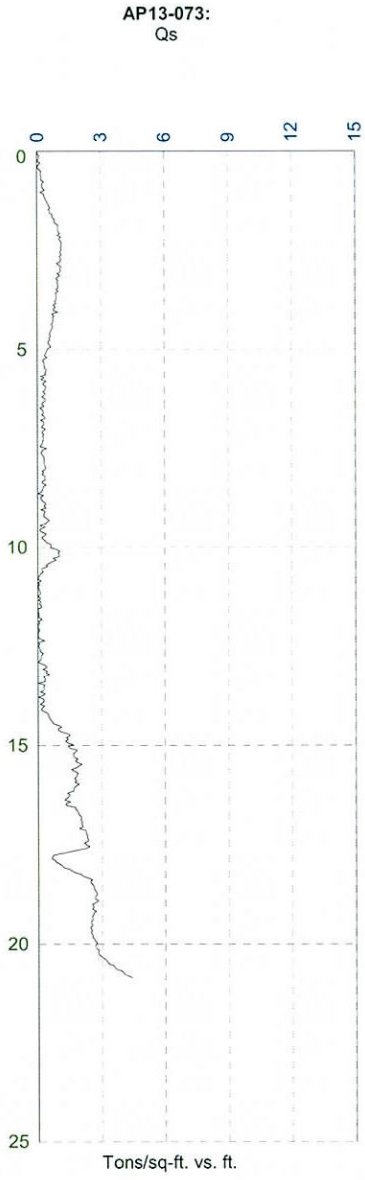

AP13-072:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

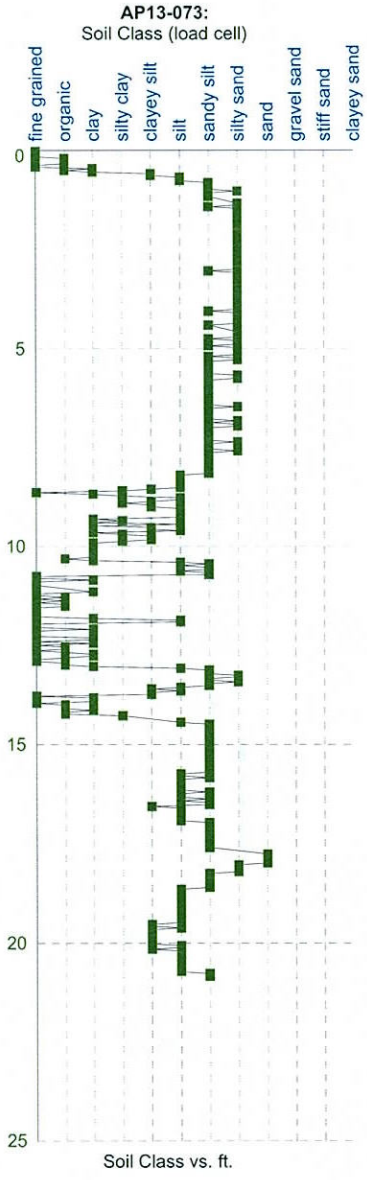

AP13-072:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

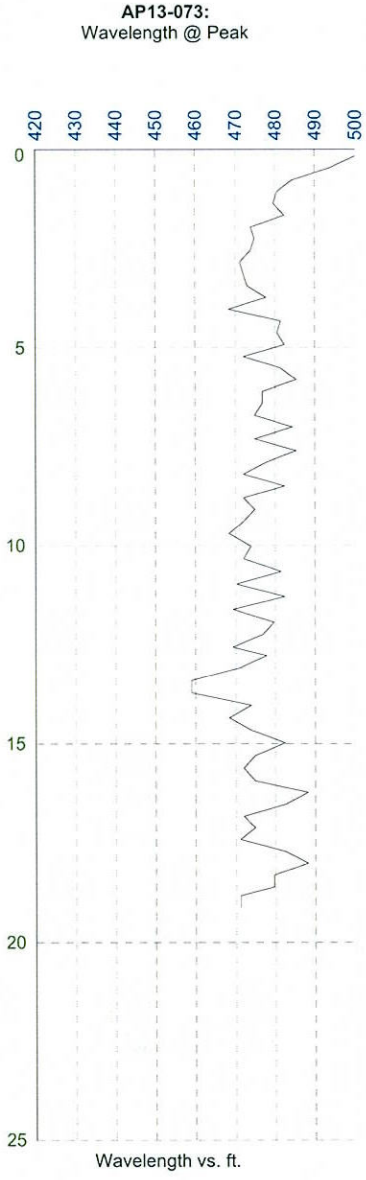

AP13-072:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

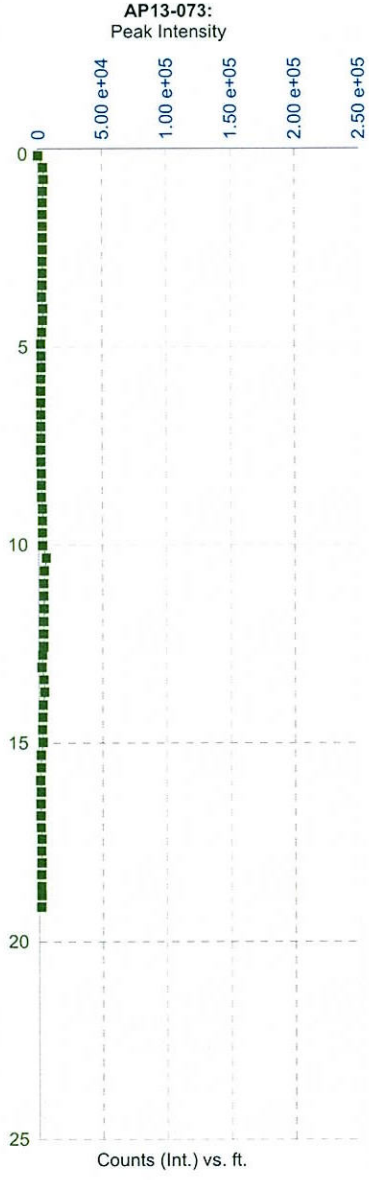

AP13-072:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

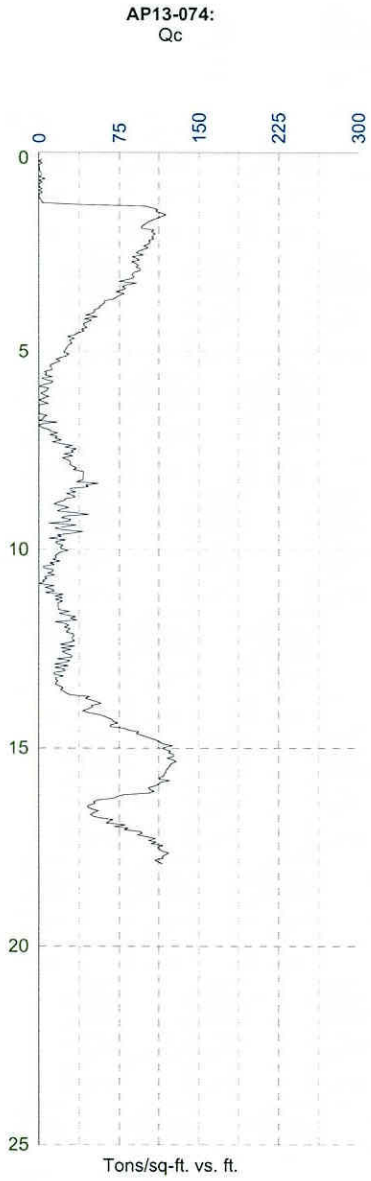

AP13-073:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

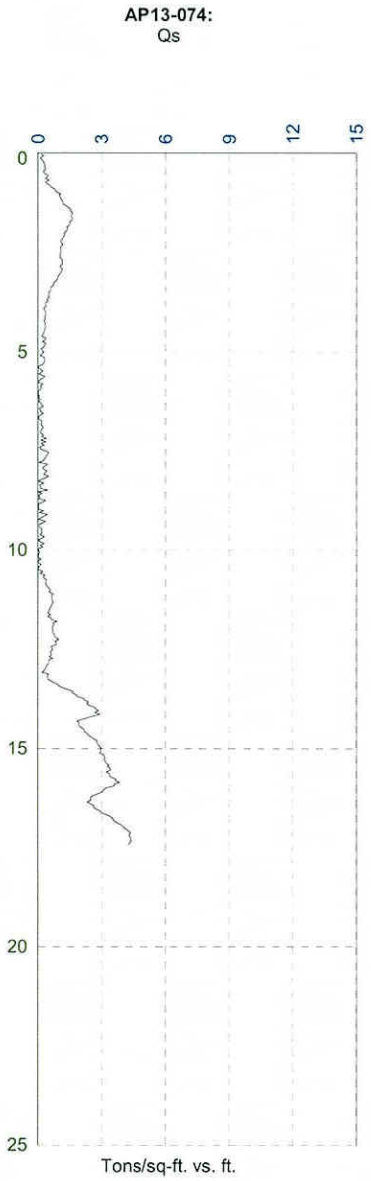

AP13-073:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

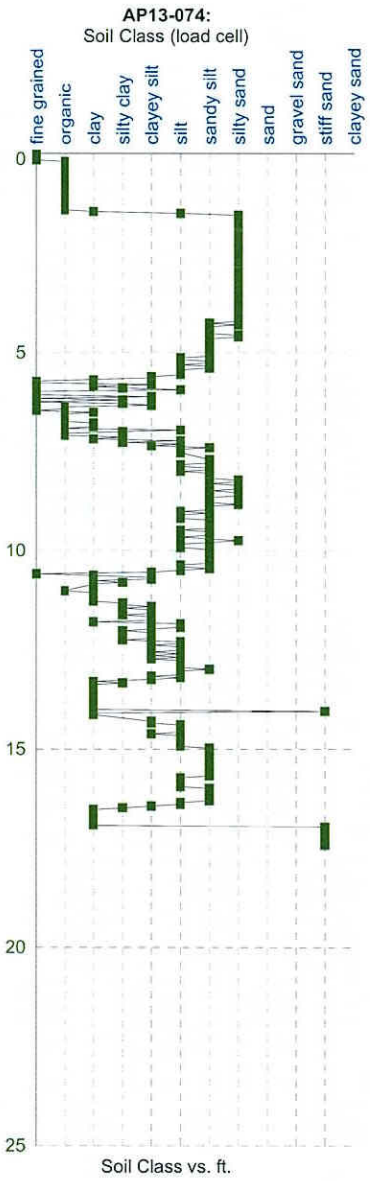

AP13-073:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

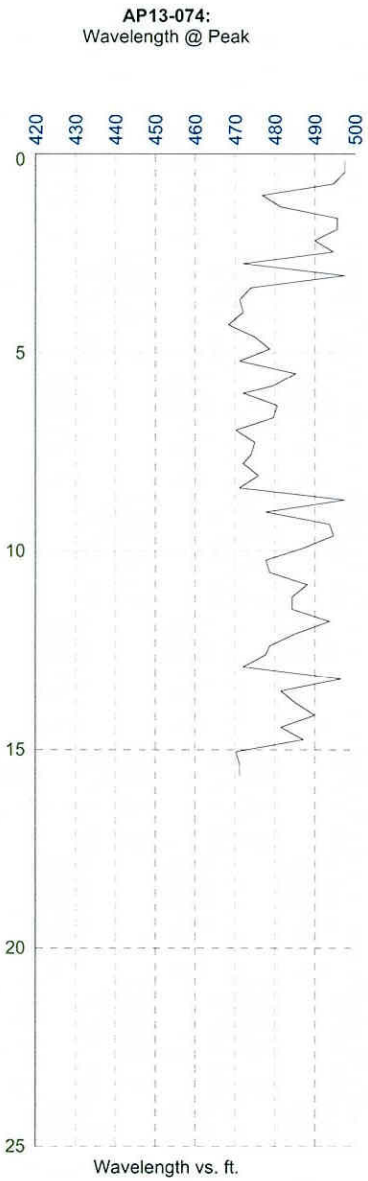

AP13-073:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

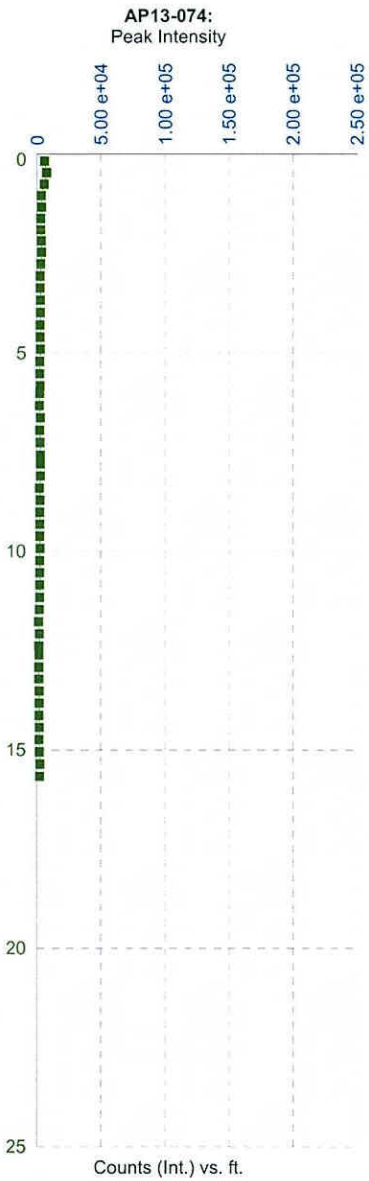

AP13-073:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.


AP13-074:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

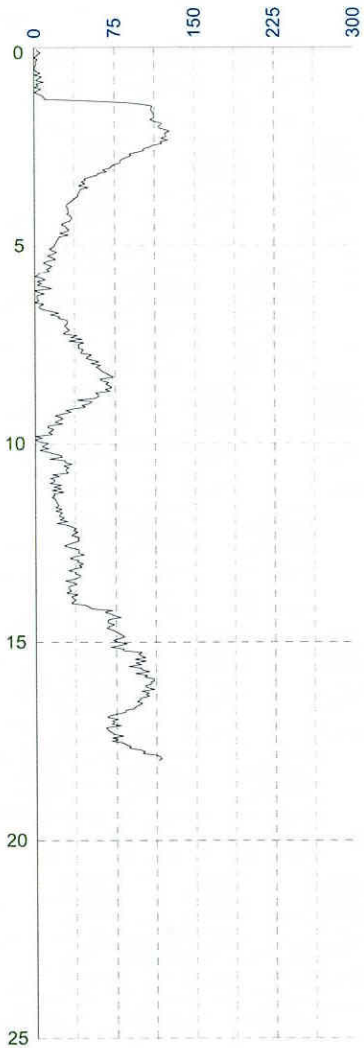

AP13-074:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.


AP13-074:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.


AP13-074:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

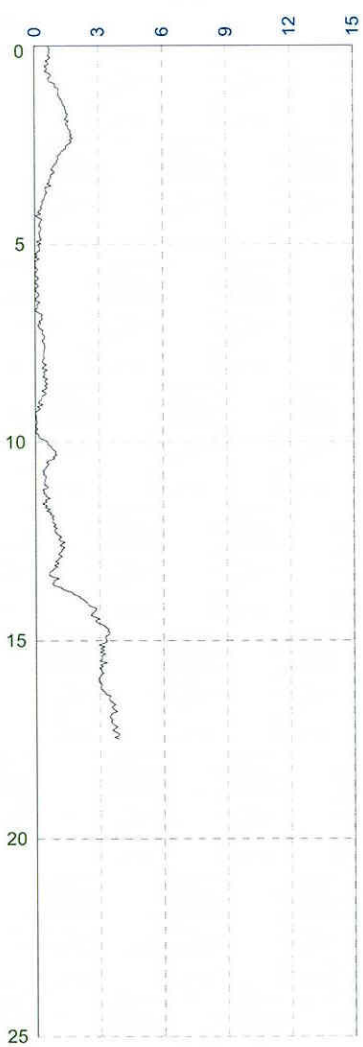

AP13-074:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

**AP13-075A:**
Qc



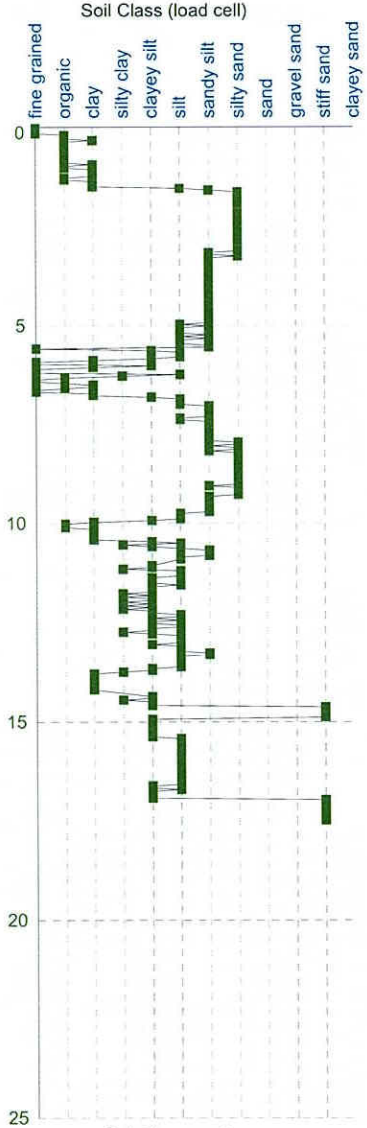

Tons/sq-ft. vs. ft.

**AP13-075A:**
Qs



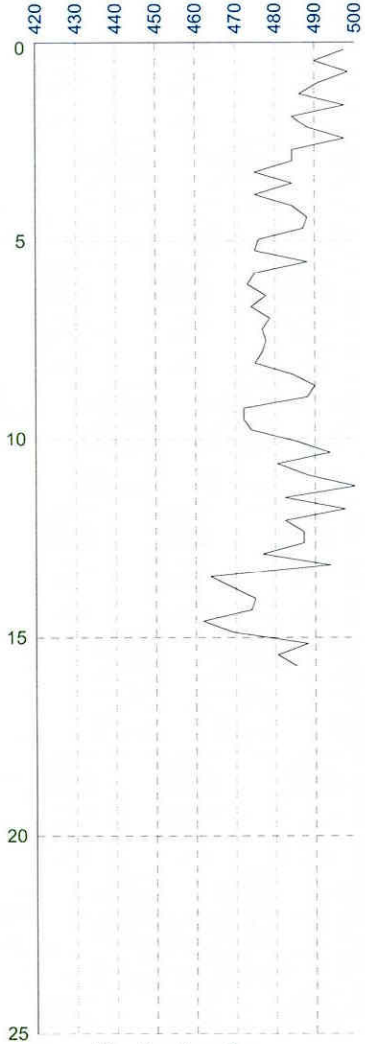

Tons/sq-ft. vs. ft.

**AP13-075A:**
Soil Class (load cell)



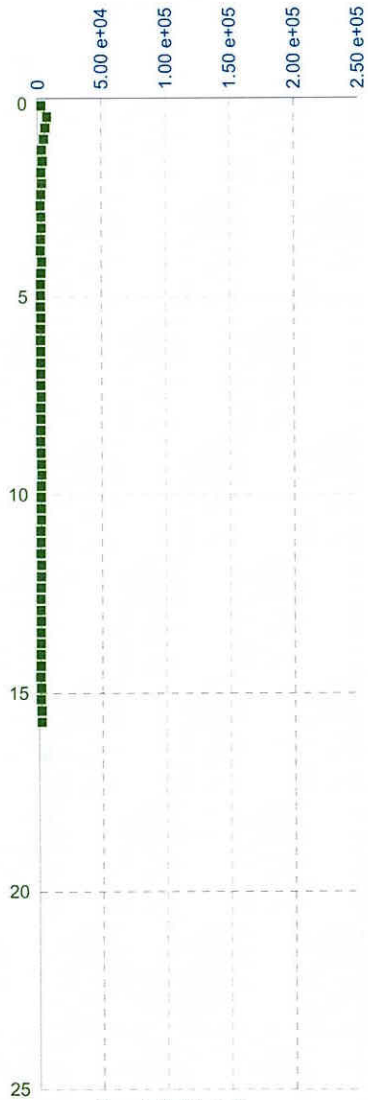

Soil Class vs. ft.

**AP13-075A:**
Wavelength @ Peak

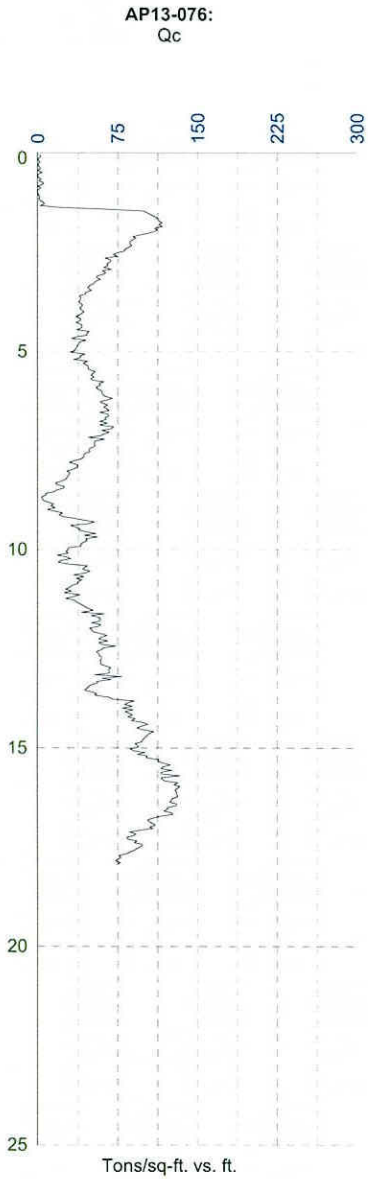


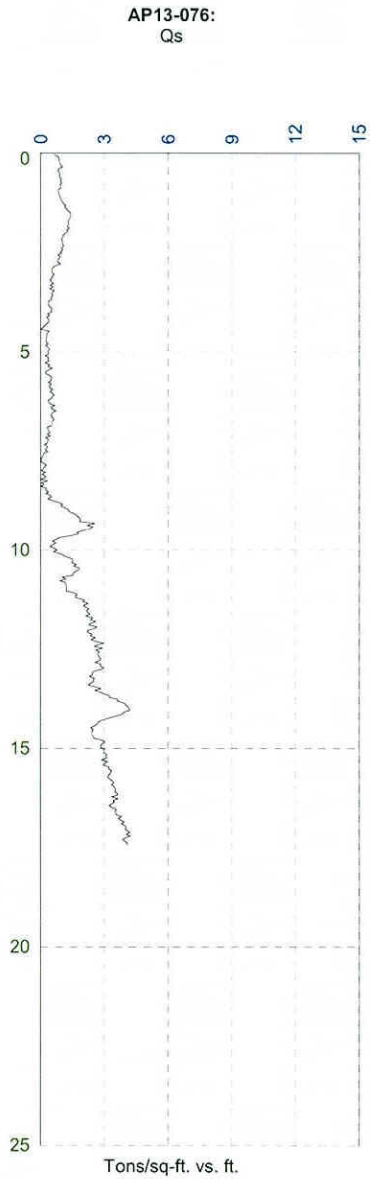

Wavelength vs. ft.

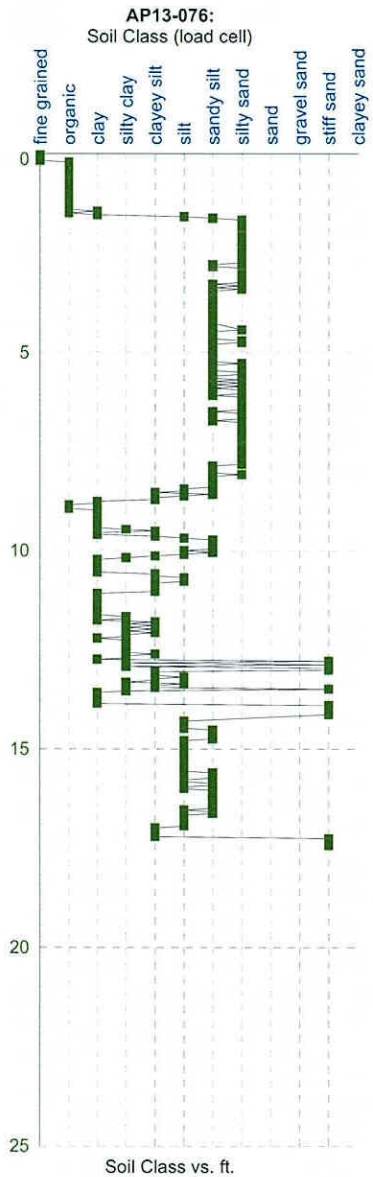
**AP13-075A:**
Peak Intensity

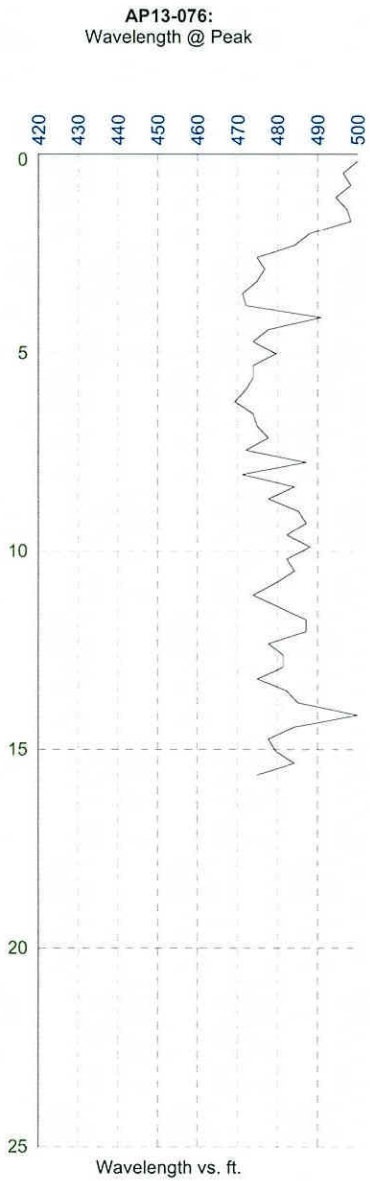


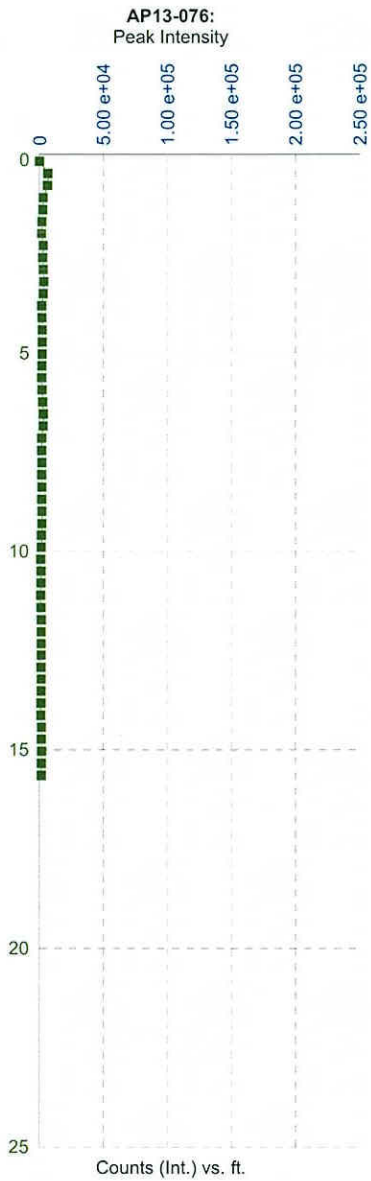

Counts (Int.) vs. ft.

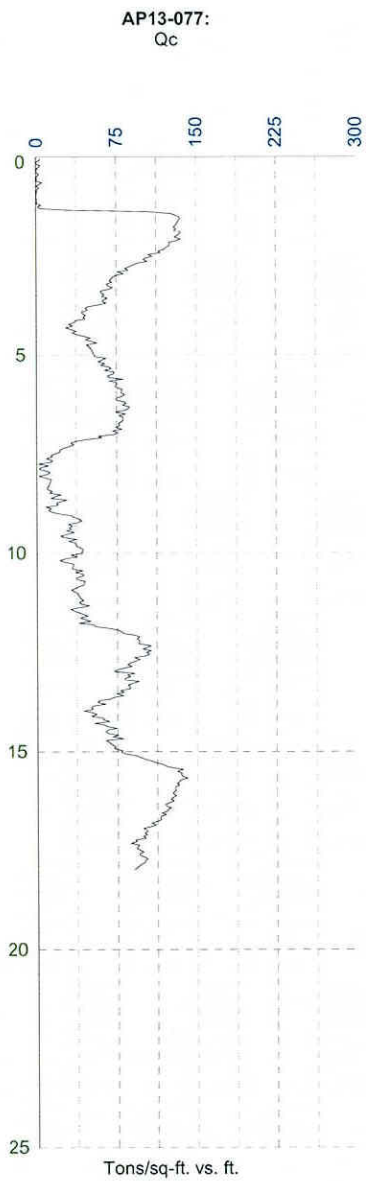

AP13-076:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

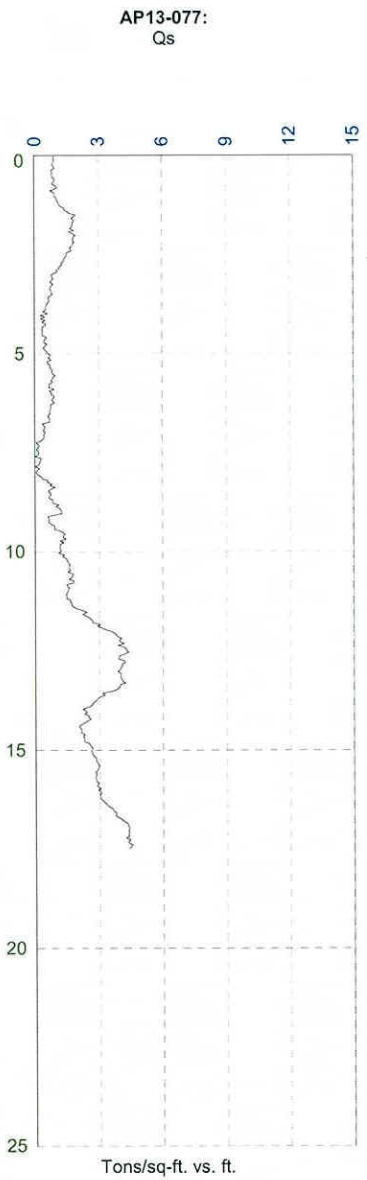

AP13-076:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

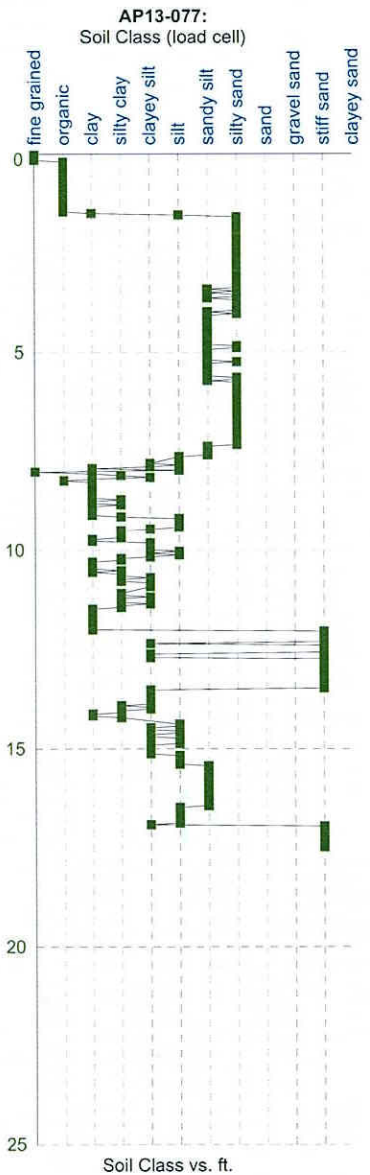

AP13-076:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

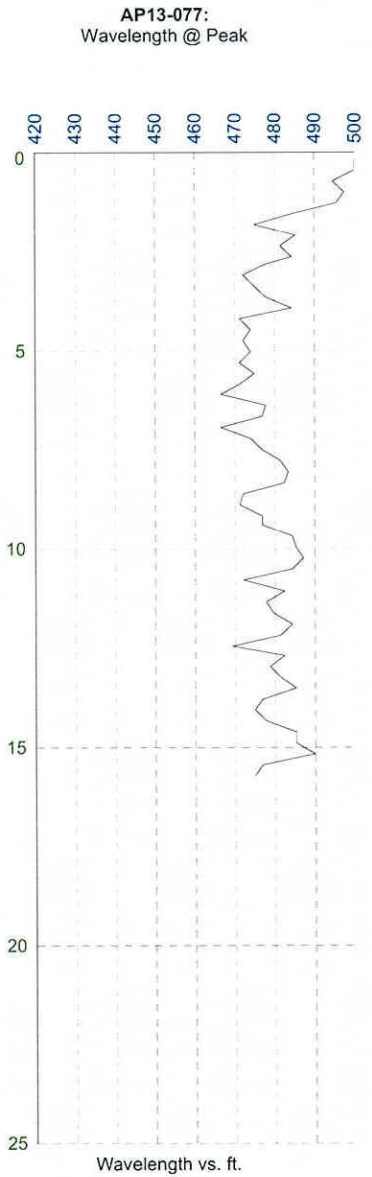

AP13-076:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

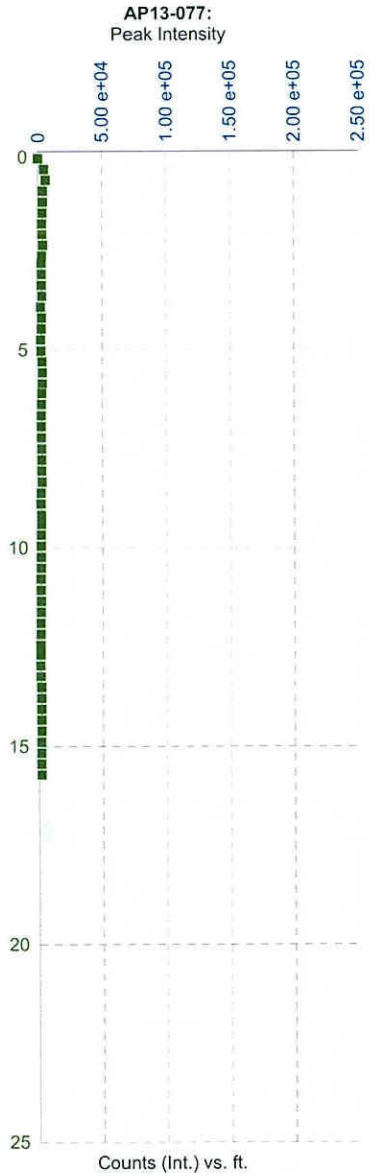

AP13-076:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

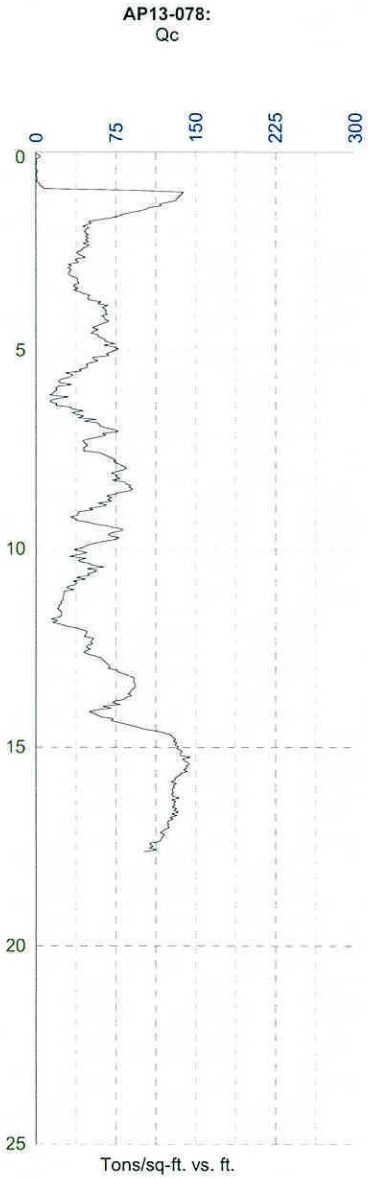

AP13-077:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

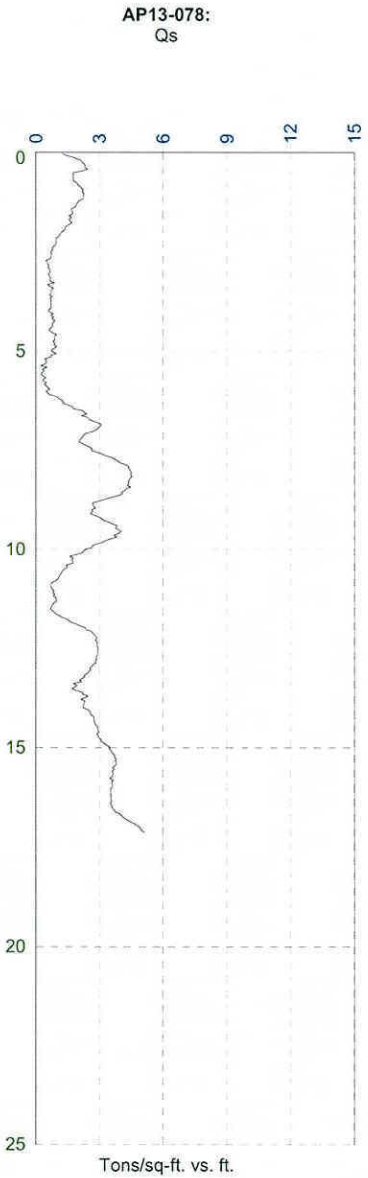

AP13-077:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

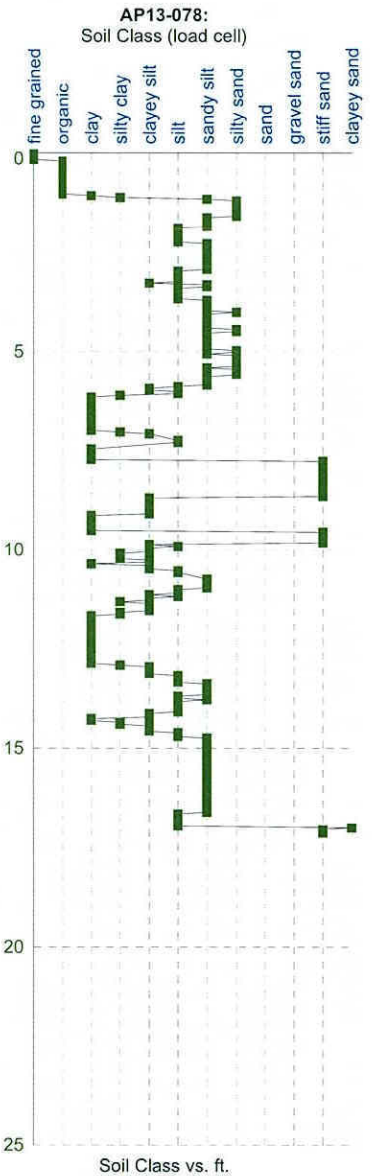

AP13-077:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

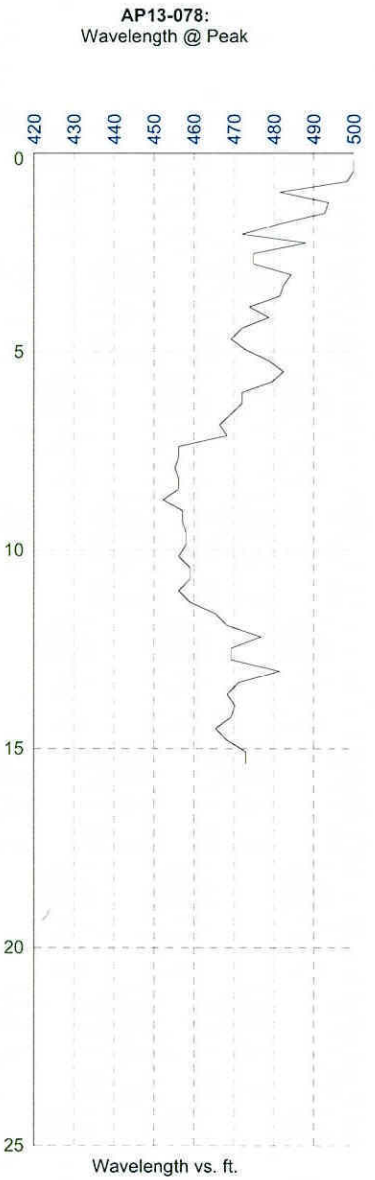

AP13-077:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

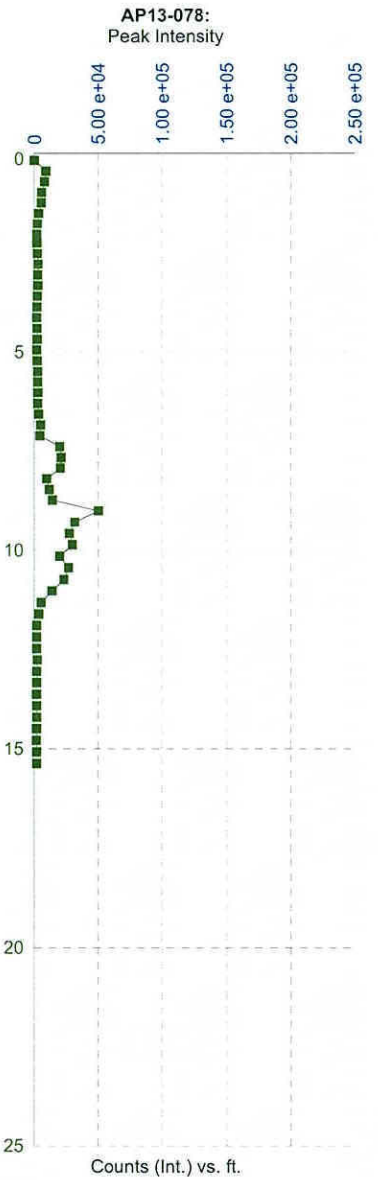

AP13-077:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

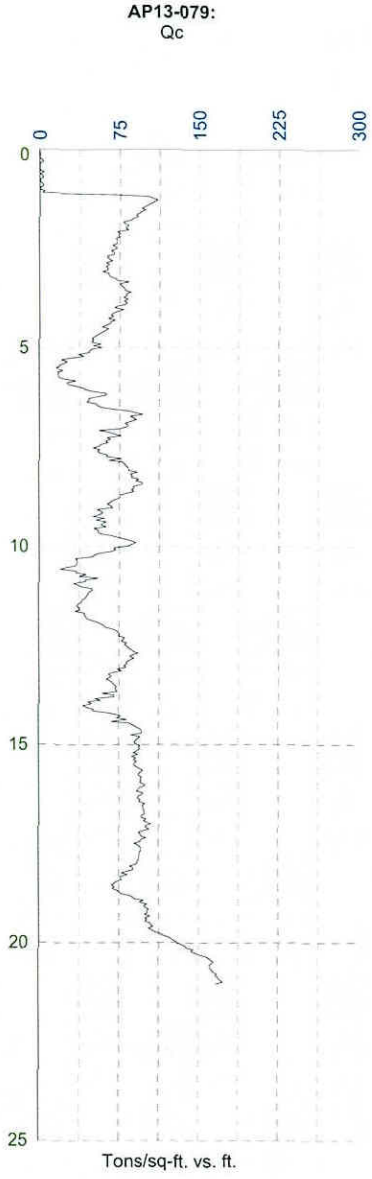

AP13-078:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

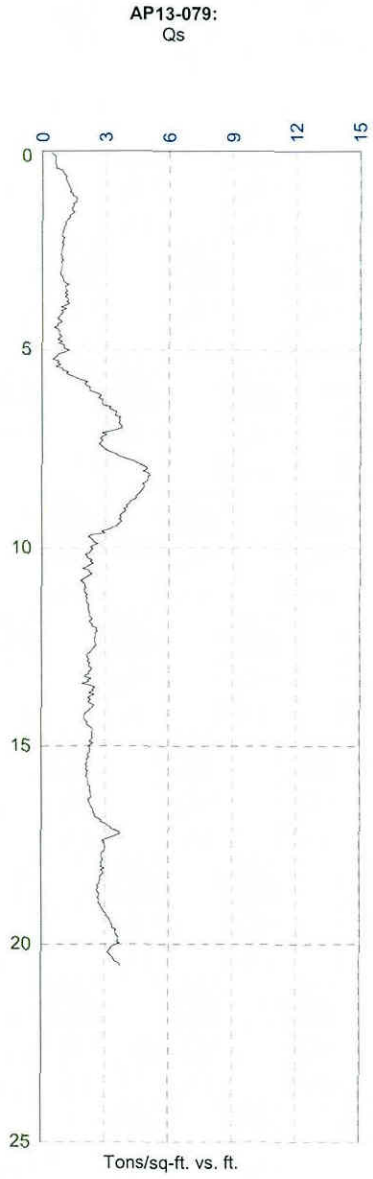

AP13-078:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

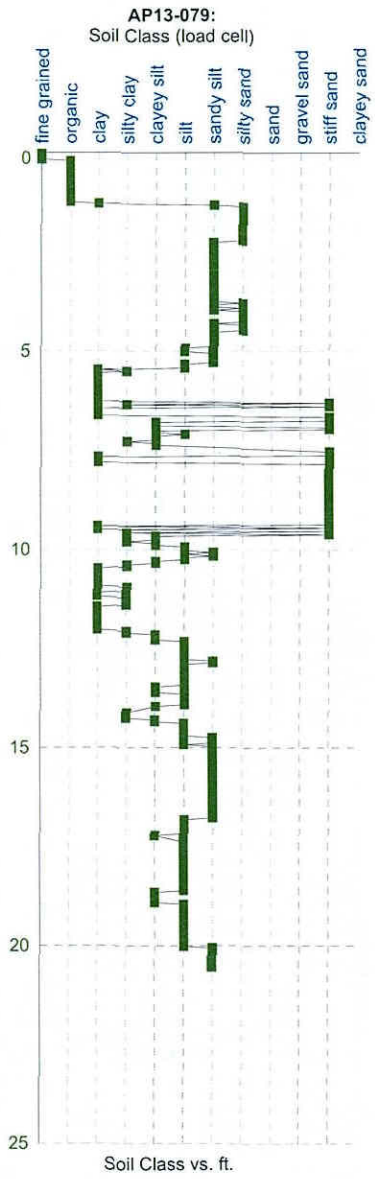

AP13-078:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

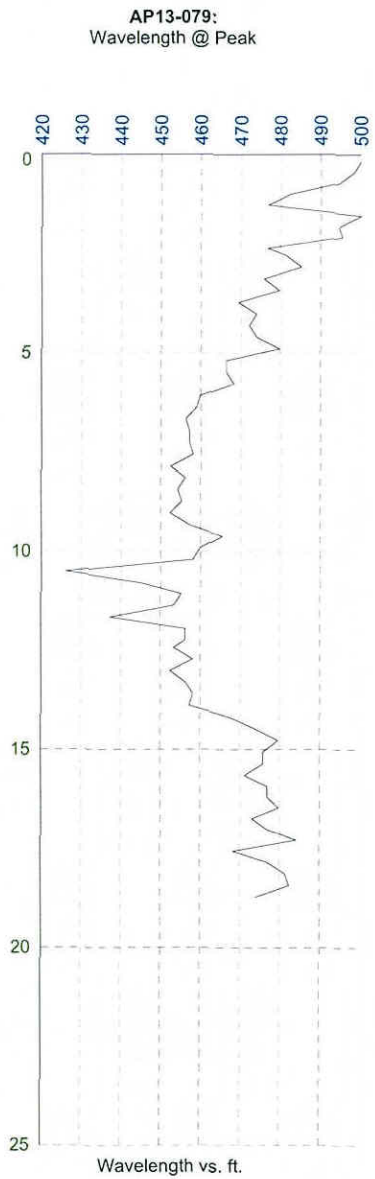

AP13-078:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

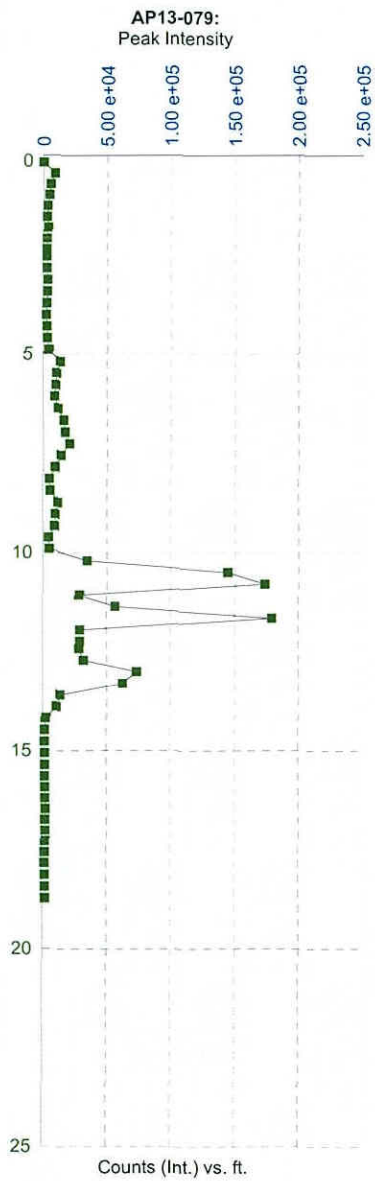

AP13-078:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

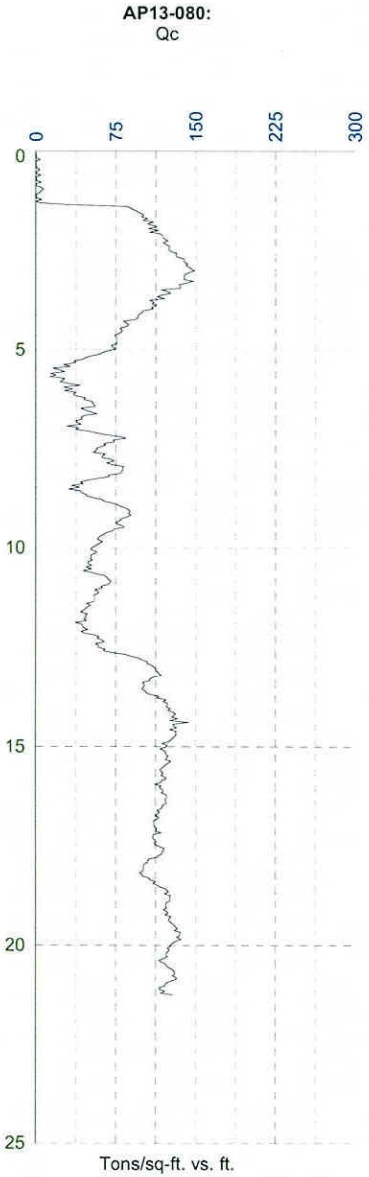

AP13-079:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

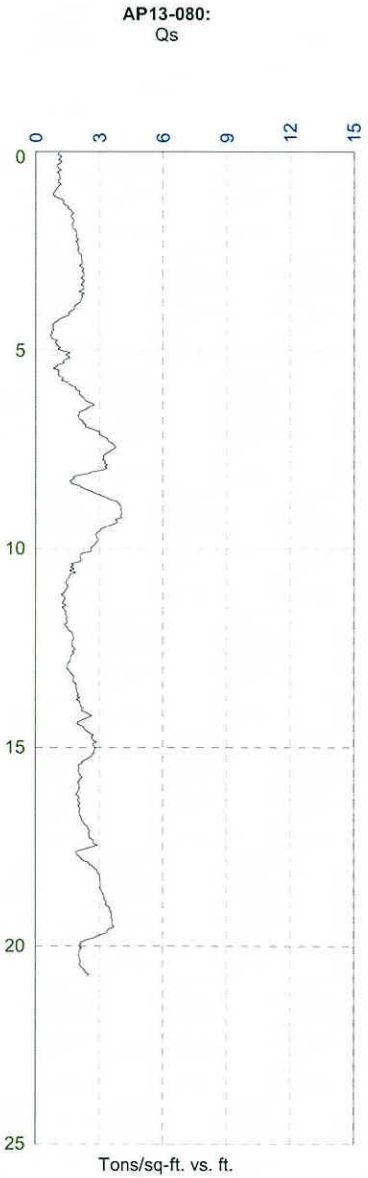

AP13-079:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

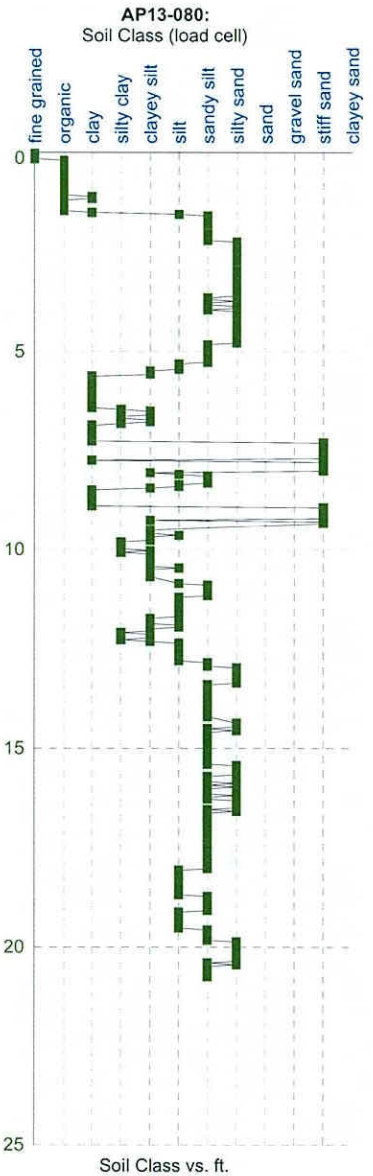

AP13-079:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

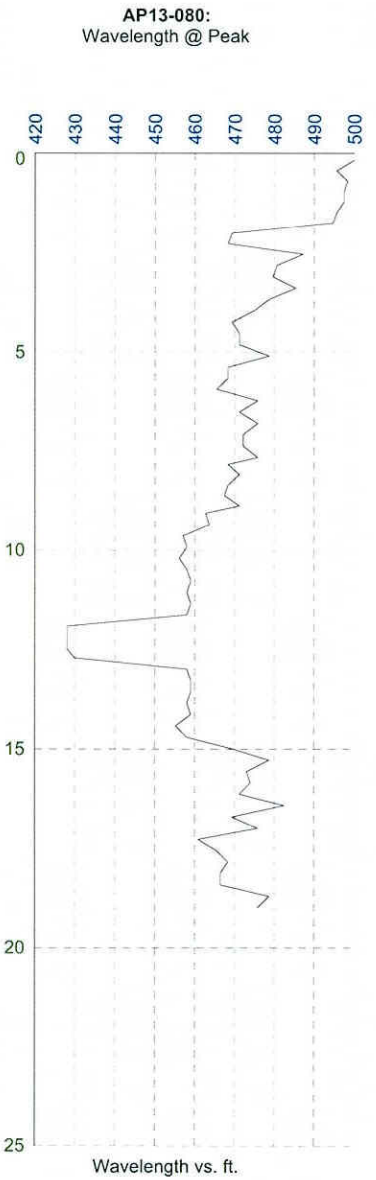

AP13-079:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

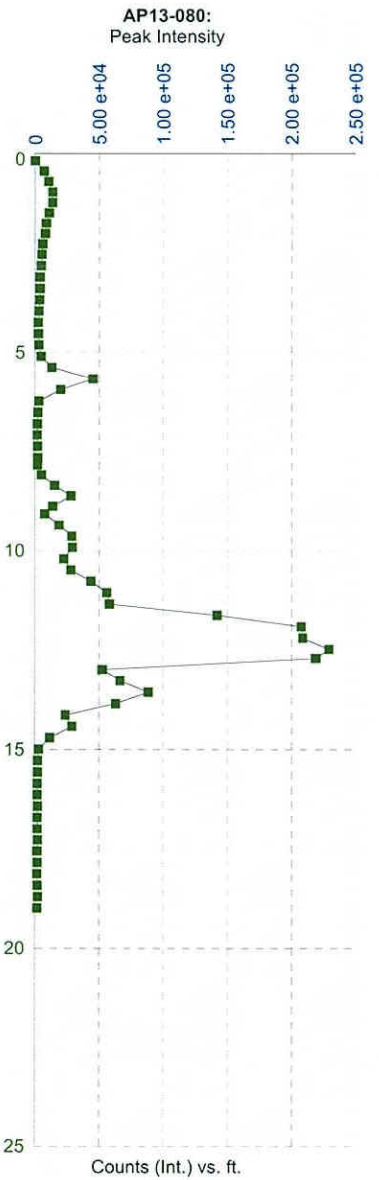

AP13-079:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

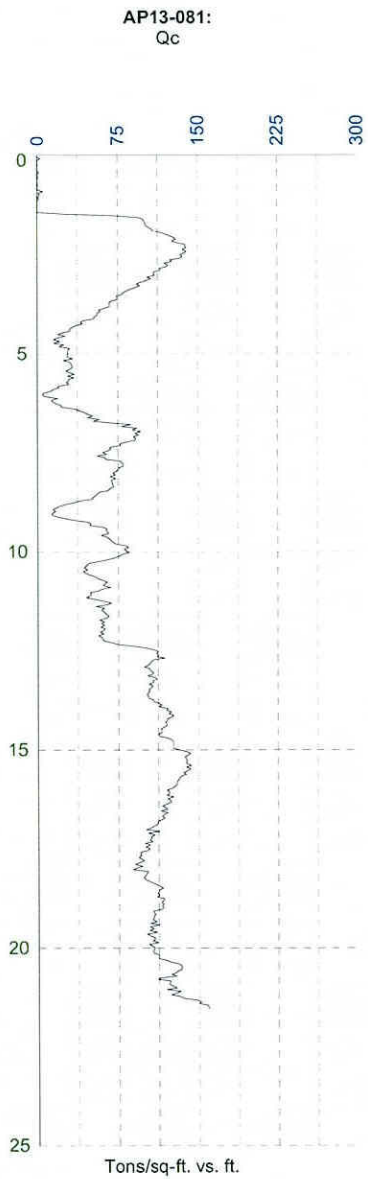

AP13-080:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

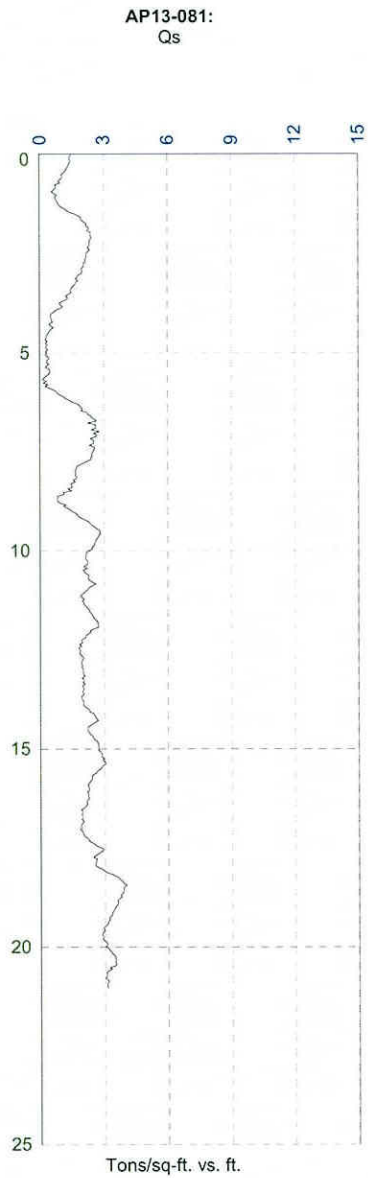

AP13-080:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

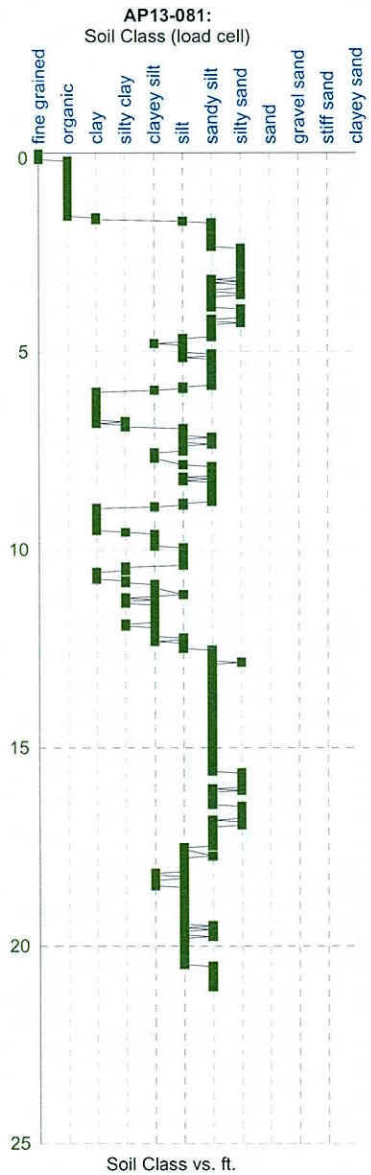

AP13-080:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

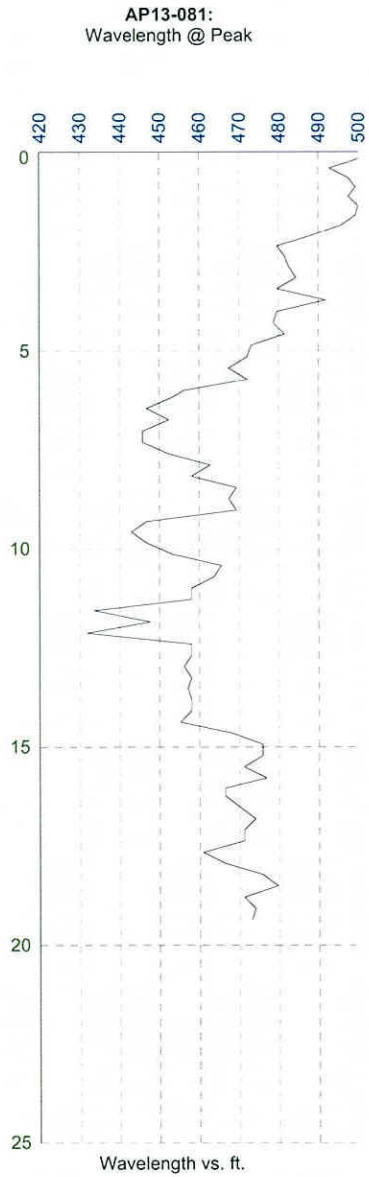

AP13-080:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

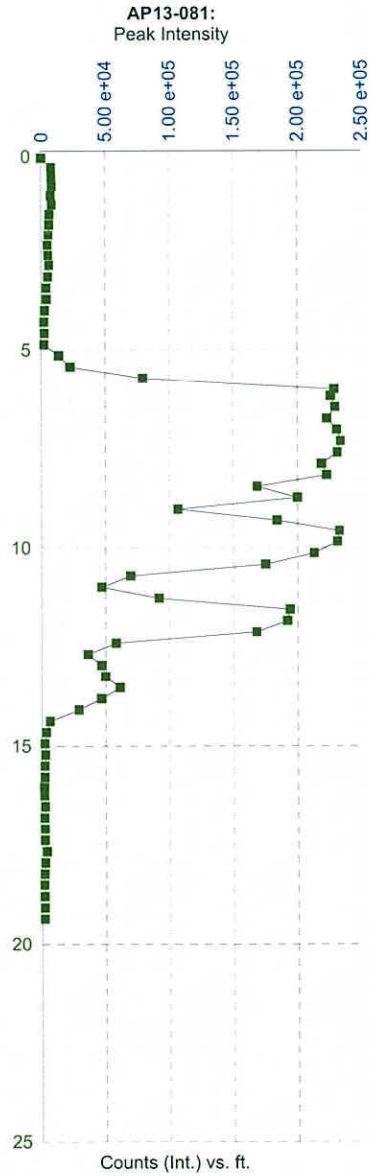

AP13-080:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

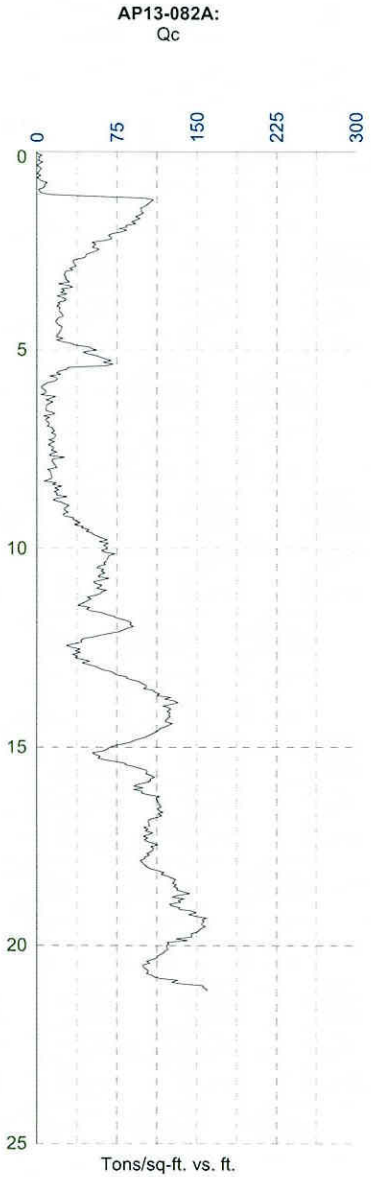

AP13-081:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

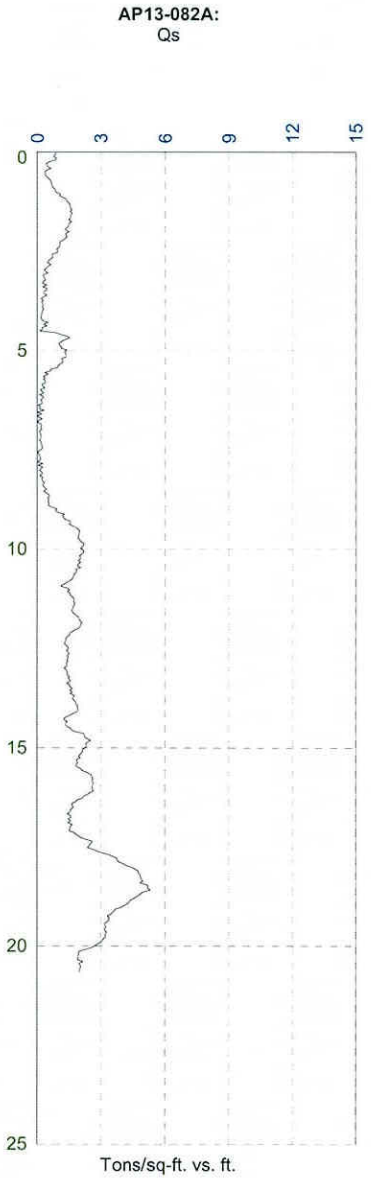

AP13-081:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

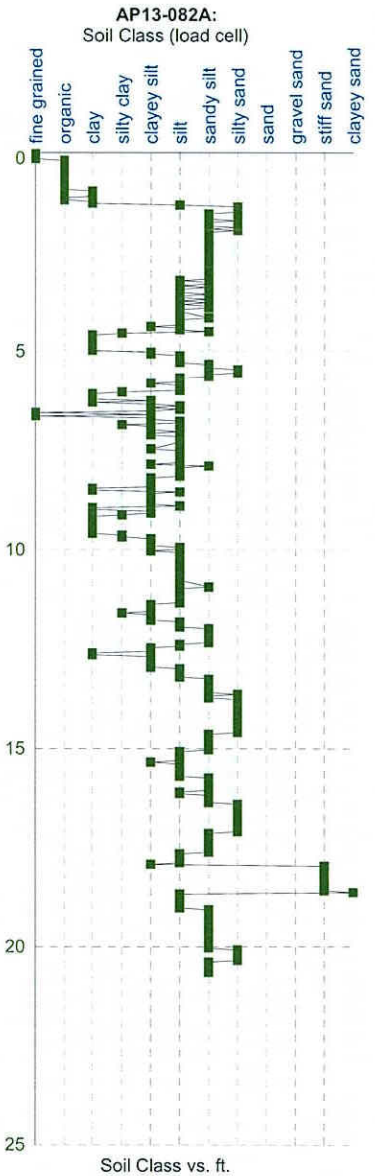

AP13-081:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

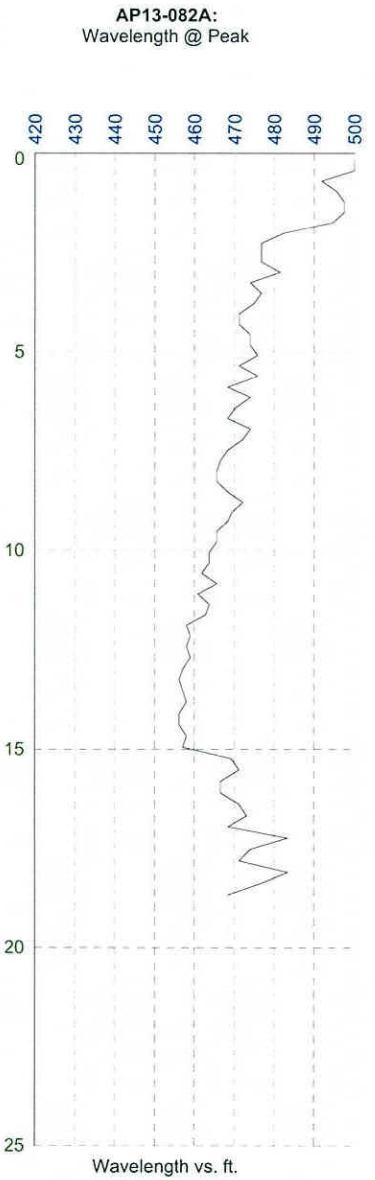

AP13-081:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

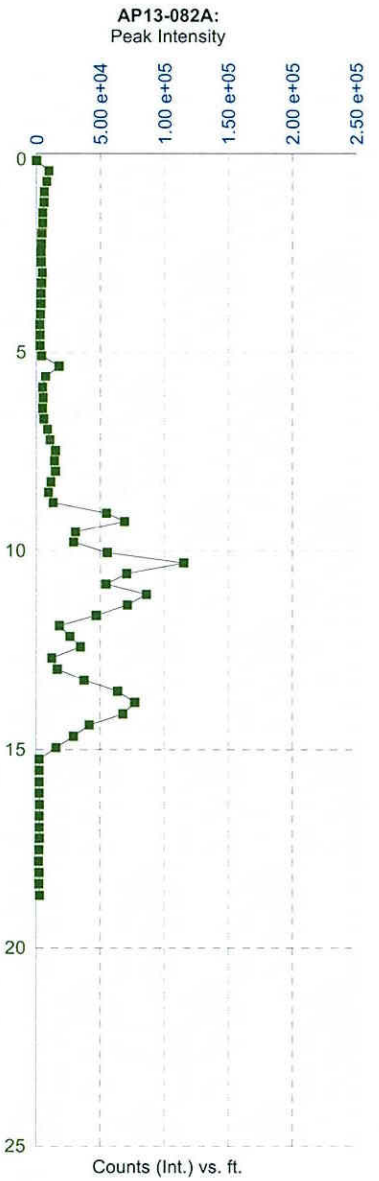

AP13-081:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

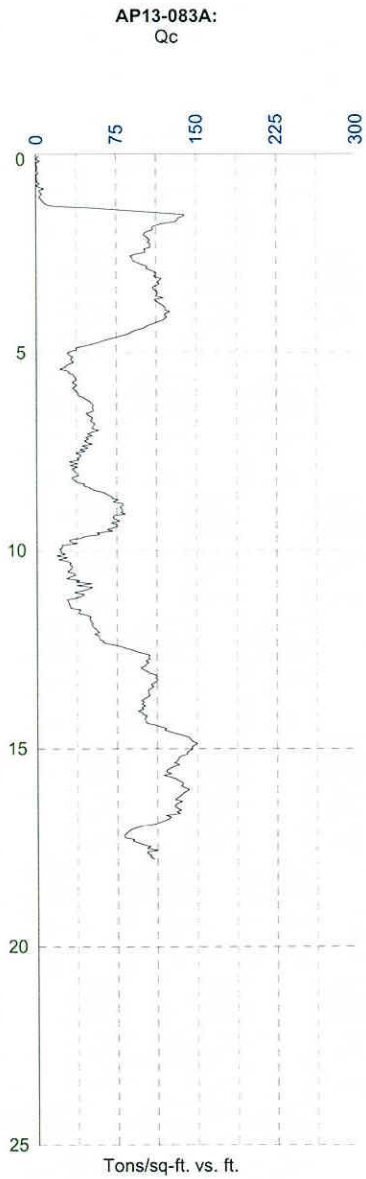

AP13-082A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

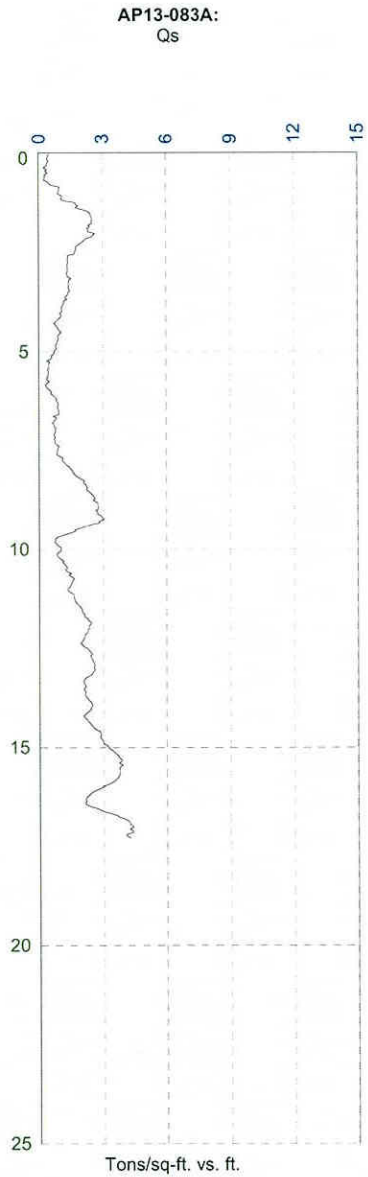

AP13-082A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

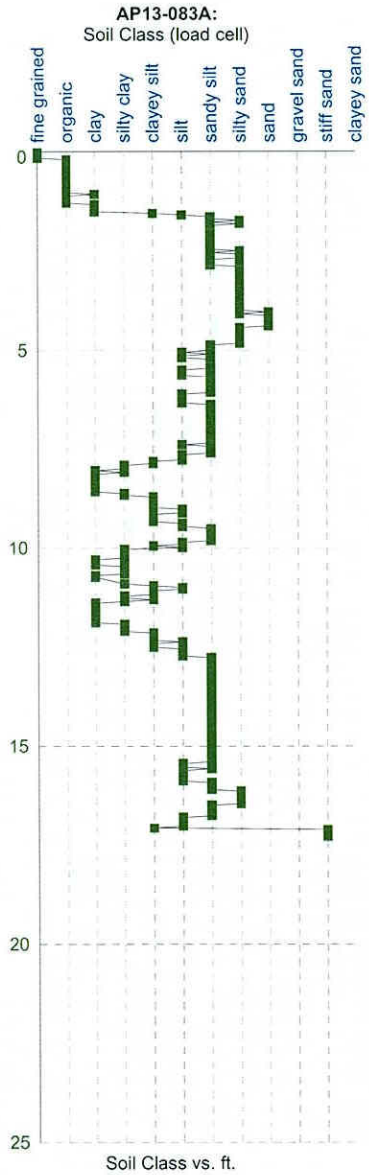

AP13-082A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

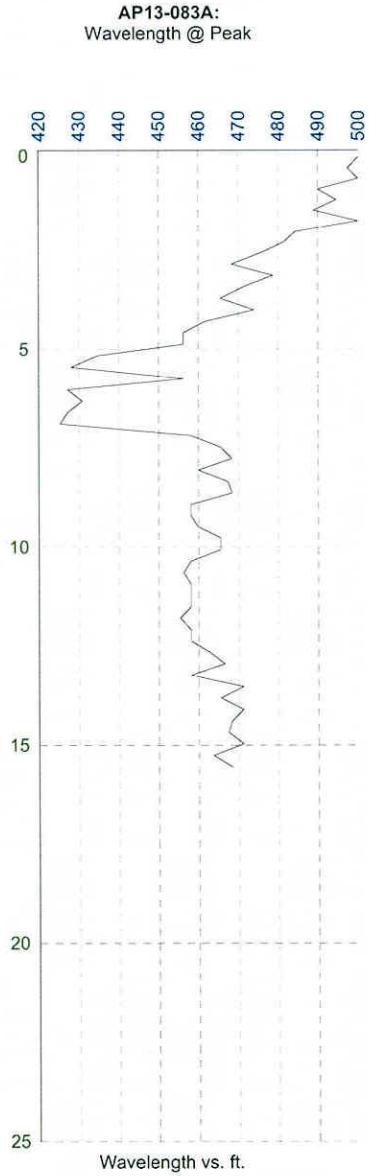

AP13-082A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

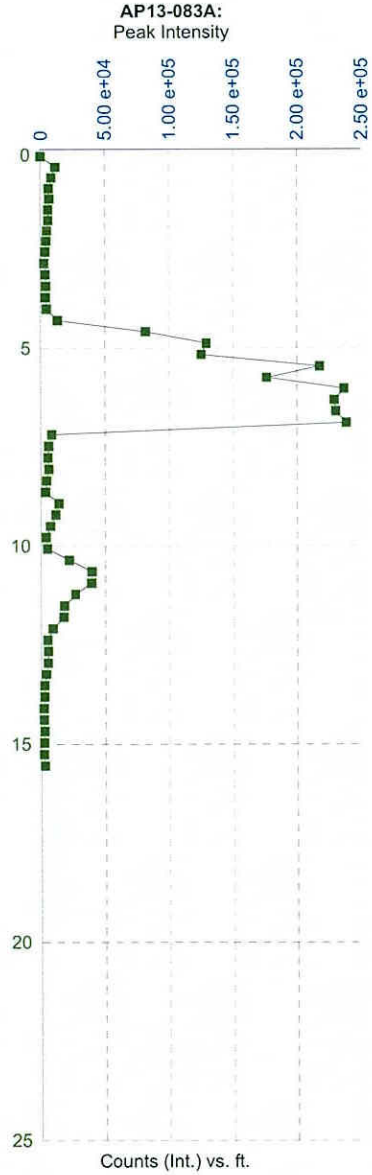

AP13-082A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

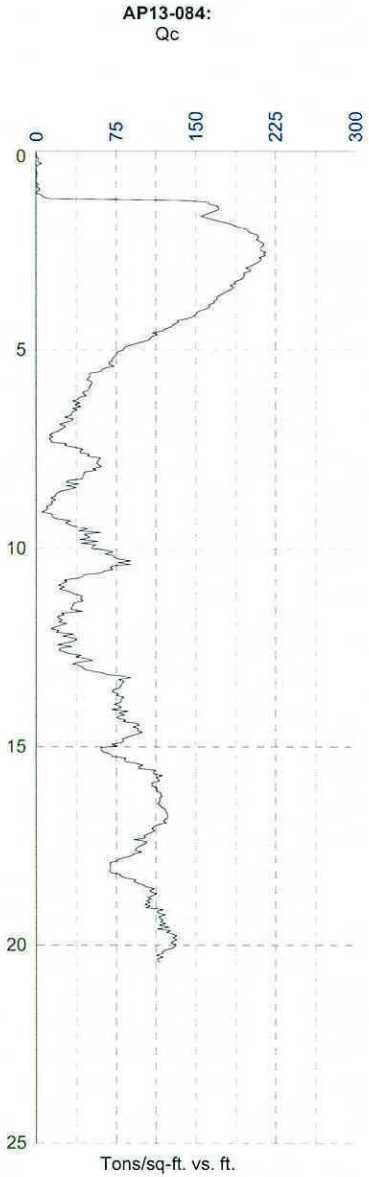

AP13-083A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

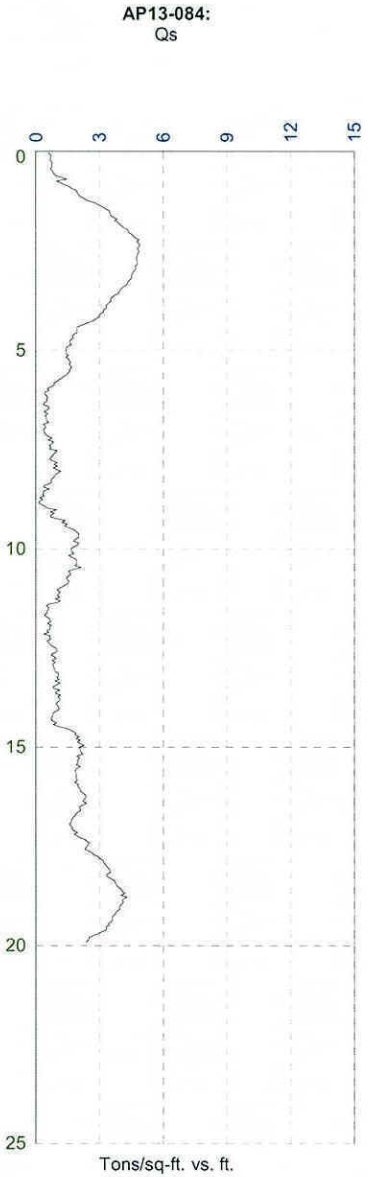

AP13-083A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

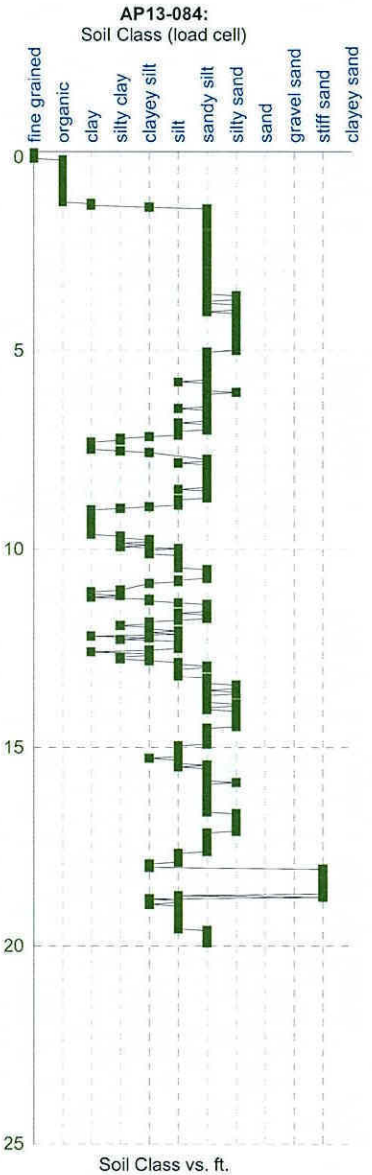

AP13-083A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

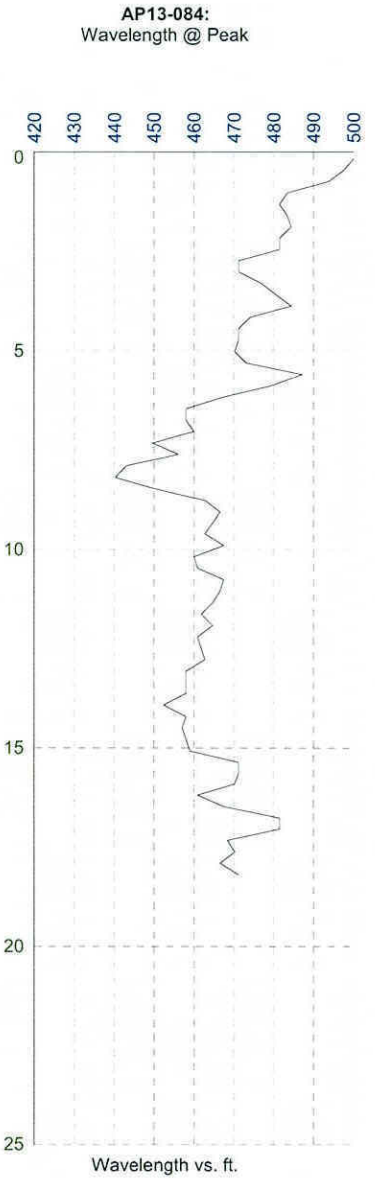

AP13-083A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

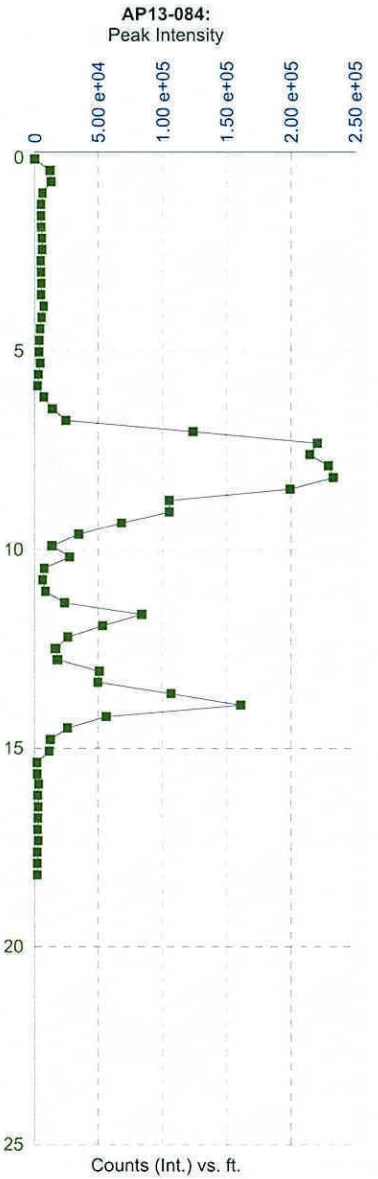

AP13-083A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

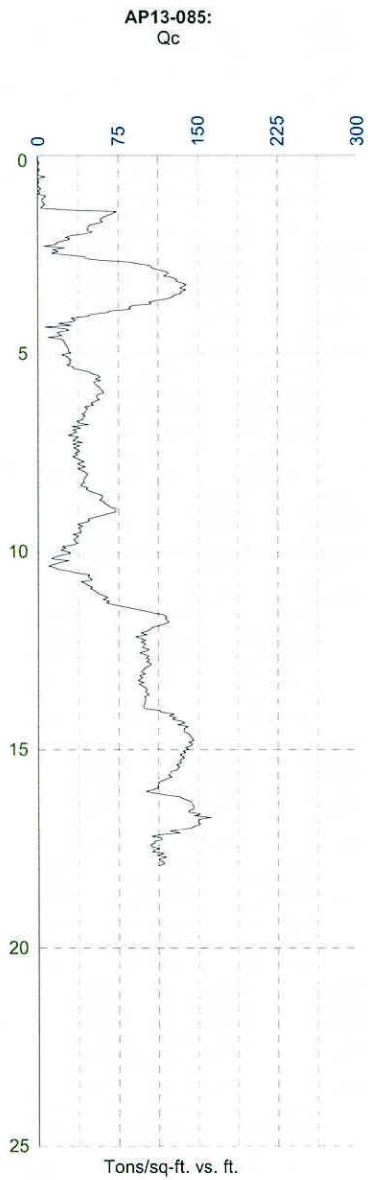

AP13-084:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

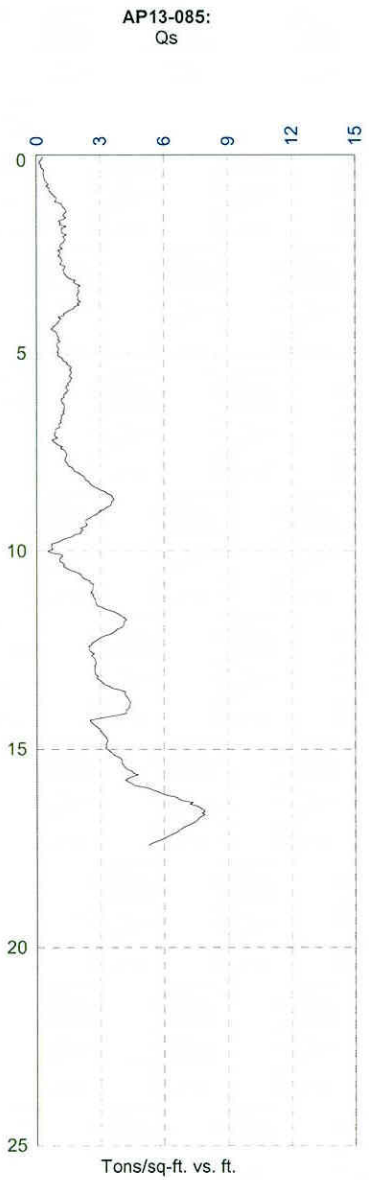

AP13-084:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

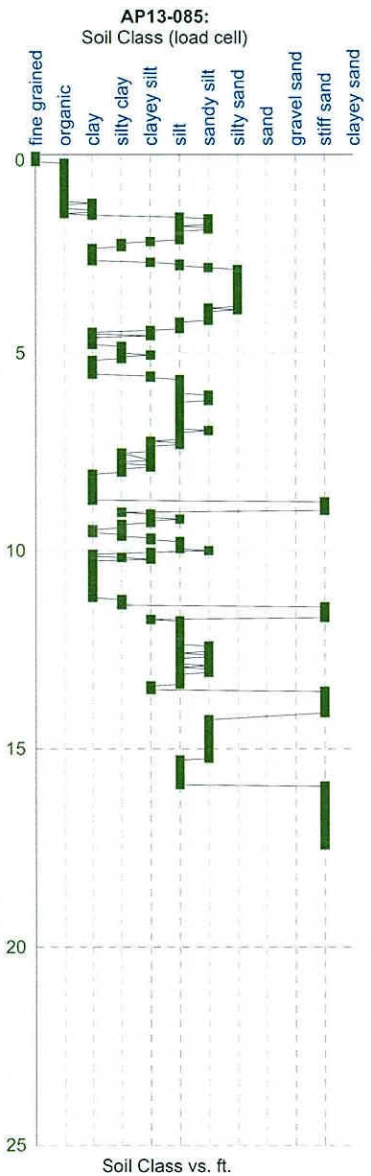

AP13-084:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

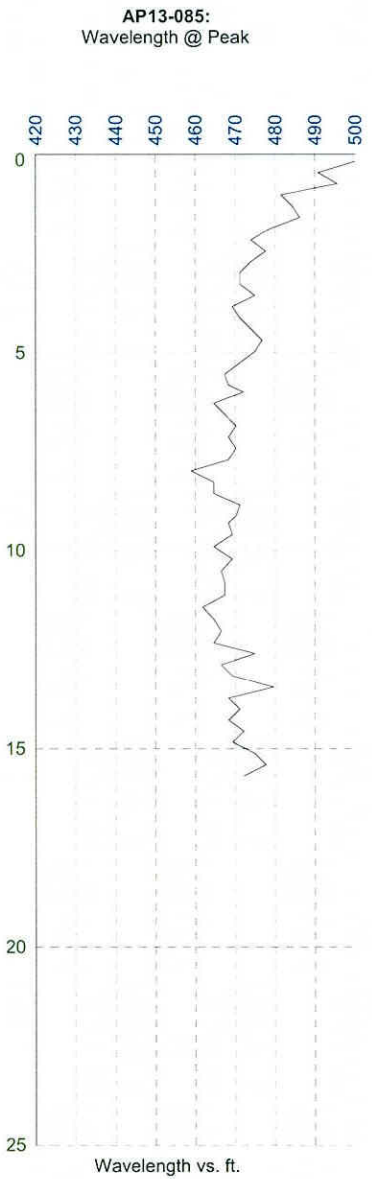

AP13-084:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

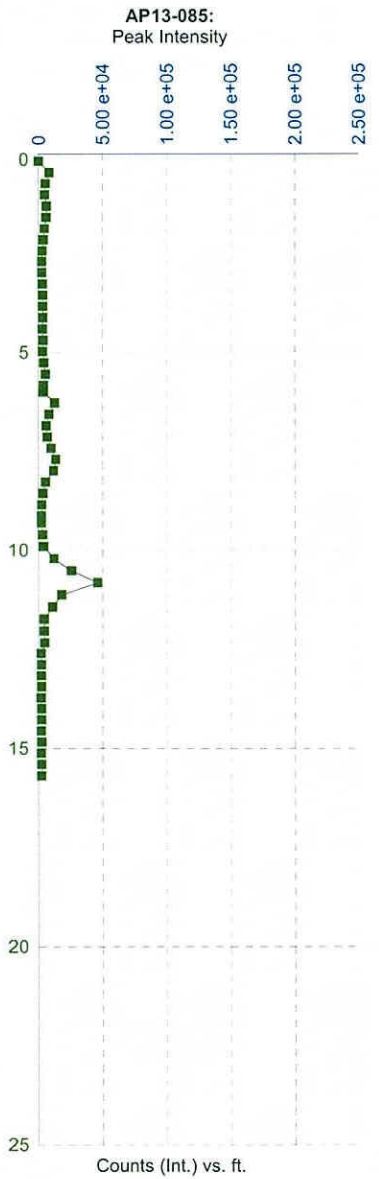

AP13-084:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

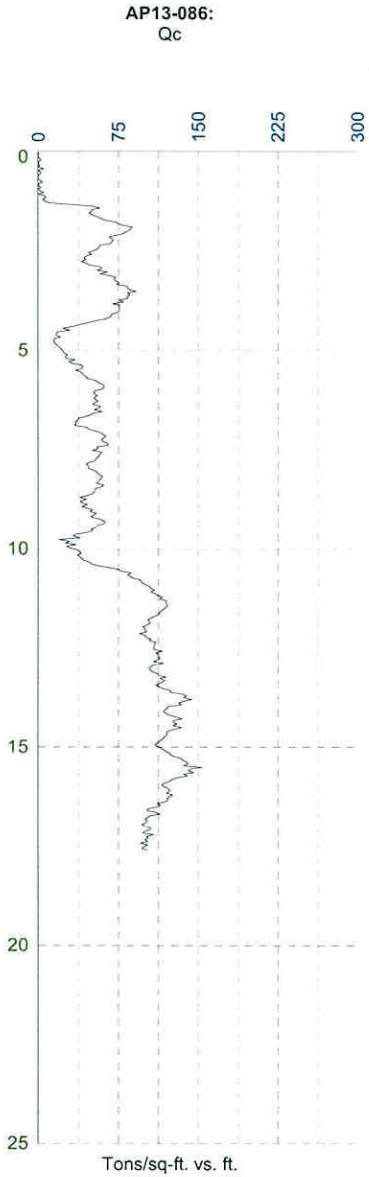

AP13-085:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

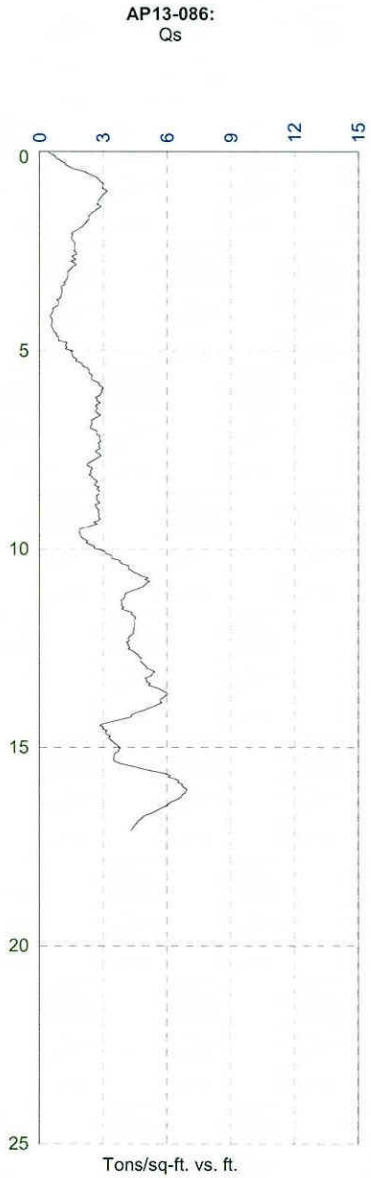

AP13-085:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

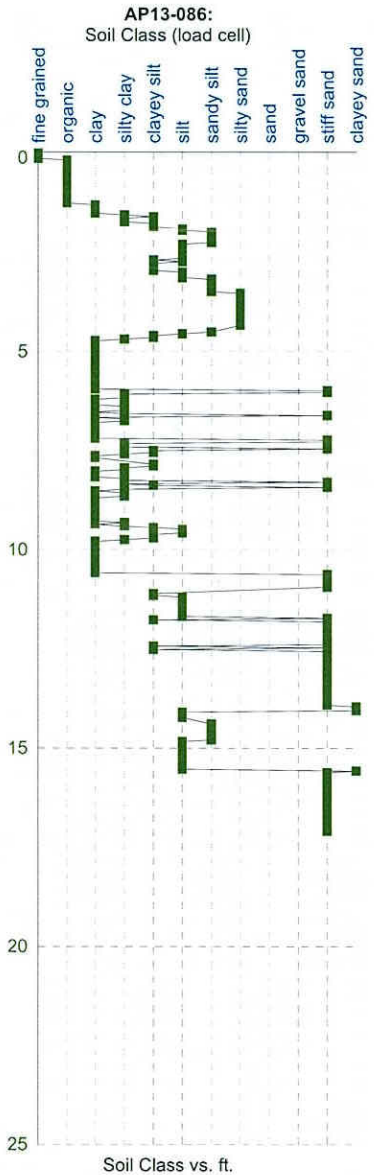

AP13-085:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

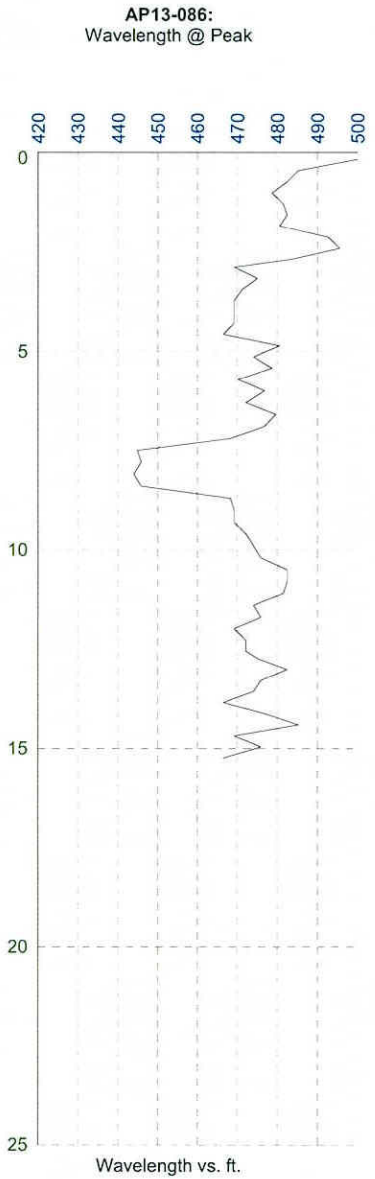

AP13-085:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

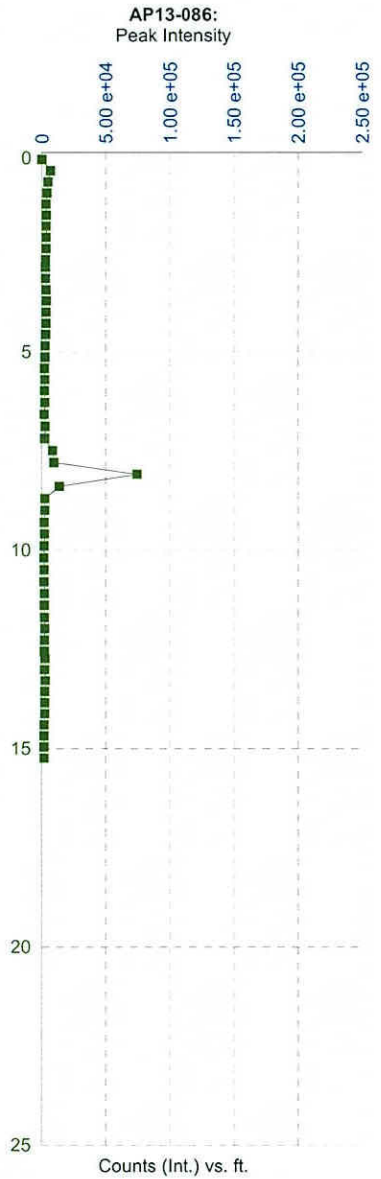

AP13-085:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

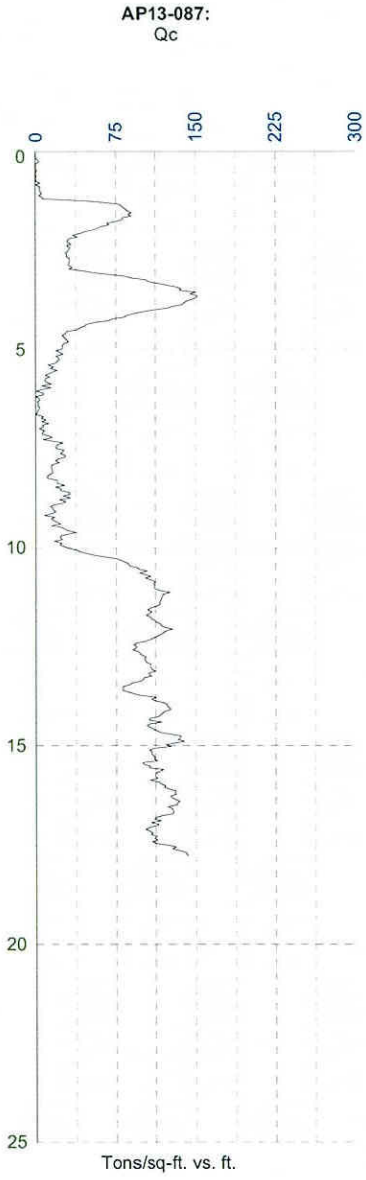

AP13-086:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

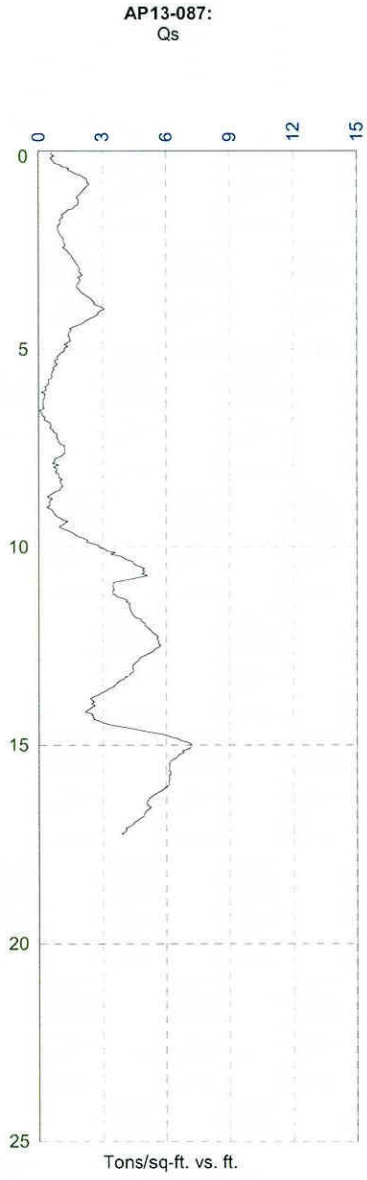

AP13-086:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

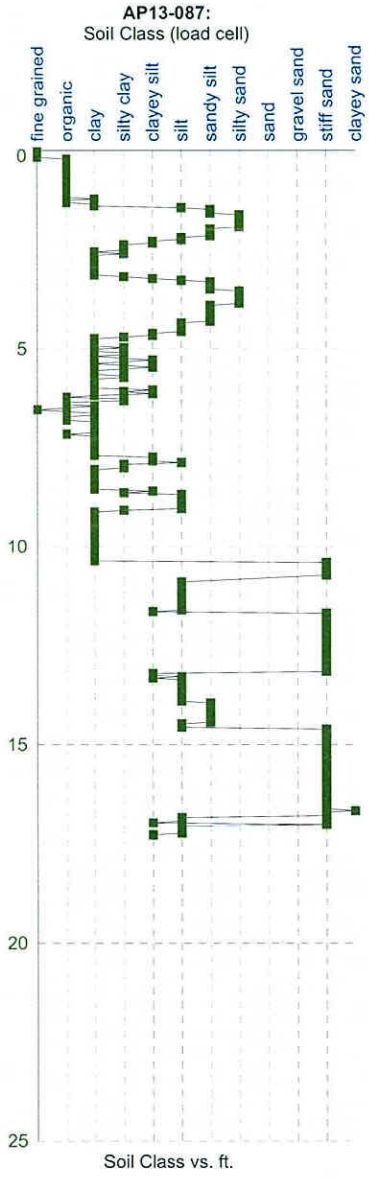

AP13-086:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

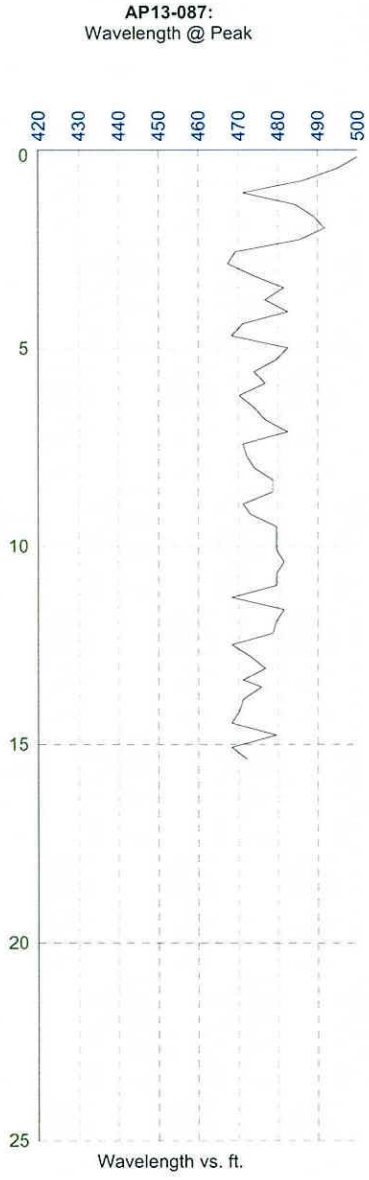

AP13-086:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

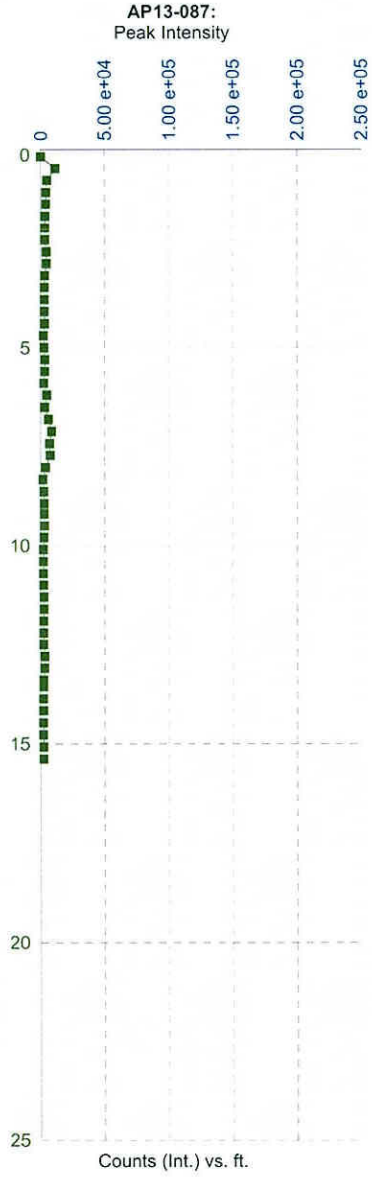

AP13-086:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

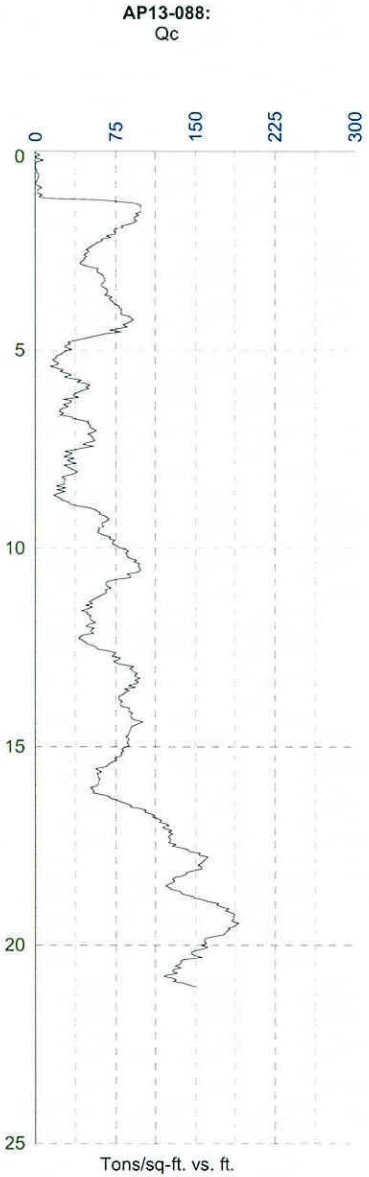

AP13-087:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

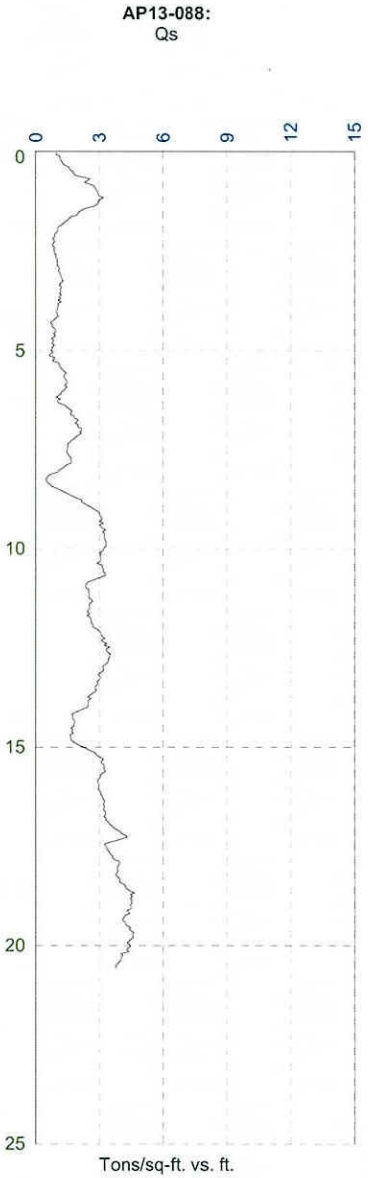

AP13-087:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

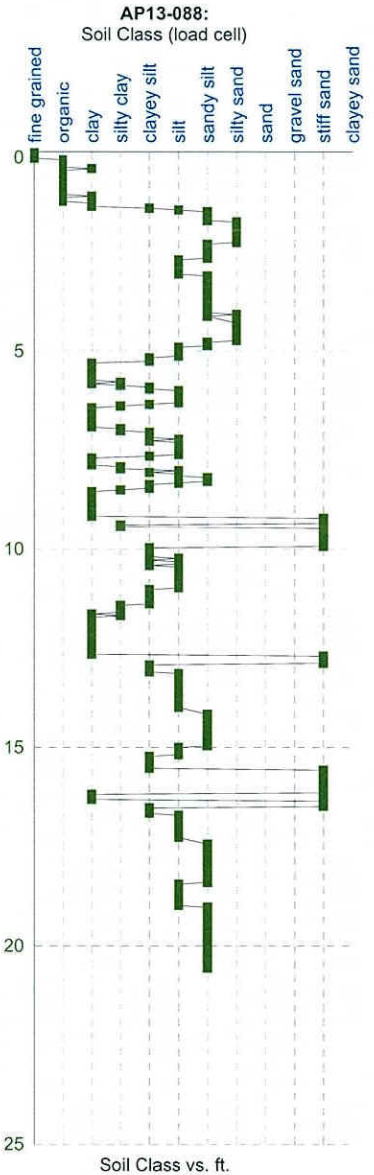

AP13-087:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

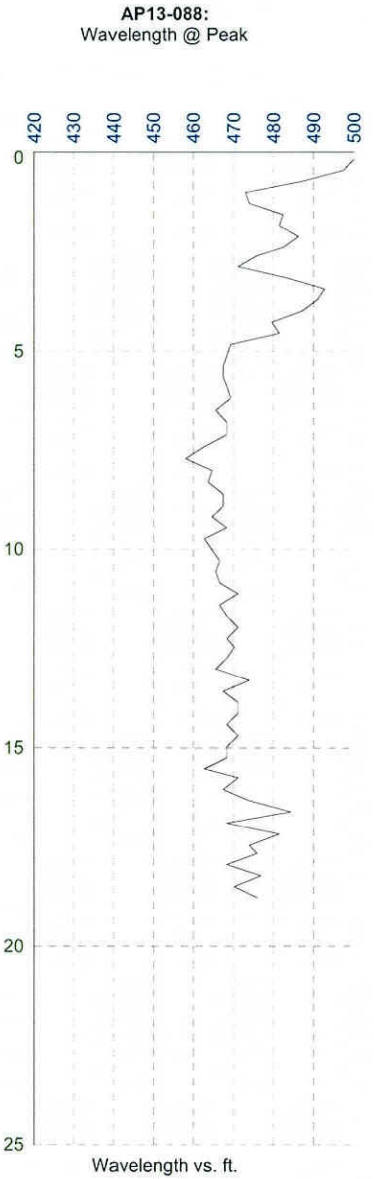

AP13-087:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

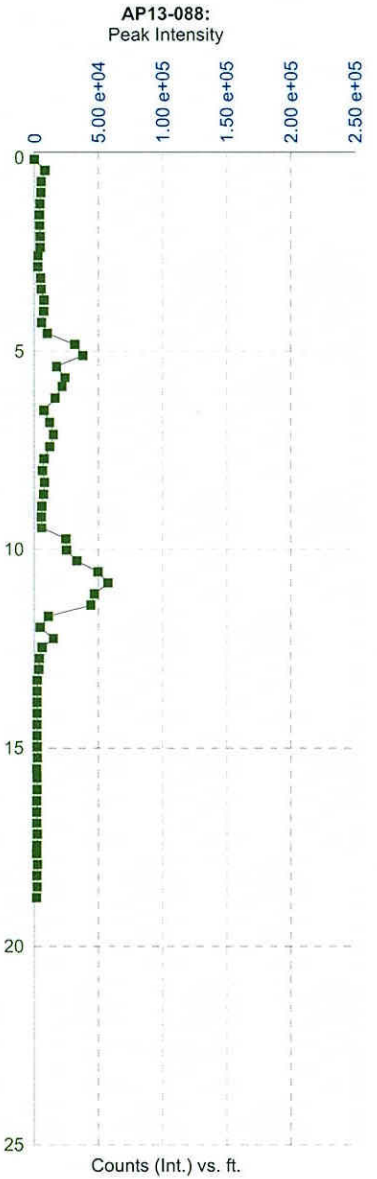

AP13-087:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

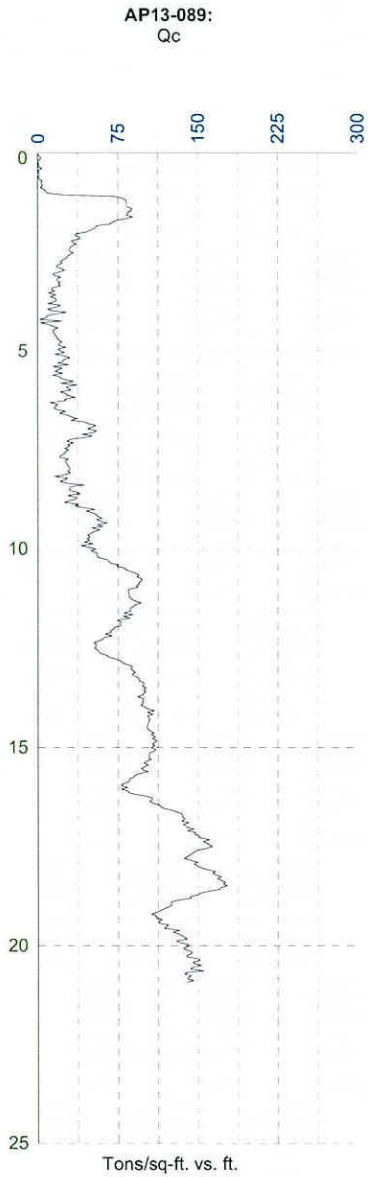

AP13-088:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

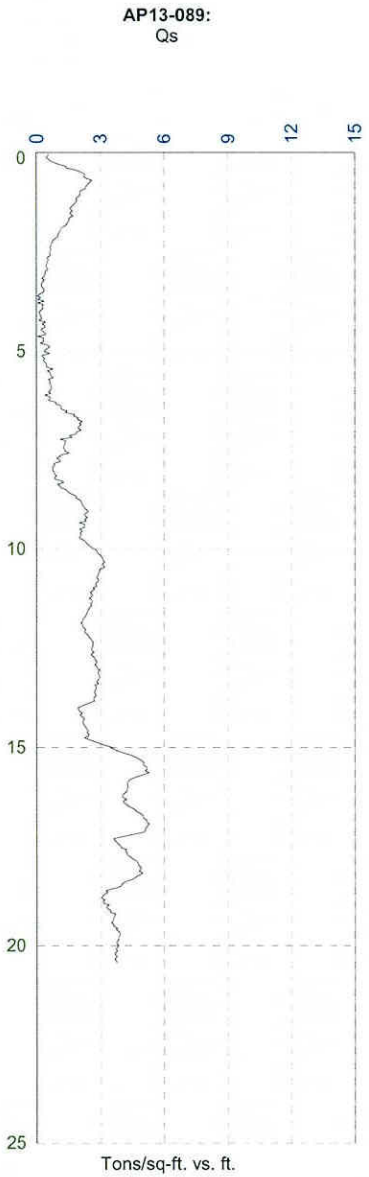

AP13-088:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

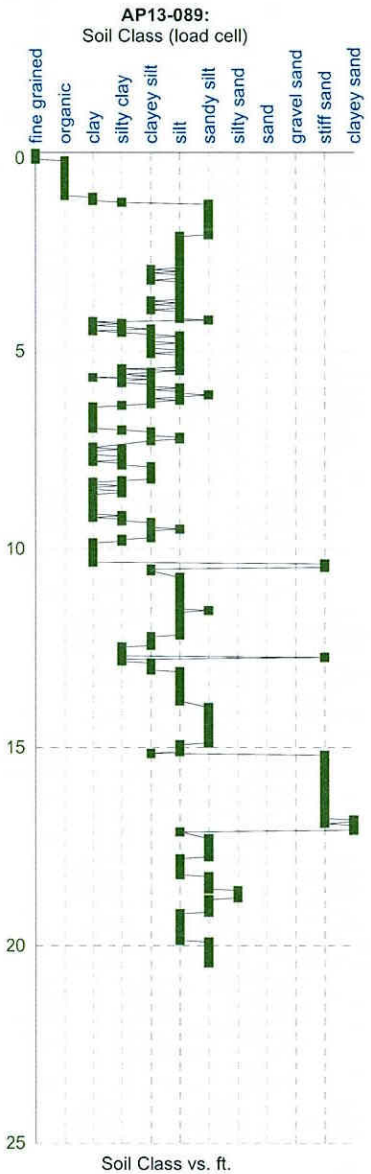

AP13-088:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

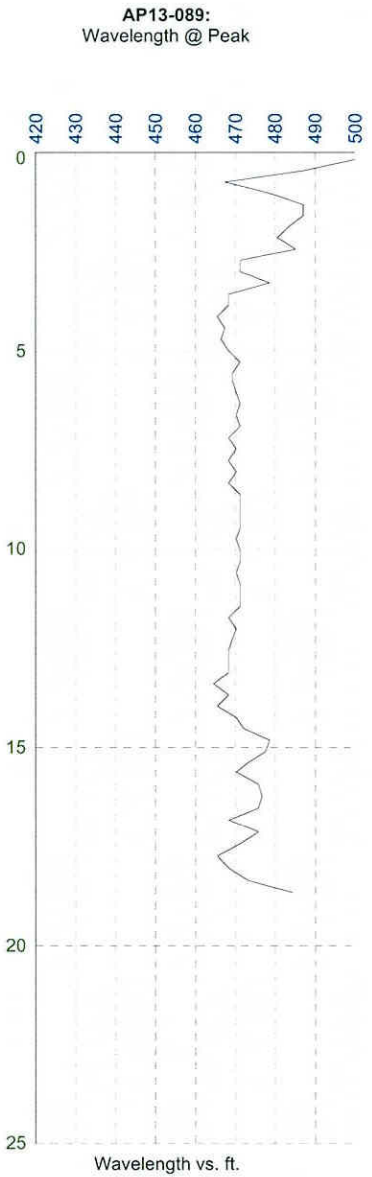

AP13-088:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

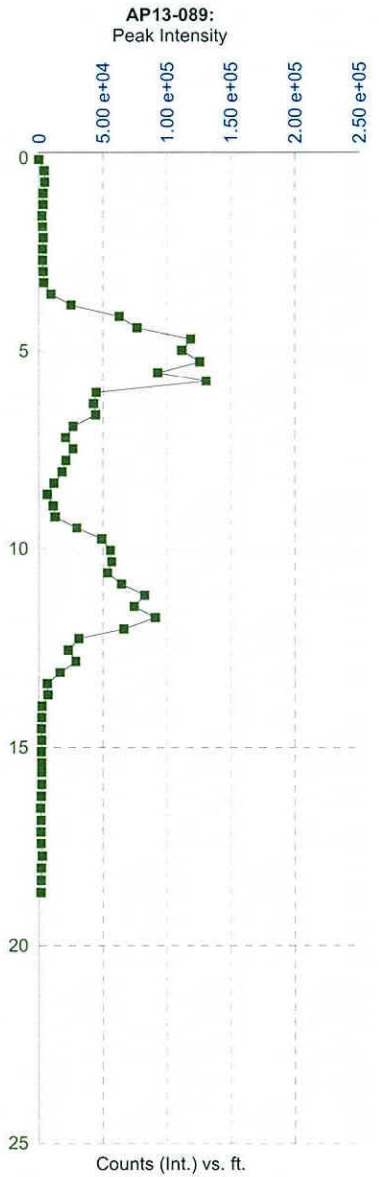

AP13-088:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

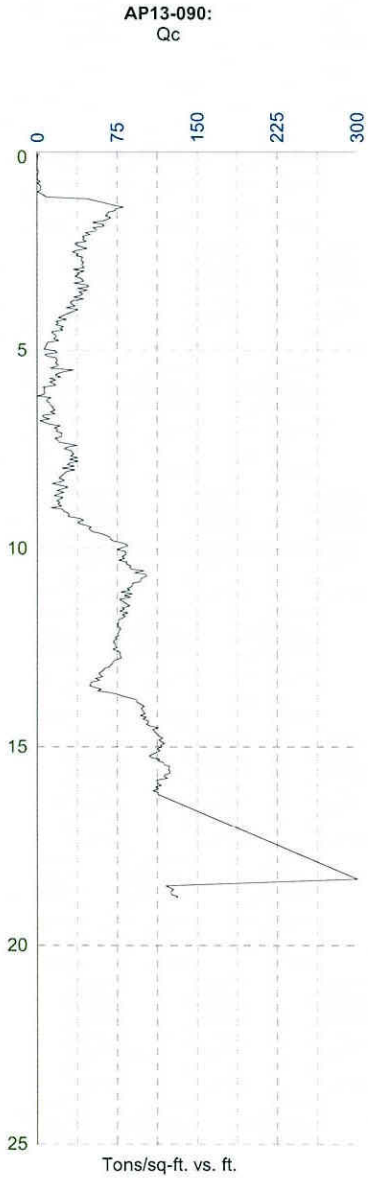

AP13-089:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

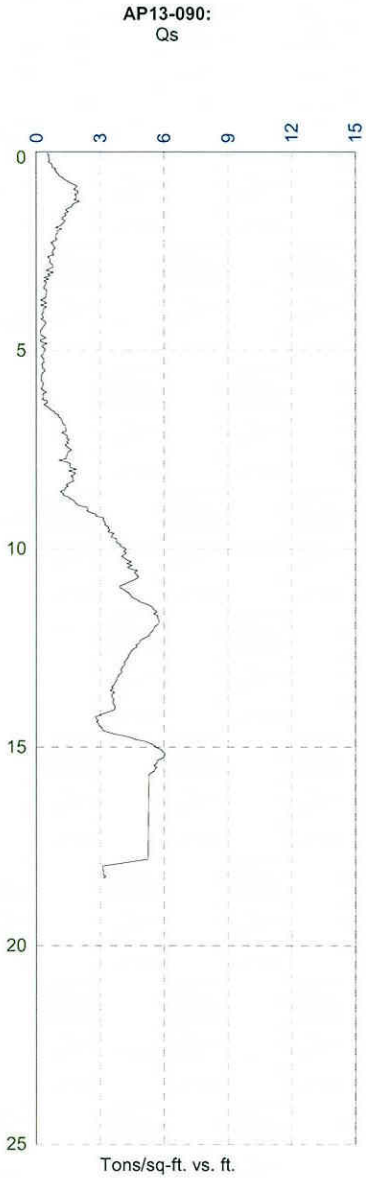

AP13-089:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

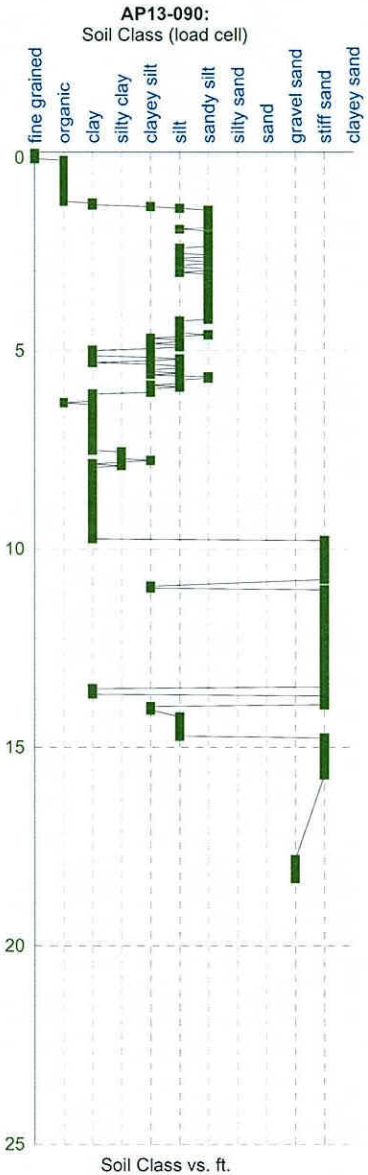

AP13-089:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

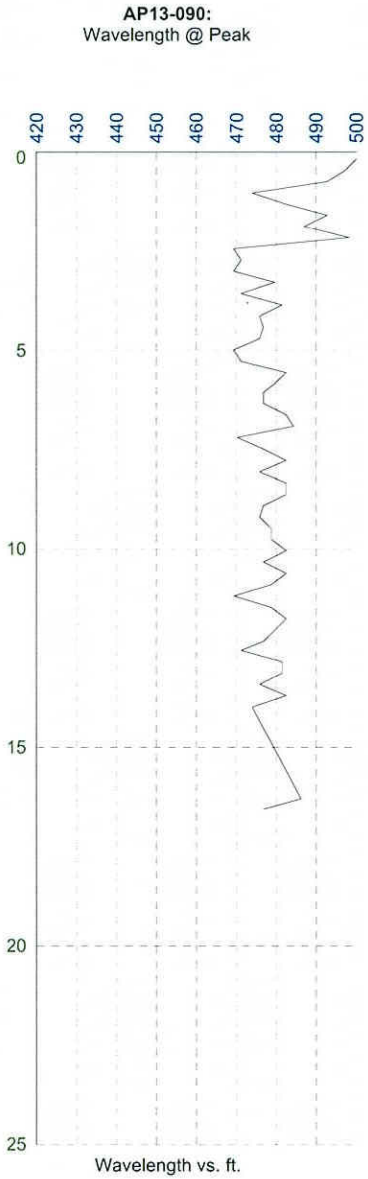

AP13-089:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

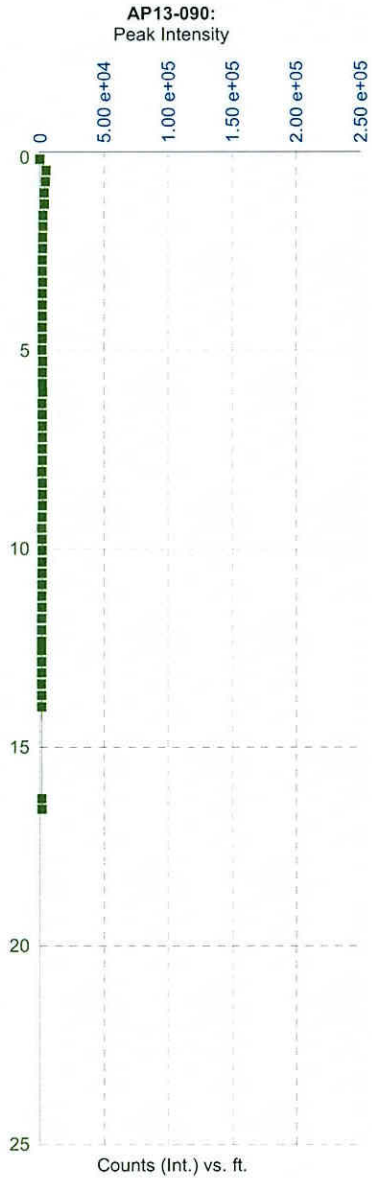

AP13-089:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

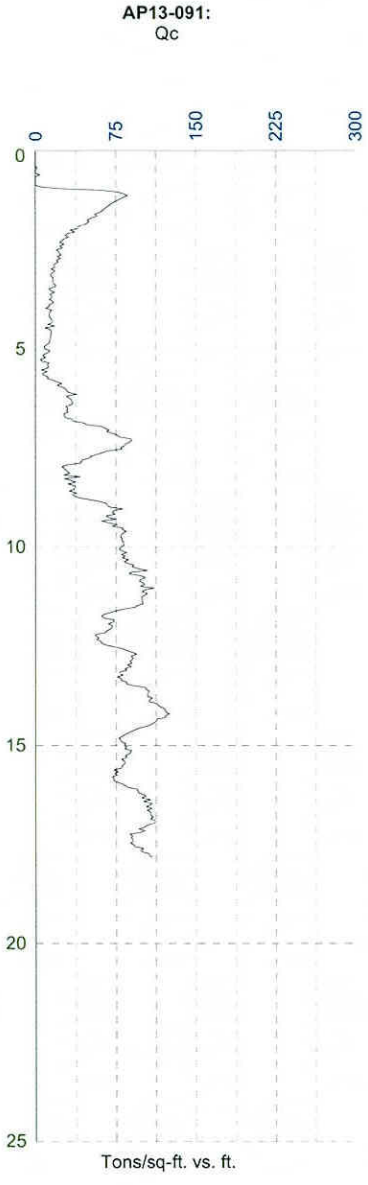

AP13-090:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

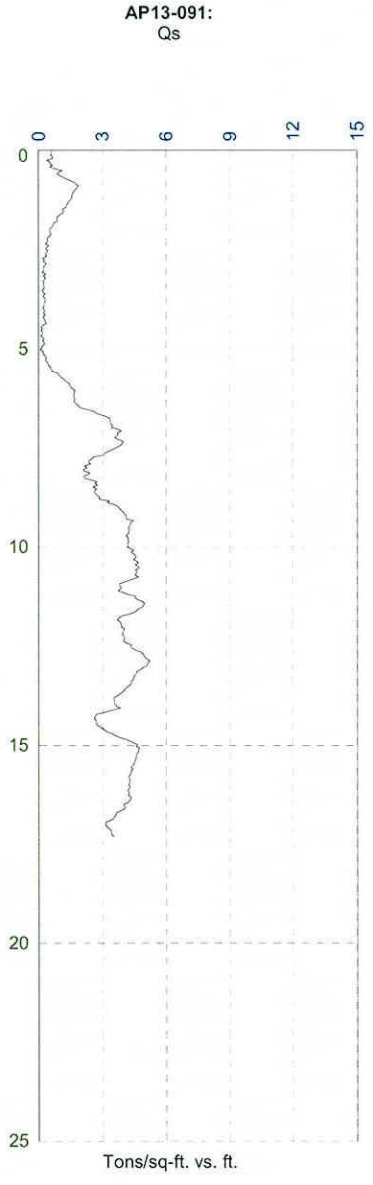

AP13-090:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

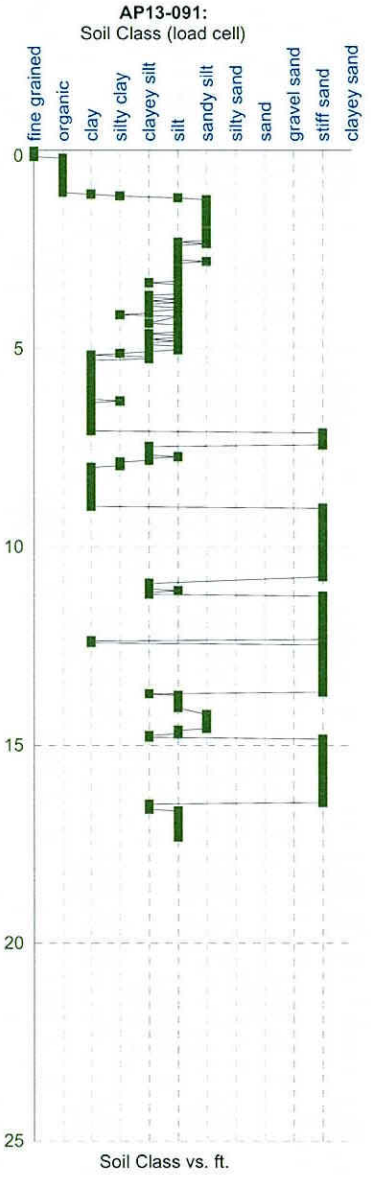

AP13-090:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

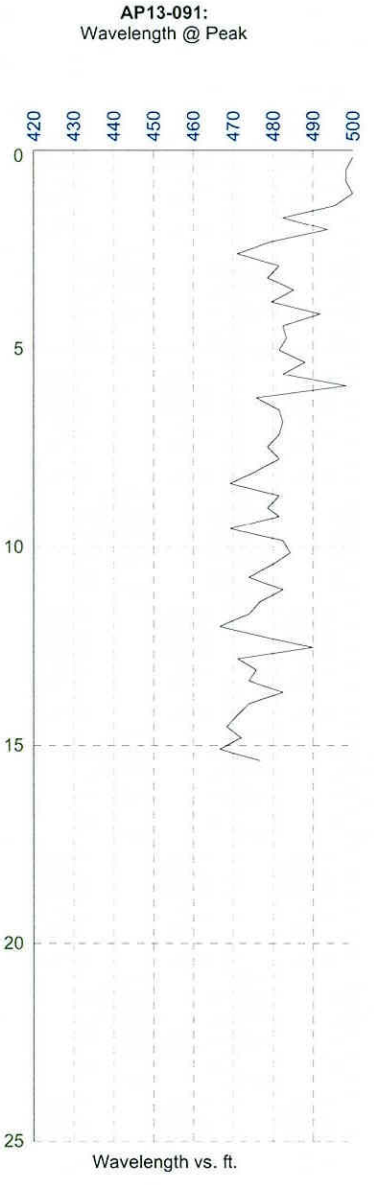

AP13-090:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

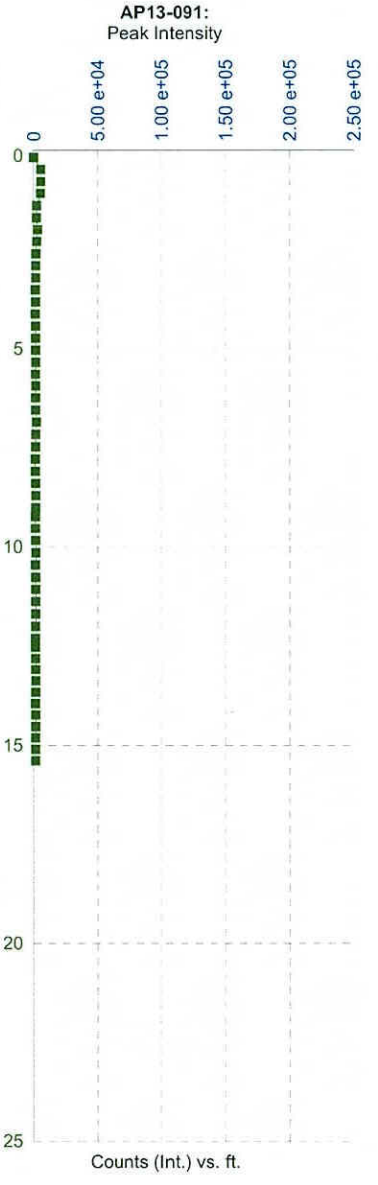

AP13-090:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

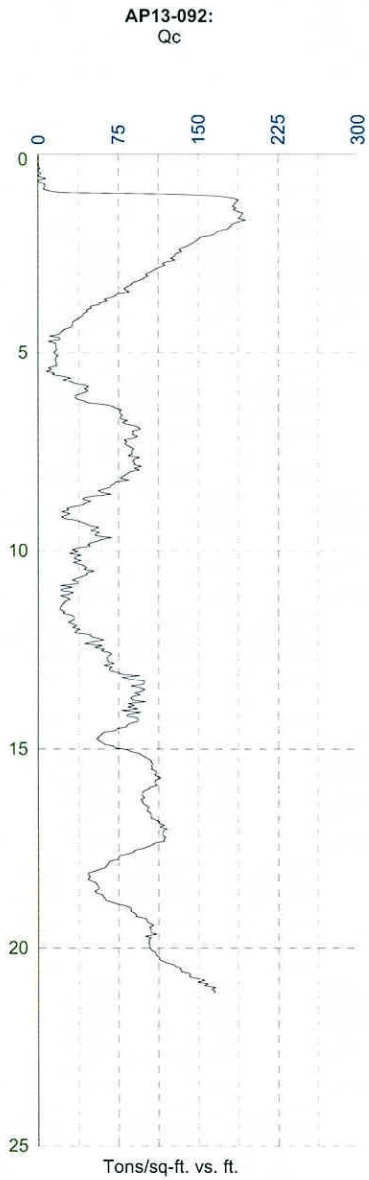

AP13-091:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

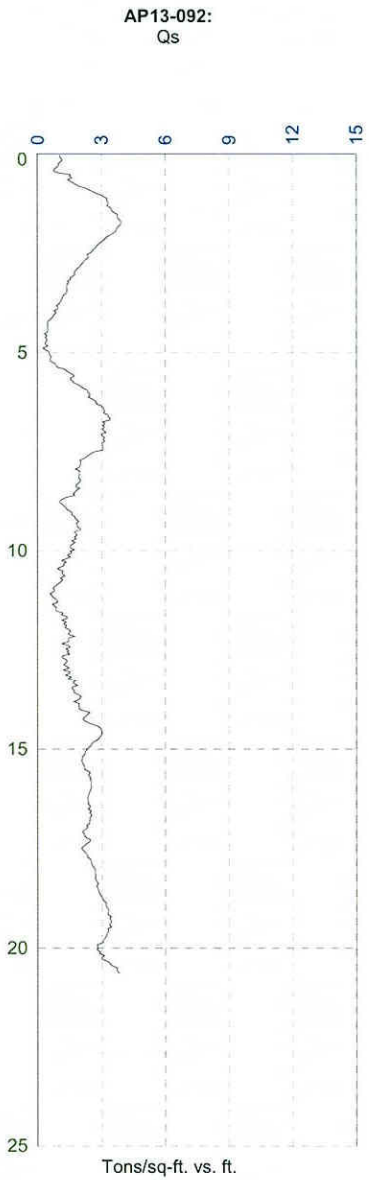

AP13-091:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

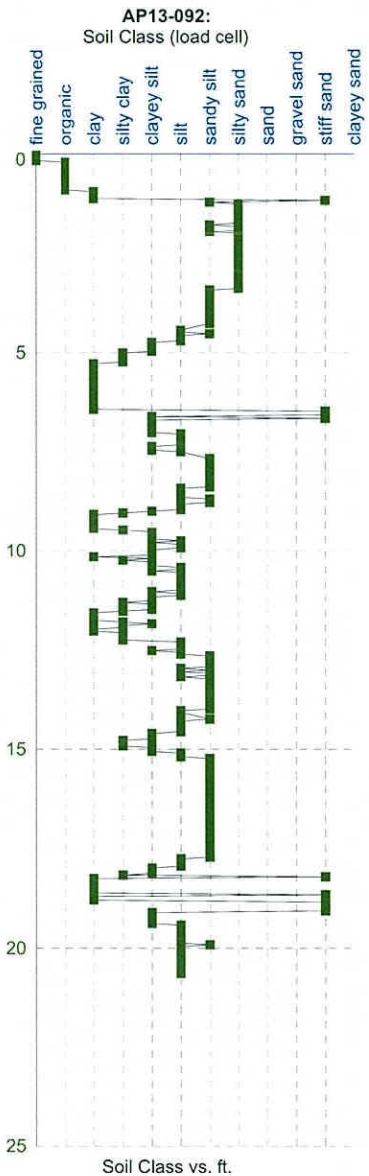

AP13-091:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

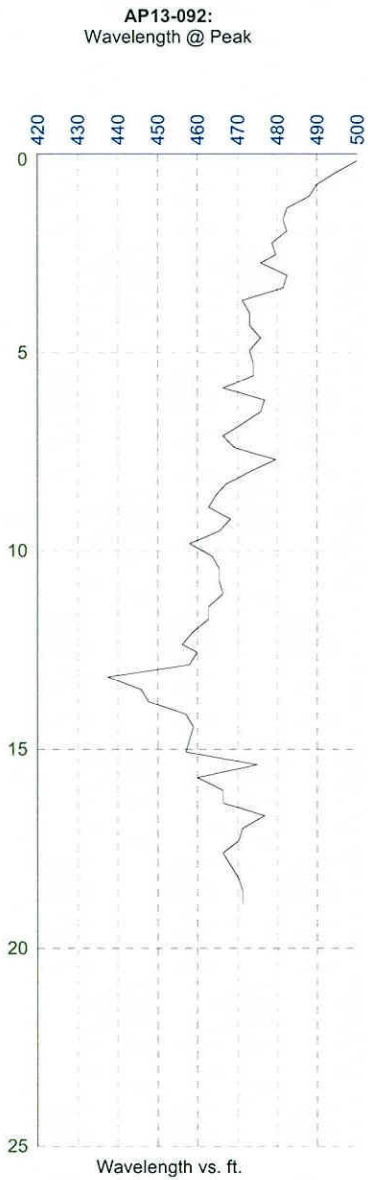

AP13-091:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

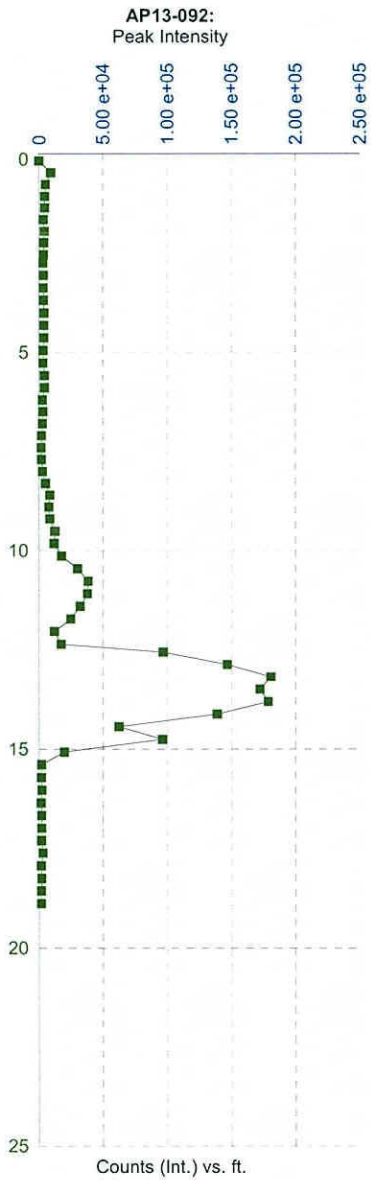

AP13-091:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

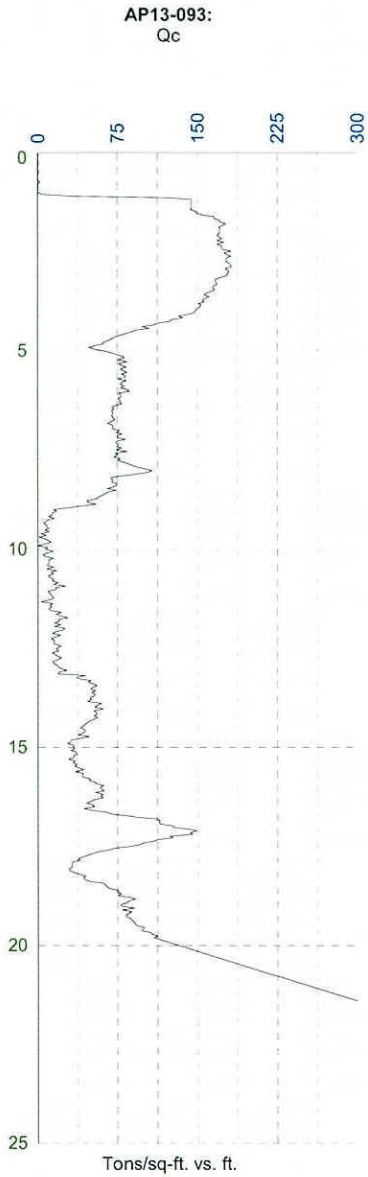

AP13-092:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

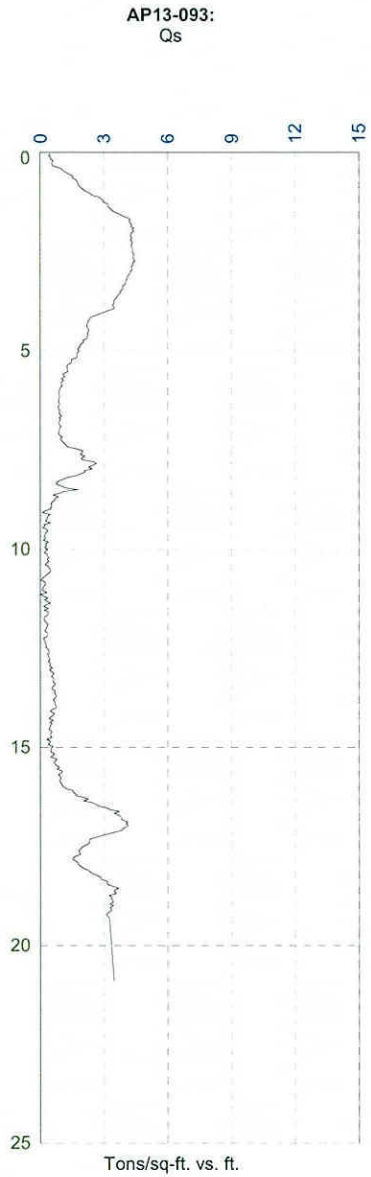

AP13-092:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

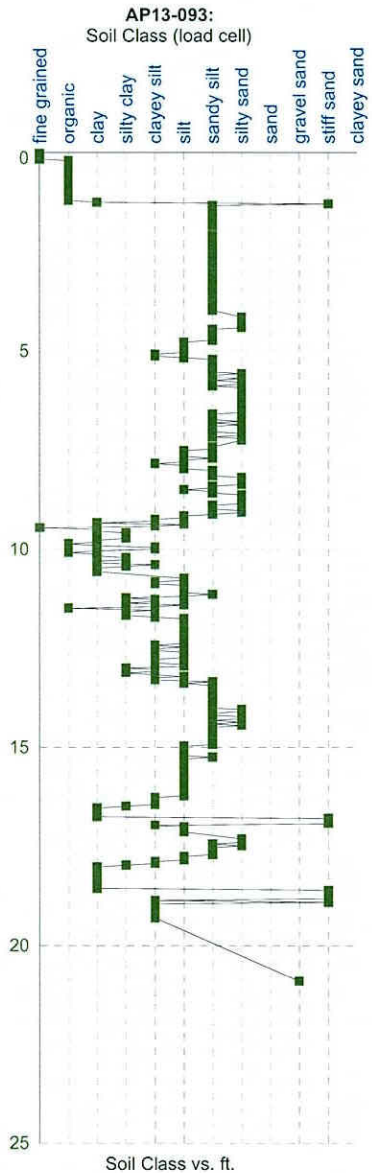

AP13-092:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

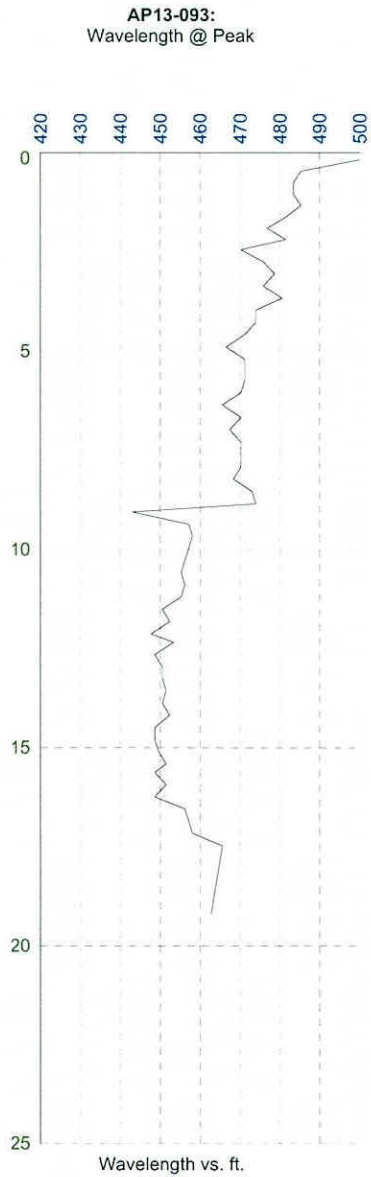

AP13-092:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

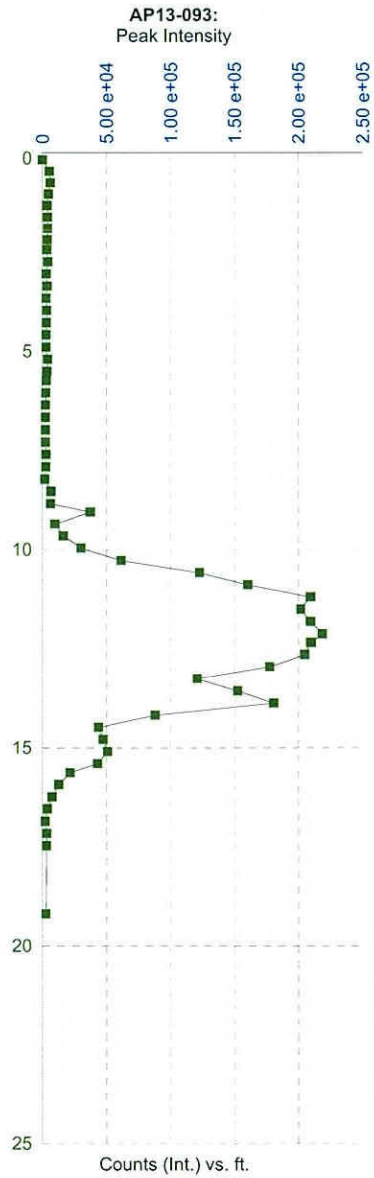

AP13-092:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

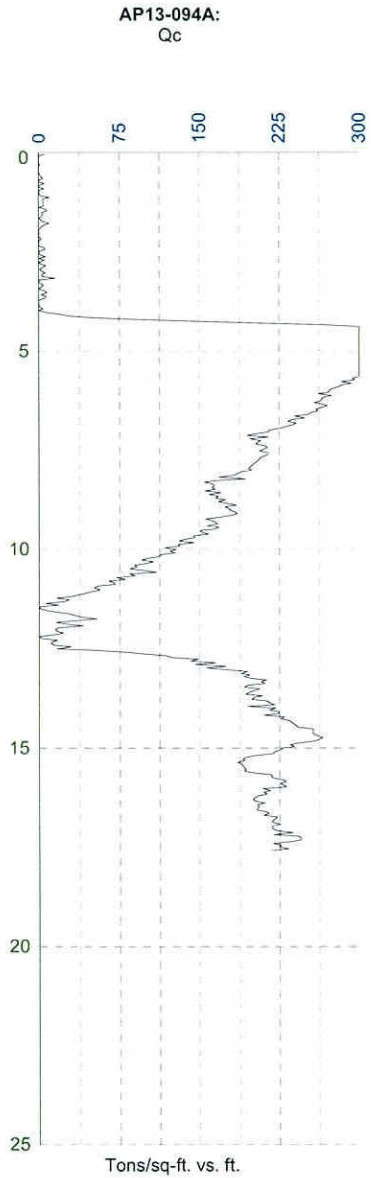

AP13-093:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

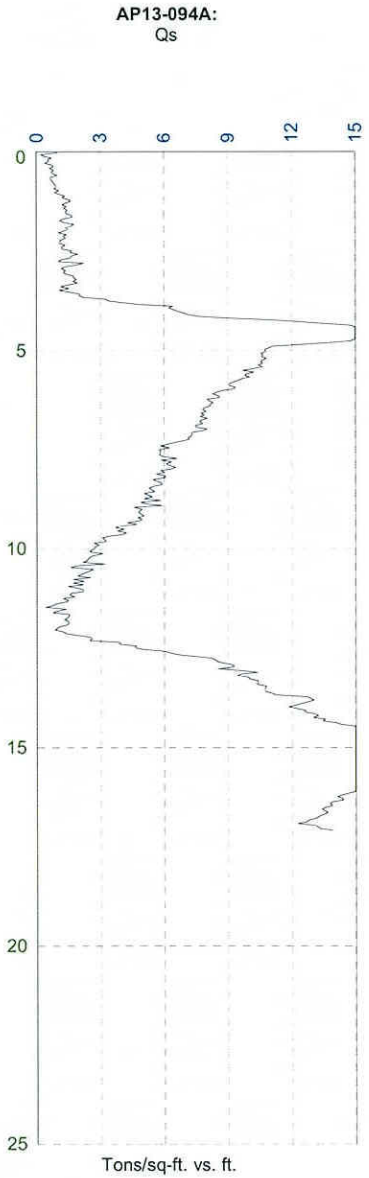

AP13-093:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

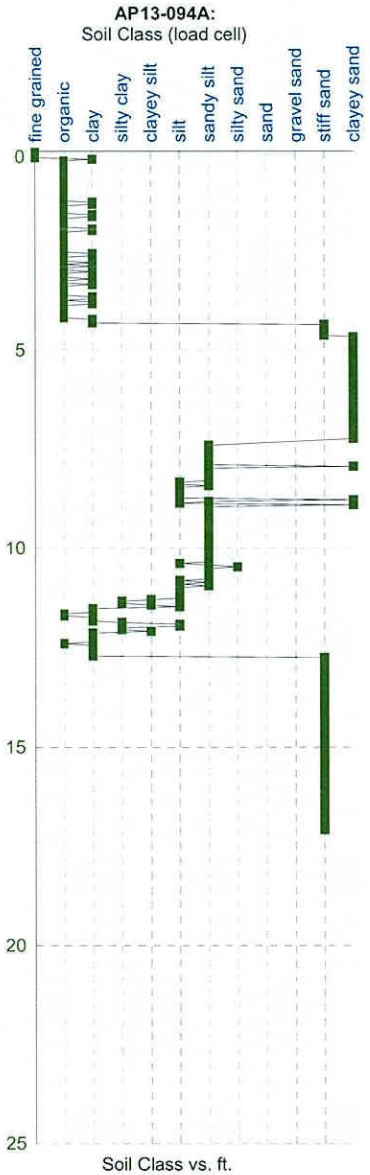

AP13-093:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

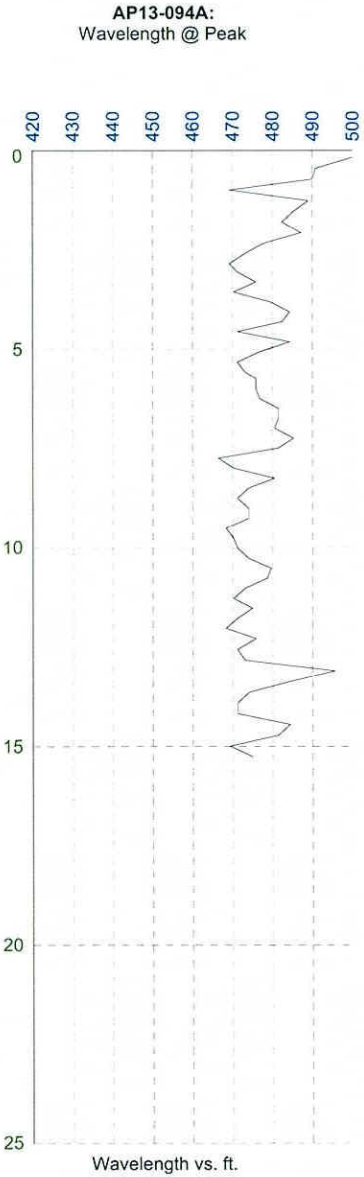

AP13-093:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

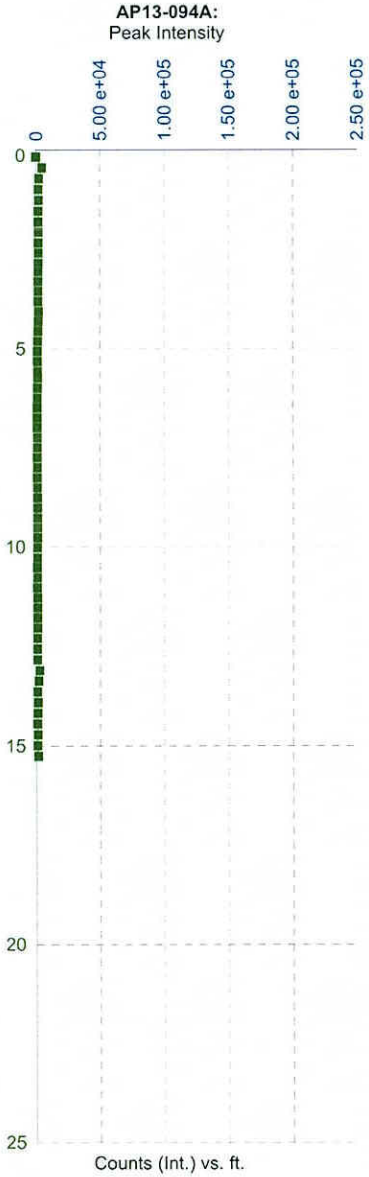

AP13-093:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

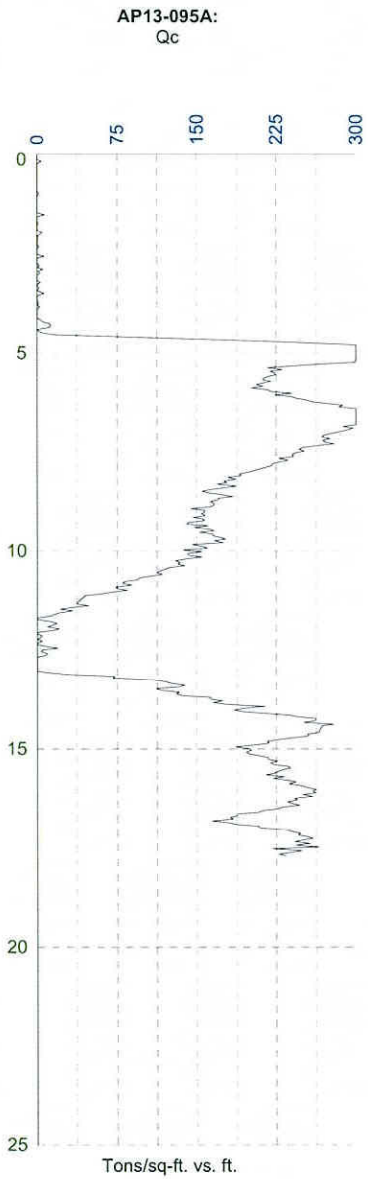

AP13-094A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

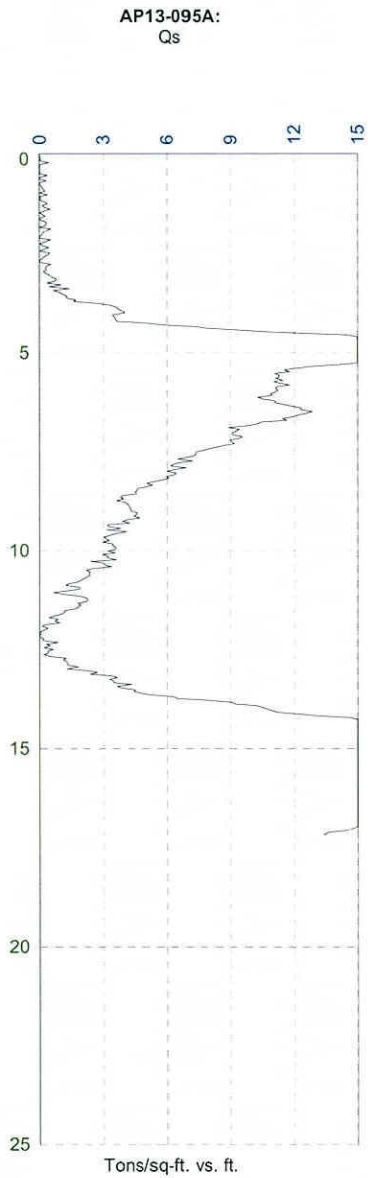

AP13-094A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

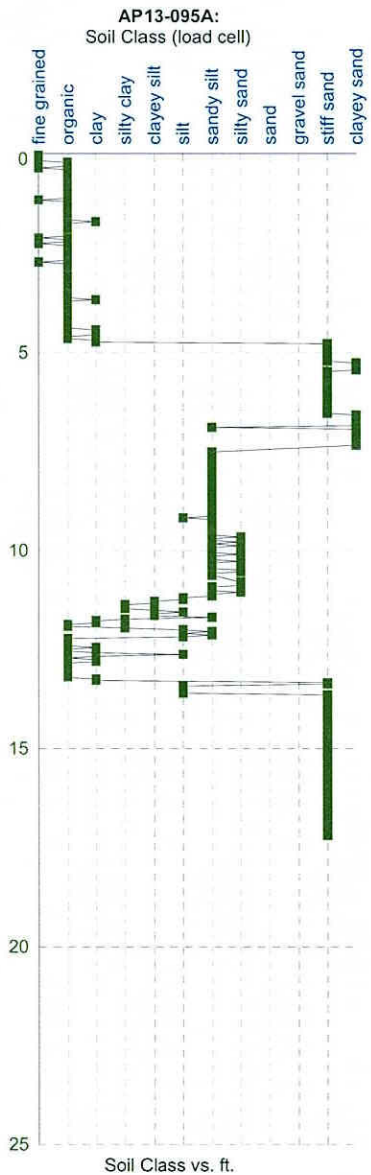

AP13-094A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

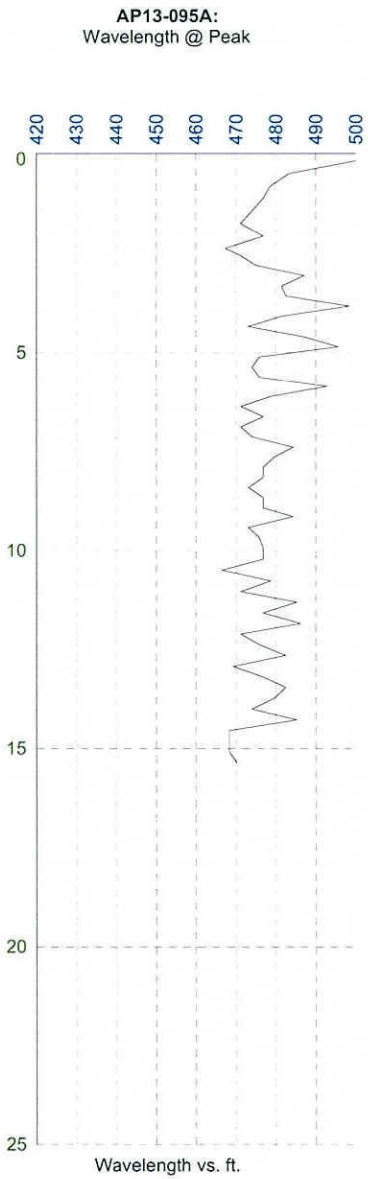

AP13-094A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

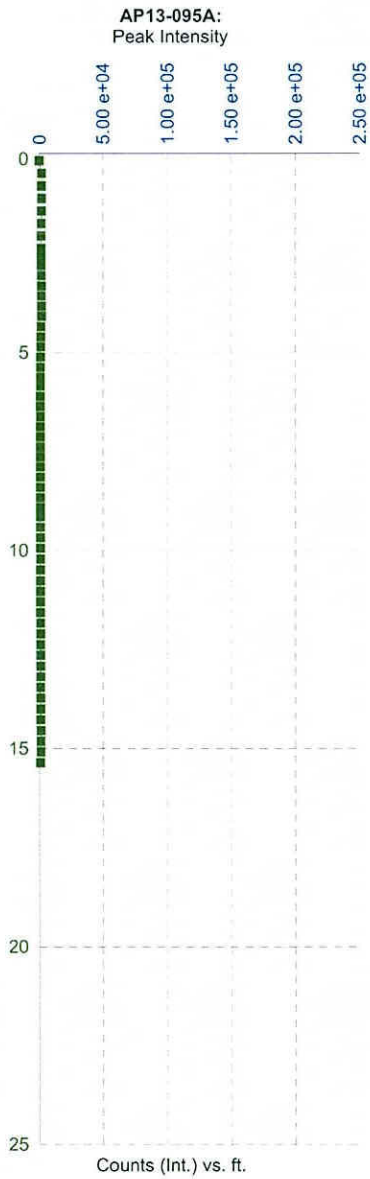

AP13-094A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

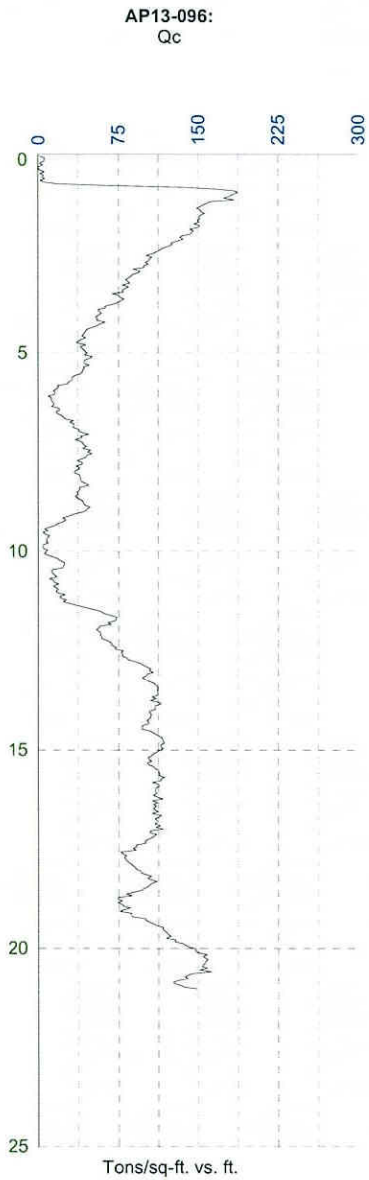

AP13-095A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

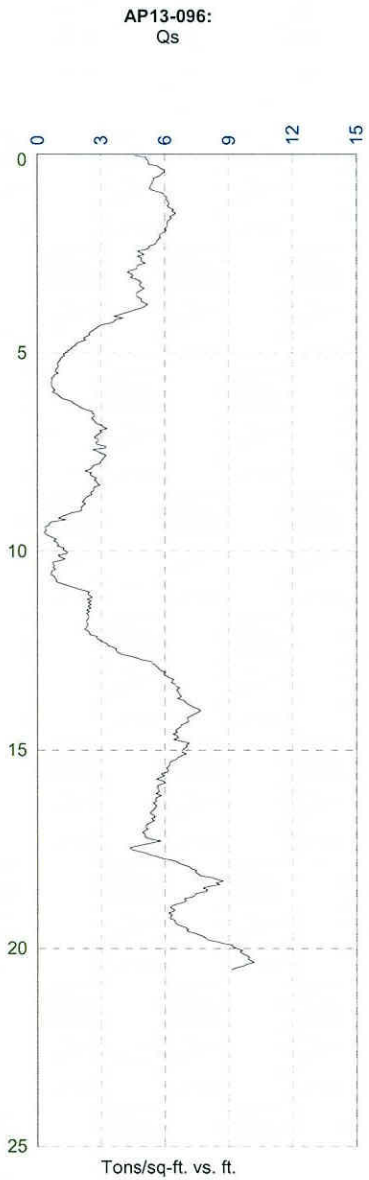

AP13-095A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

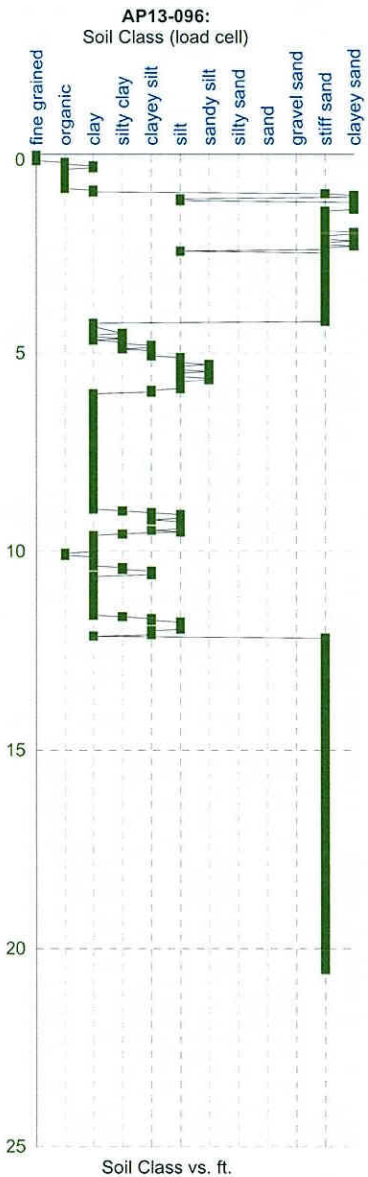

AP13-095A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

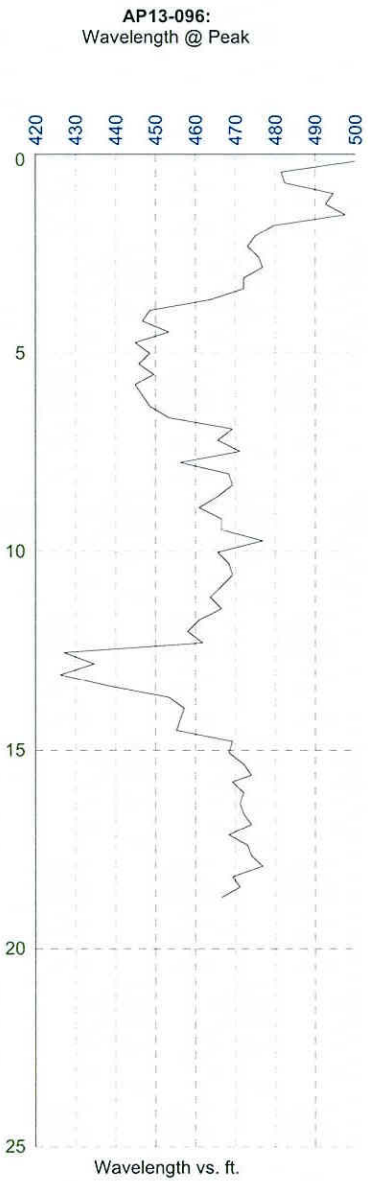

AP13-095A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

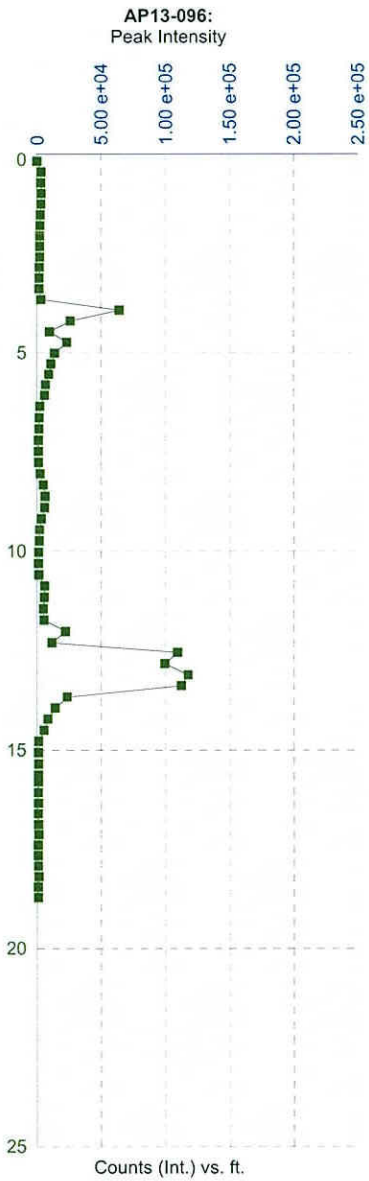

AP13-095A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

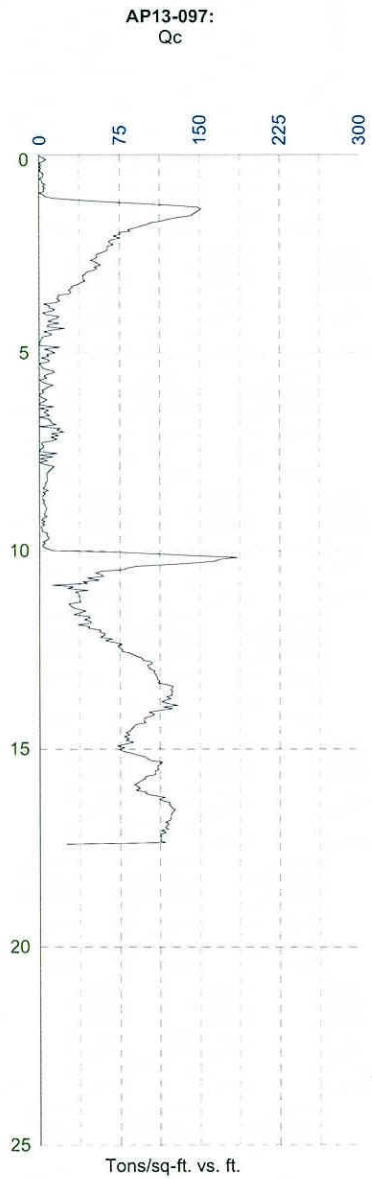

AP13-096:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

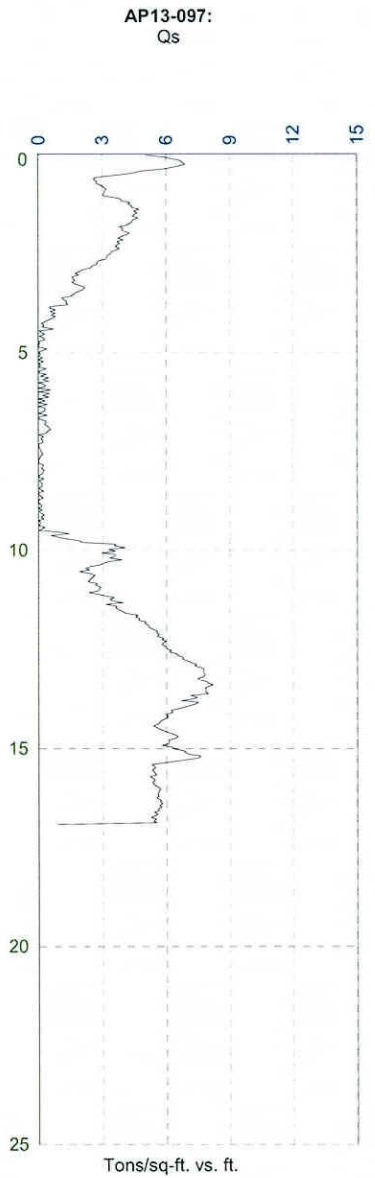

AP13-096:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

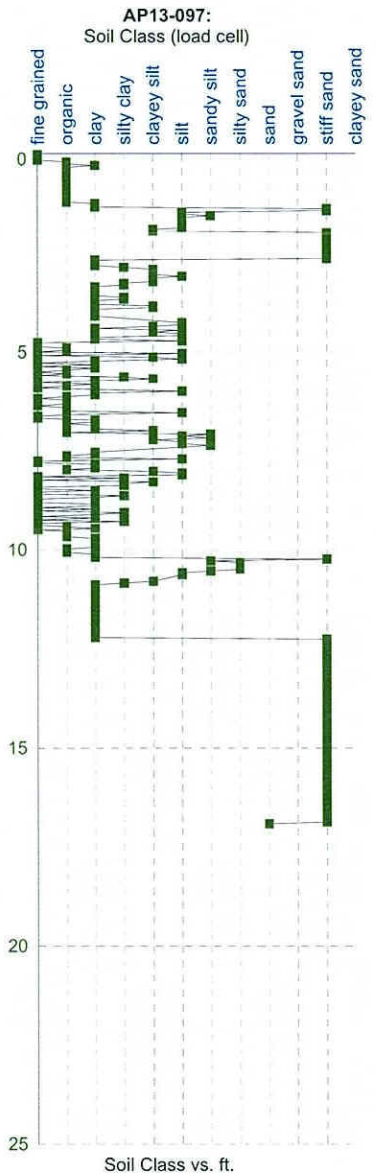

AP13-096:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

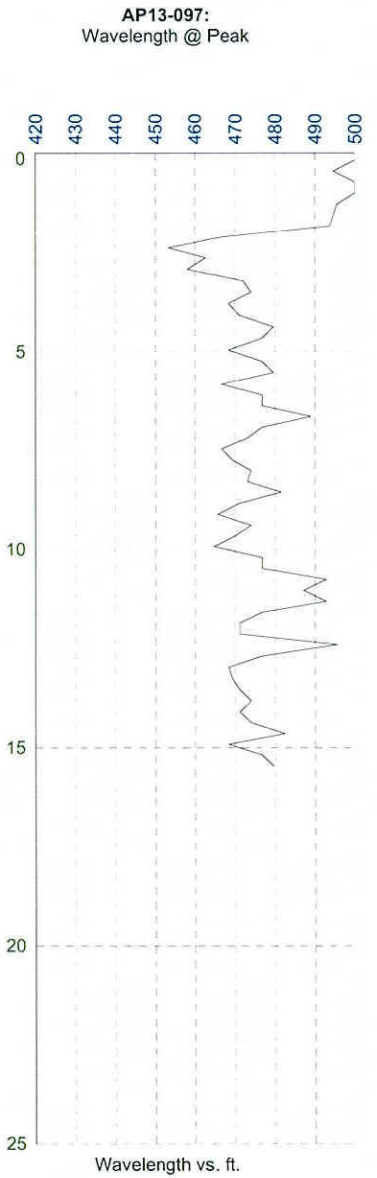

AP13-096:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

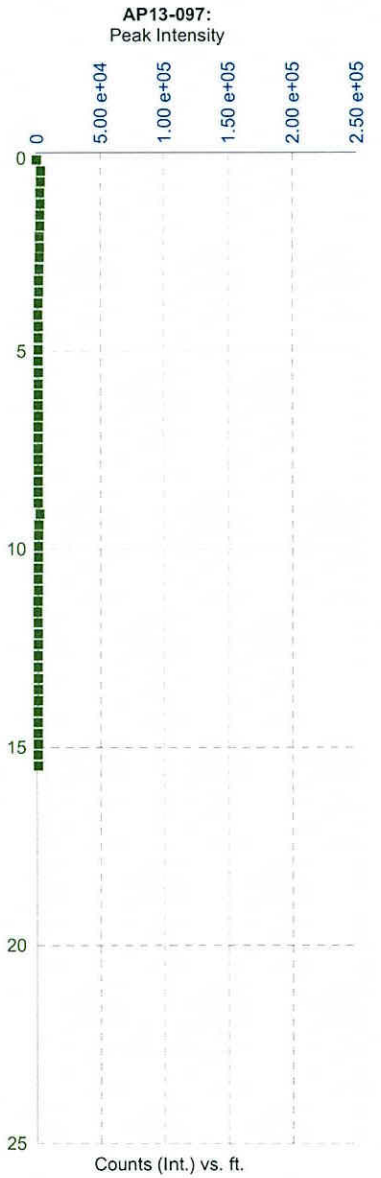

AP13-096:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

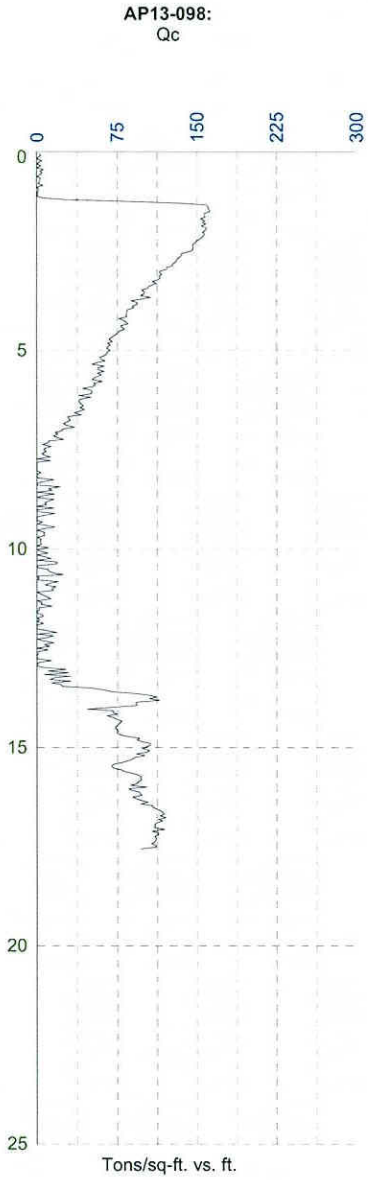

AP13-097:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

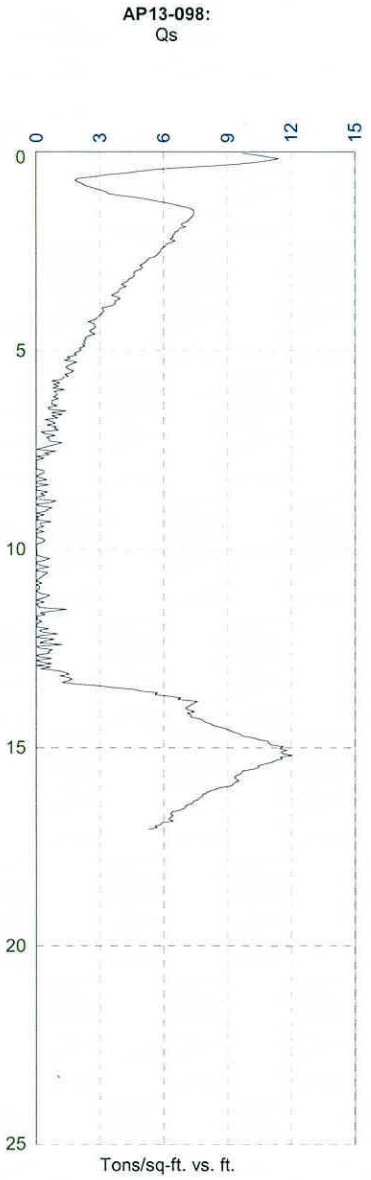

AP13-097:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

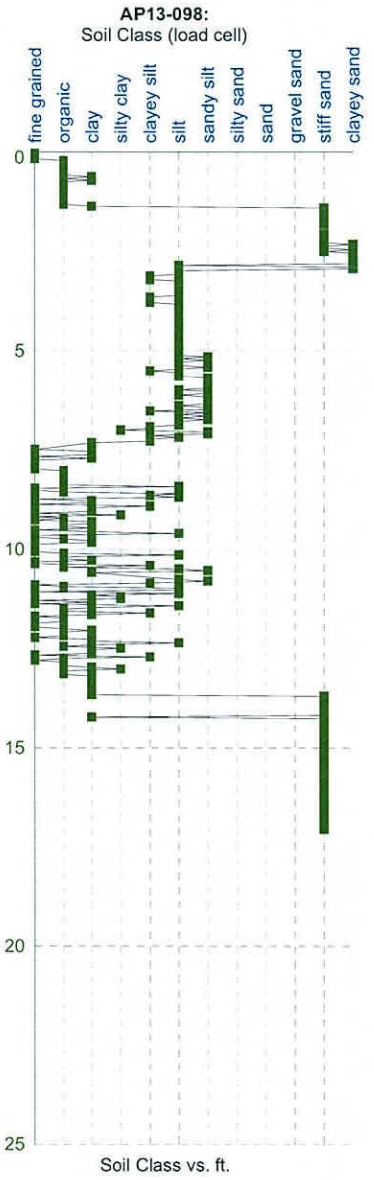

AP13-097:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

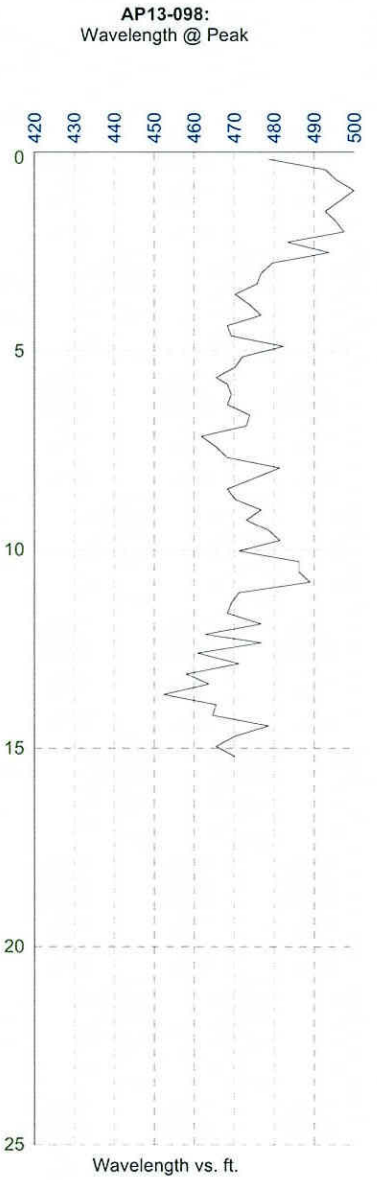

AP13-097:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

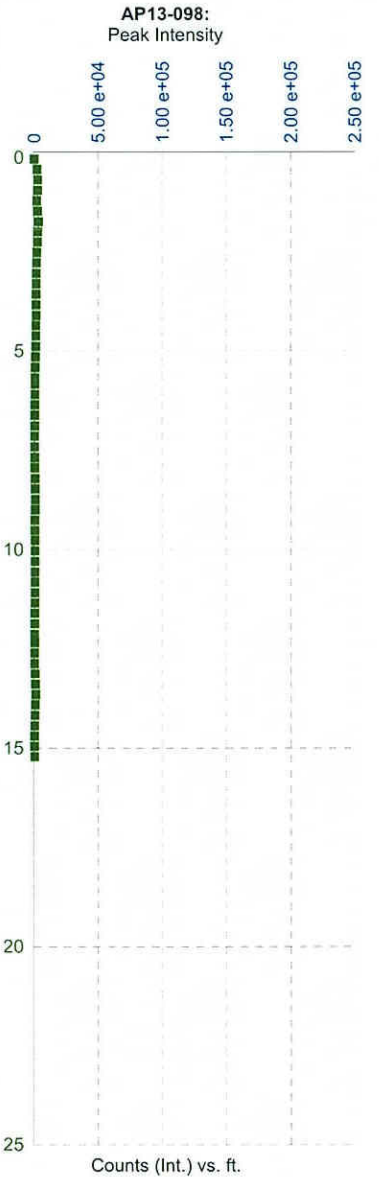

AP13-097:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

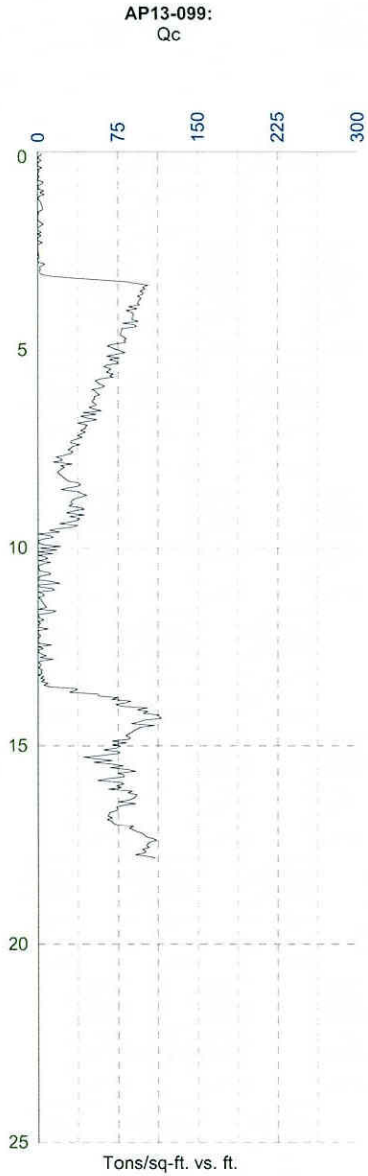

AP13-098:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

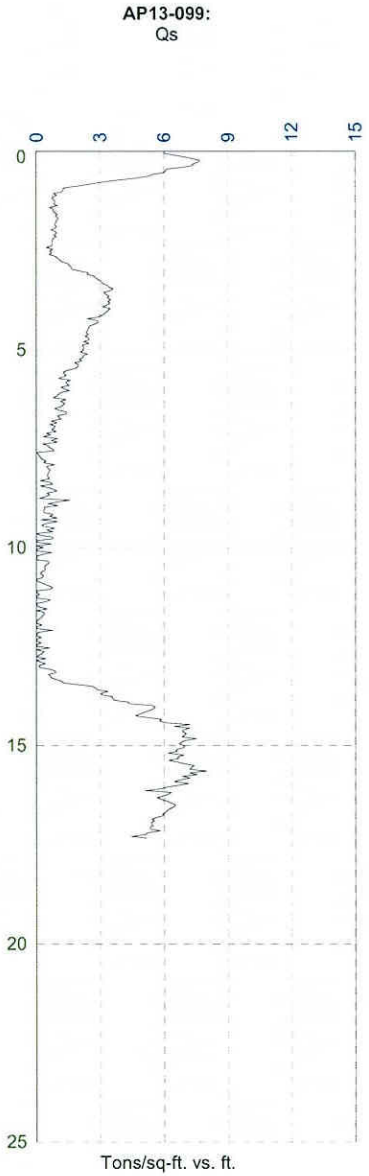

AP13-098:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

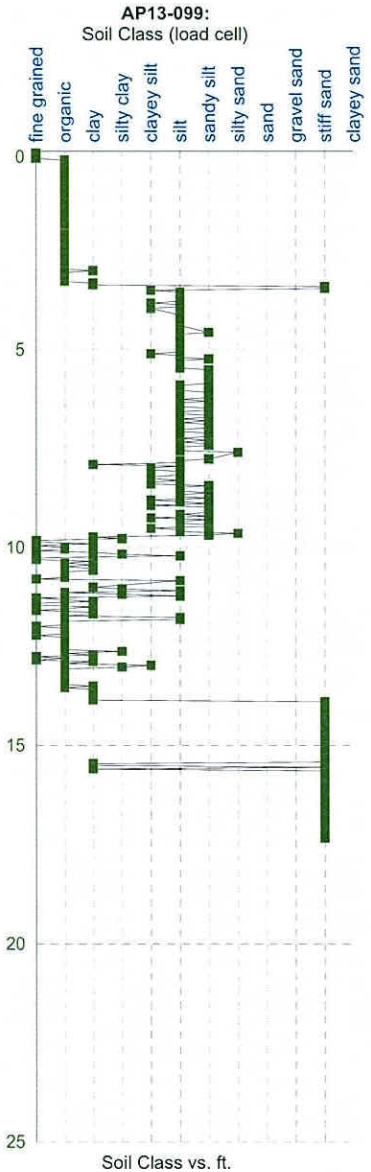

AP13-098:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

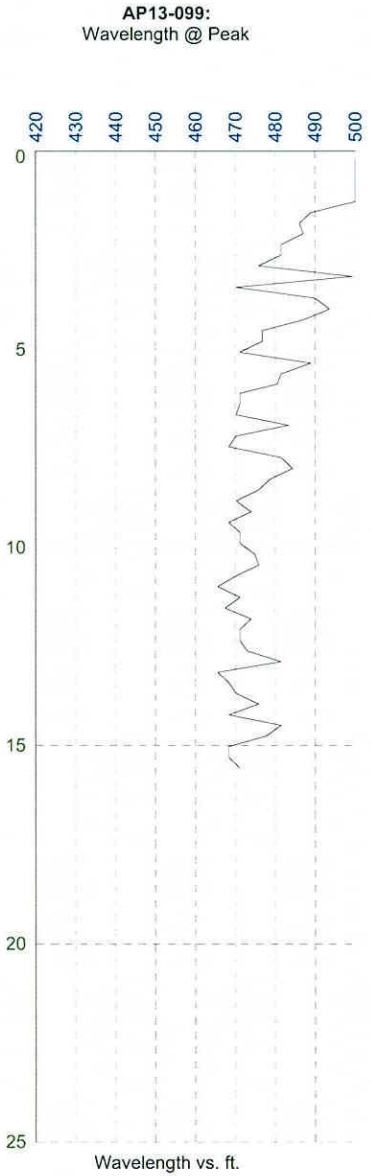

AP13-098:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

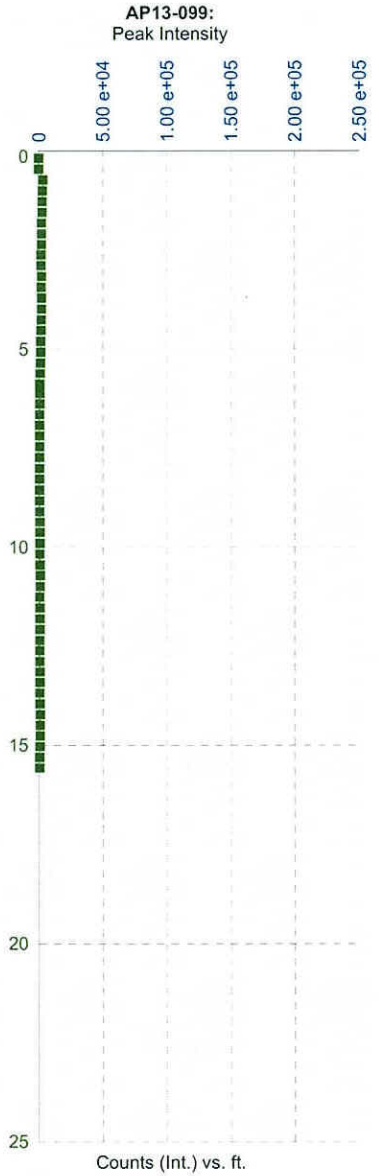

AP13-098:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

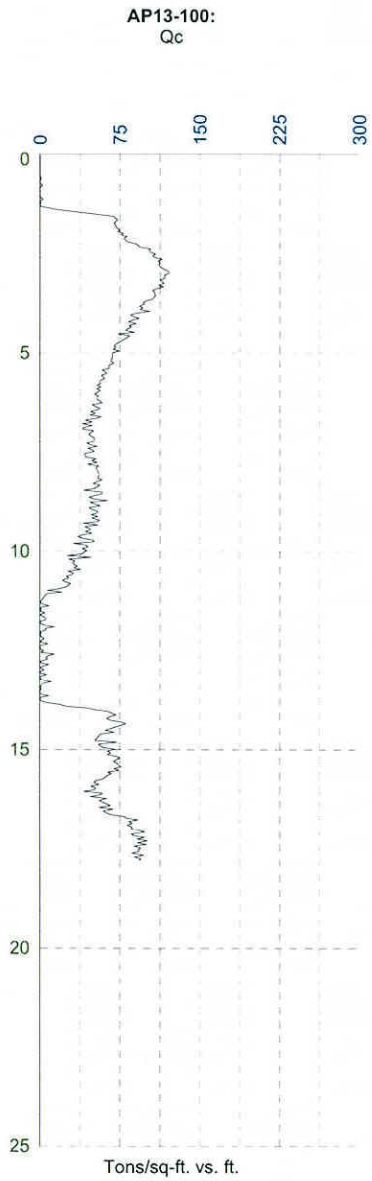

AP13-099:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

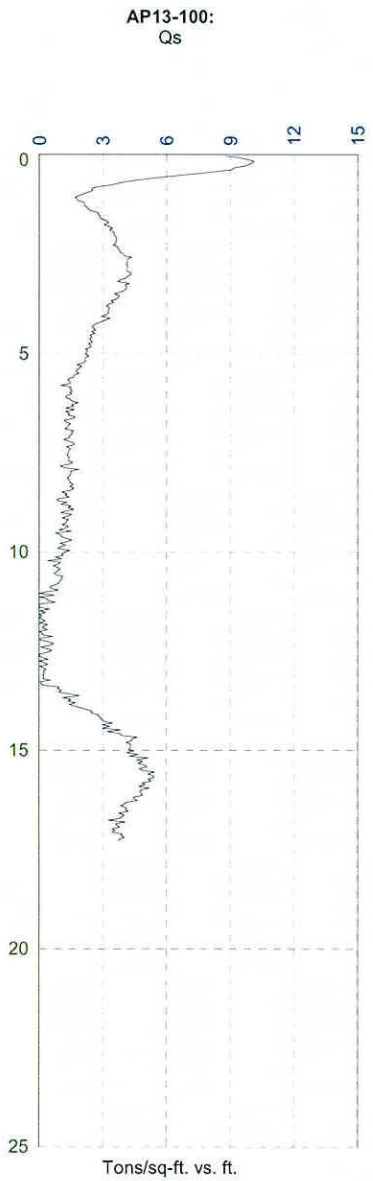

AP13-099:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

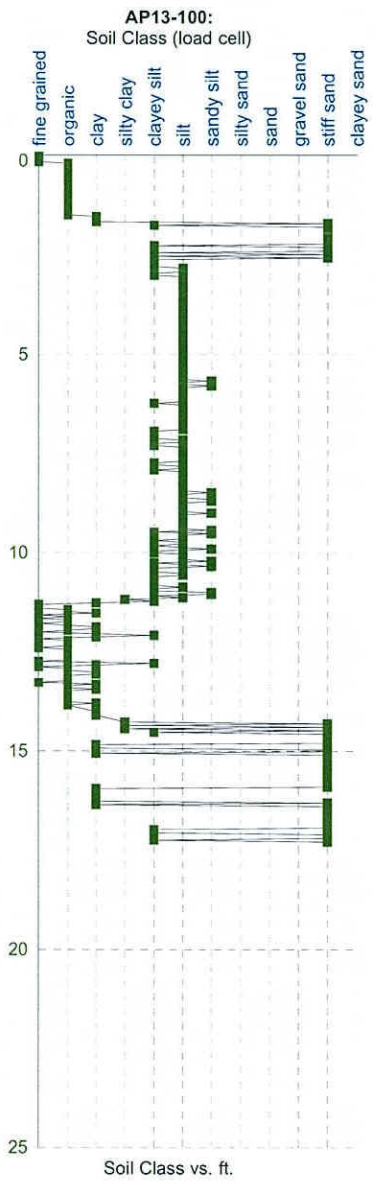

AP13-099:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

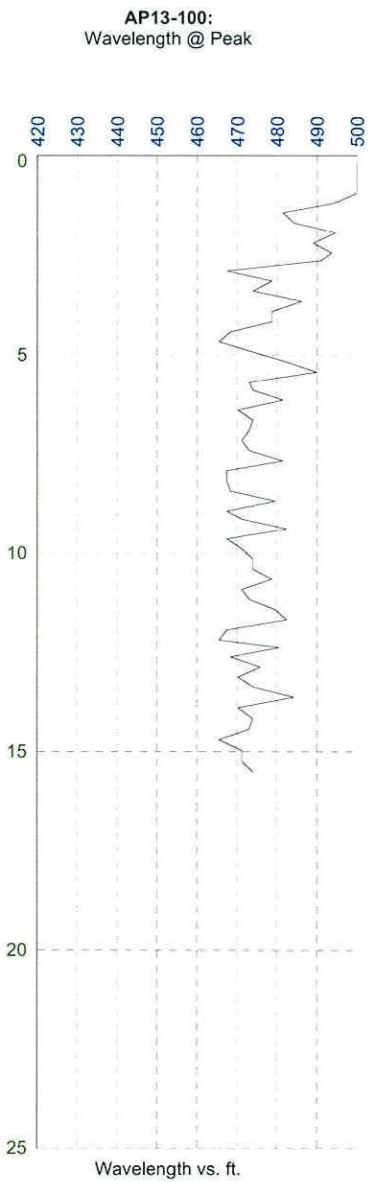

AP13-099:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

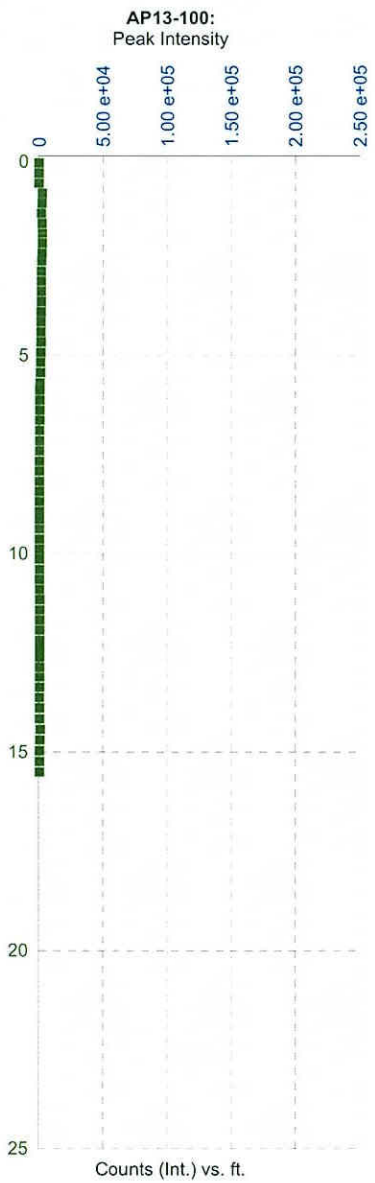

AP13-099:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

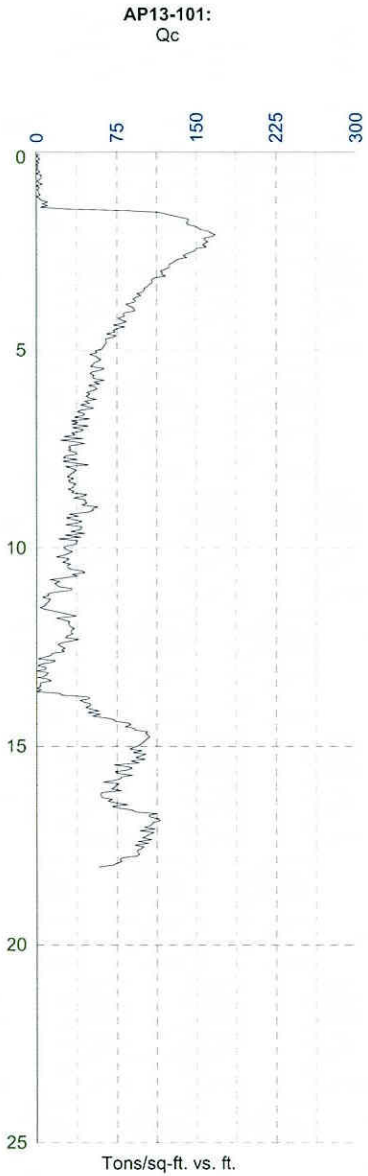

AP13-100:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

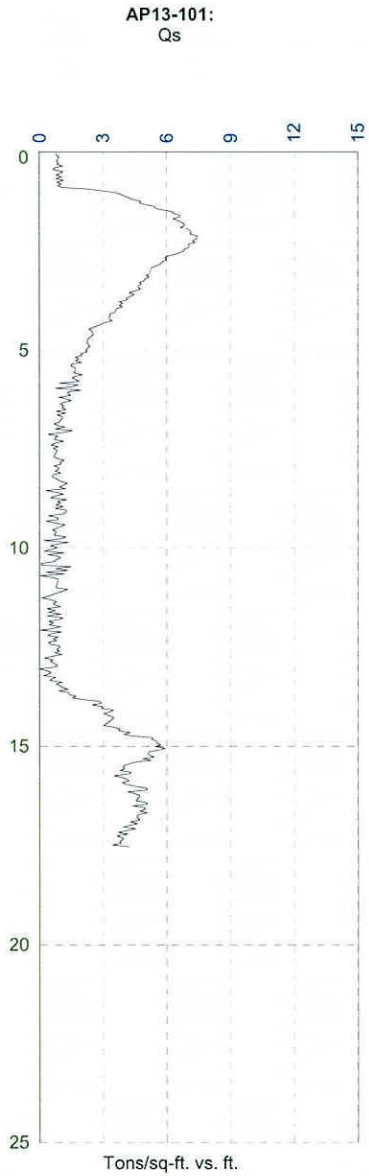

AP13-100:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

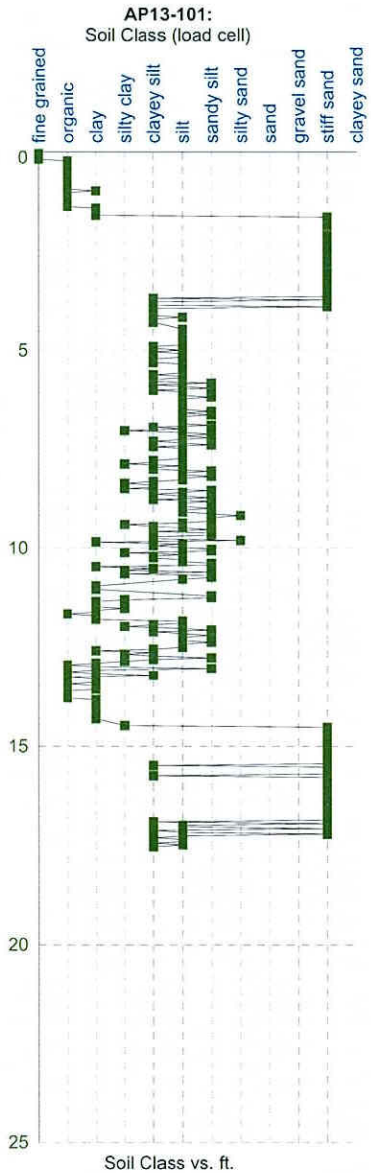

AP13-100:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

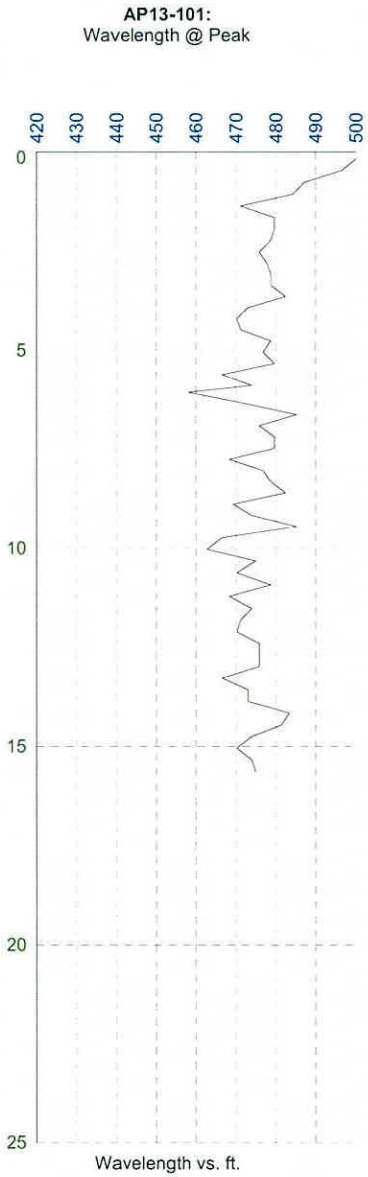

AP13-100:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

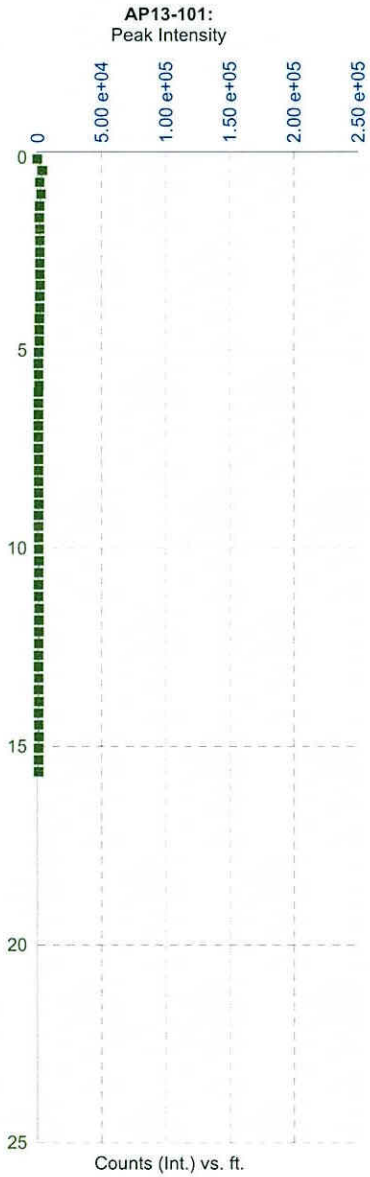

AP13-100:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

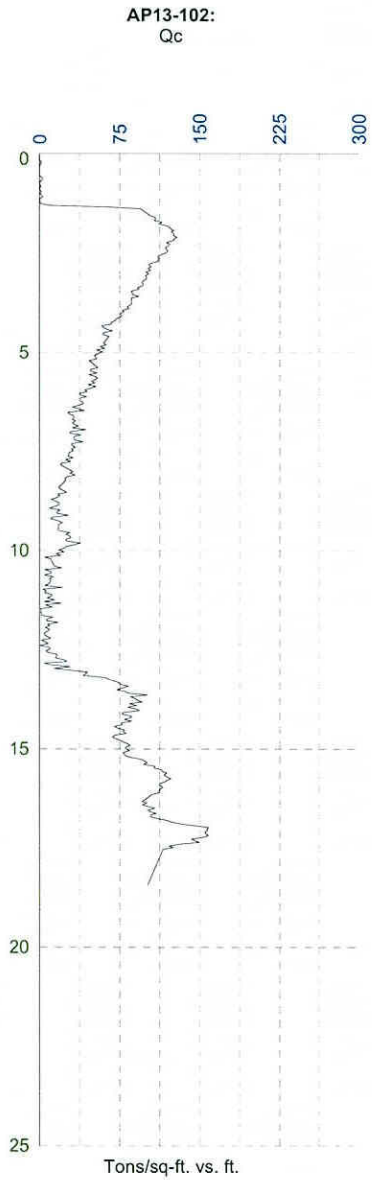

AP13-101:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

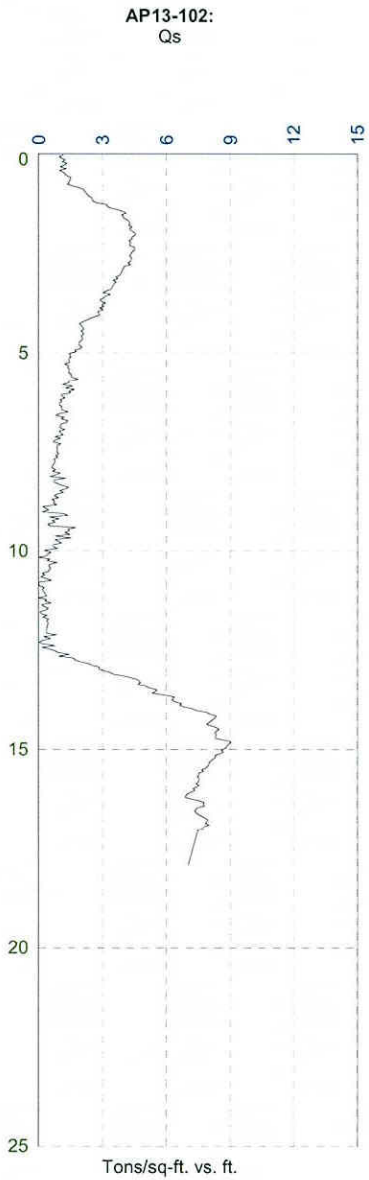

AP13-101:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

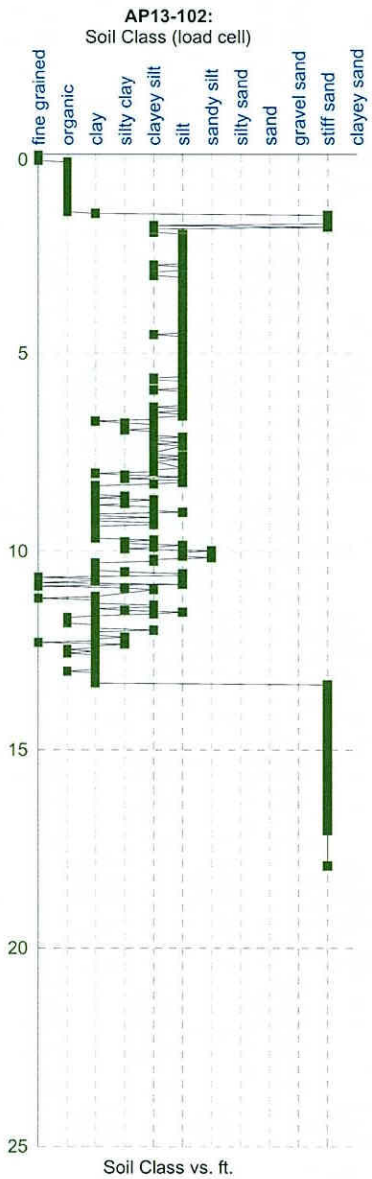

AP13-101:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

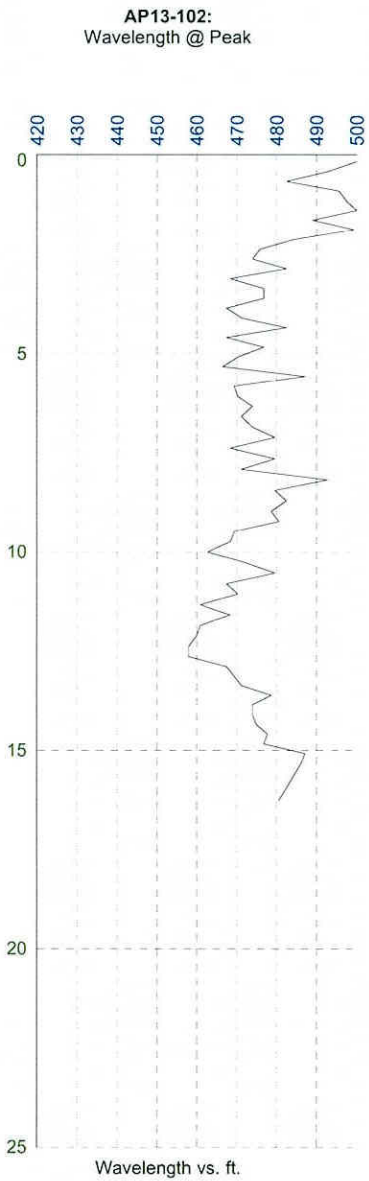

AP13-101:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

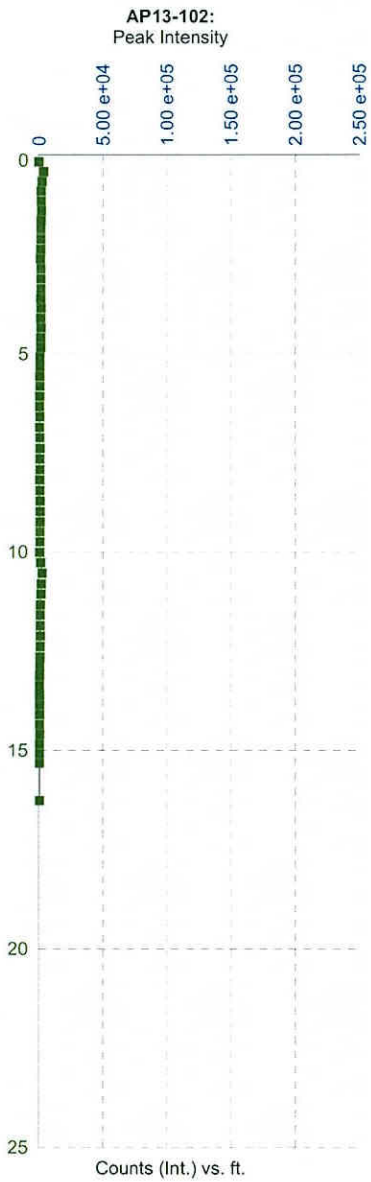

AP13-101:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

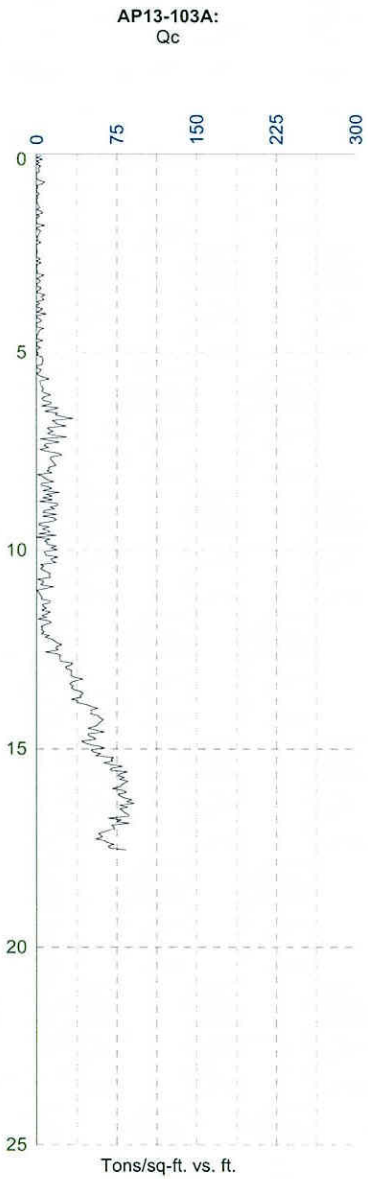

AP13-102:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

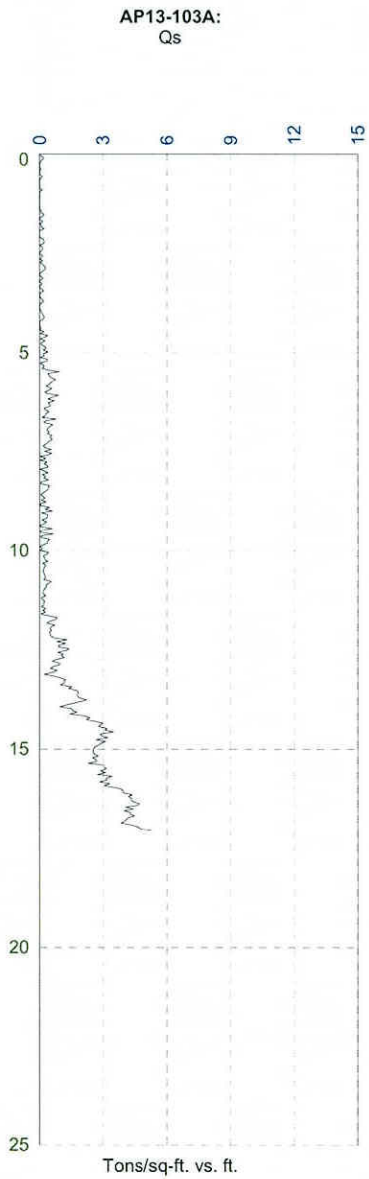

AP13-102:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

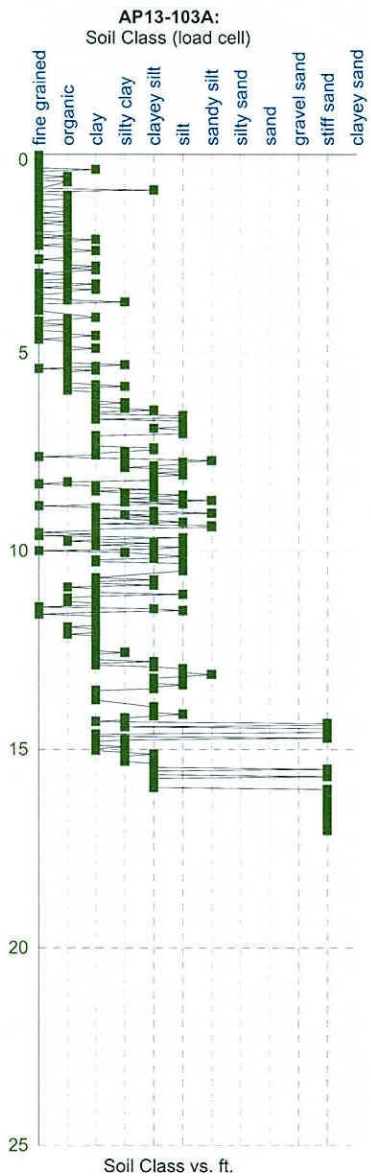

AP13-102:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

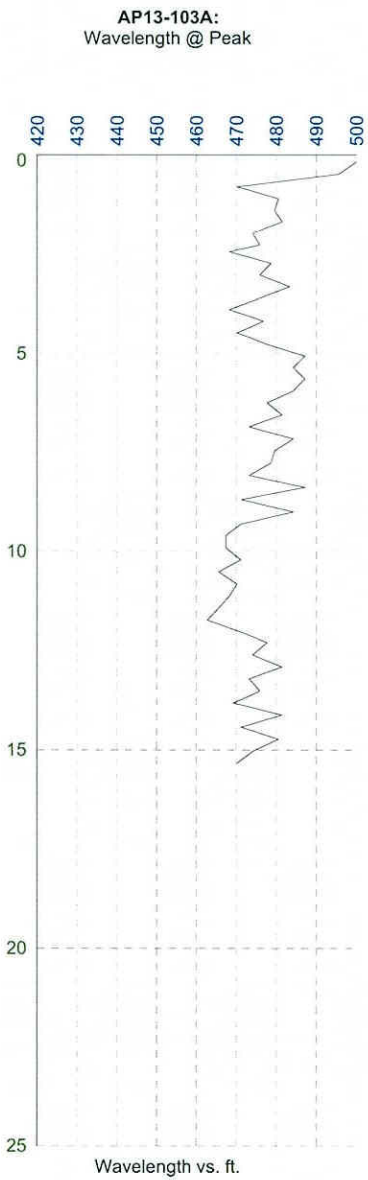

AP13-102:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

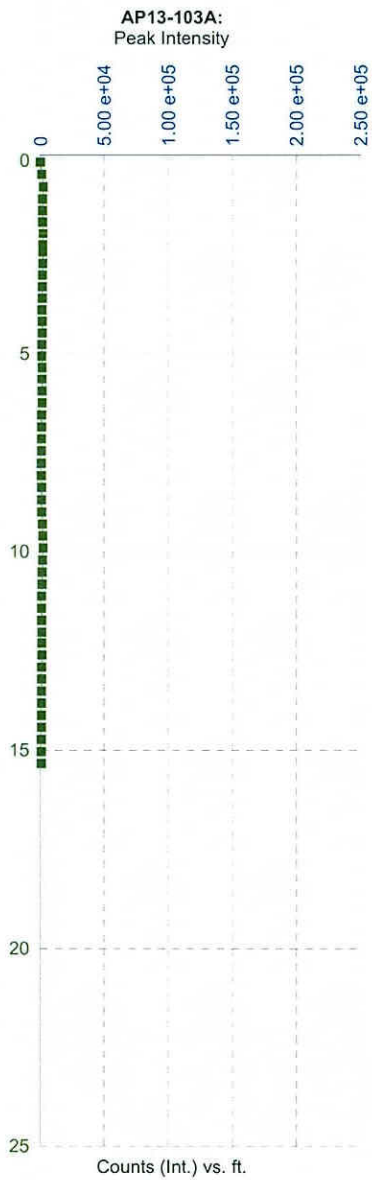

AP13-102:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

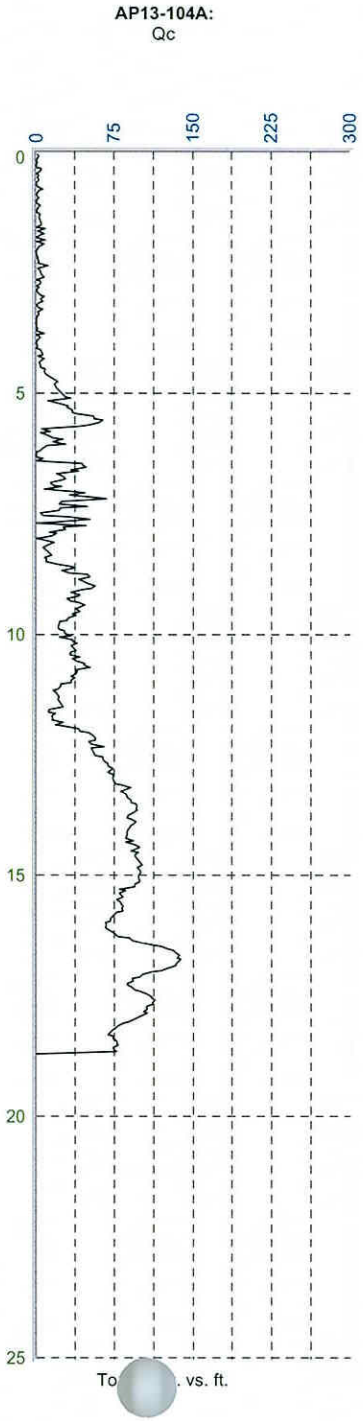

AP13-103A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

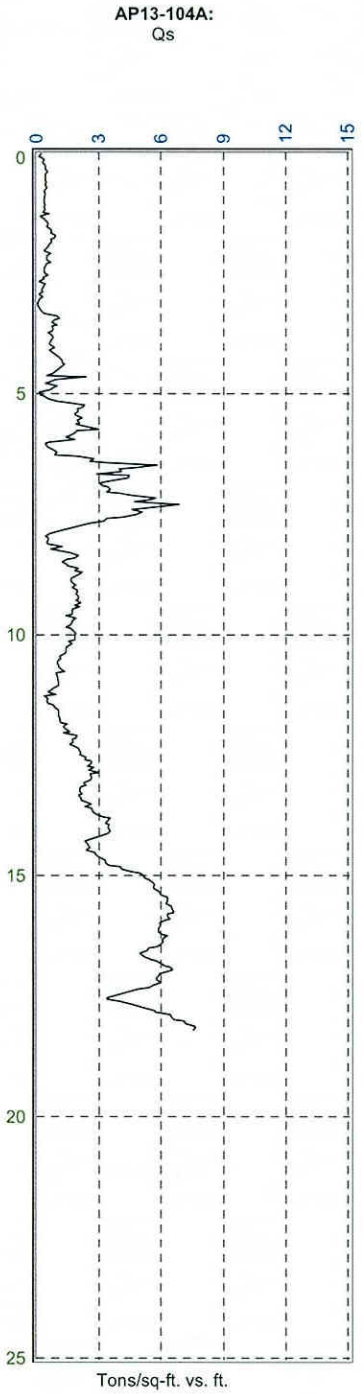

AP13-103A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

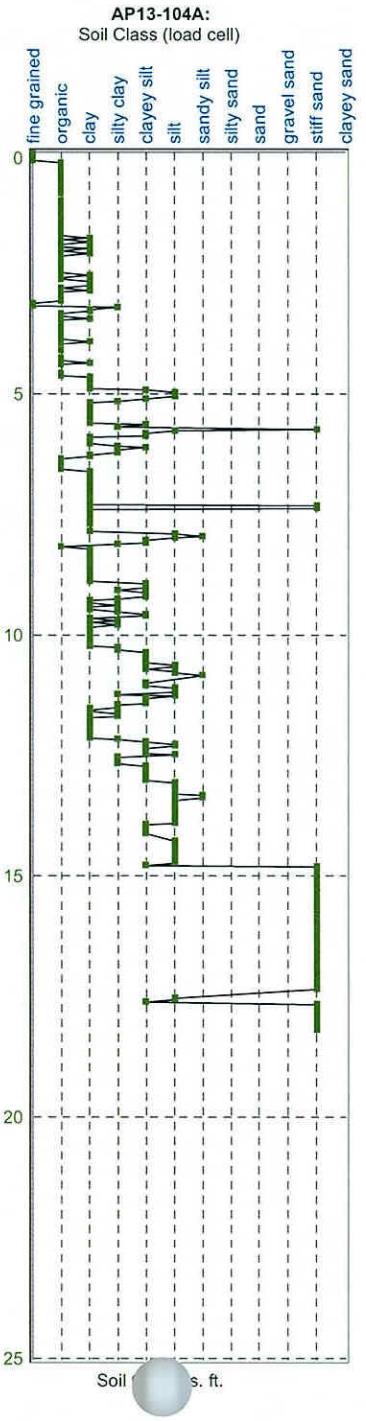

AP13-103A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

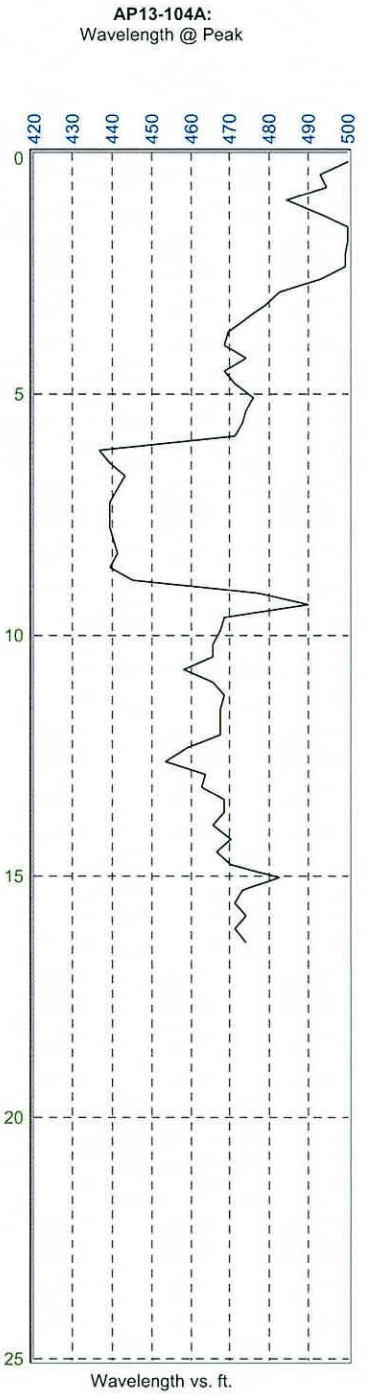

AP13-103A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

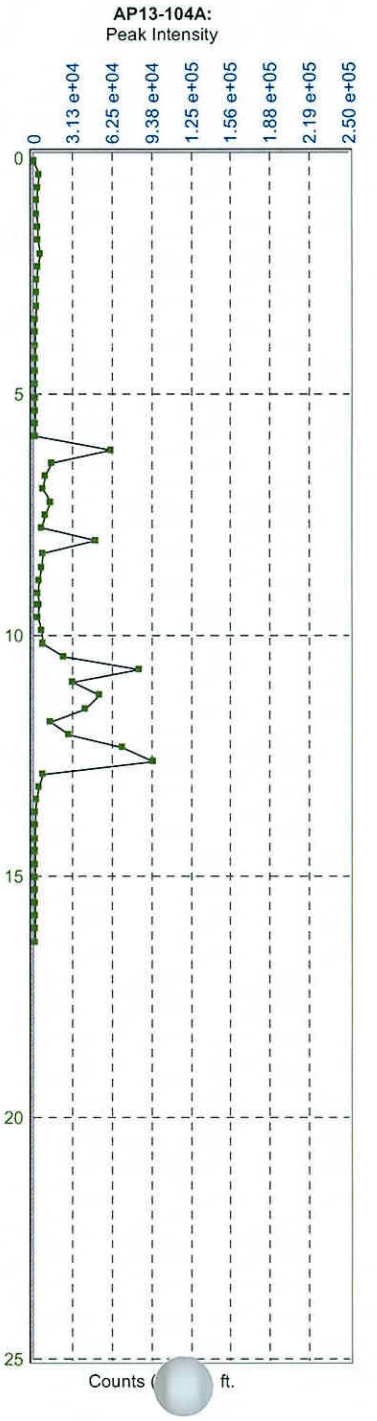

AP13-103A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

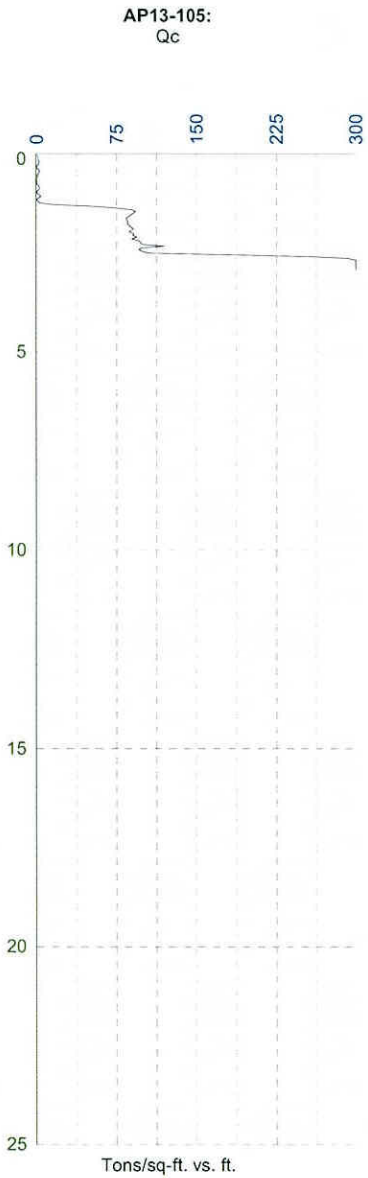

AP13-104A:
Qc
0
75
150
225
300
0
5
10
15
20
25
To . vs. ft.

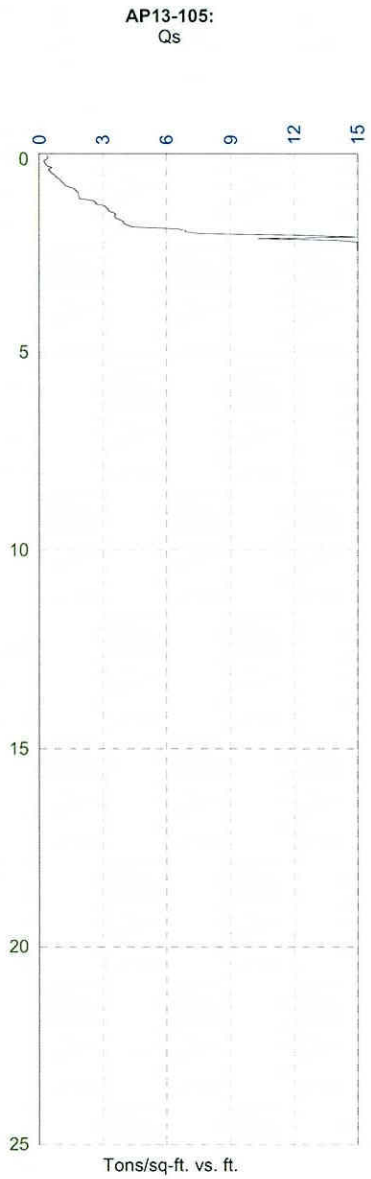

AP13-104A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

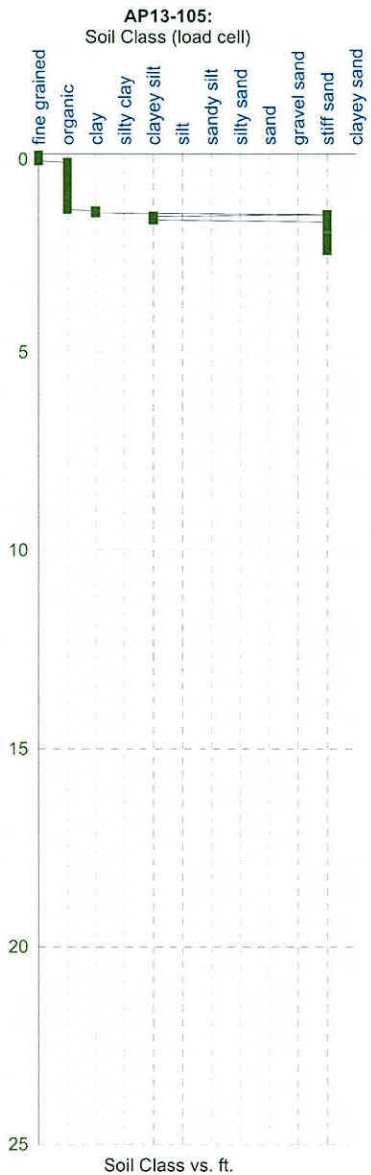

AP13-104A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil s. ft.

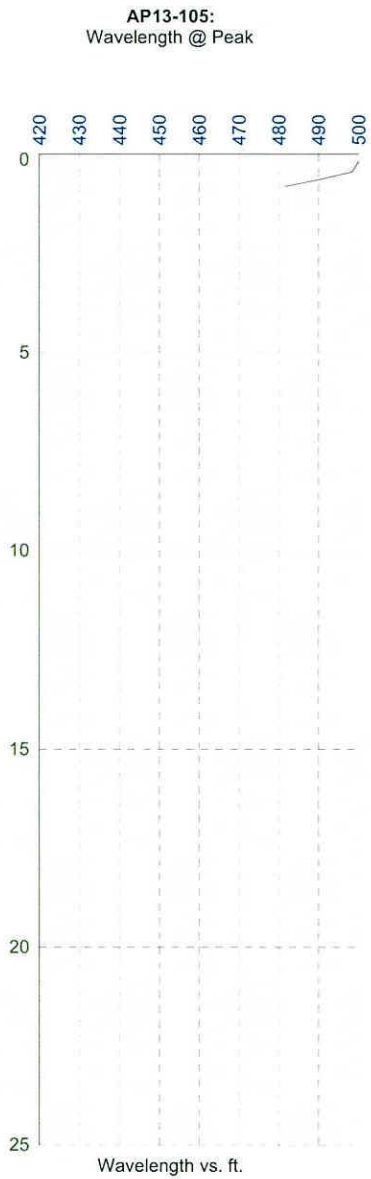

AP13-104A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

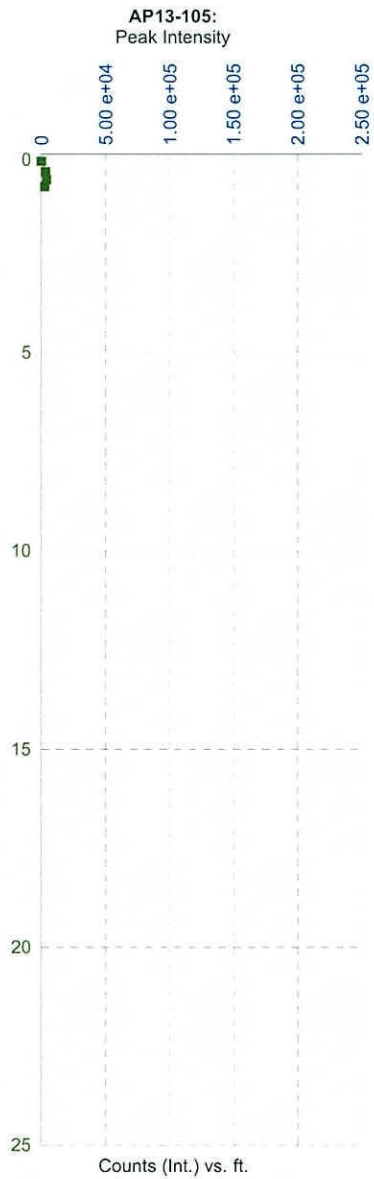

AP13-104A:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts ( ft.

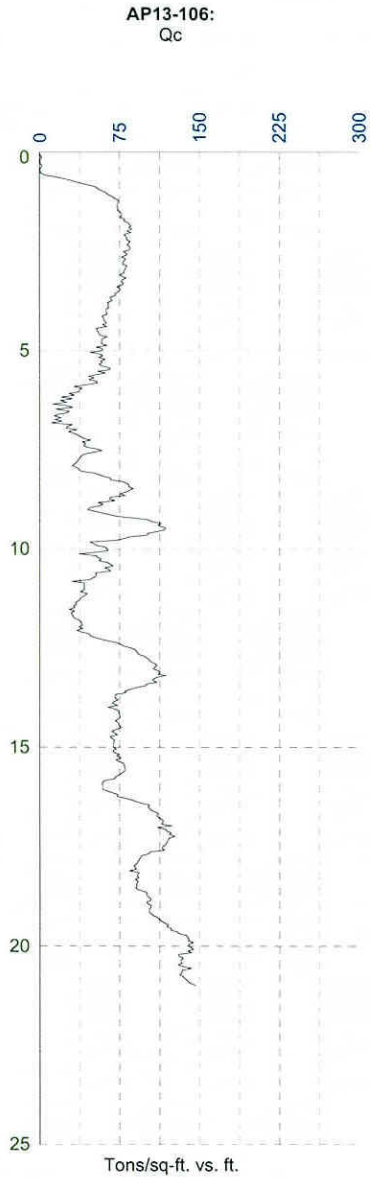

AP13-105:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

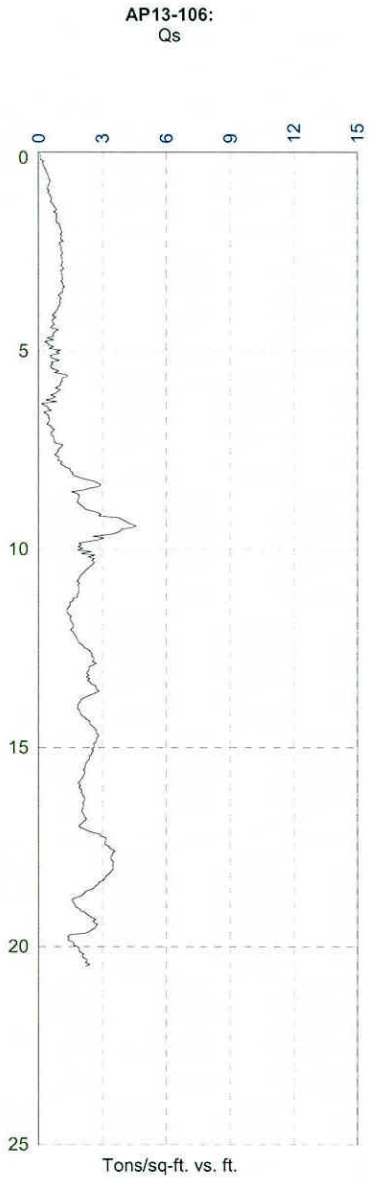

AP13-105:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

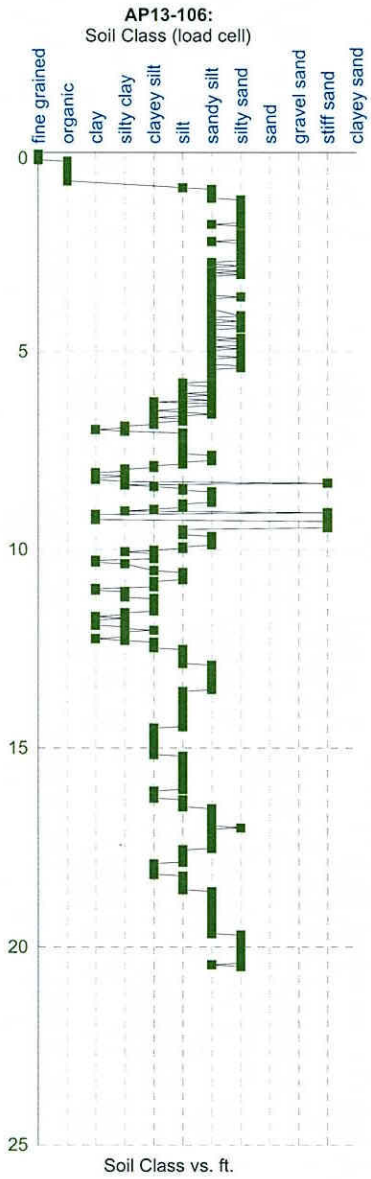

AP13-105:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

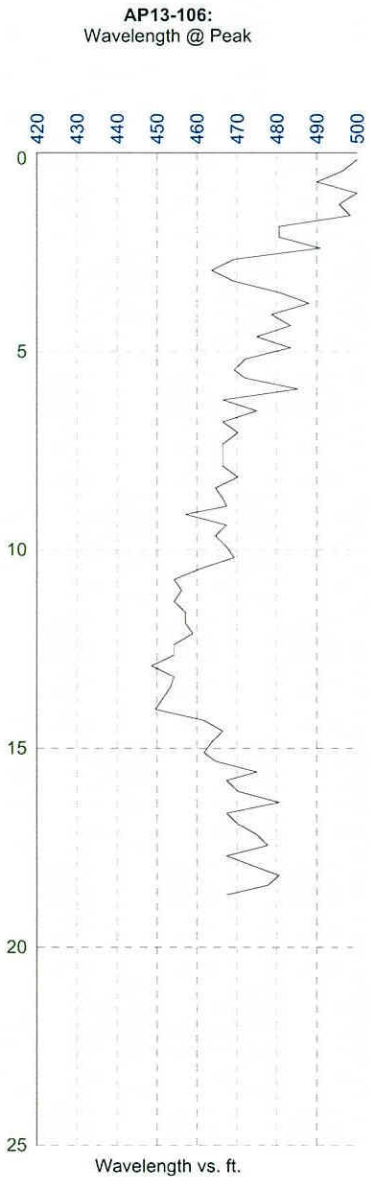

AP13-105:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

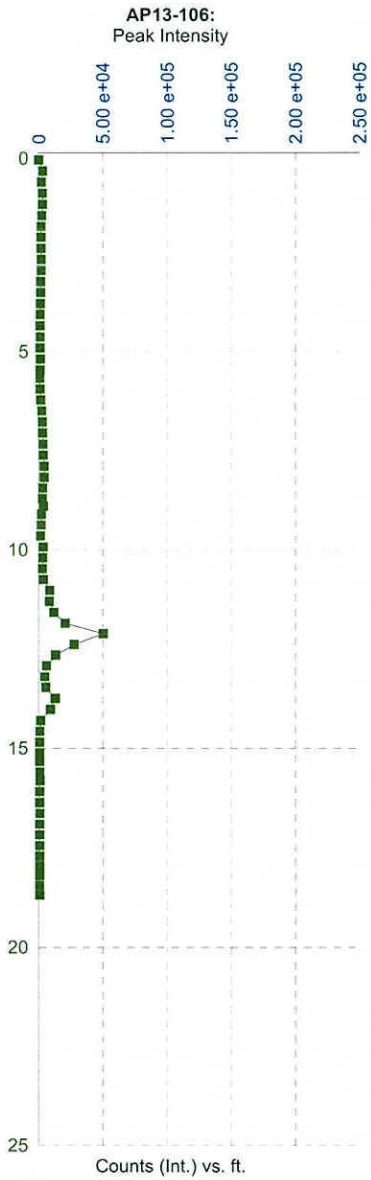

AP13-105:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

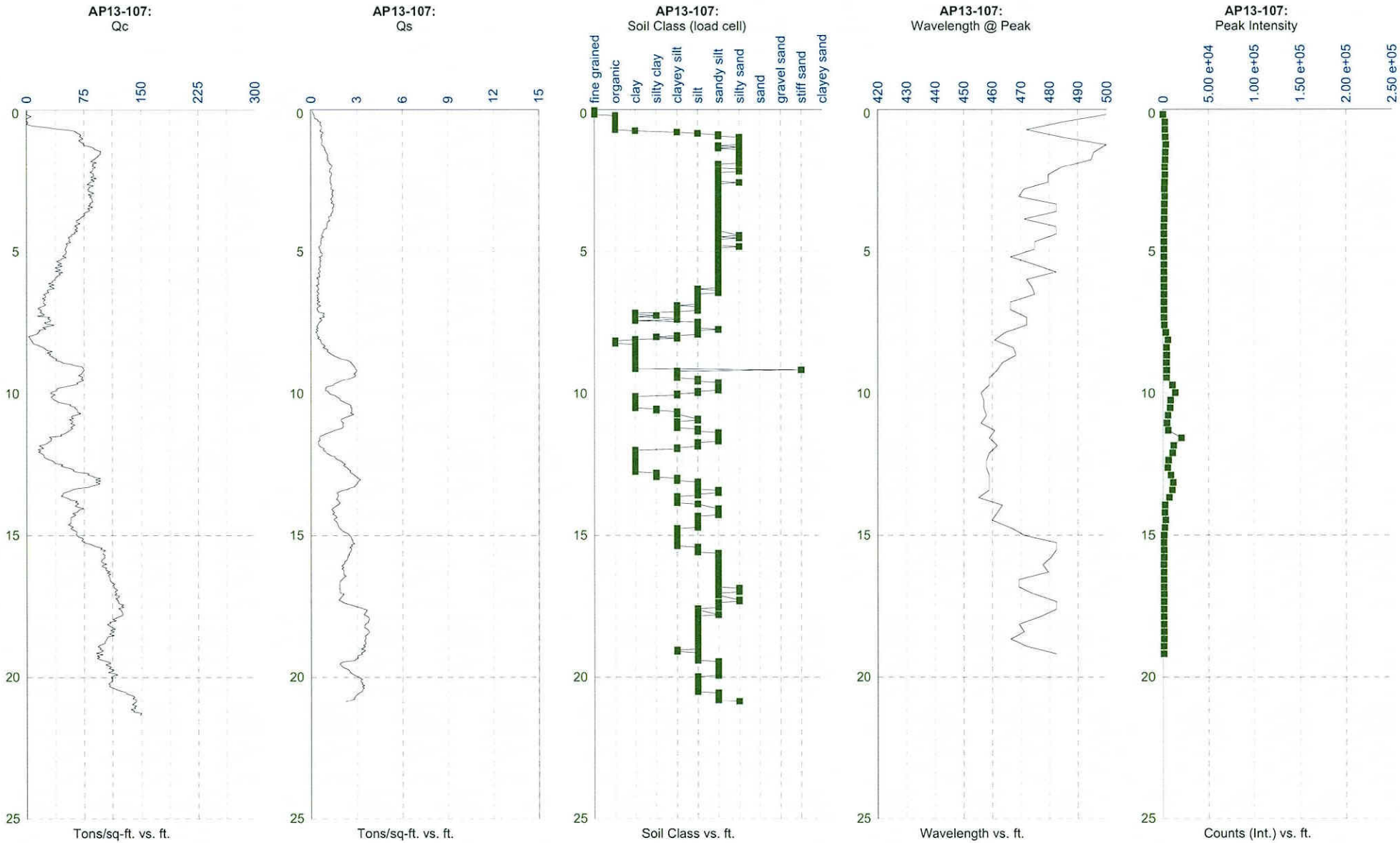

AP13-106:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

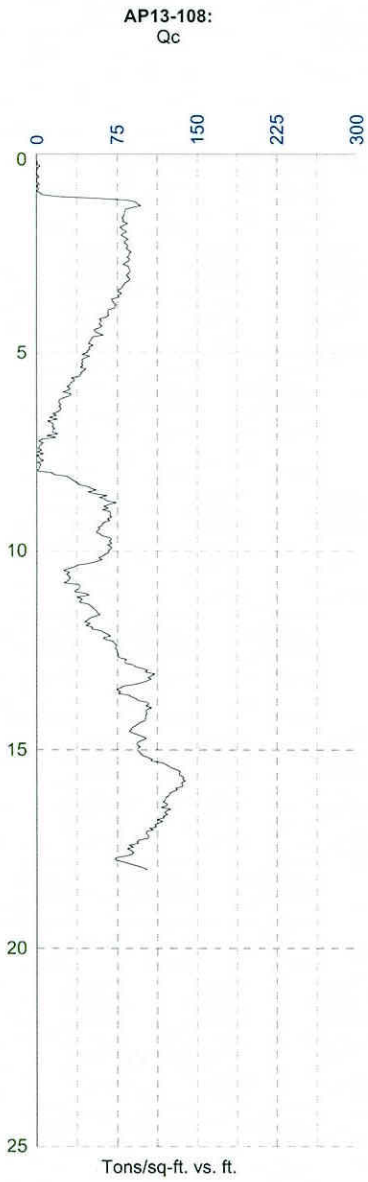

AP13-106:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

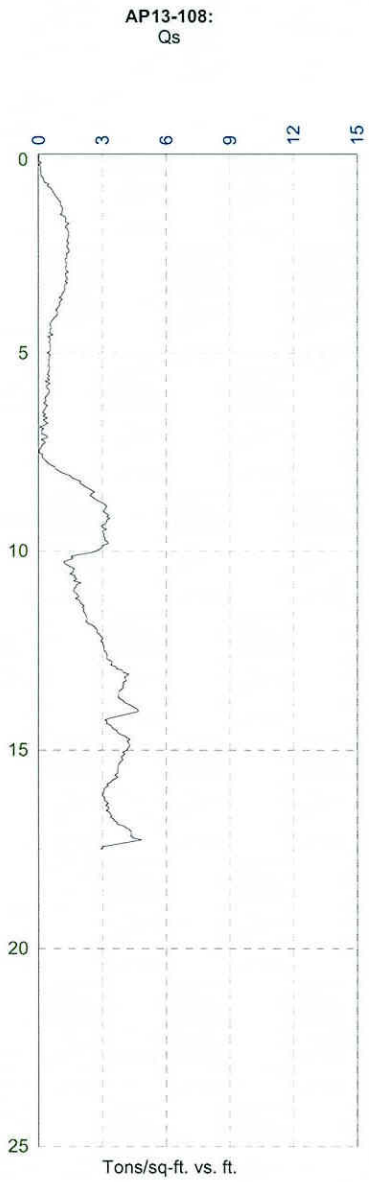

AP13-106:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

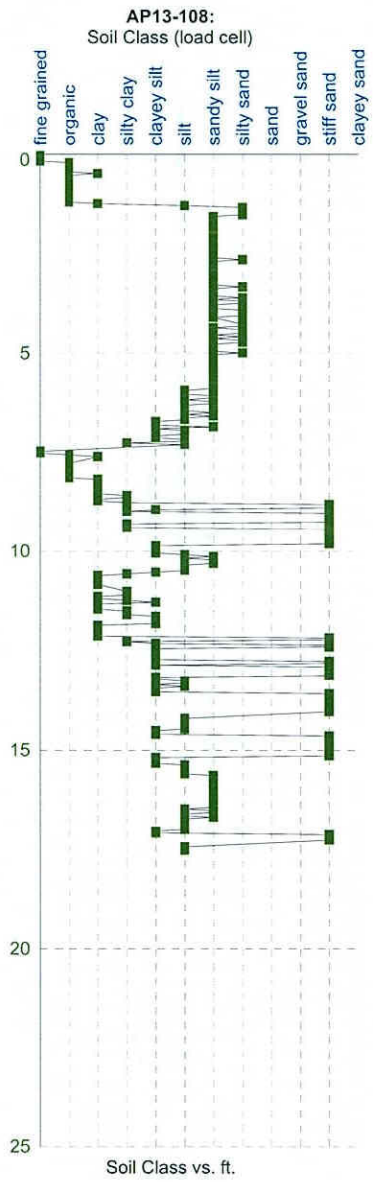

AP13-106:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

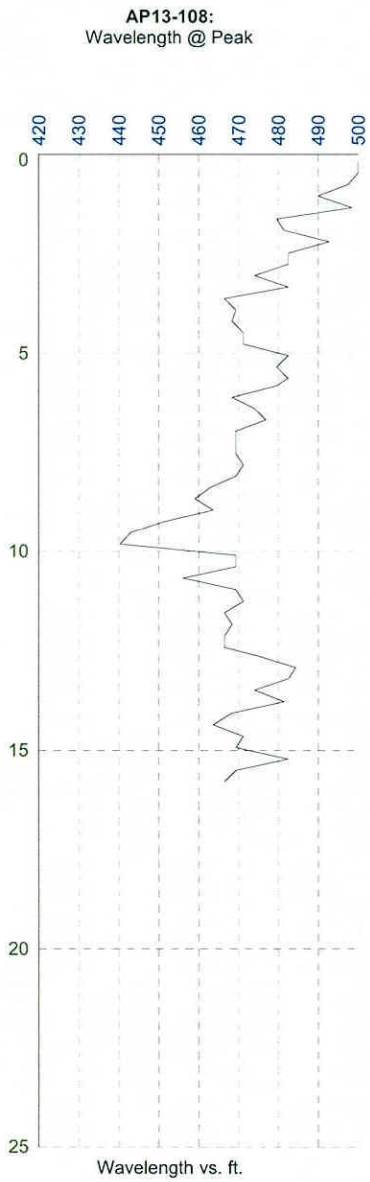

AP13-106:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

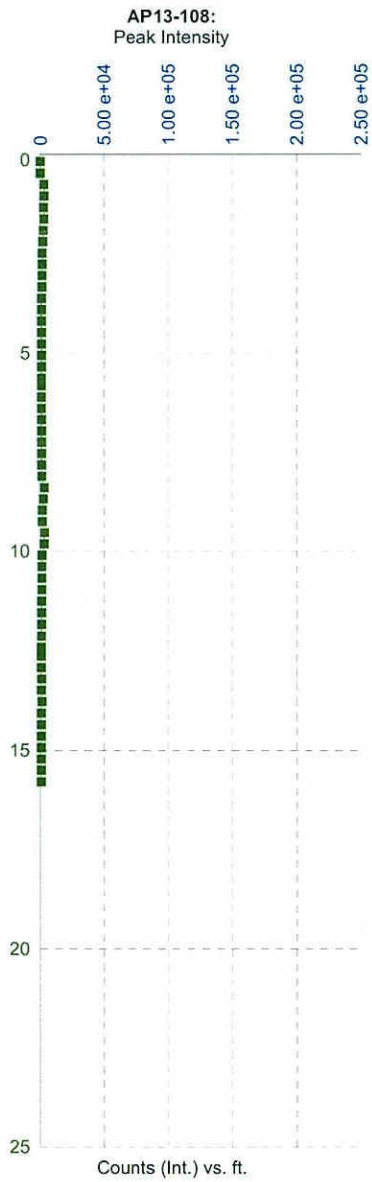

AP13-107:
Qc
0
75
150
225
300
Tons/sq-ft. vs. ft.
AP13-107:
Qs
0
3
6
9
12
15
Tons/sq-ft. vs. ft.
AP13-107:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
Soil Class vs. ft.
AP13-107:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
Wavelength vs. ft.
AP13-107:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
Counts (Int.) vs. ft.
0
5
10
15
20
25

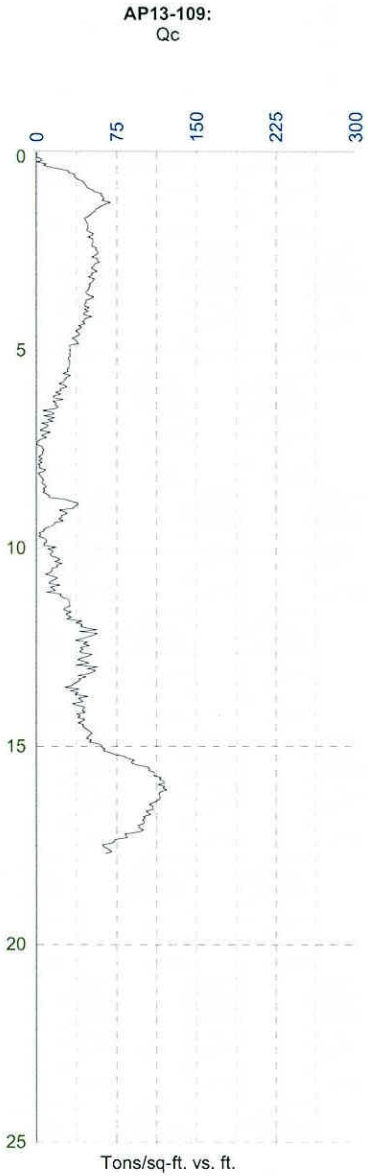

AP13-108:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

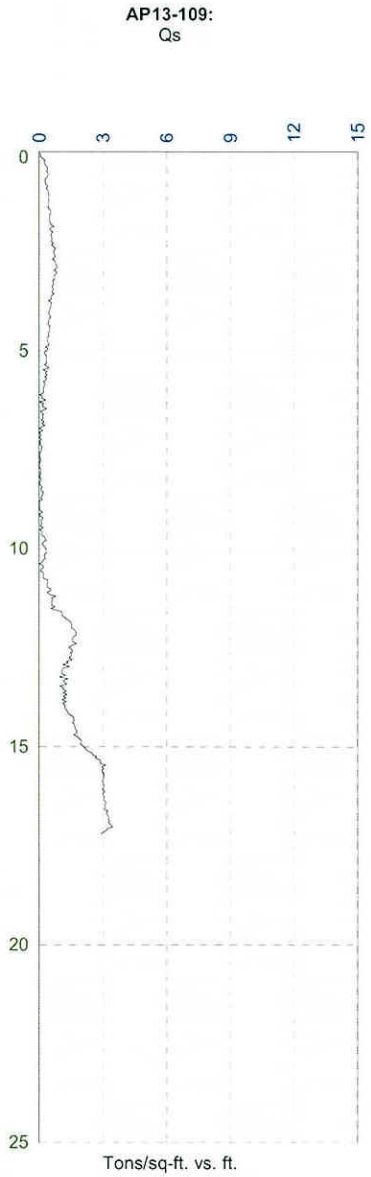

AP13-108:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

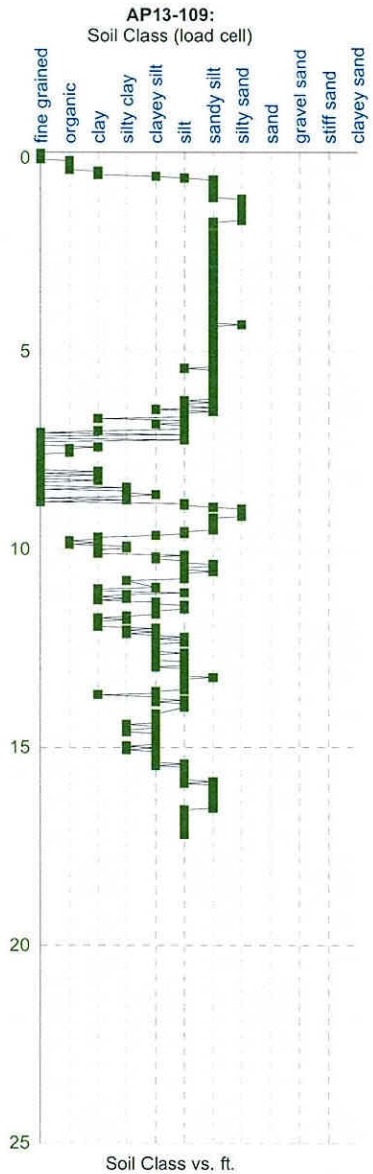

AP13-108:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

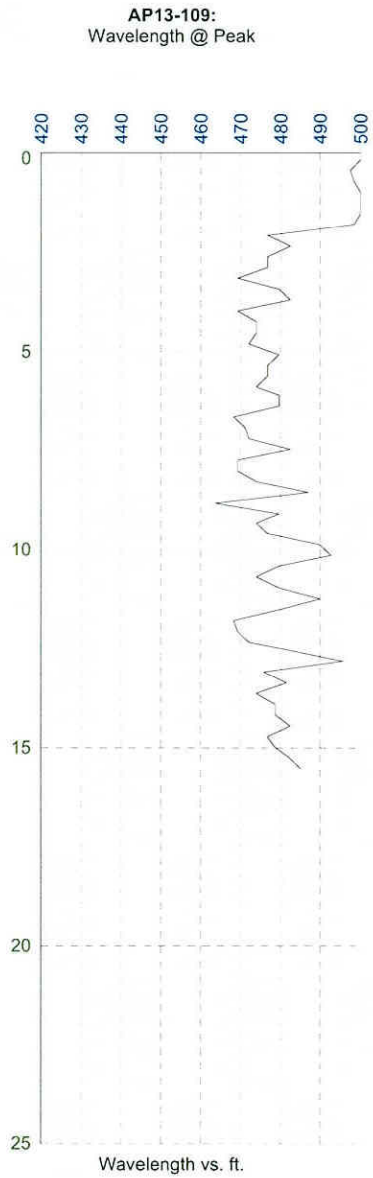

AP13-108:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

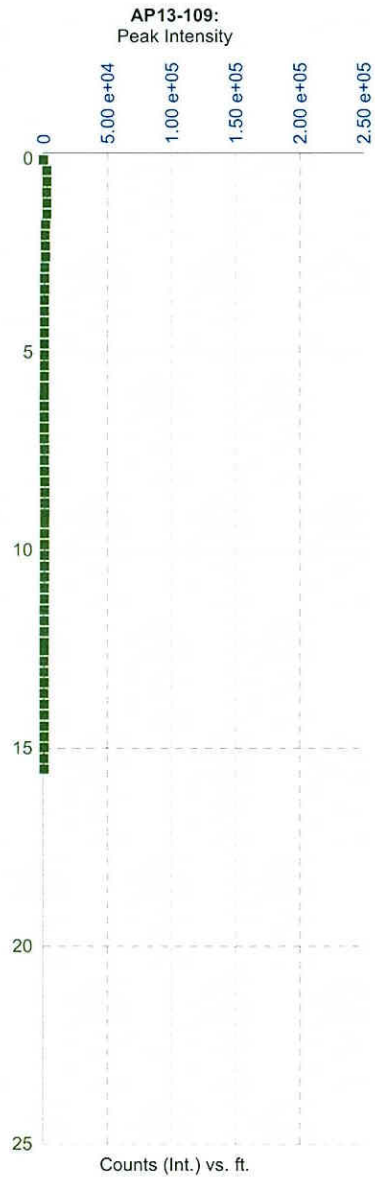

AP13-108:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

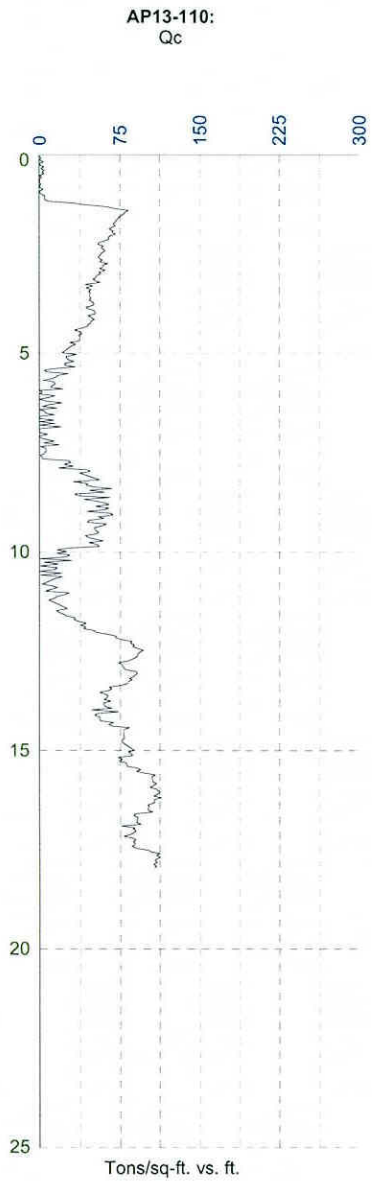

AP13-109:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

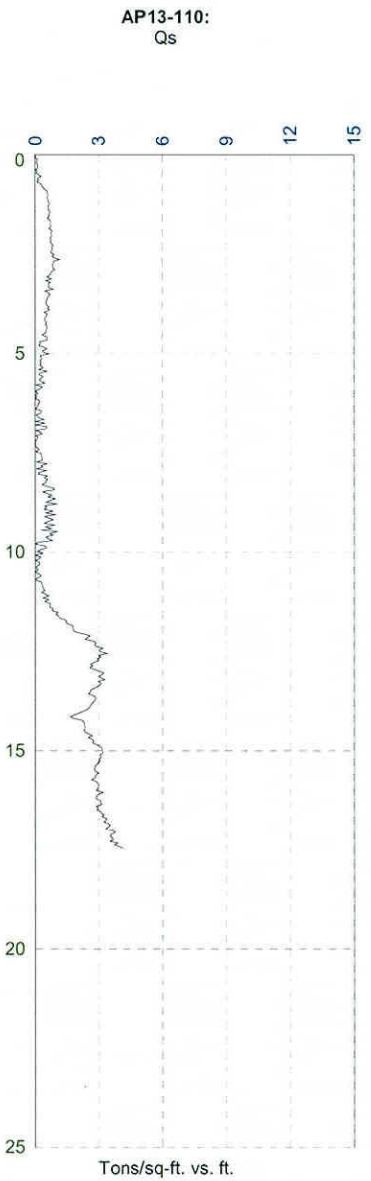

AP13-109:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

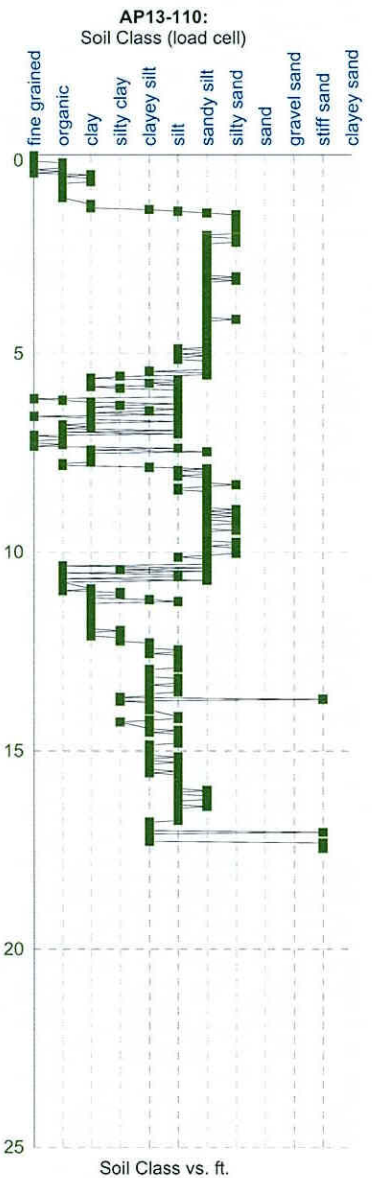

AP13-109:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

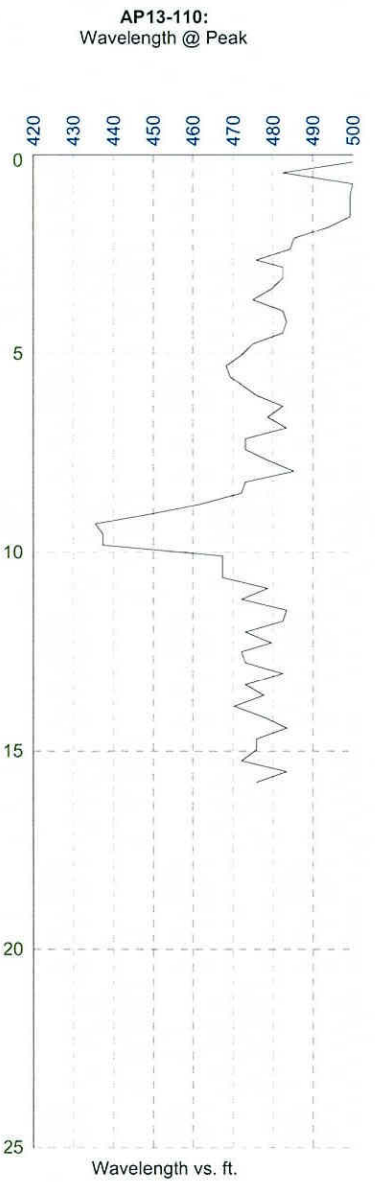

AP13-109:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

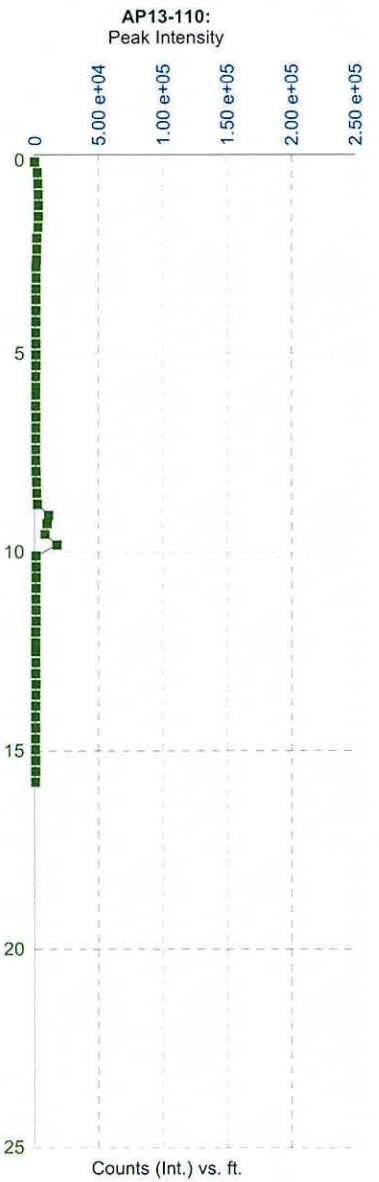

AP13-109:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

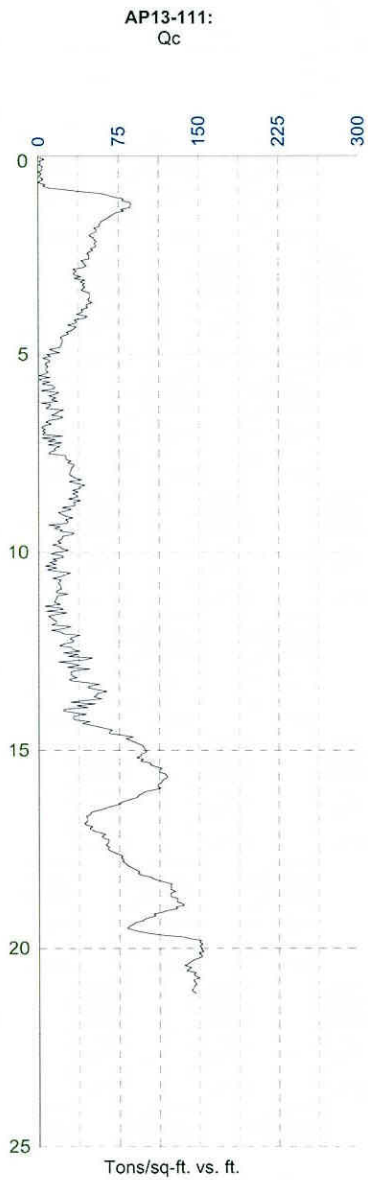

AP13-110:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

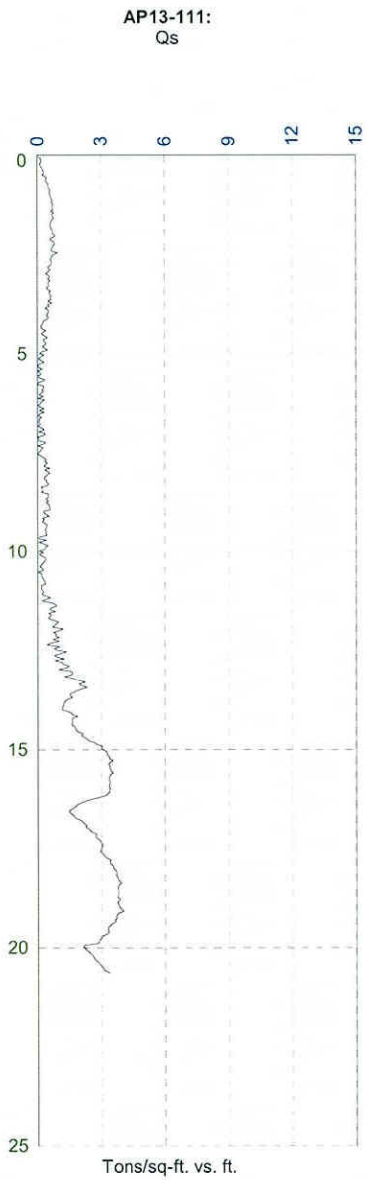

AP13-110:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

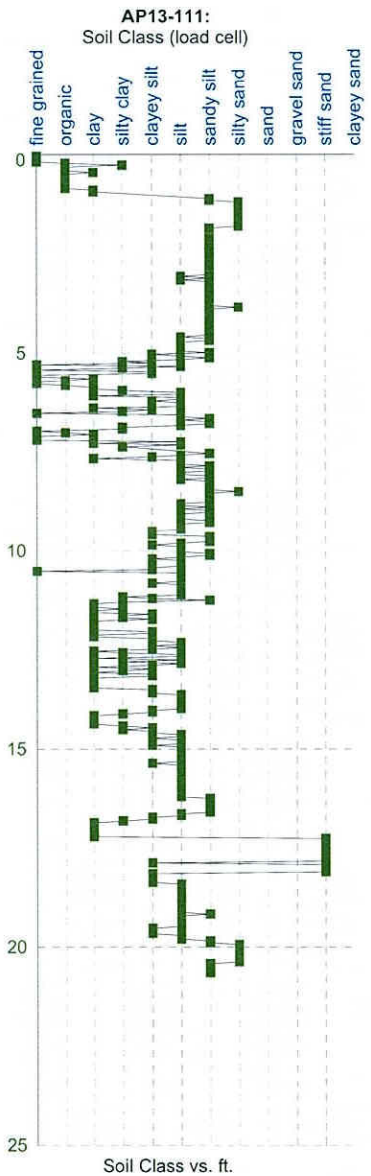

AP13-110:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

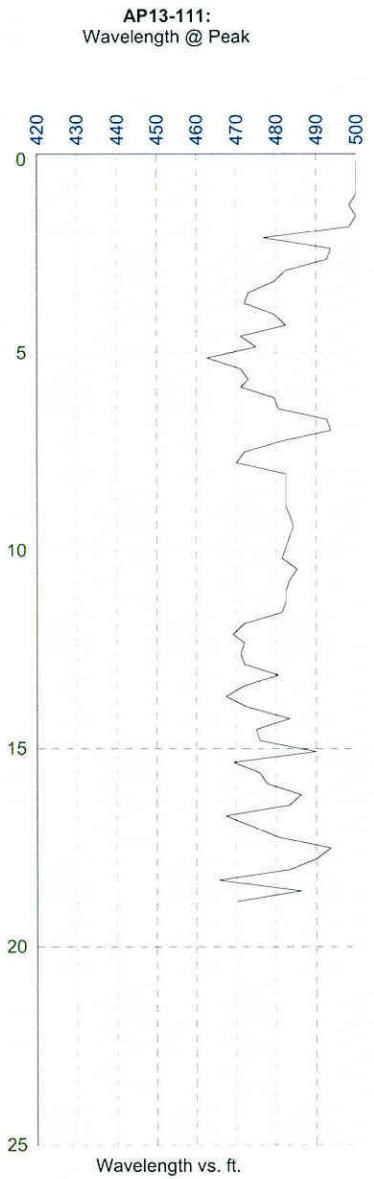

AP13-110:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

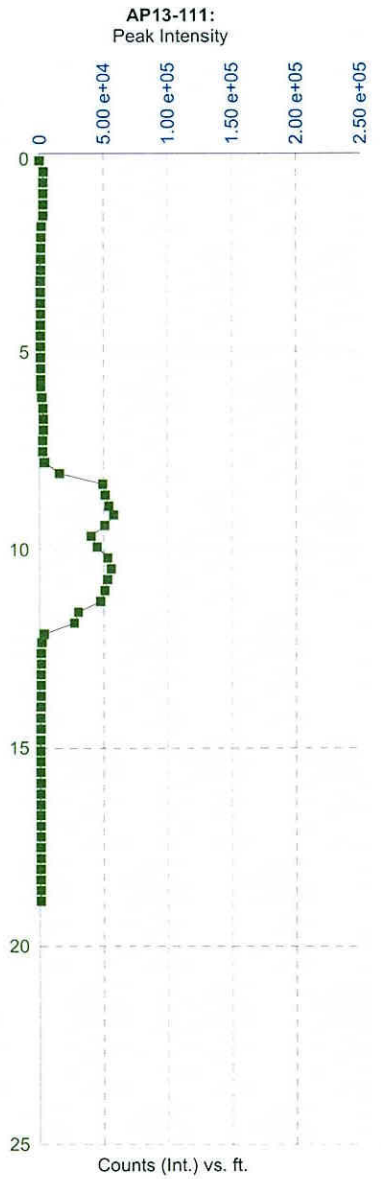

AP13-110:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

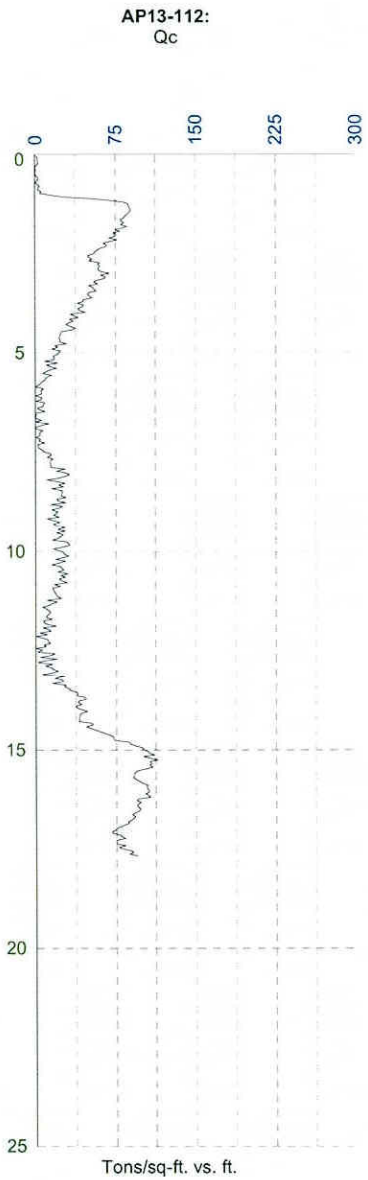

AP13-111:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

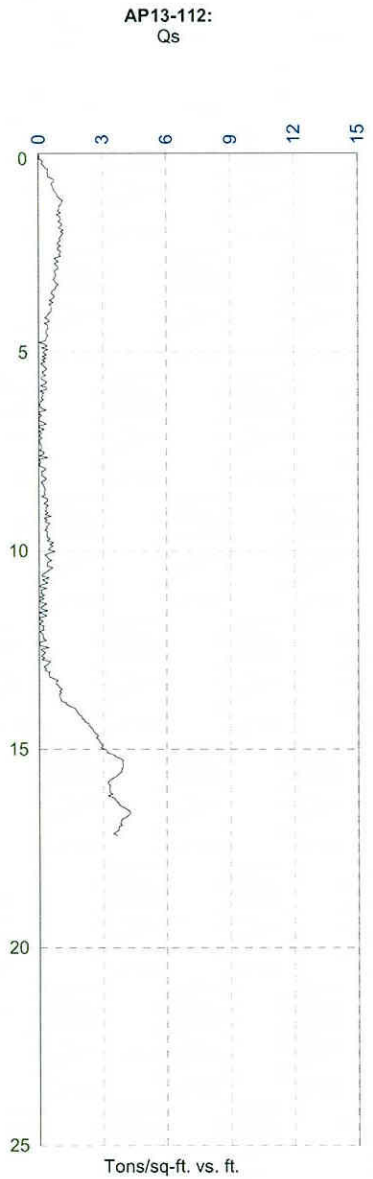

AP13-111:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

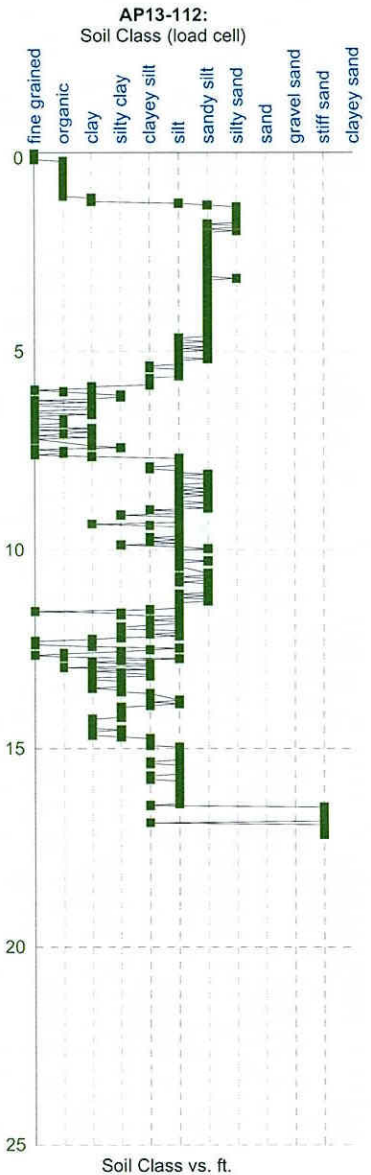

AP13-111:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

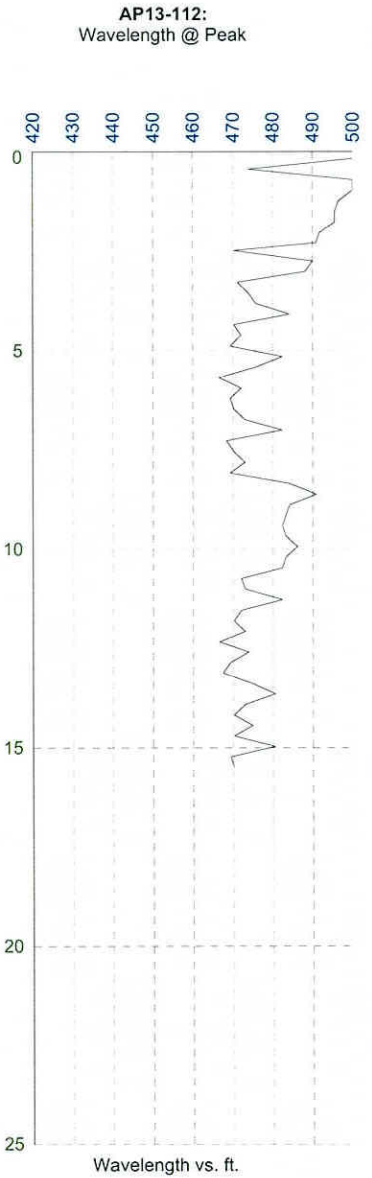

AP13-111:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

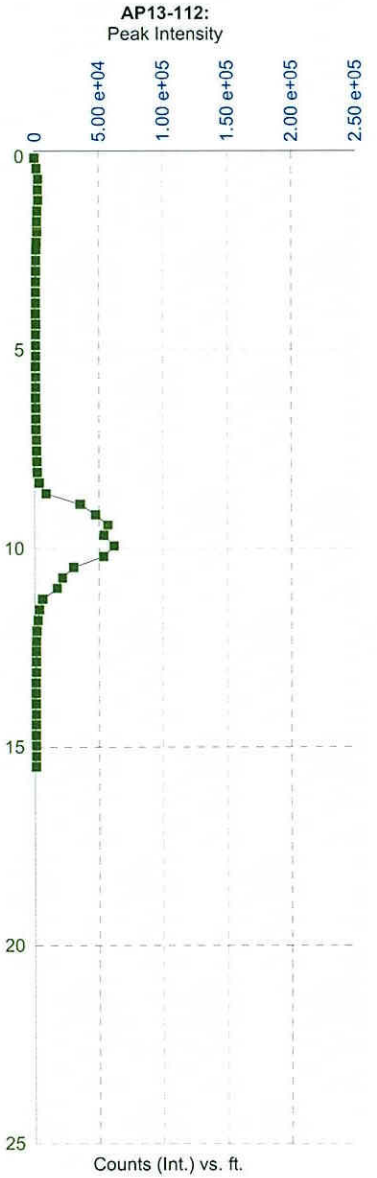

AP13-111:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

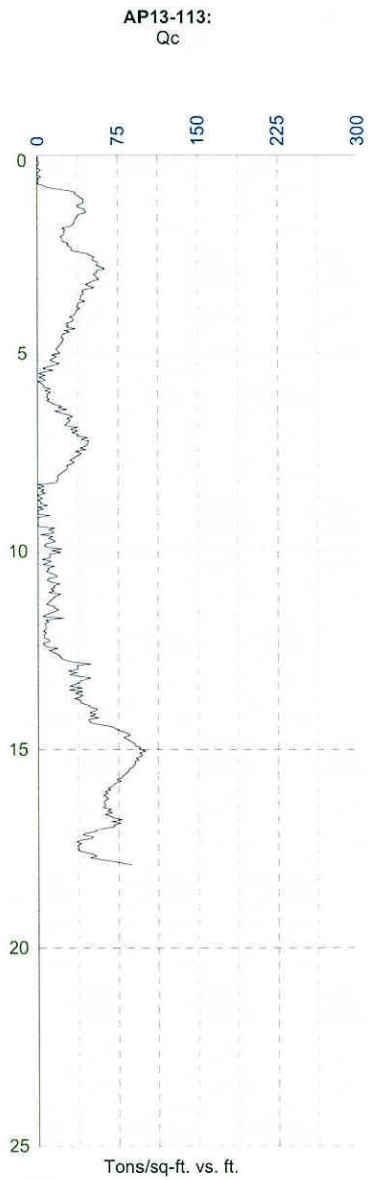

AP13-112:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

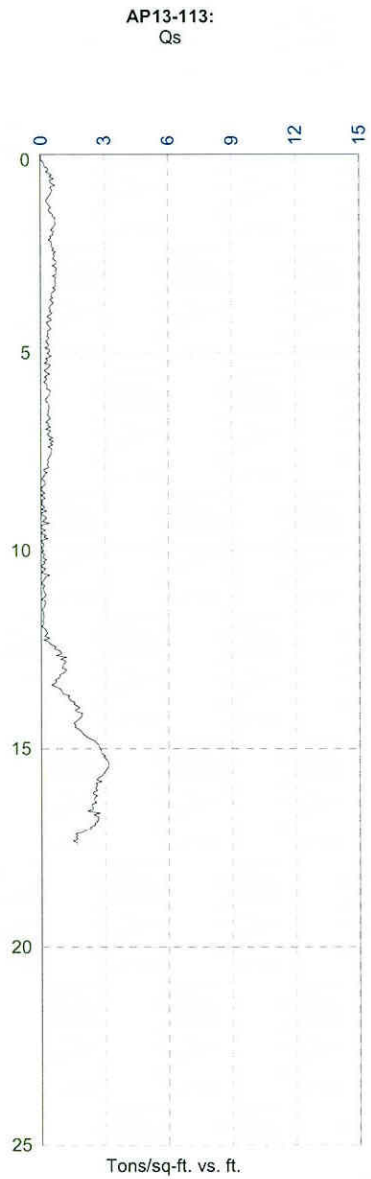

AP13-112:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

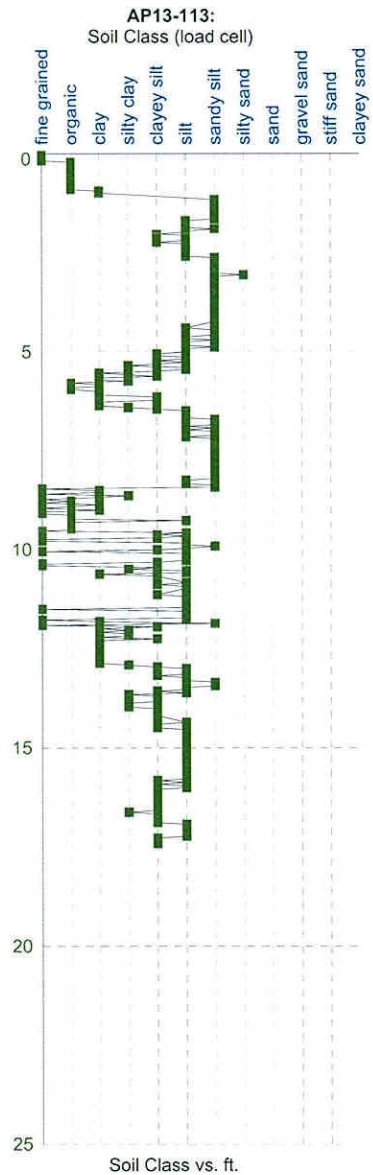

AP13-112:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

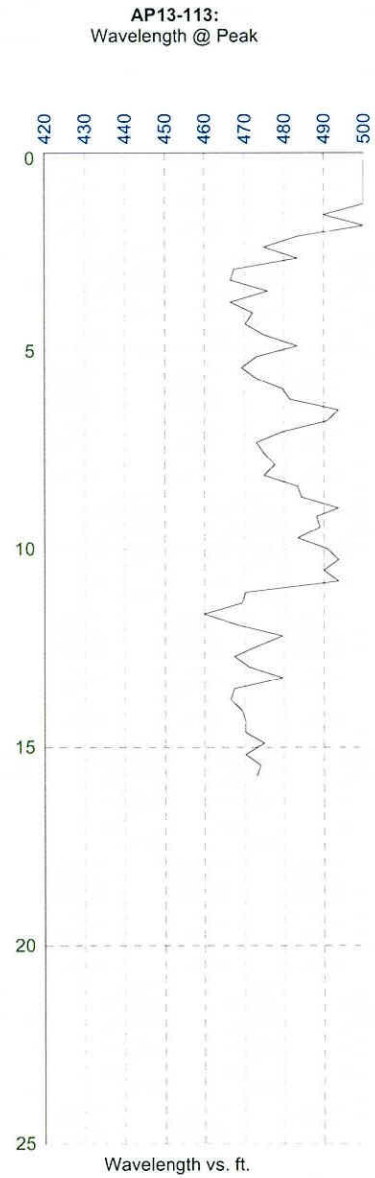

AP13-112:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

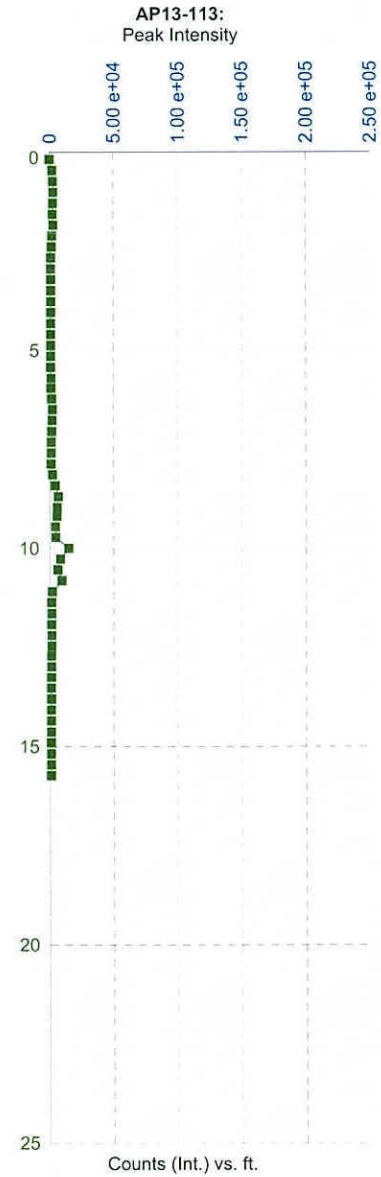

AP13-112:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

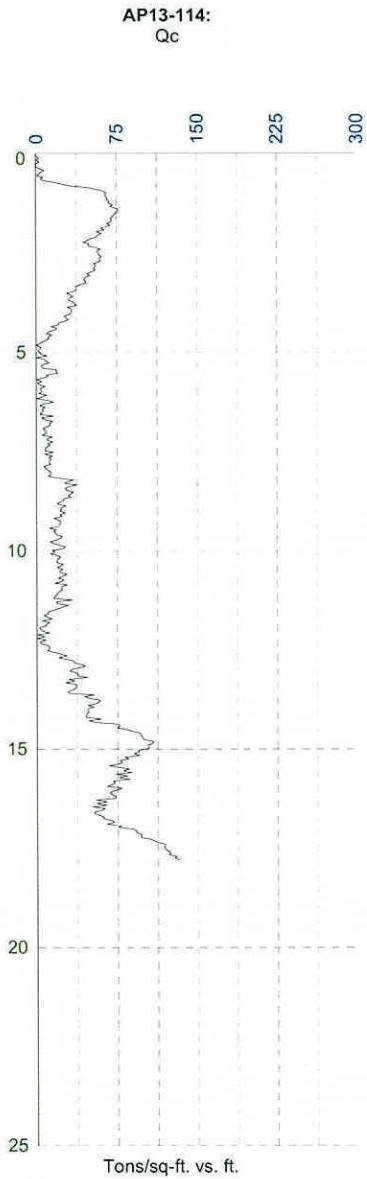

AP13-113:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

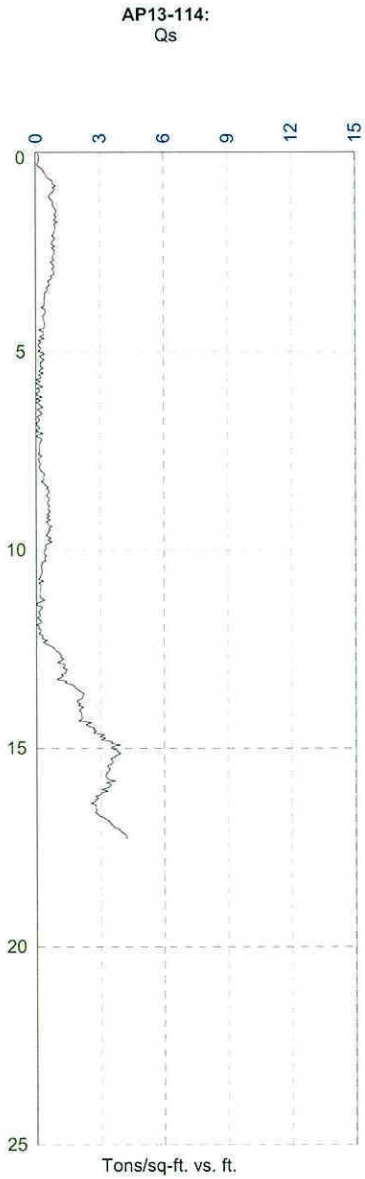

AP13-113:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

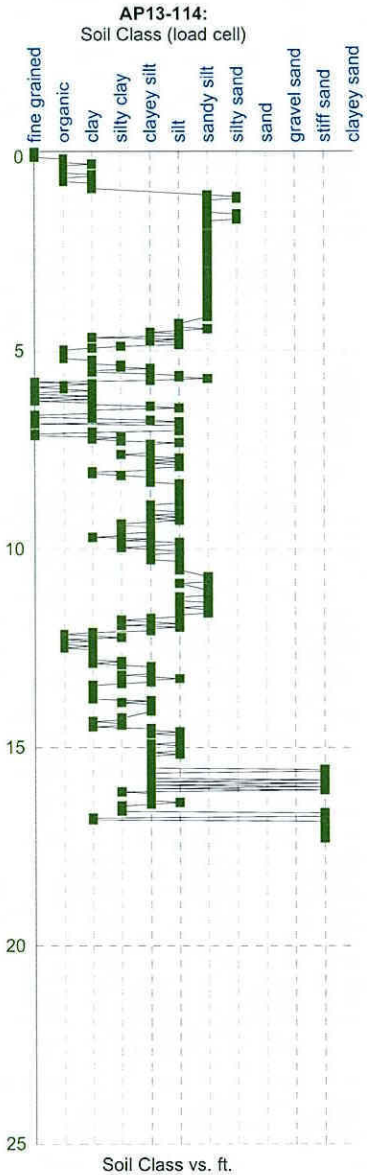

AP13-113:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

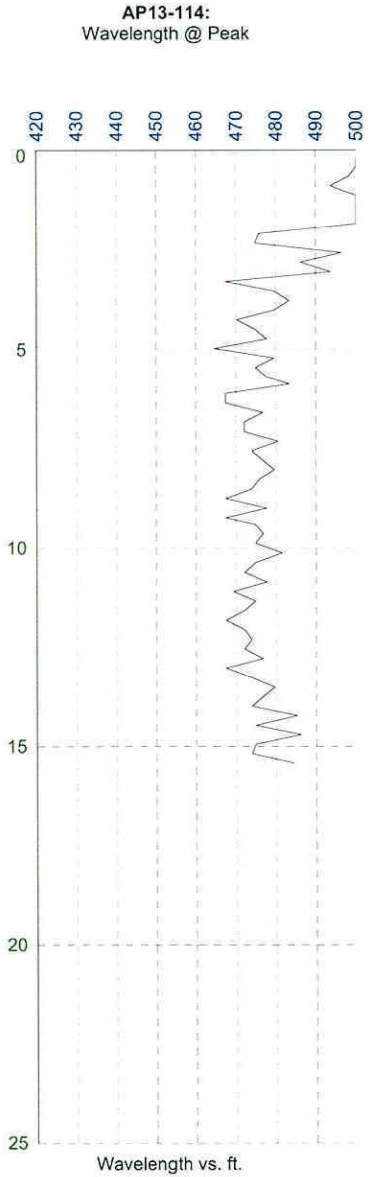

AP13-113:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

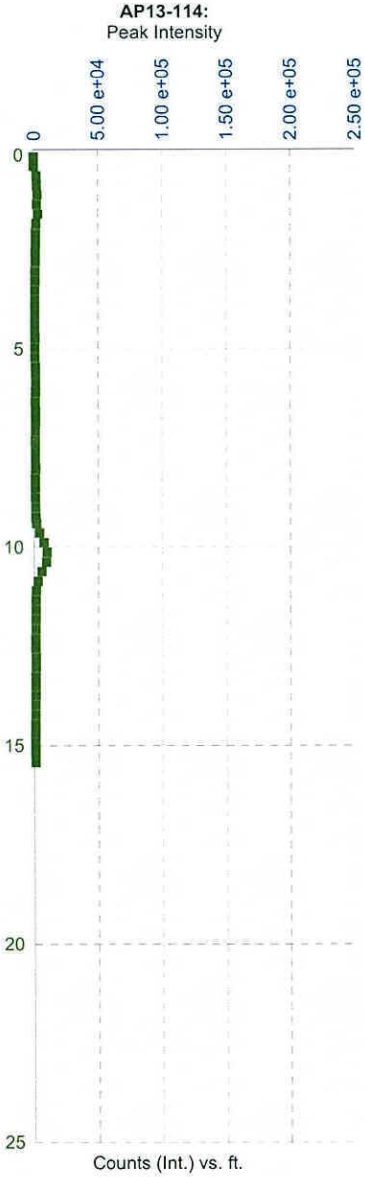

AP13-113:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

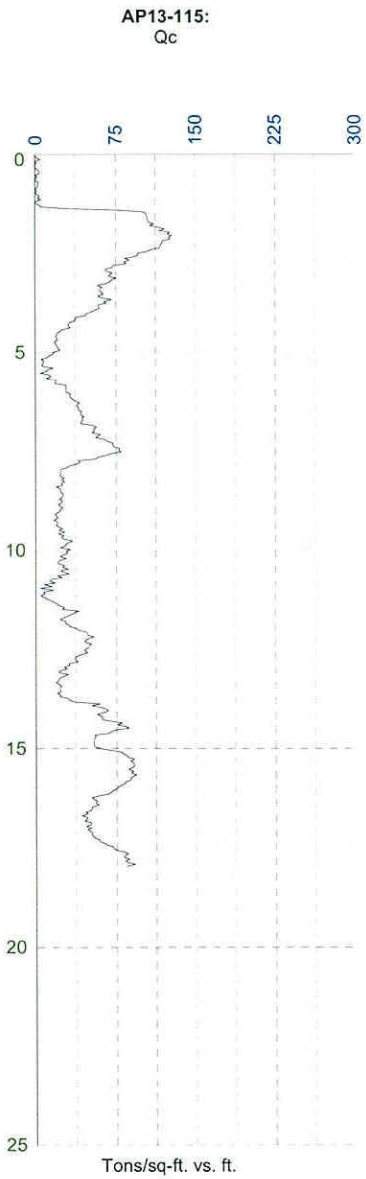

AP13-114:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

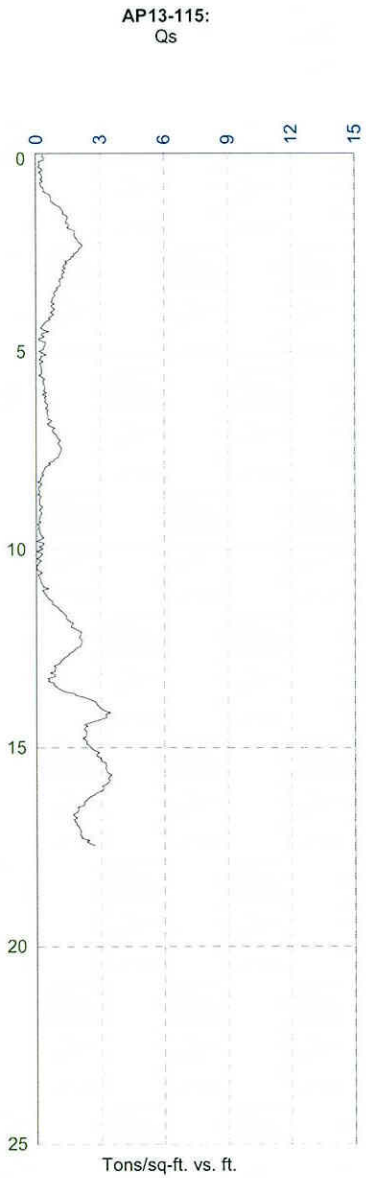

AP13-114:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

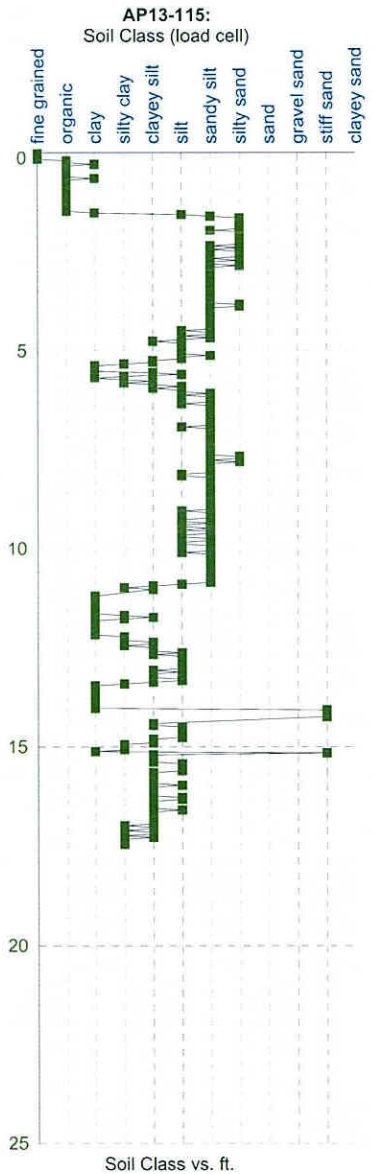

AP13-114:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

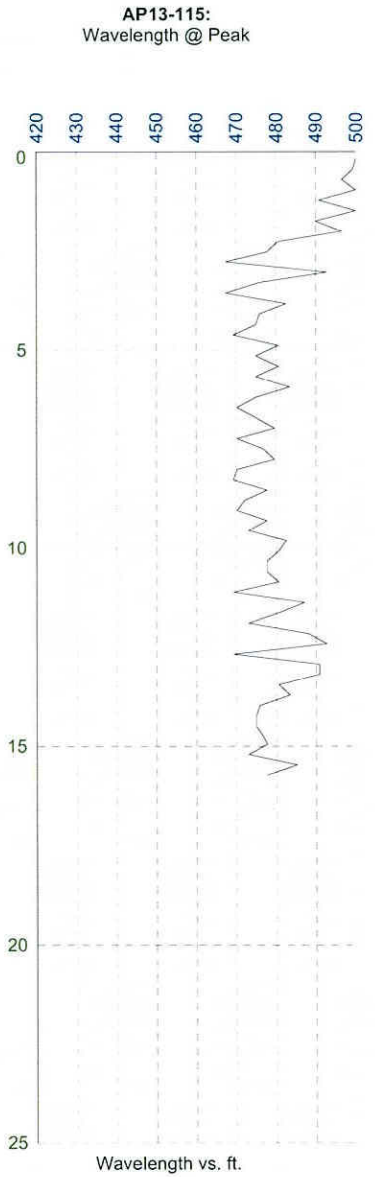

AP13-114:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

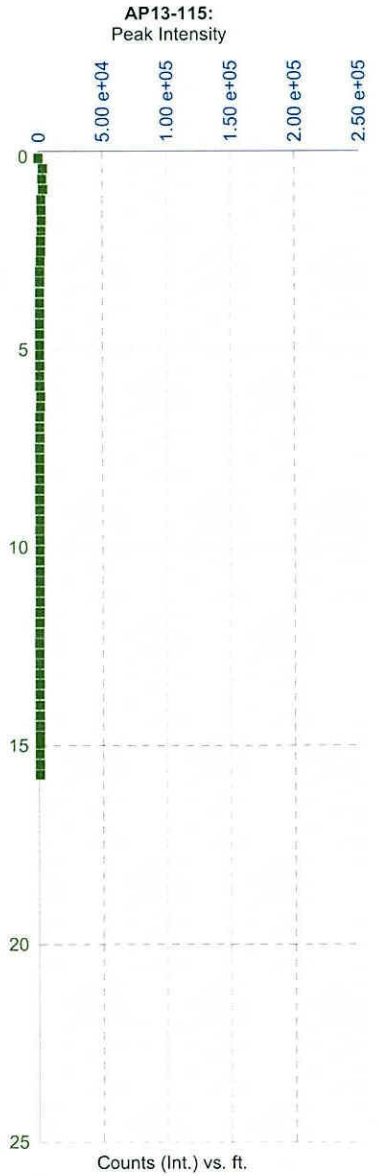

AP13-114:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

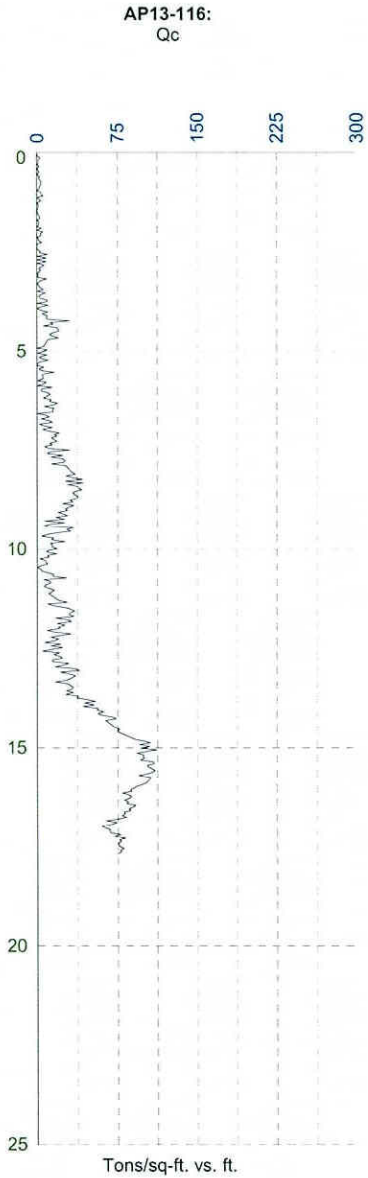

AP13-115:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

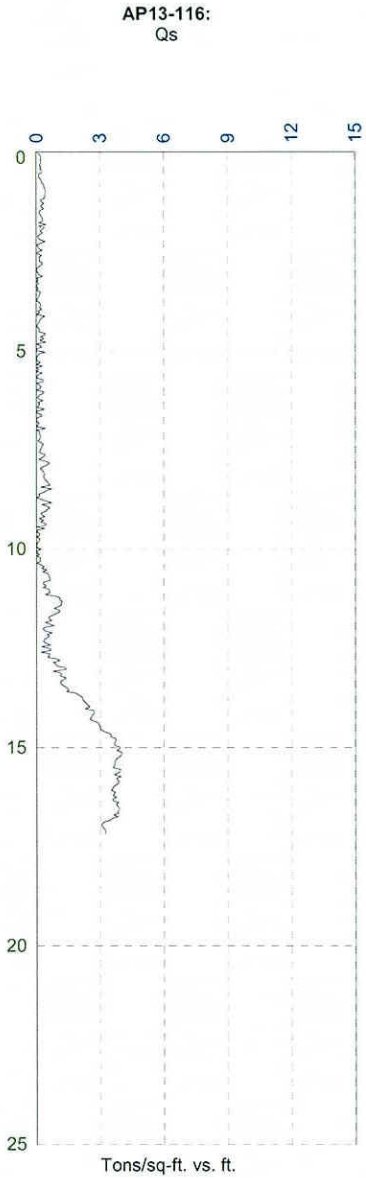

AP13-115:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

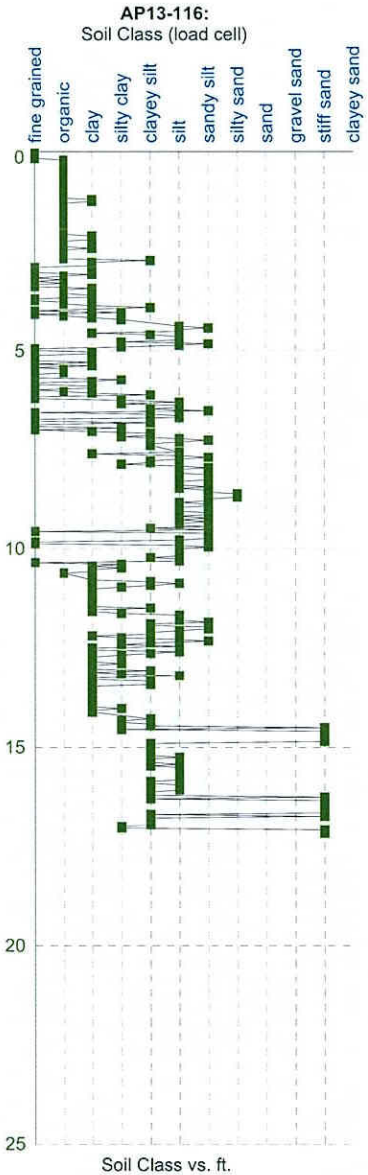

AP13-115:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

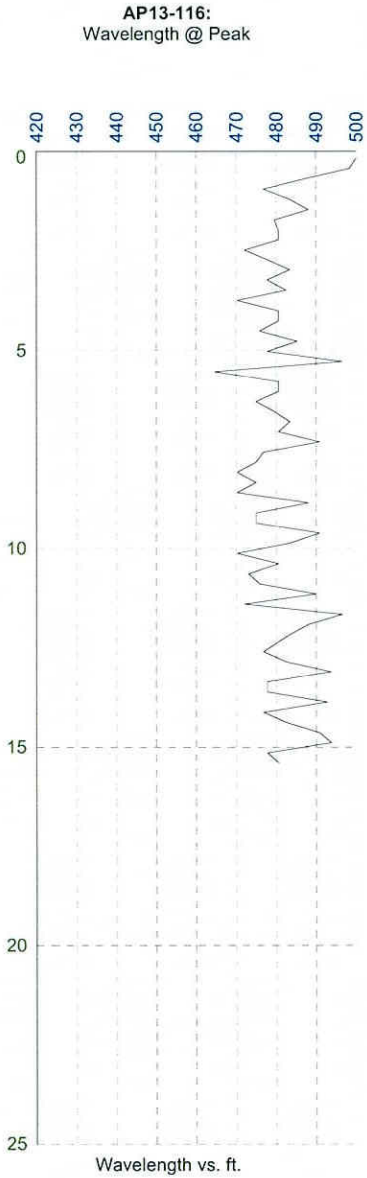

AP13-115:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

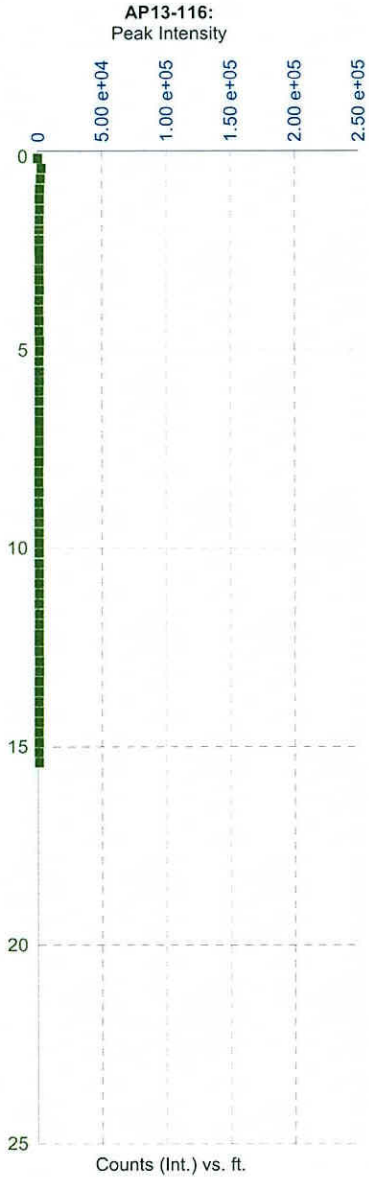

AP13-115:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

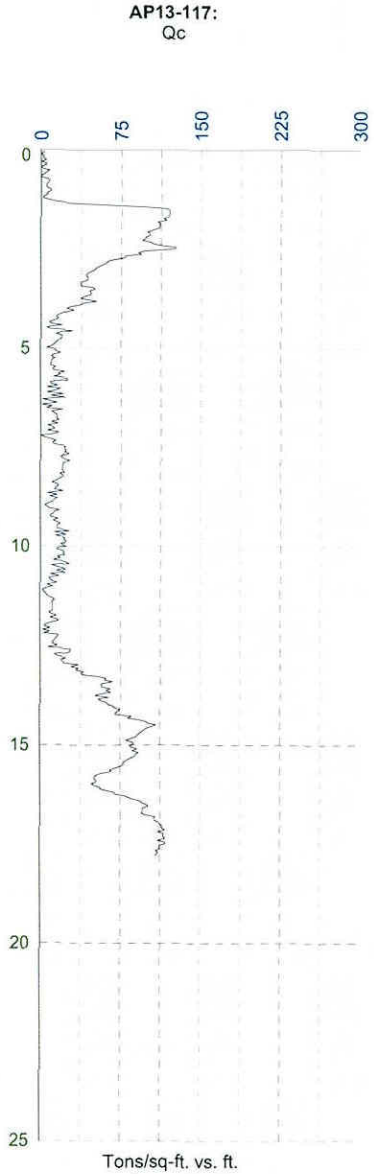

AP13-116:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

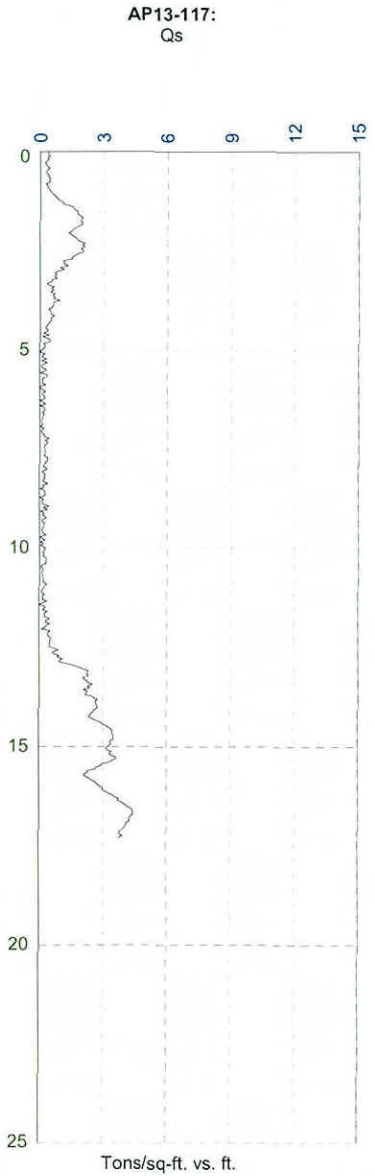

AP13-116:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

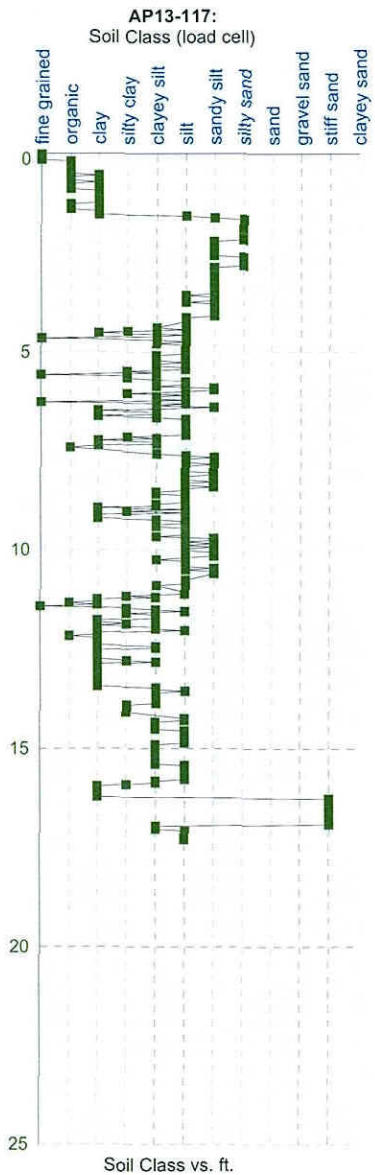

AP13-116:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

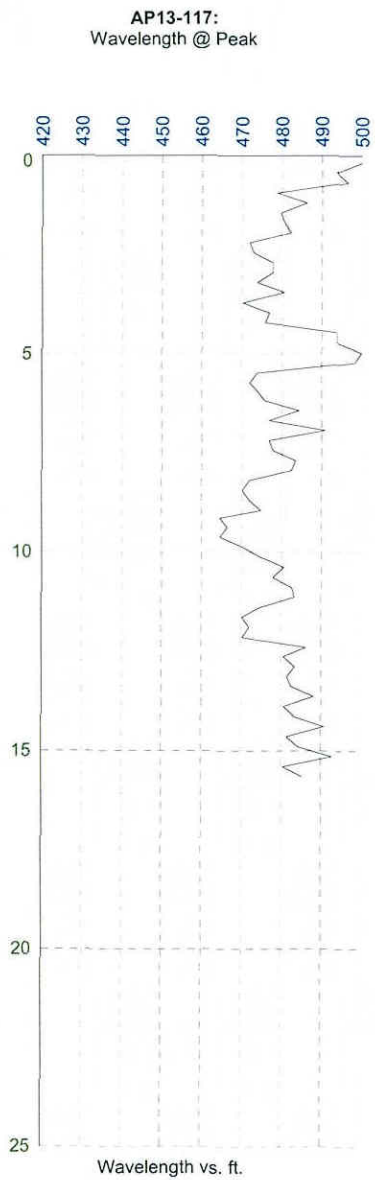

AP13-116:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

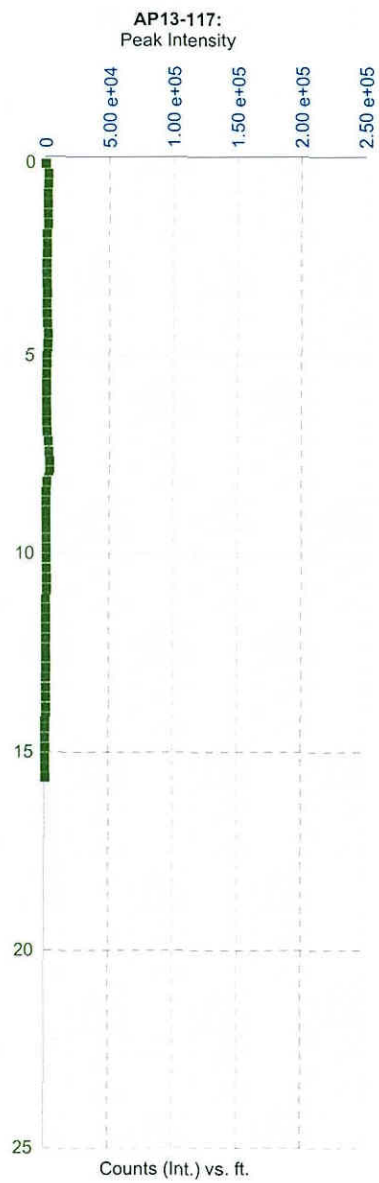

AP13-116:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

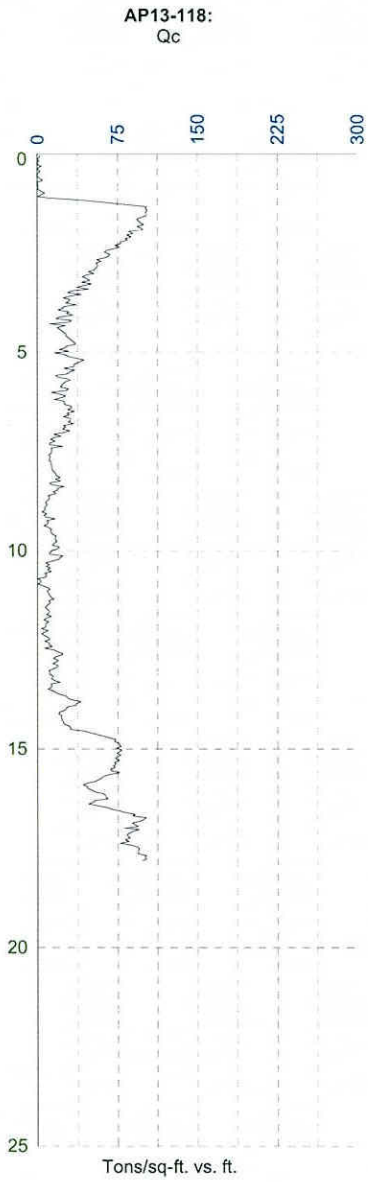

AP13-117:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

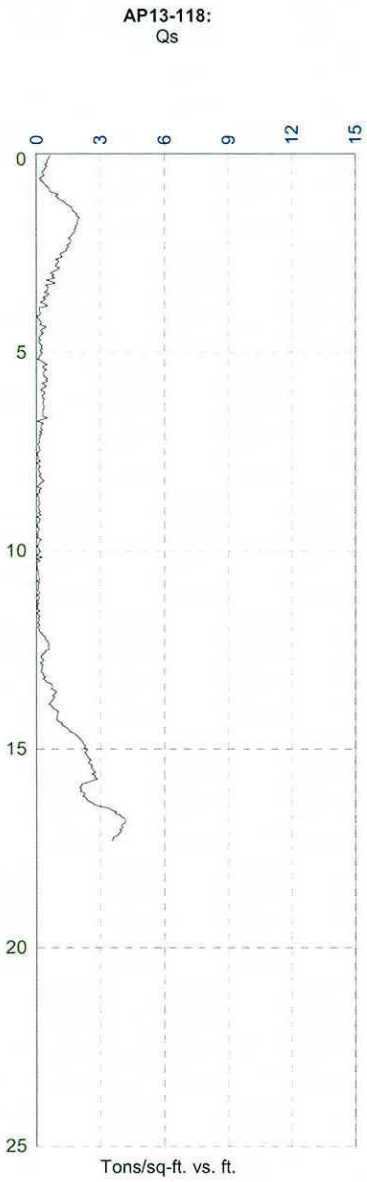

AP13-117:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

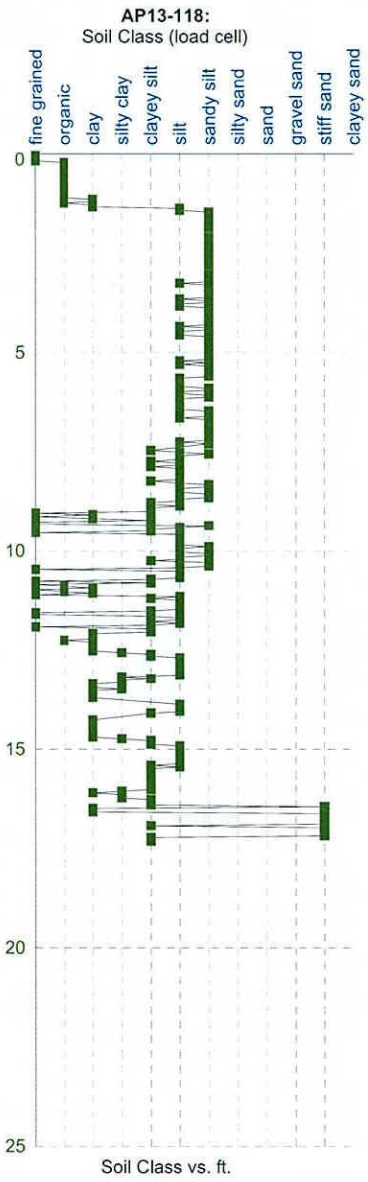

AP13-117:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

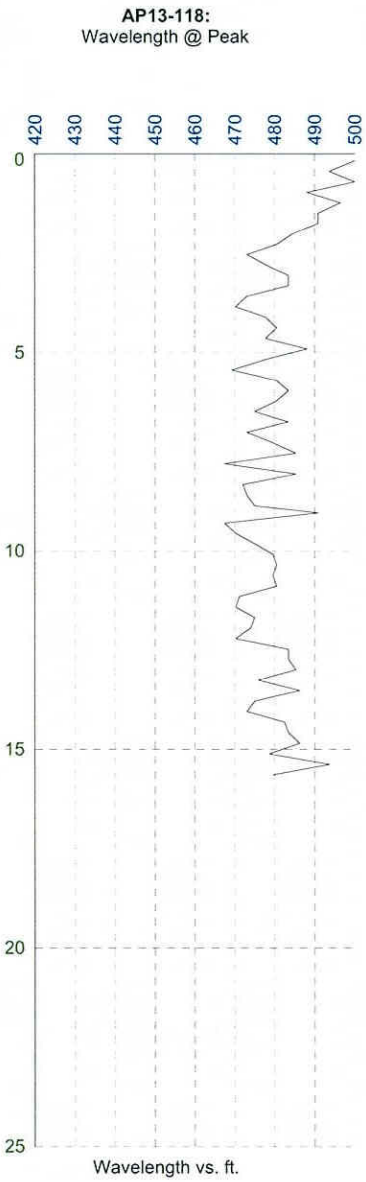

AP13-117:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

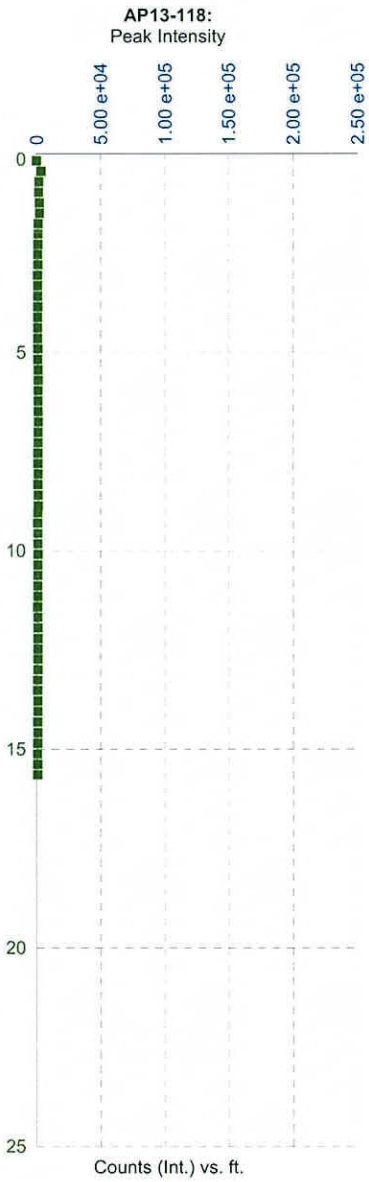

AP13-117:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

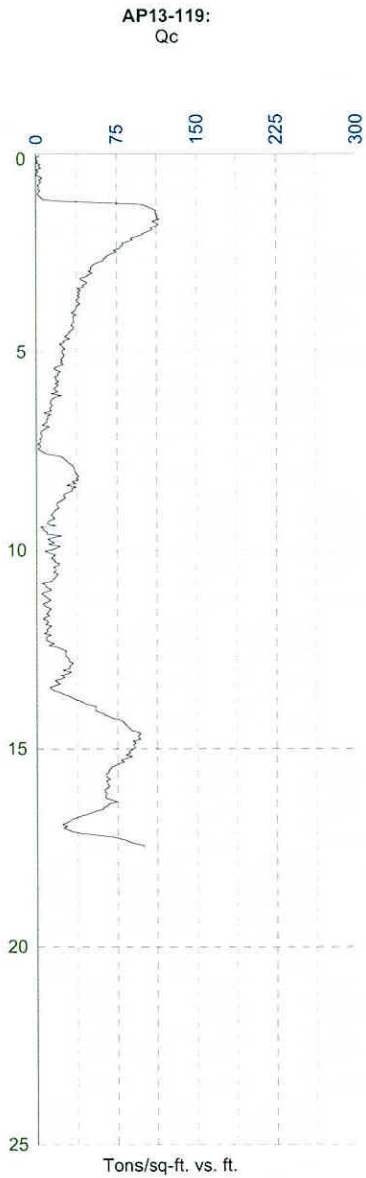

AP13-118:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

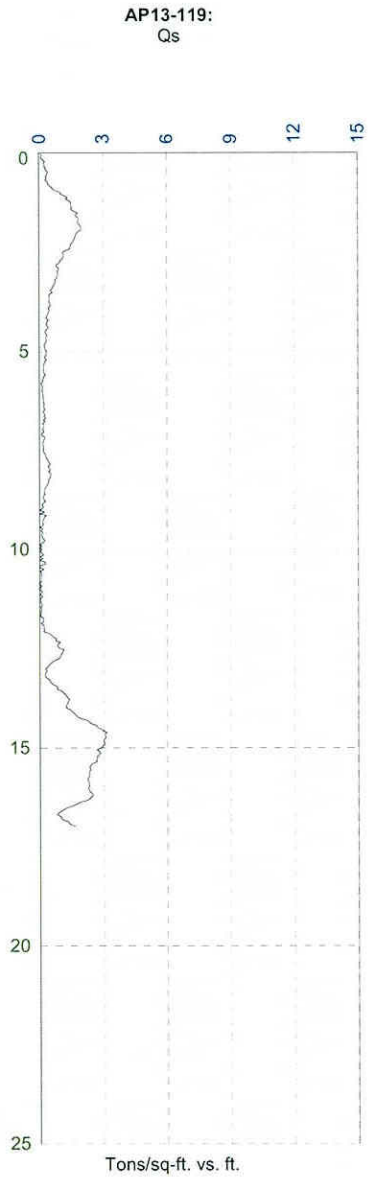

AP13-118:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

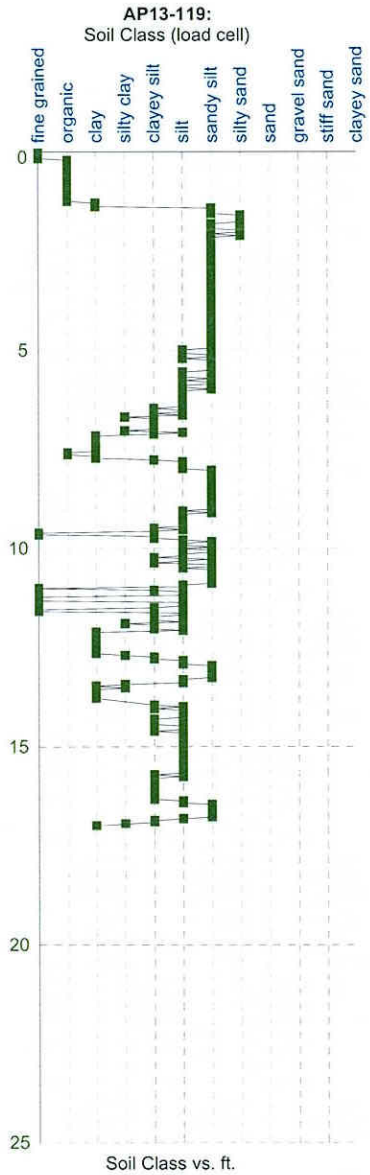

AP13-118:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

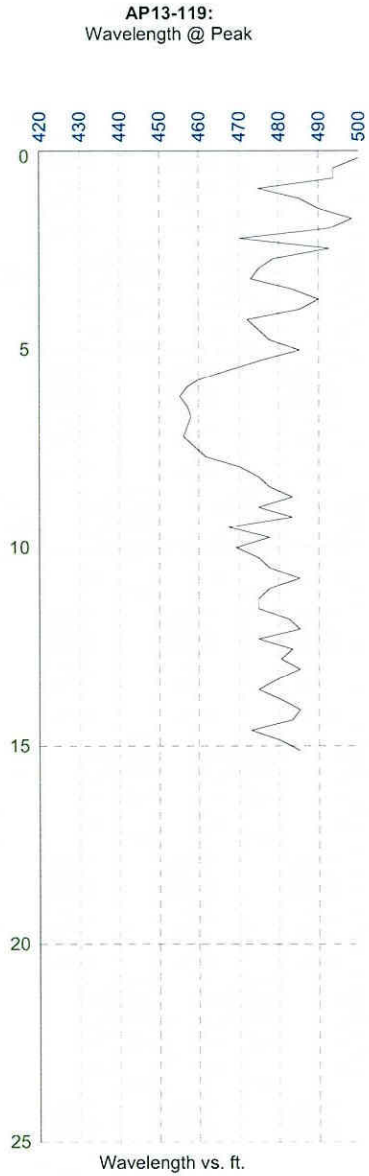

AP13-118:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

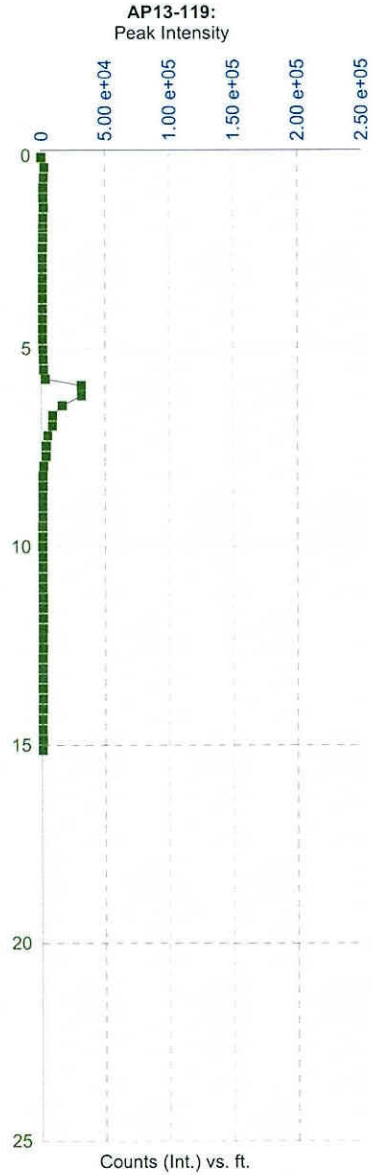

AP13-118:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

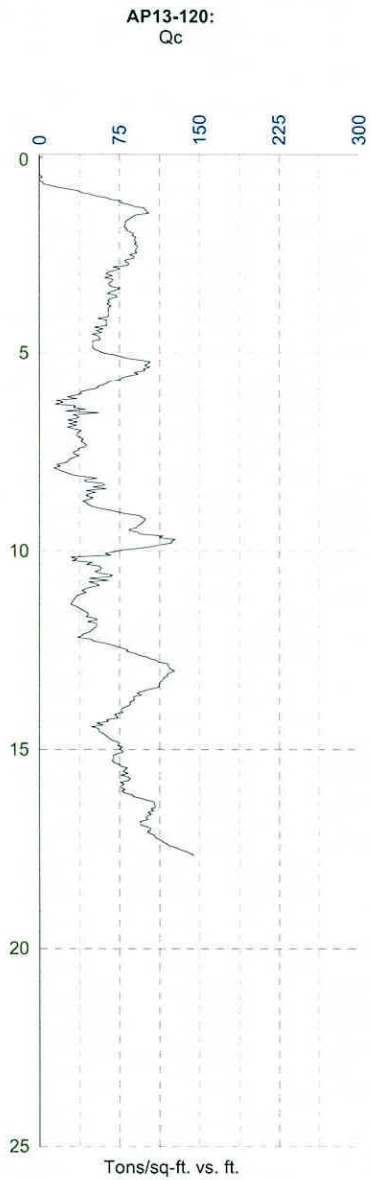

AP13-119:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

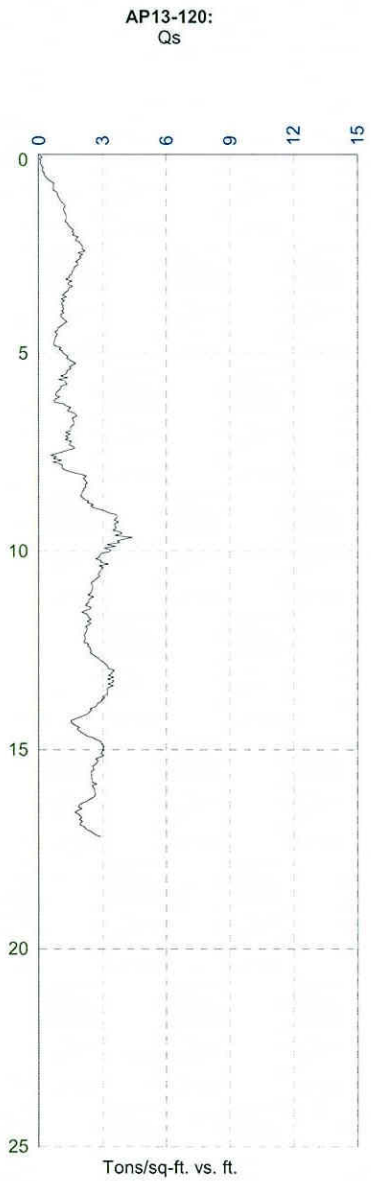

AP13-119:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

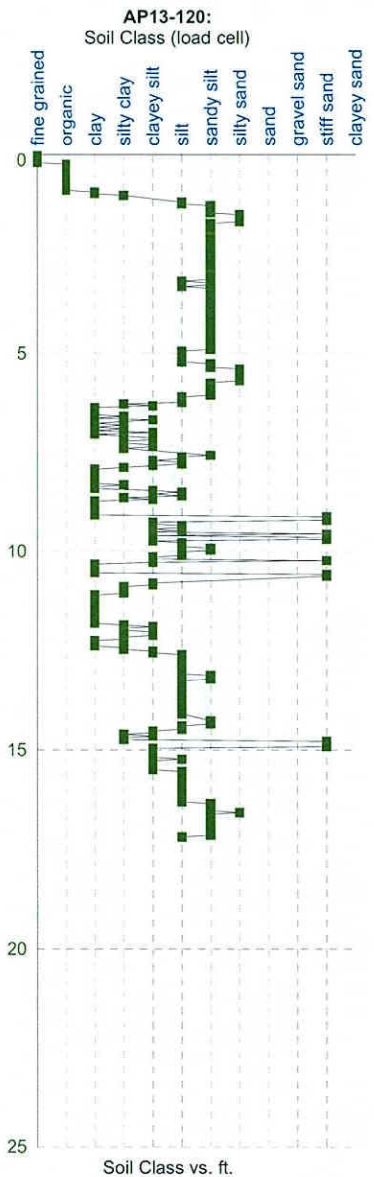

AP13-119:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

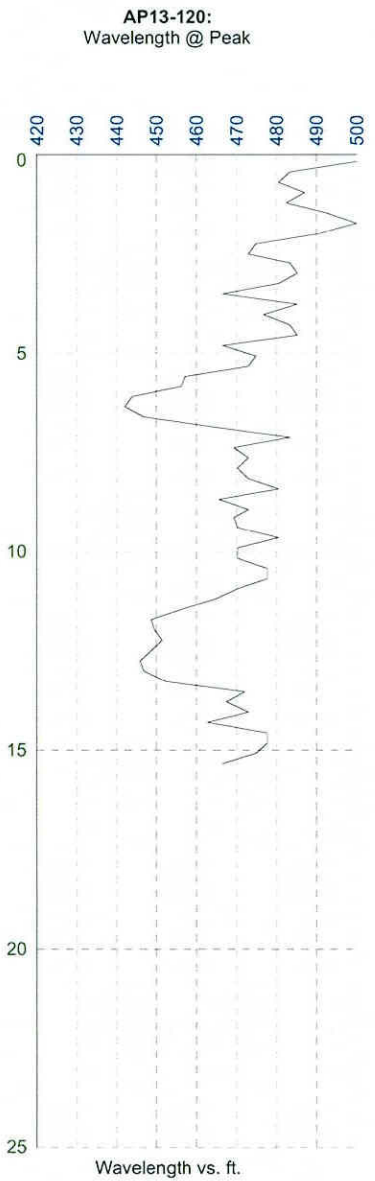

AP13-119:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

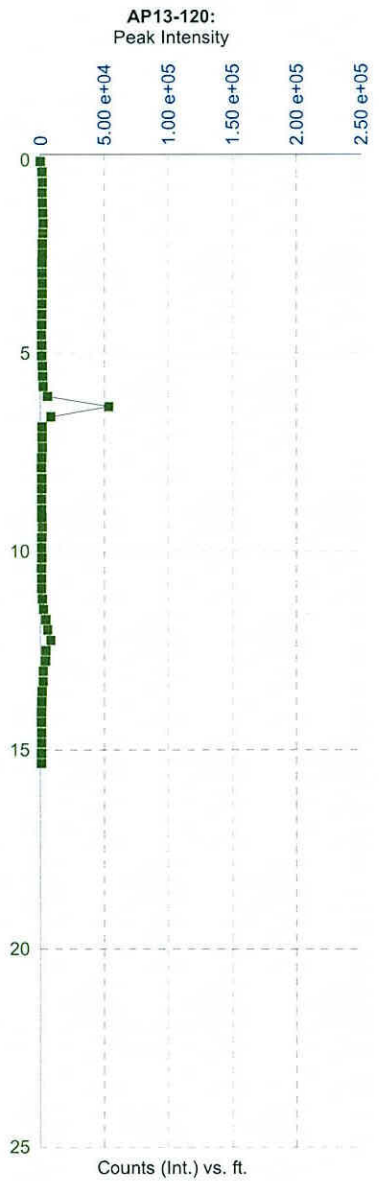

AP13-119:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

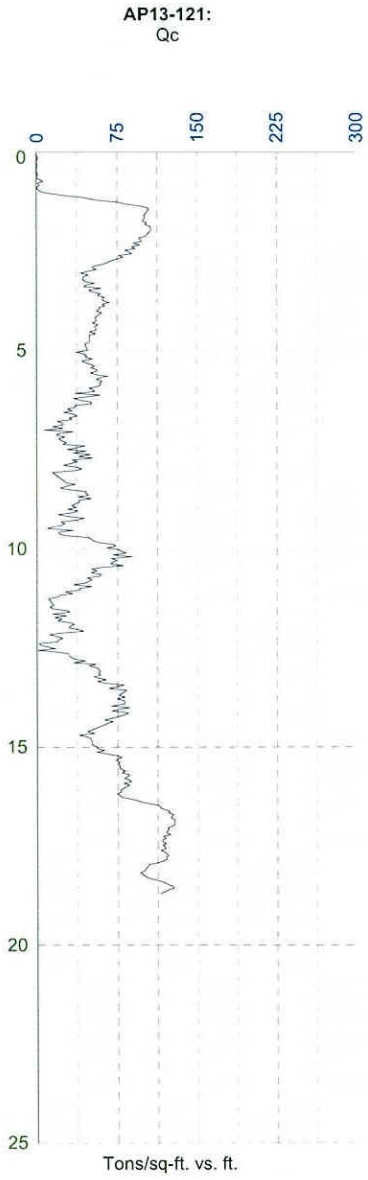

AP13-120:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

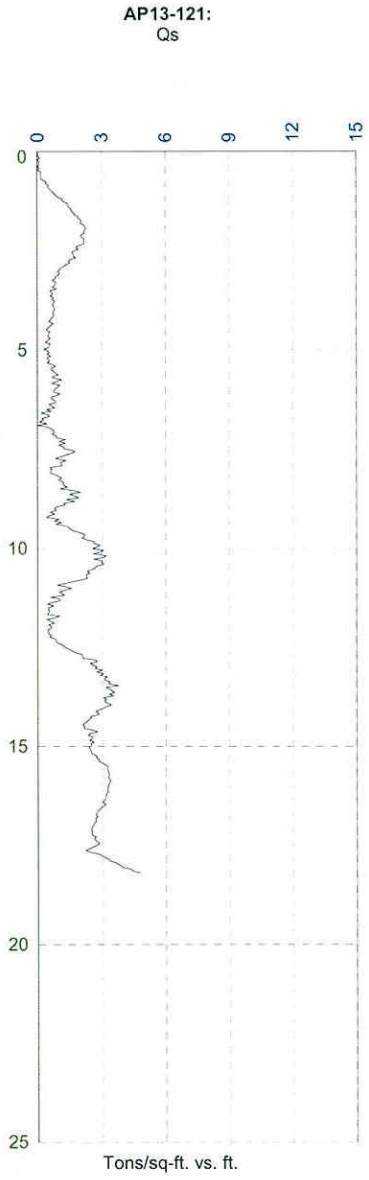

AP13-120:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

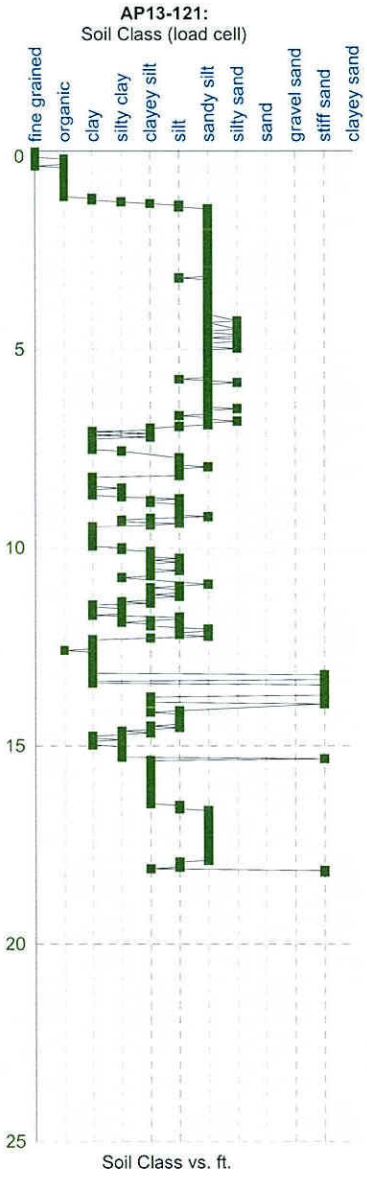

AP13-120:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

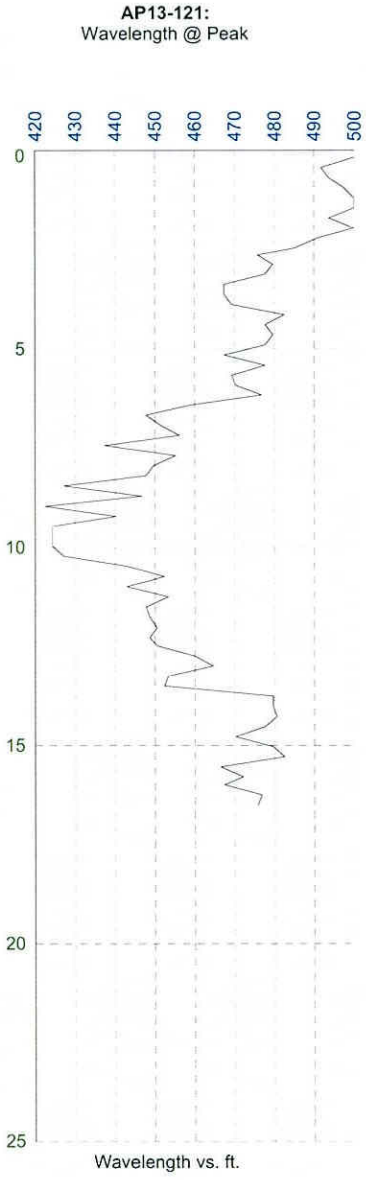

AP13-120:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

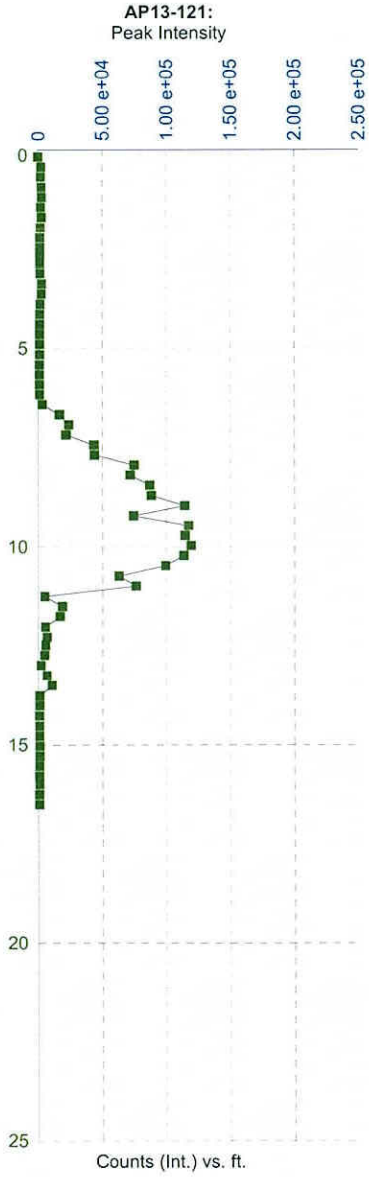

AP13-120:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

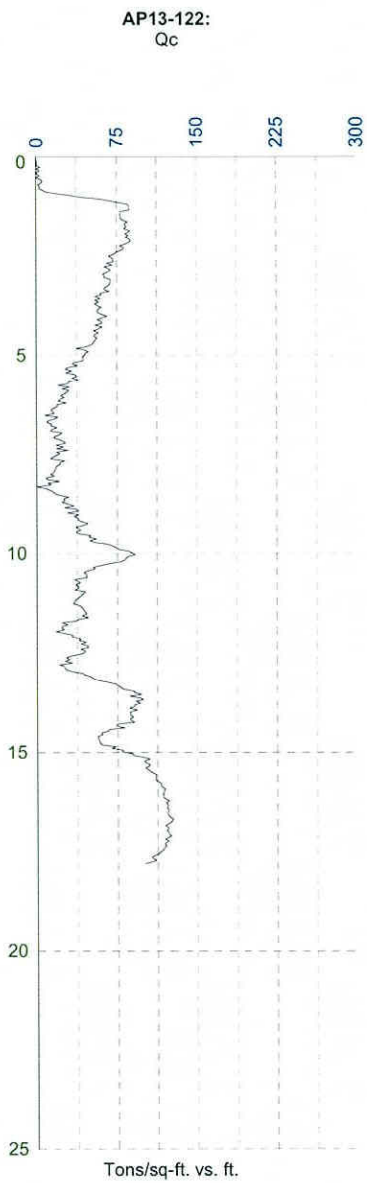

AP13-121:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

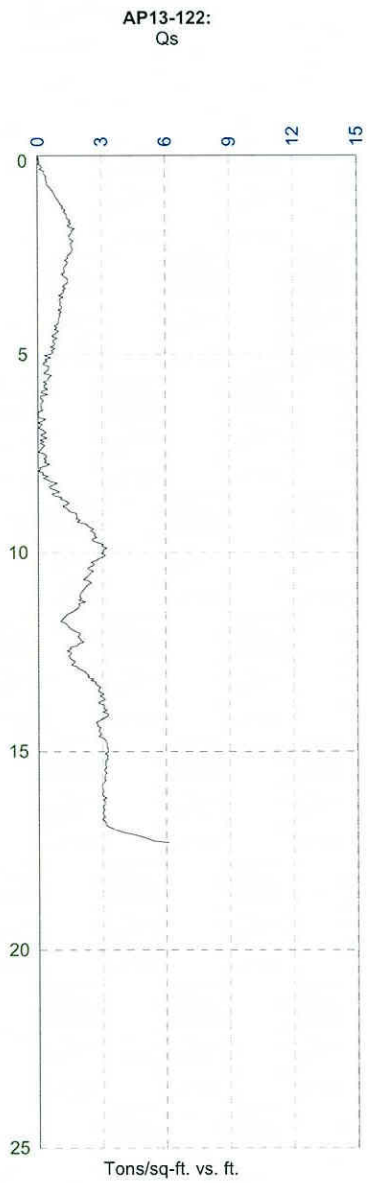

AP13-121:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

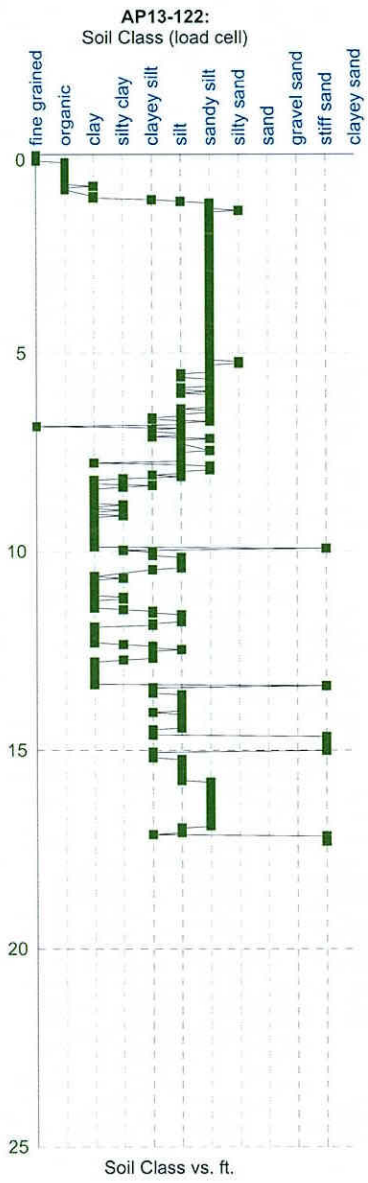

AP13-121:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

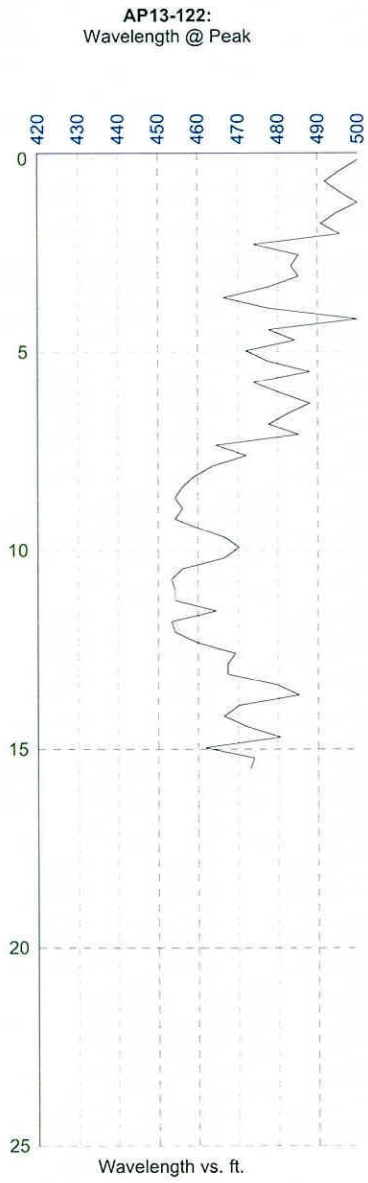

AP13-121:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

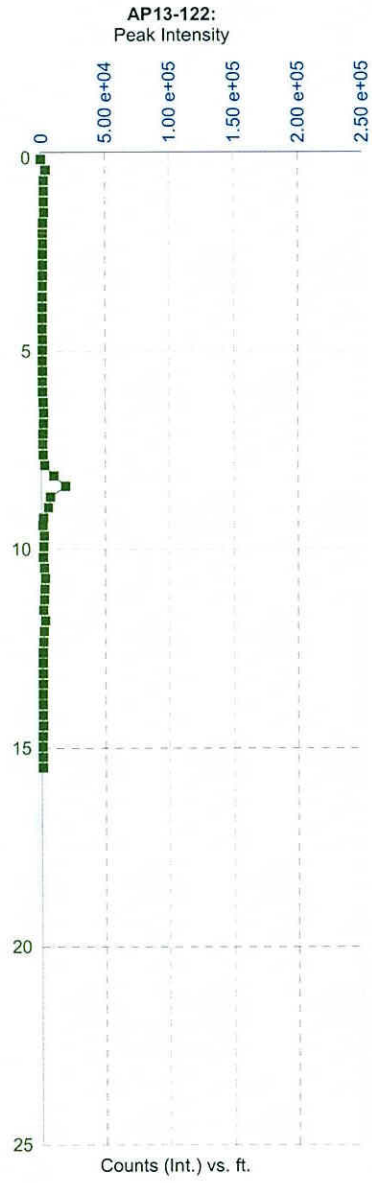

AP13-121:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

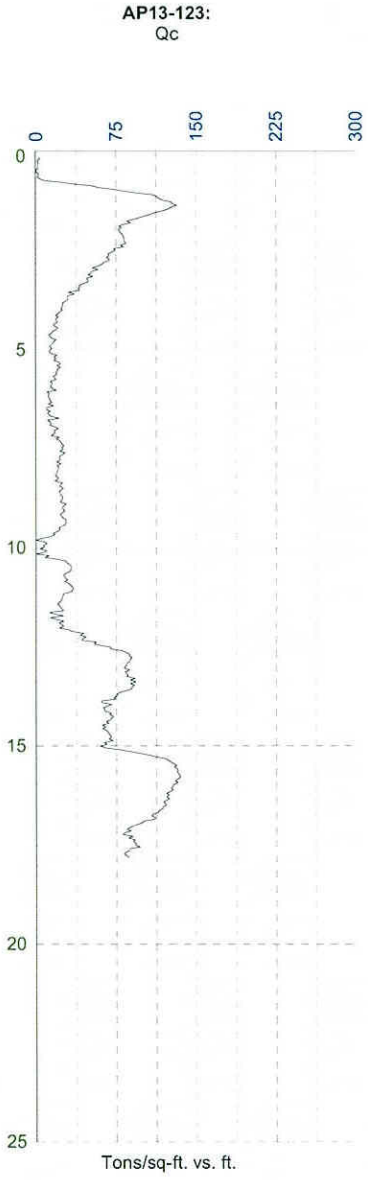

AP13-122:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

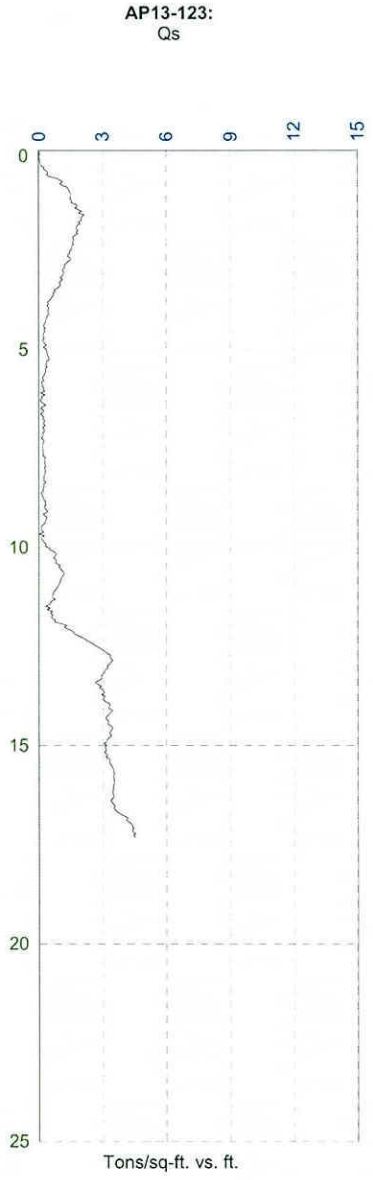

AP13-122:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

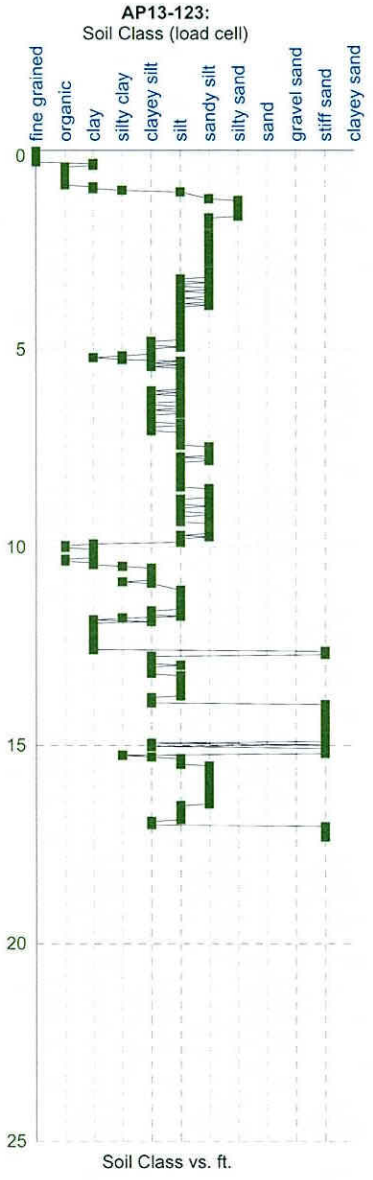

AP13-122:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

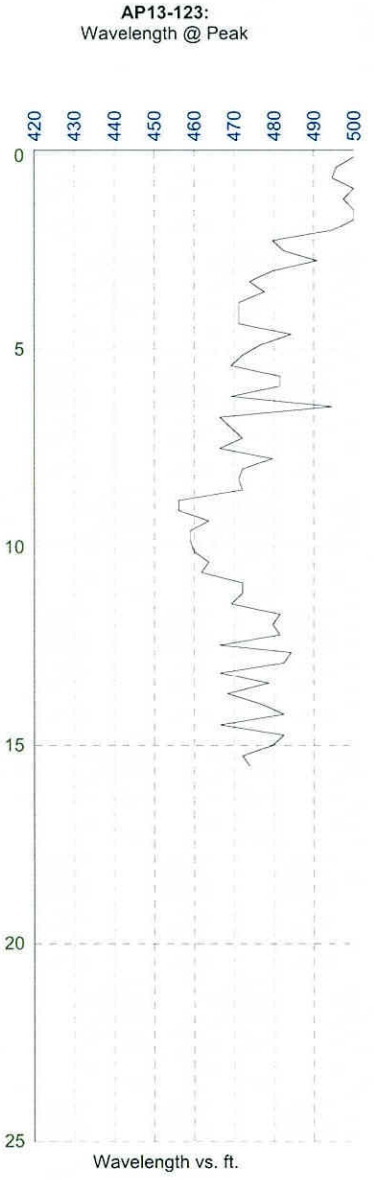

AP13-122:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

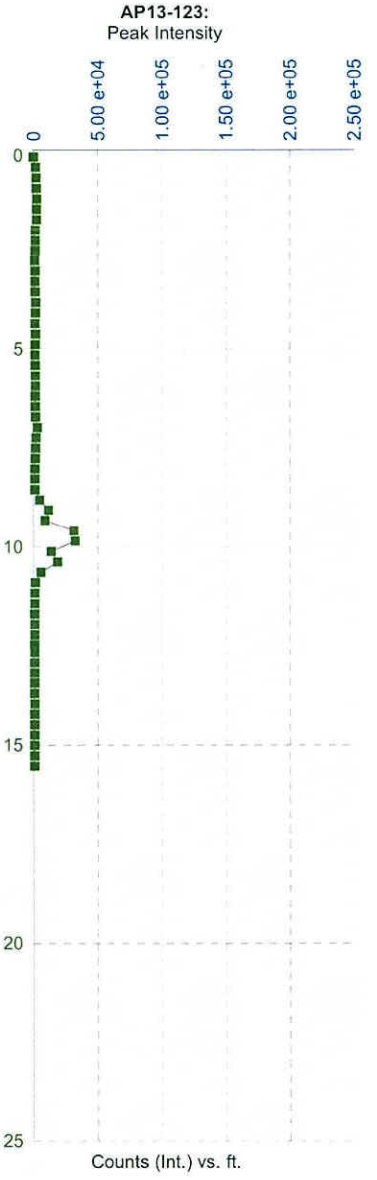

AP13-122:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

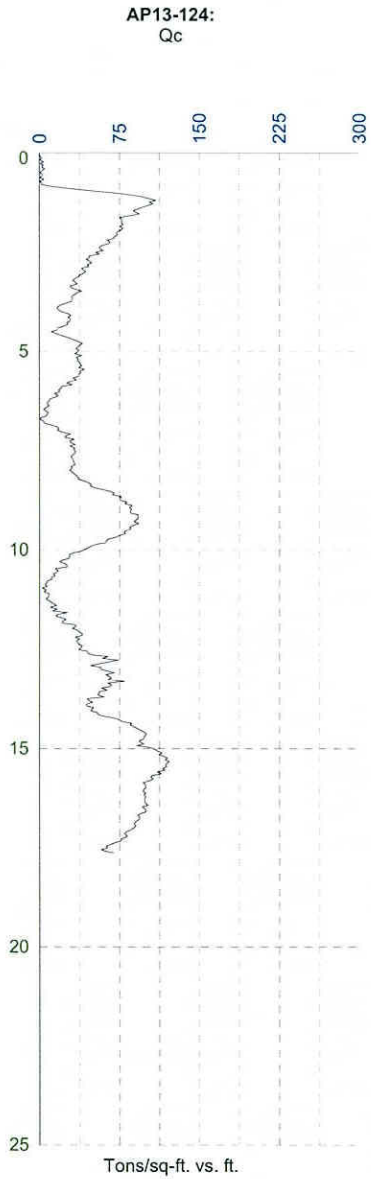

AP13-123:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

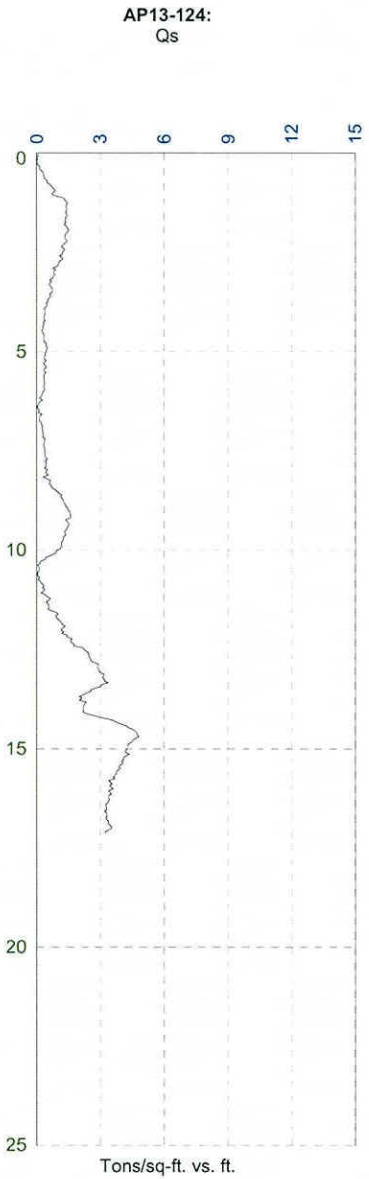

AP13-123:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

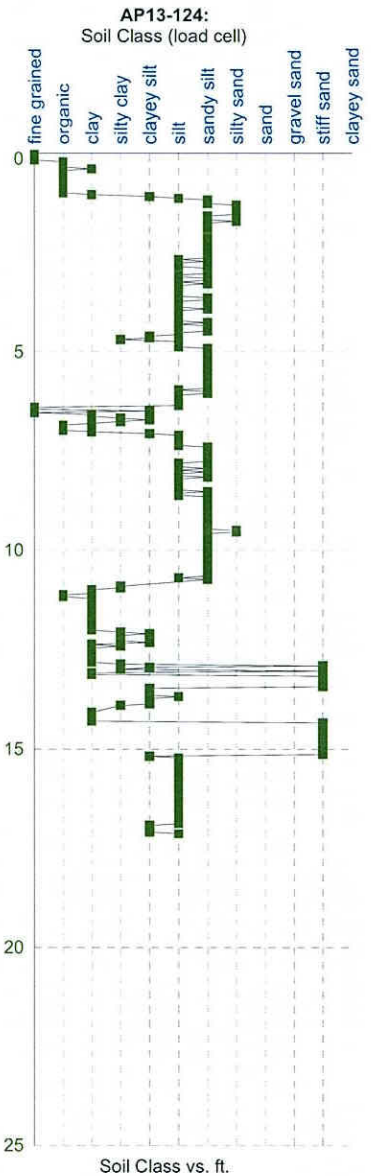

AP13-123:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

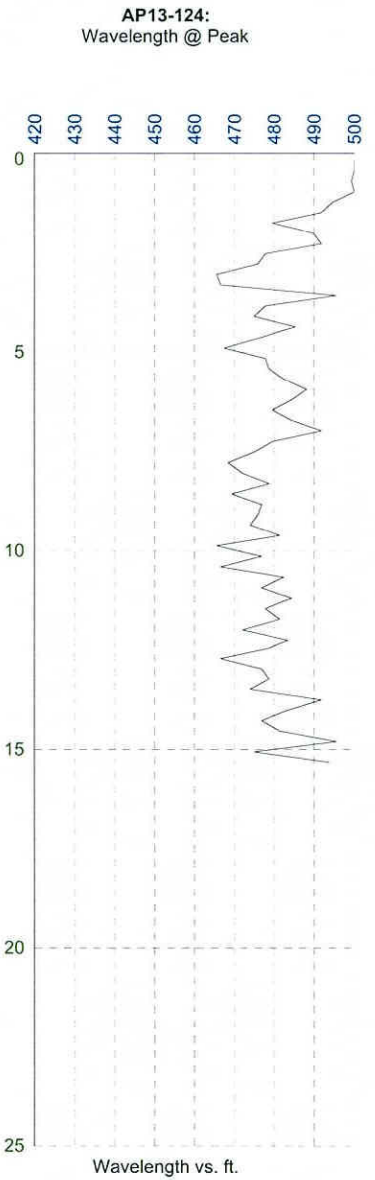

AP13-123:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

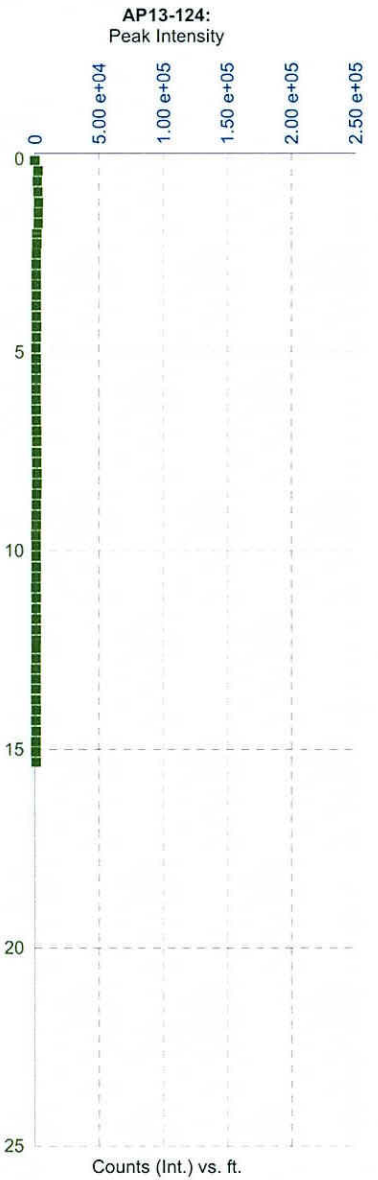

AP13-123:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

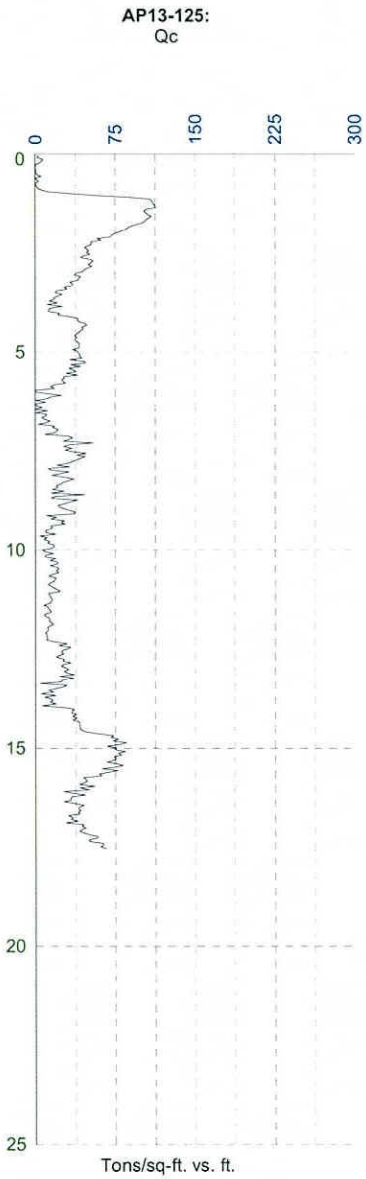

AP13-124:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

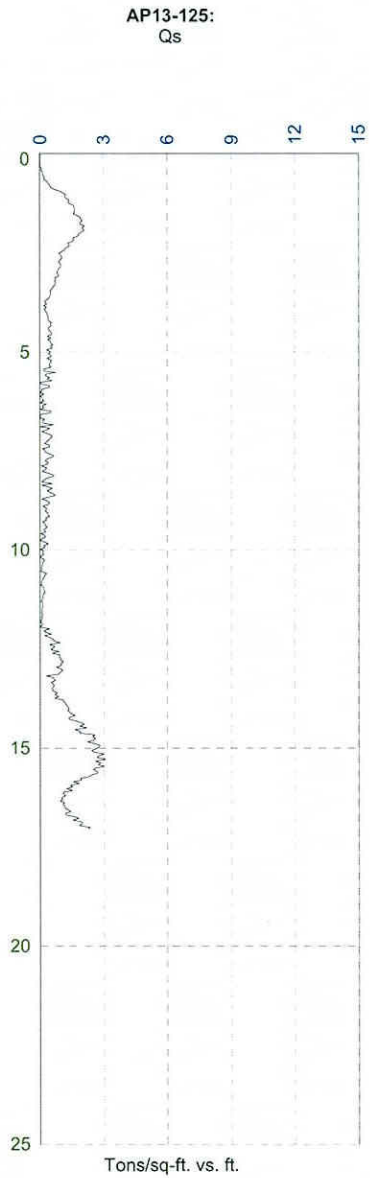

AP13-124:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

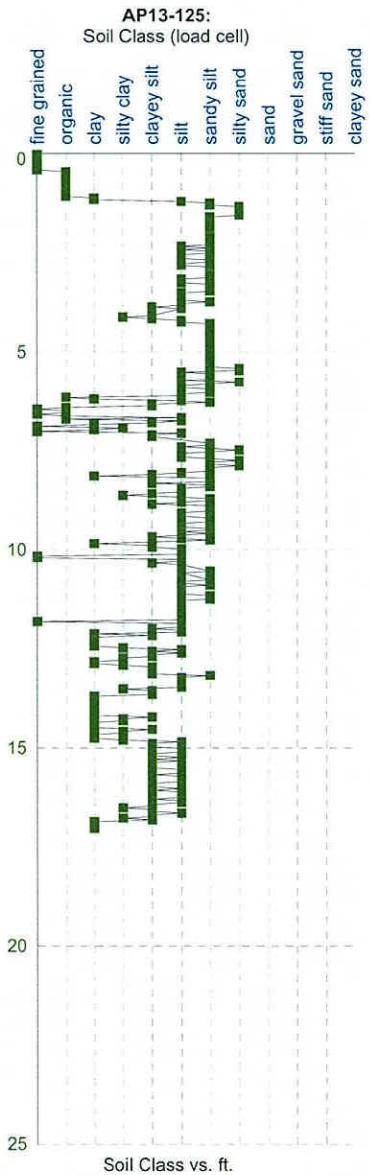

AP13-124:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

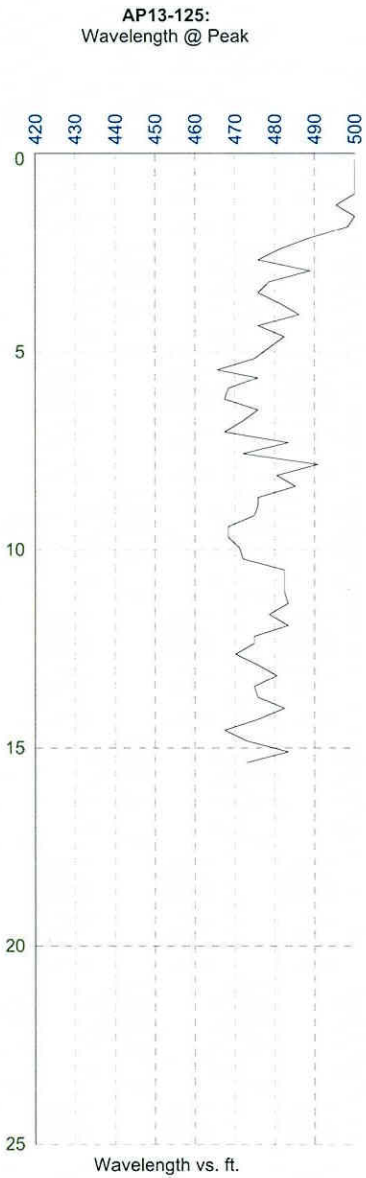

AP13-124:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

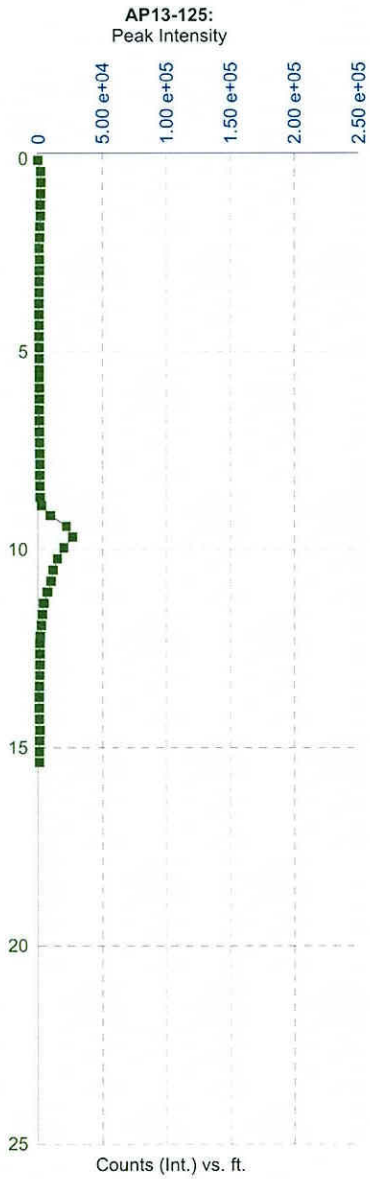

AP13-124:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

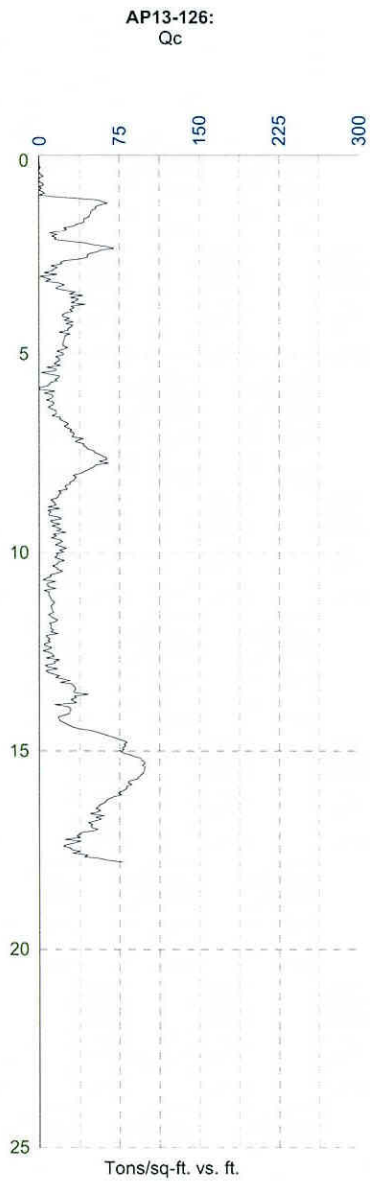

AP13-125:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

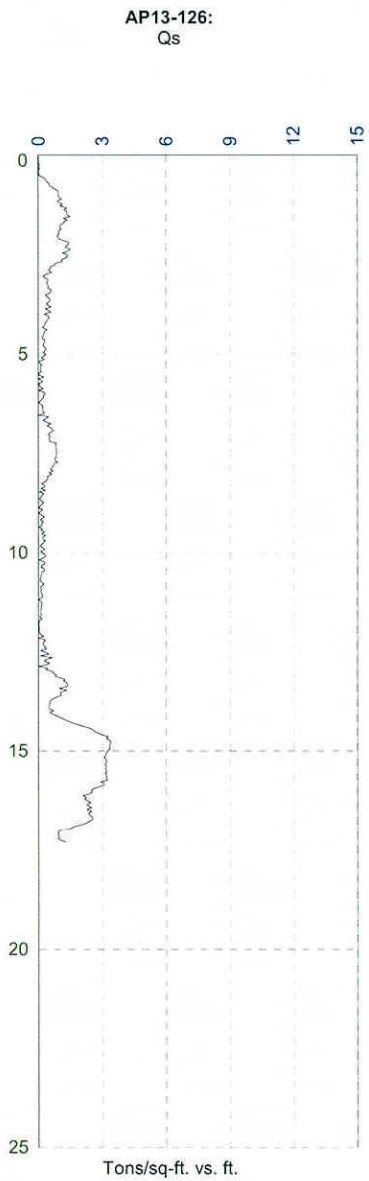

AP13-125:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

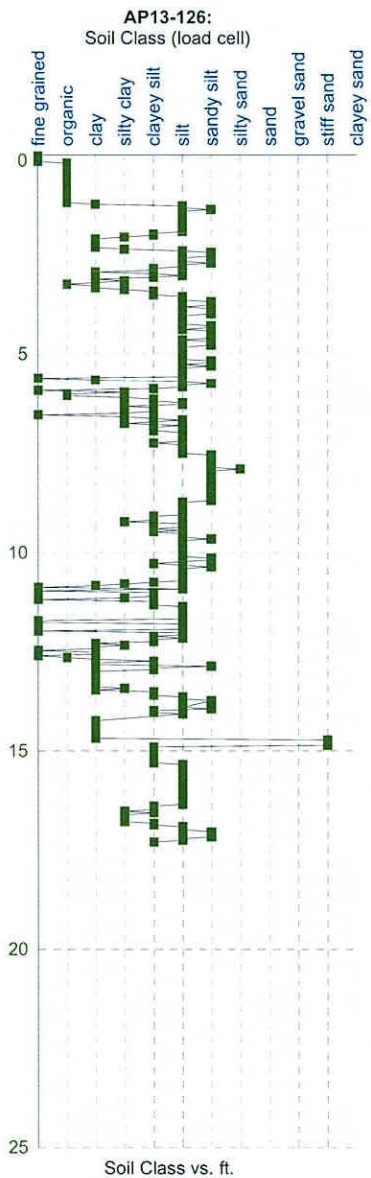

AP13-125:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

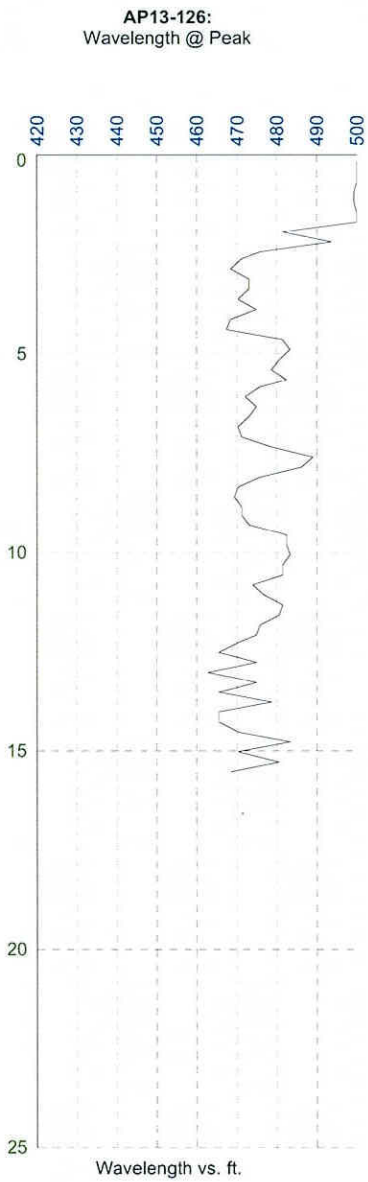

AP13-125:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

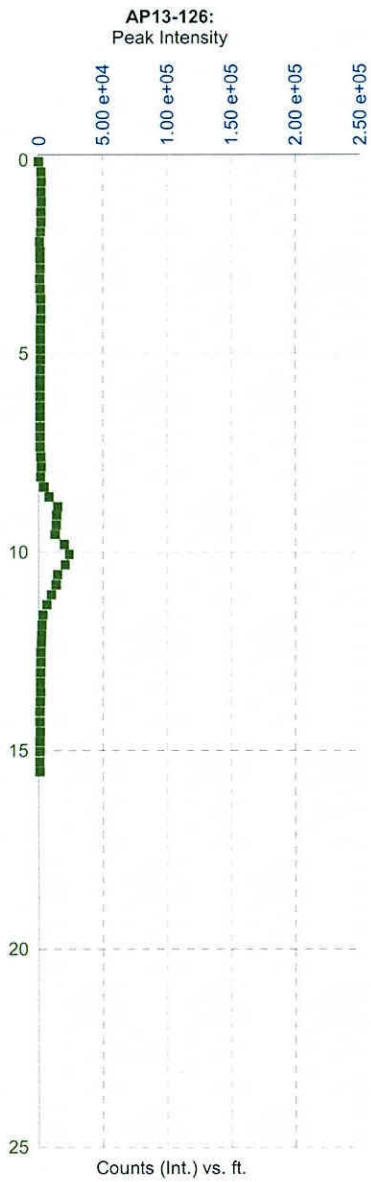

AP13-125:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

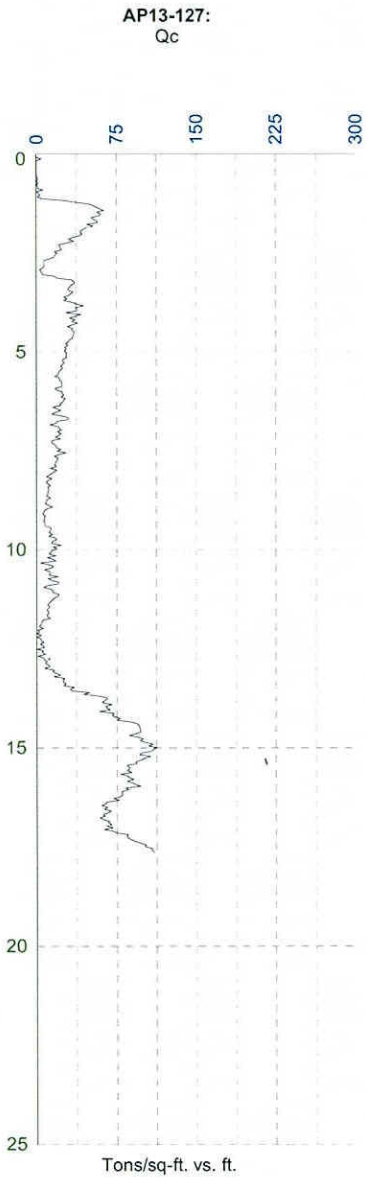

AP13-126:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

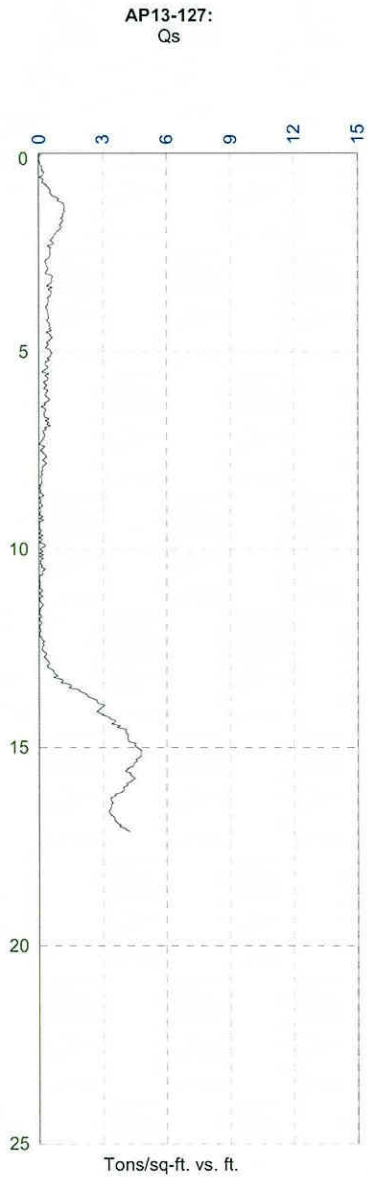

AP13-126:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

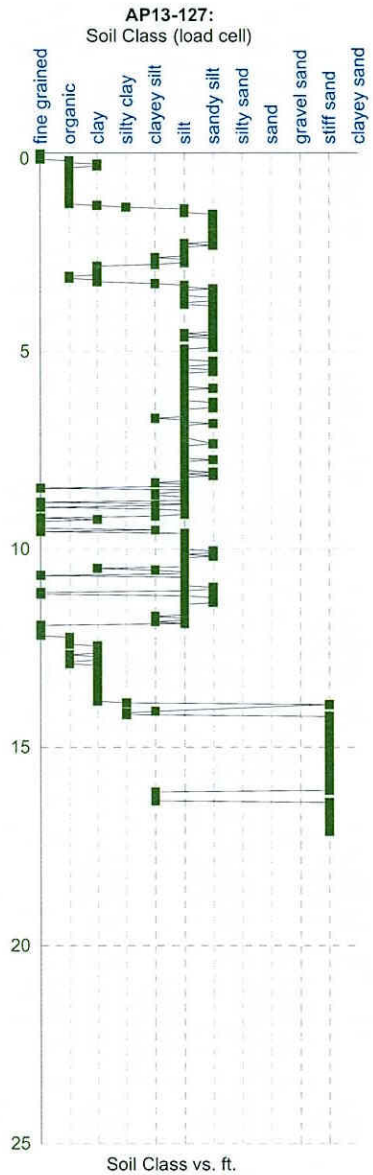

AP13-126:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

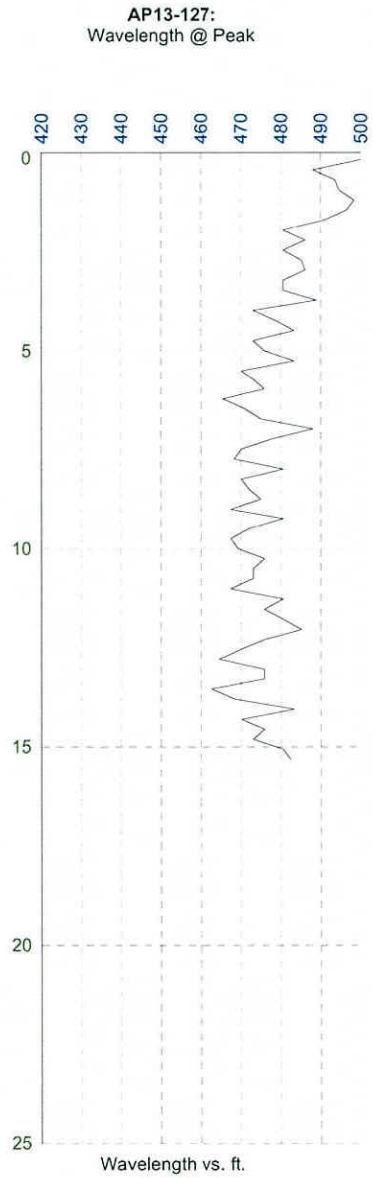

AP13-126:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

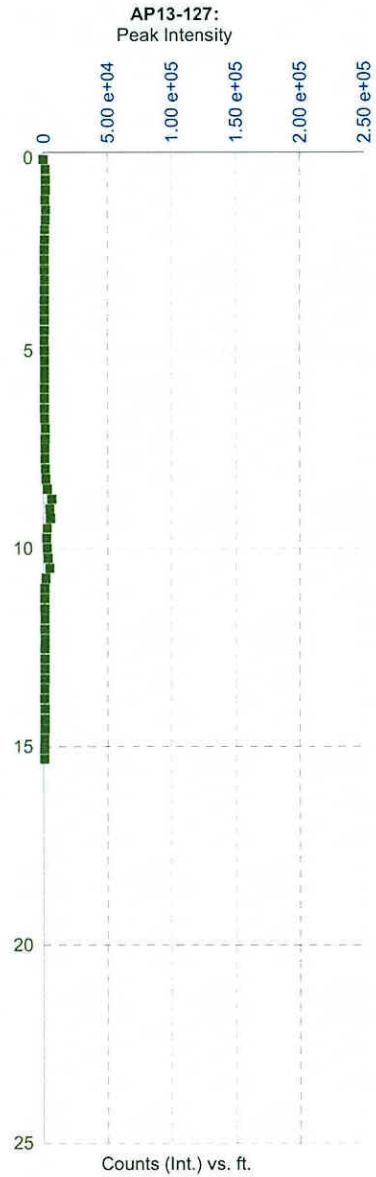

AP13-126:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

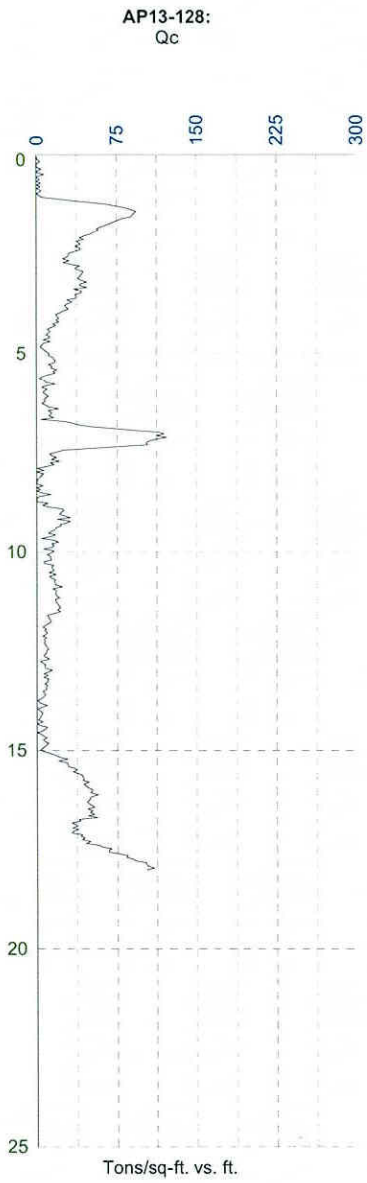

AP13-127:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

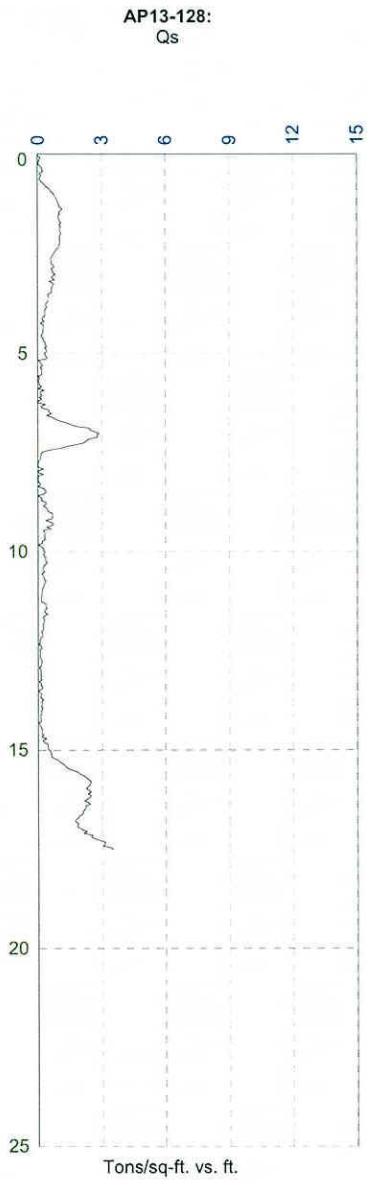

AP13-127:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

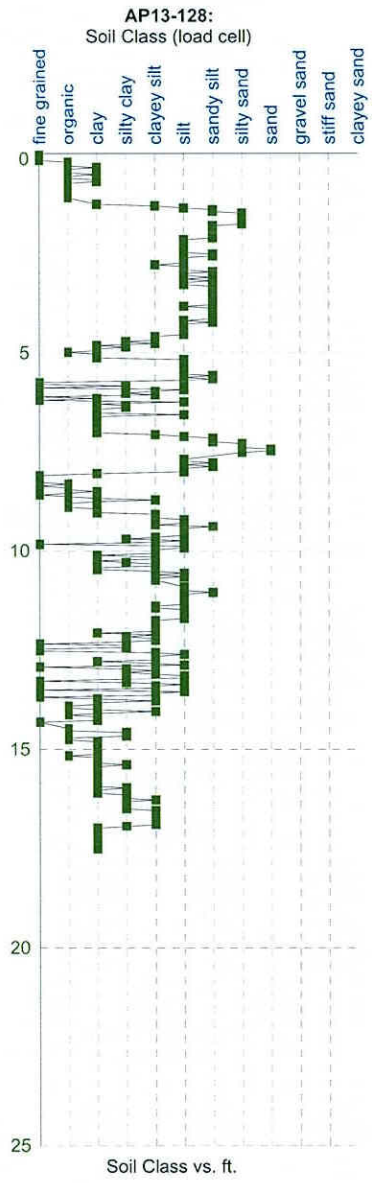

AP13-127:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

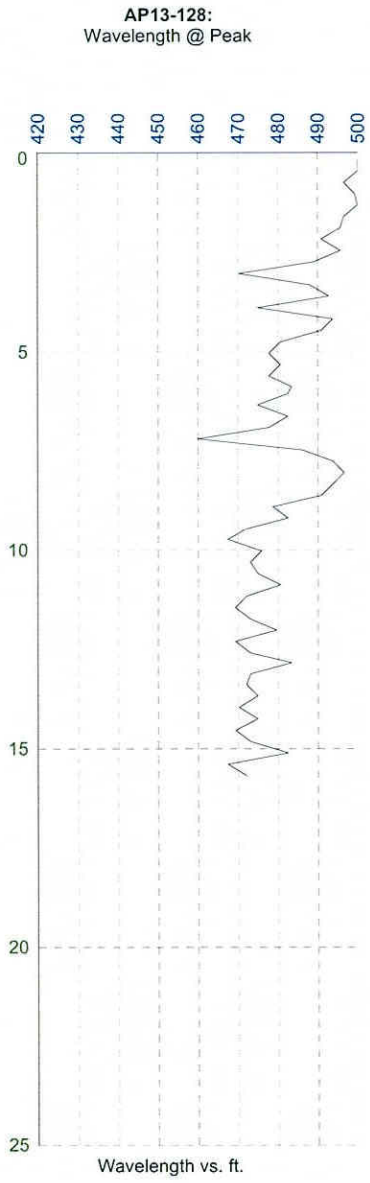

AP13-127:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

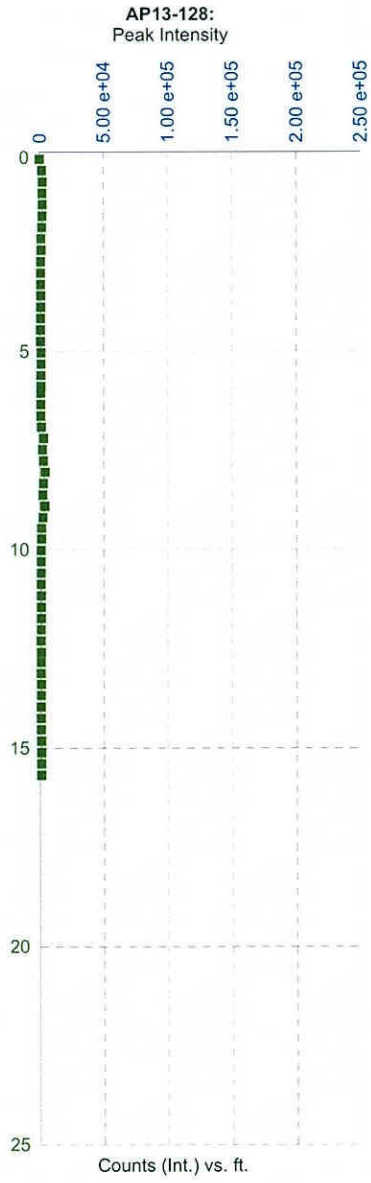

AP13-127:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

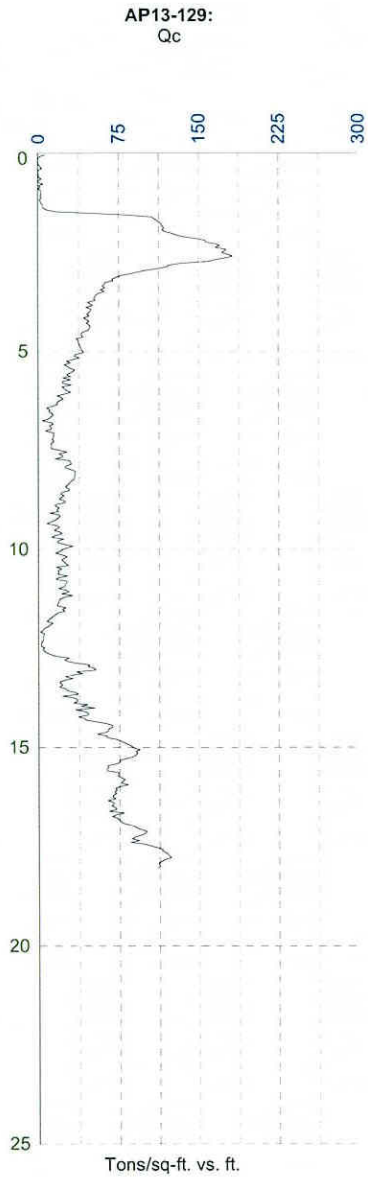

AP13-128:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

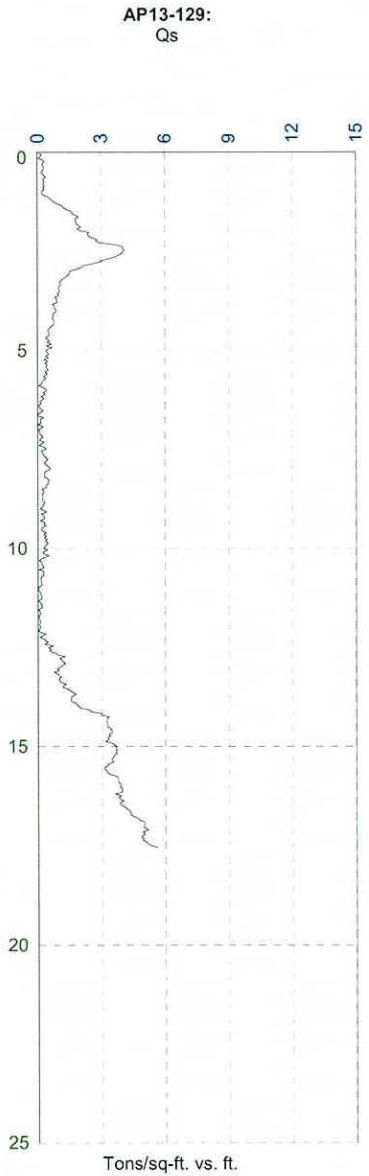

AP13-128:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

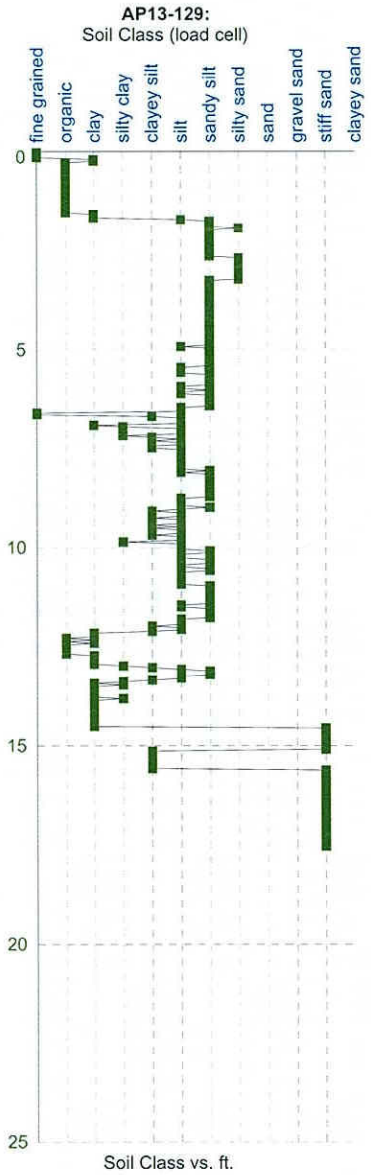

AP13-128:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

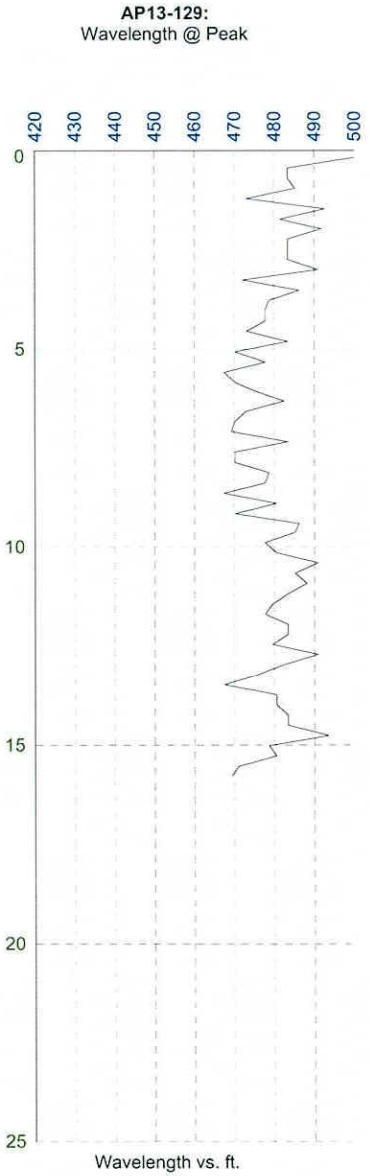

AP13-128:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

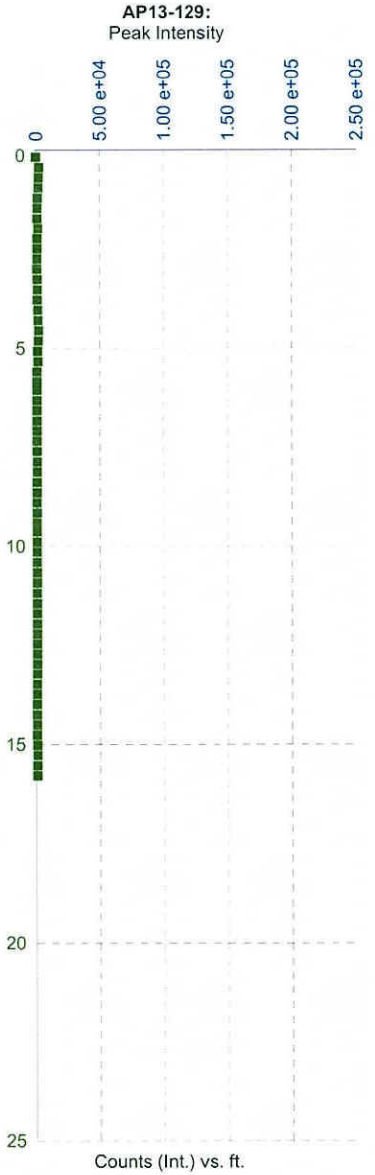

AP13-128:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

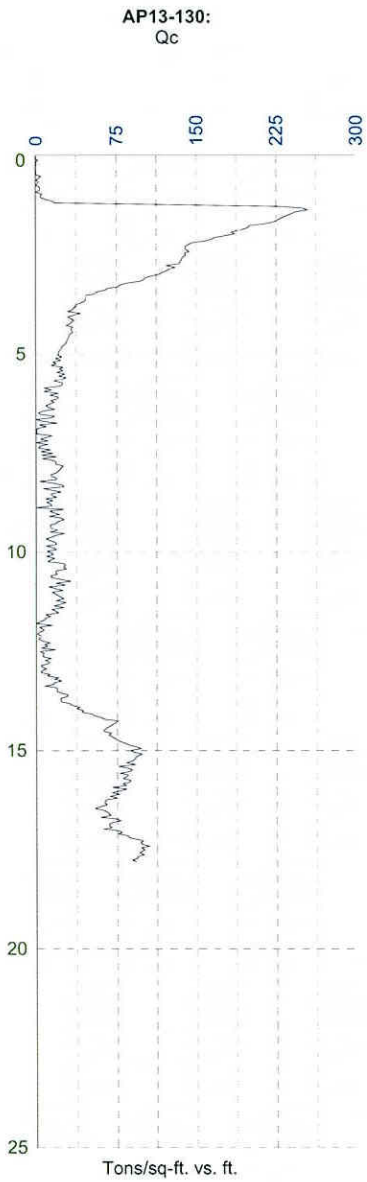

AP13-129:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

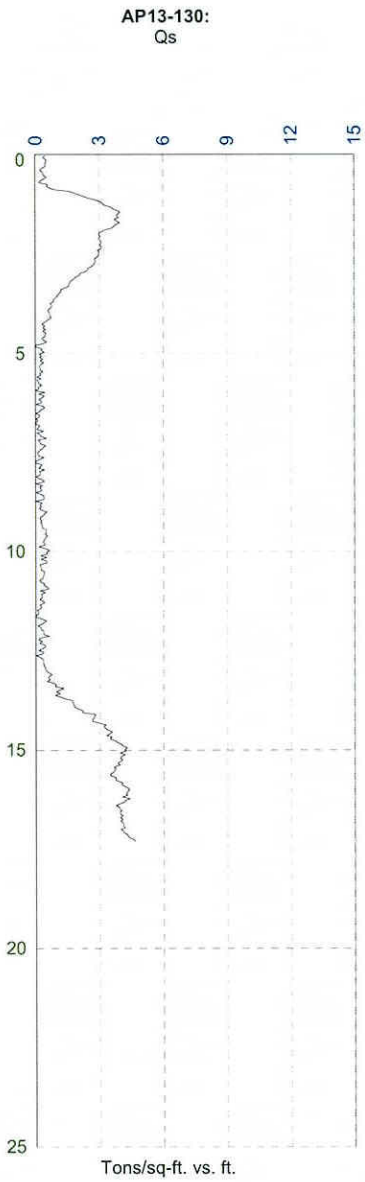

AP13-129:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

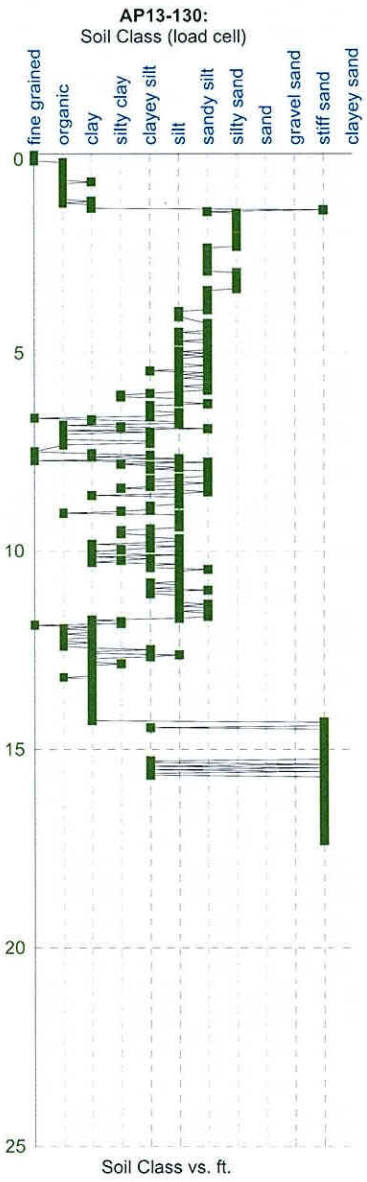

AP13-129:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

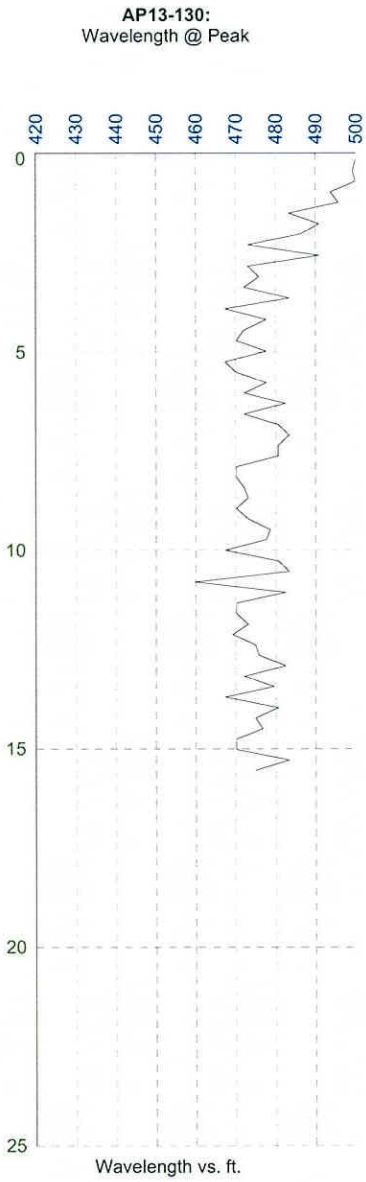

AP13-129:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

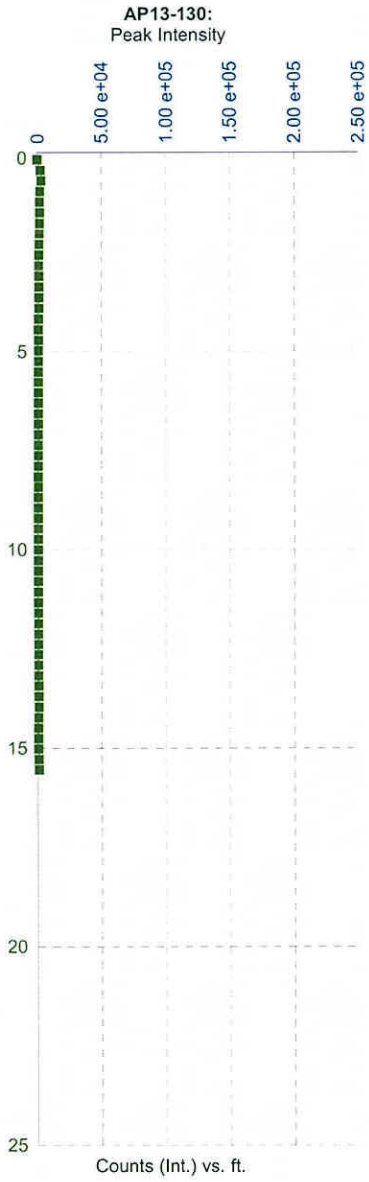

AP13-129:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

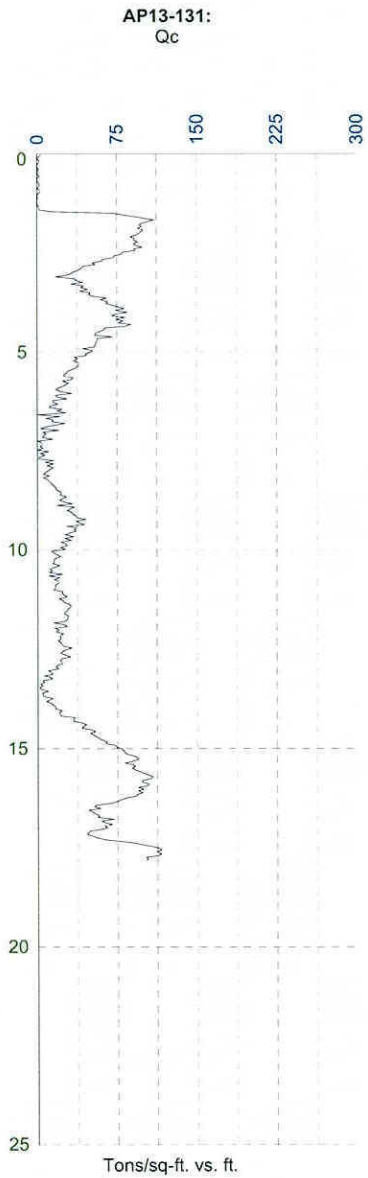

AP13-130:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

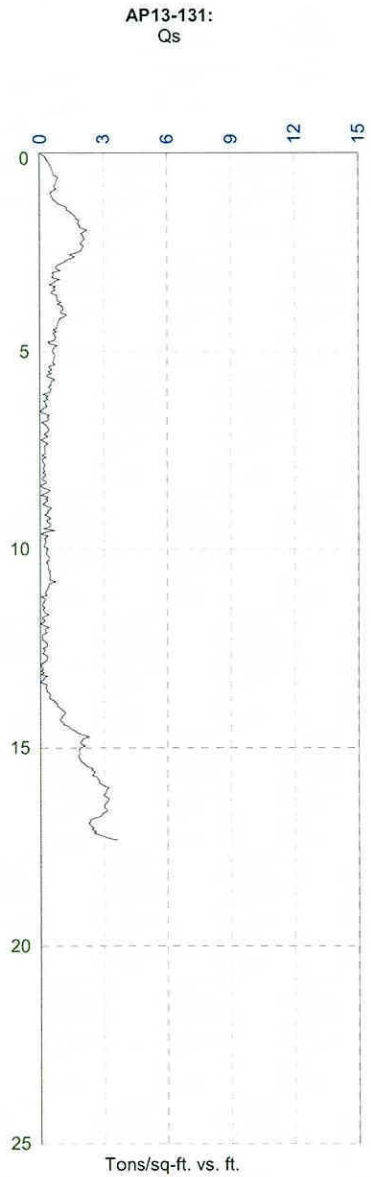

AP13-130:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

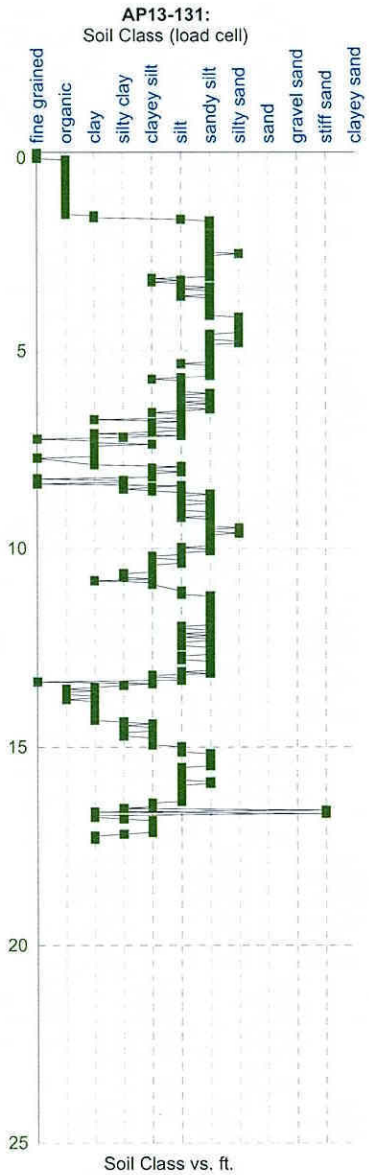

AP13-130:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

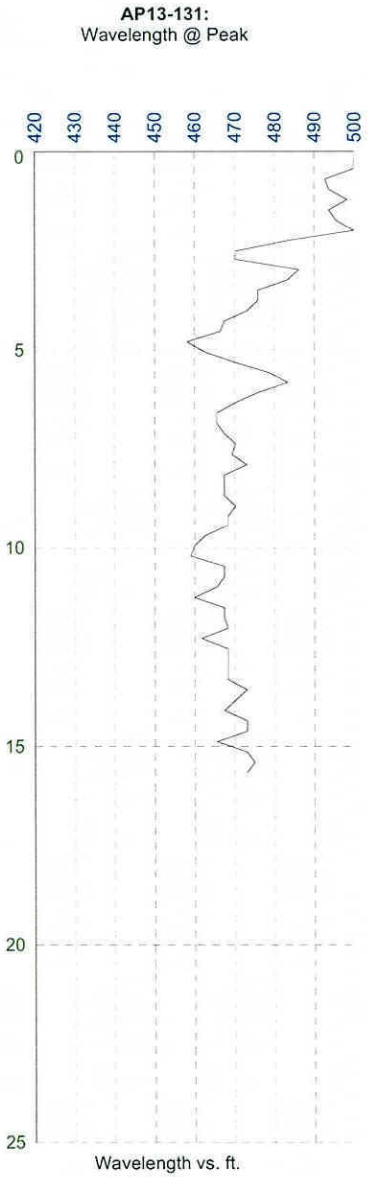

AP13-130:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

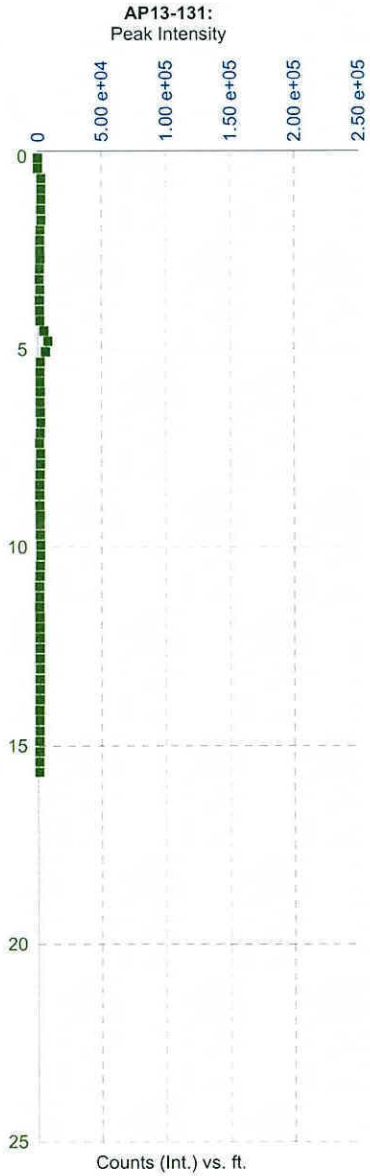

AP13-130:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

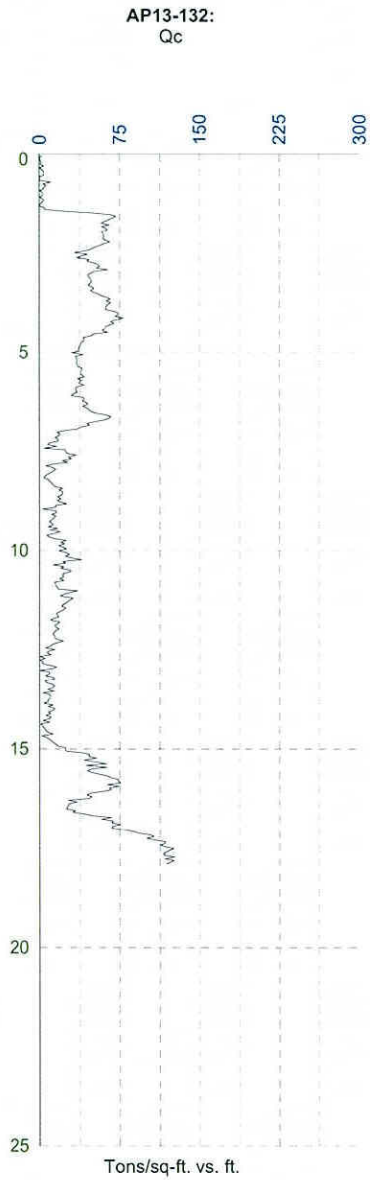

AP13-131:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

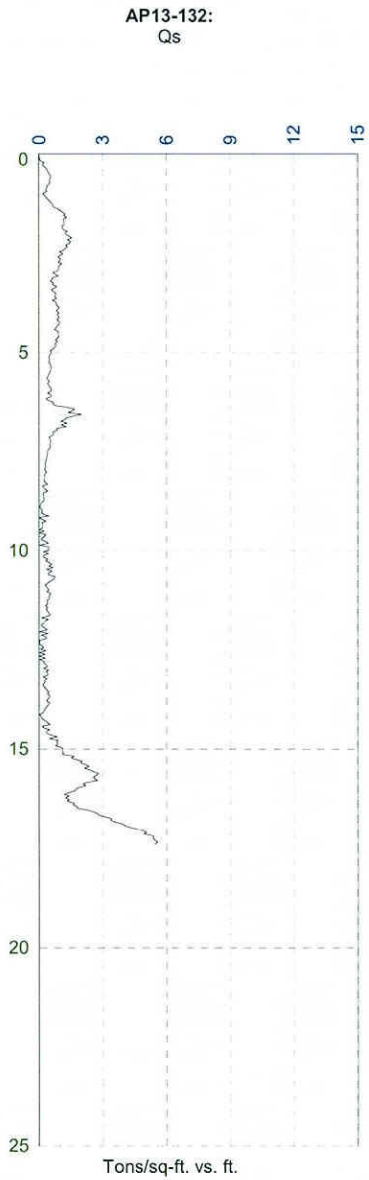

AP13-131:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

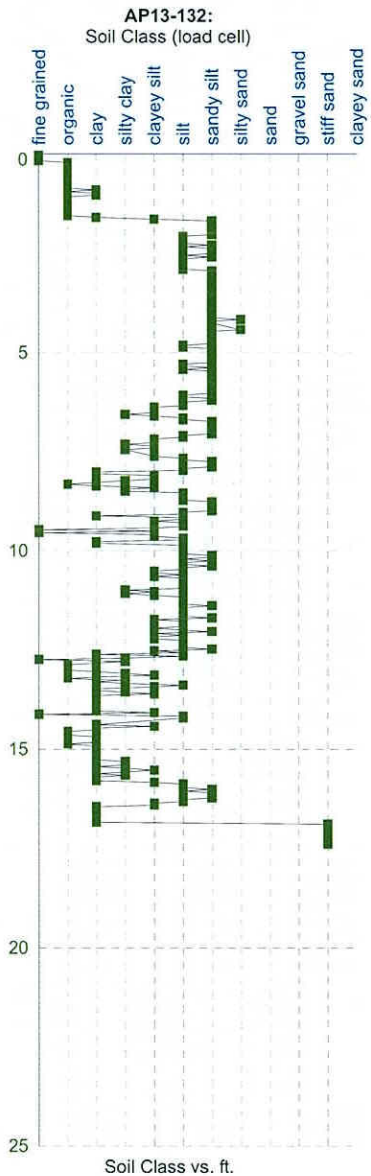

AP13-131:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

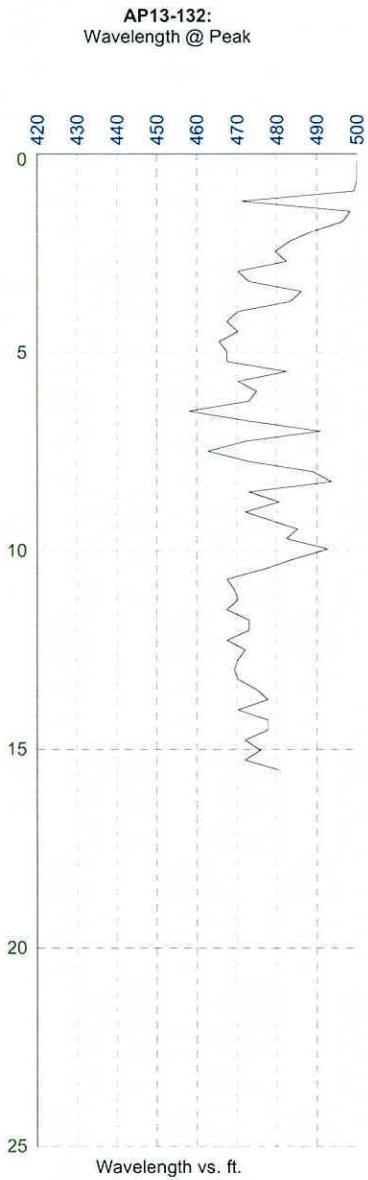

AP13-131:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

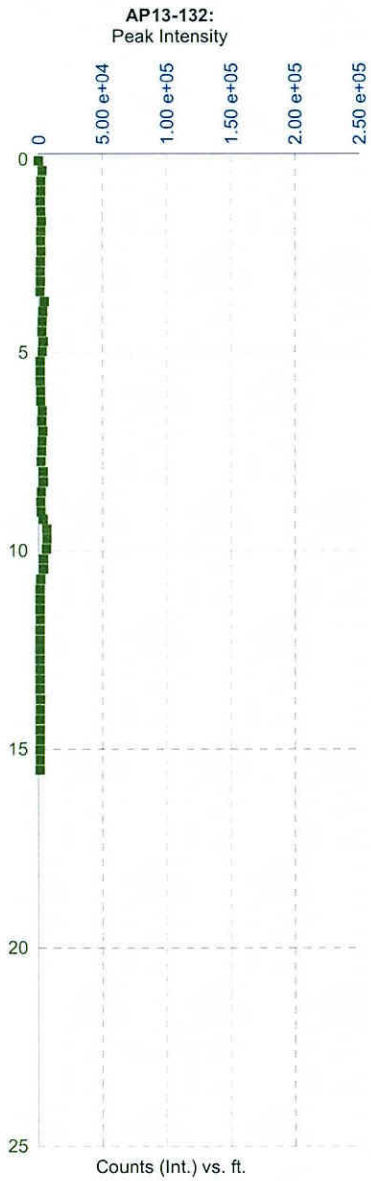

AP13-131:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

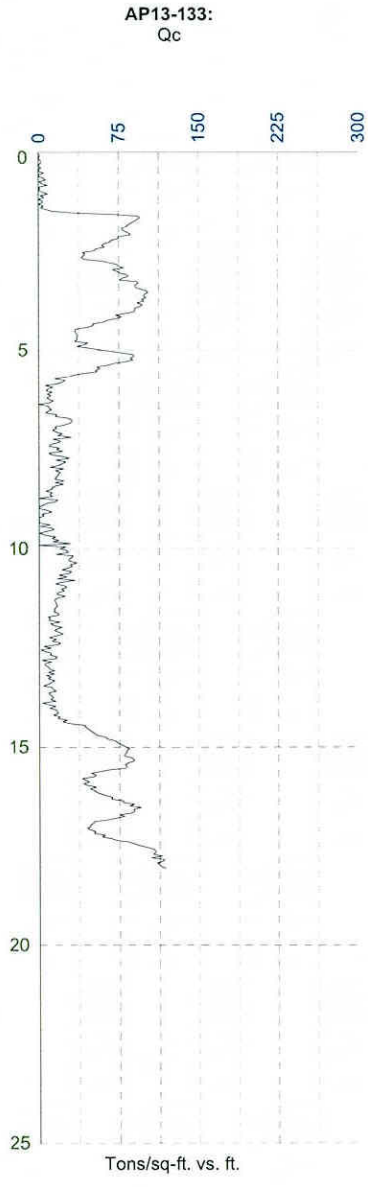

AP13-132:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

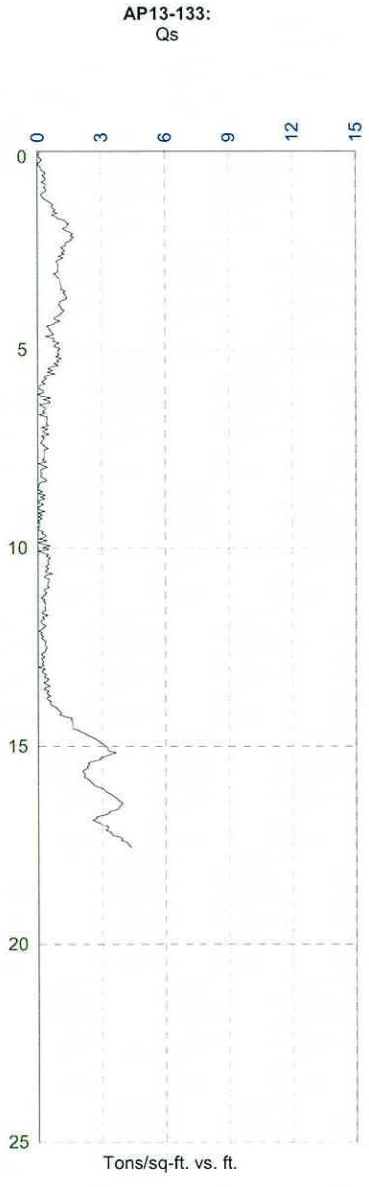

AP13-132:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

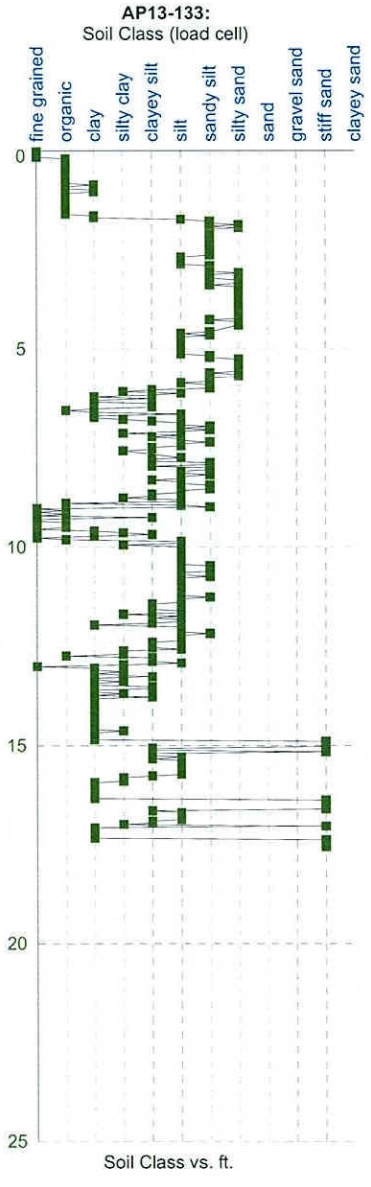

AP13-132:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

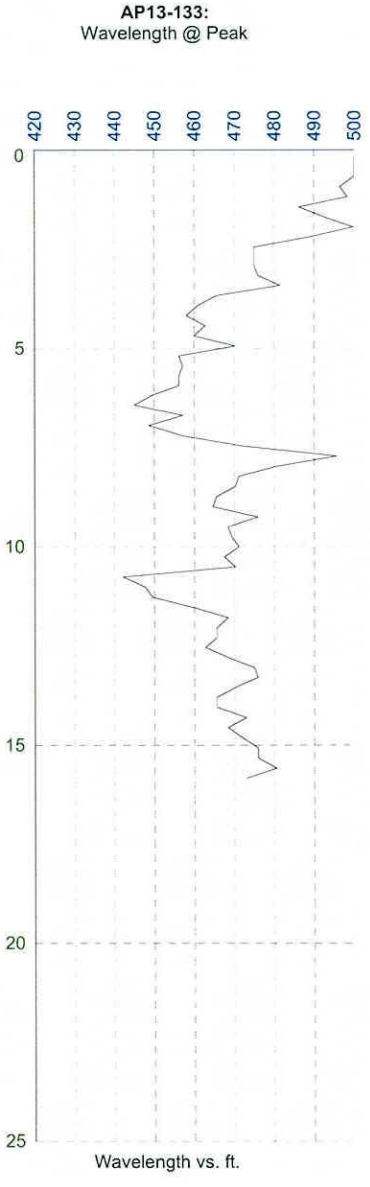

AP13-132:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

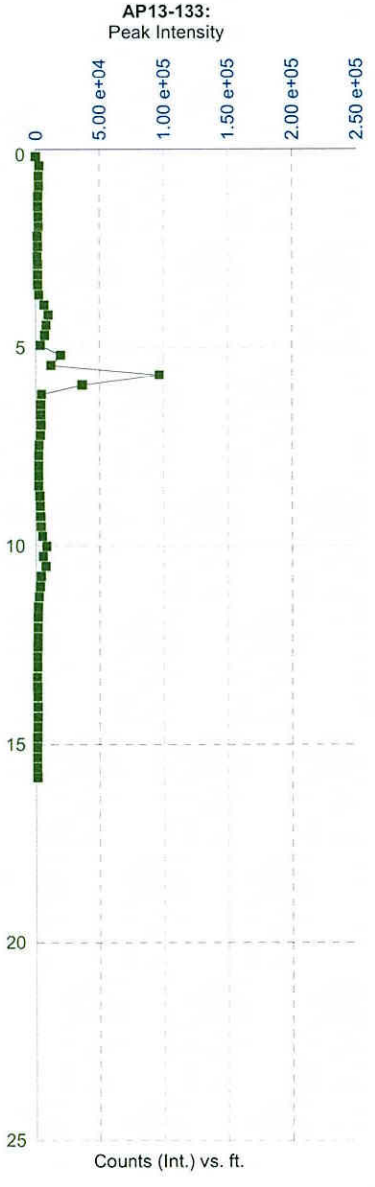

AP13-132:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

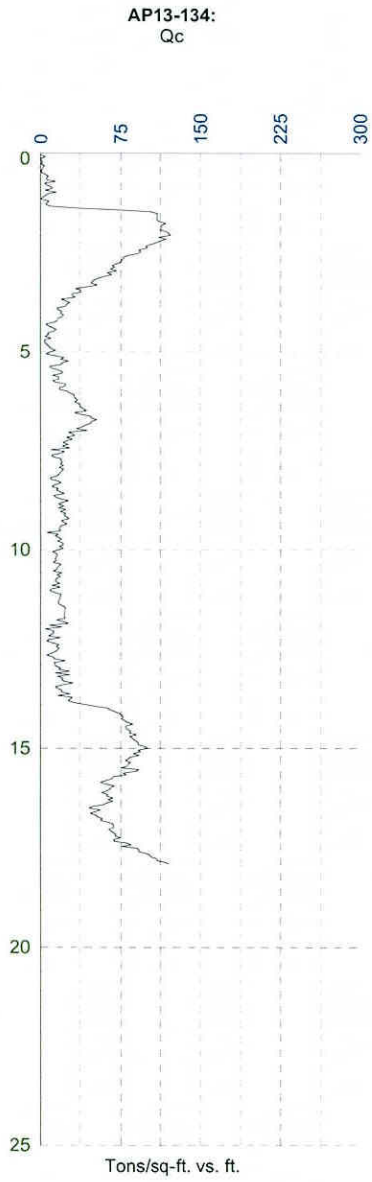

AP13-133:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

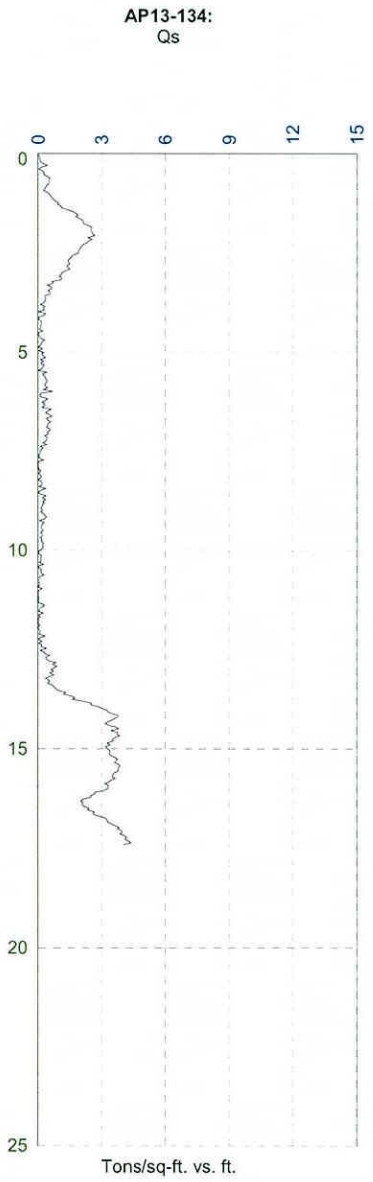

AP13-133:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

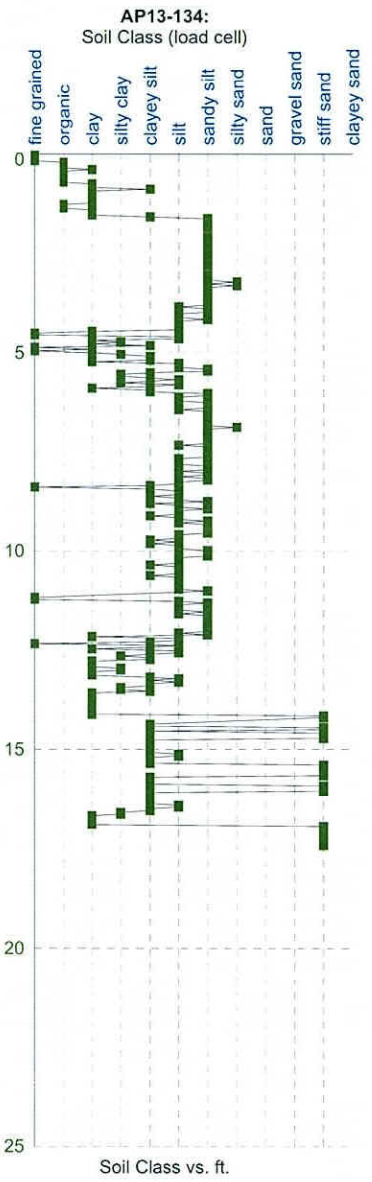

AP13-133:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

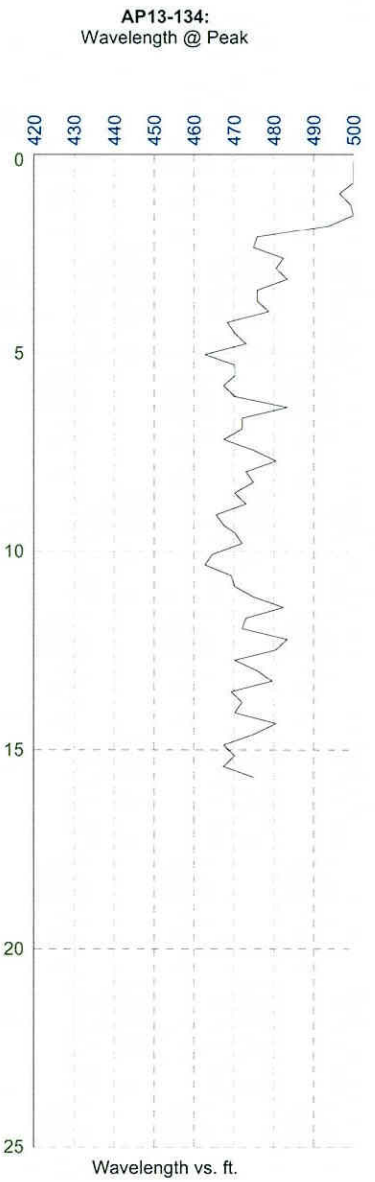

AP13-133:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

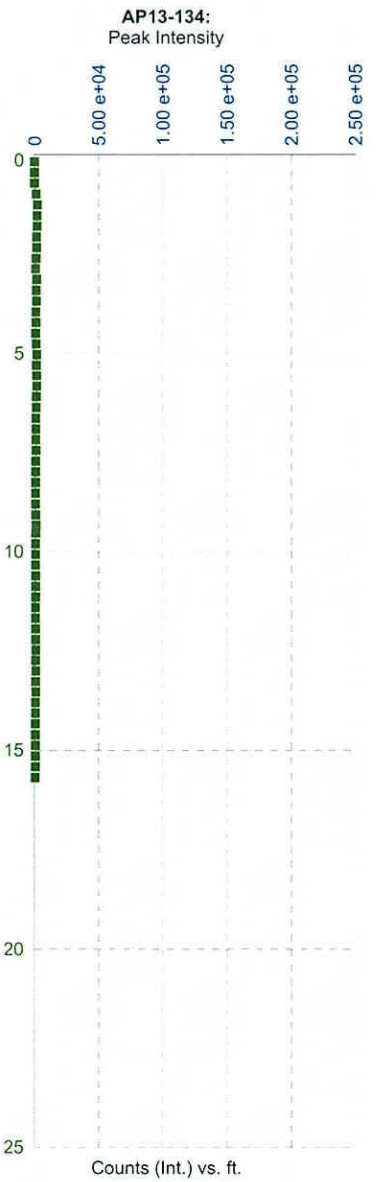

AP13-133:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

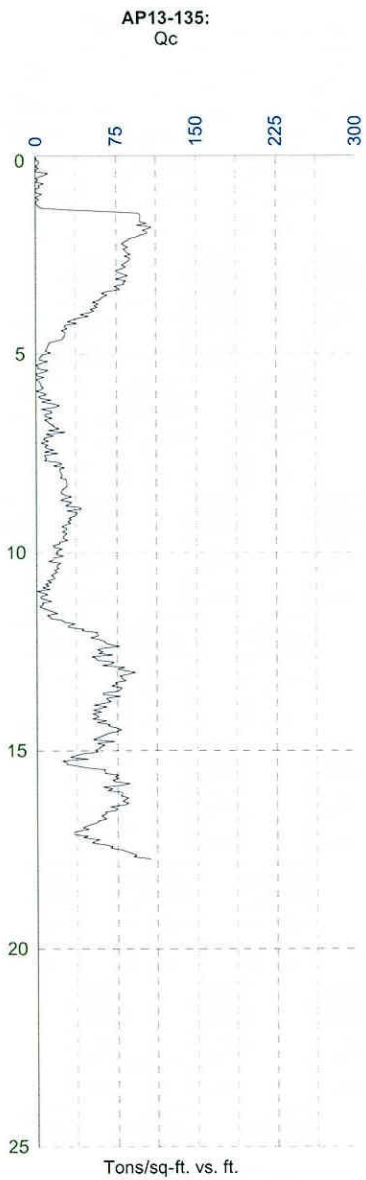

AP13-134:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

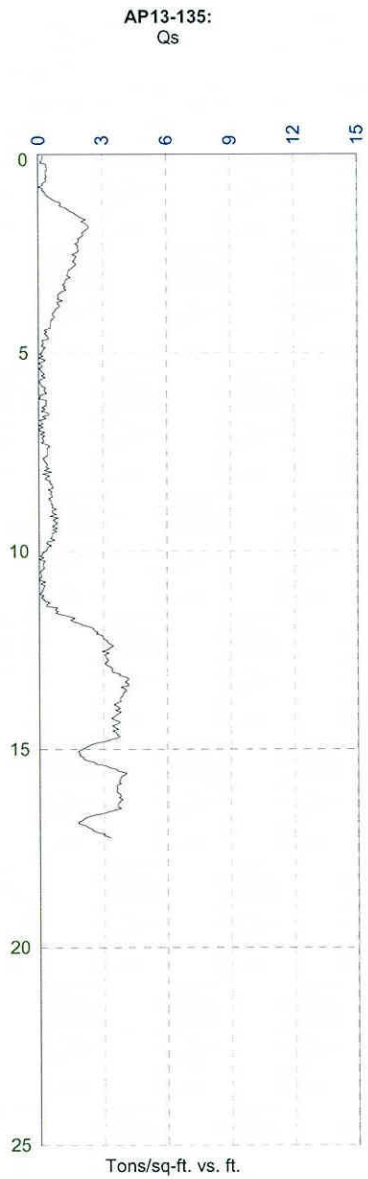

AP13-134:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

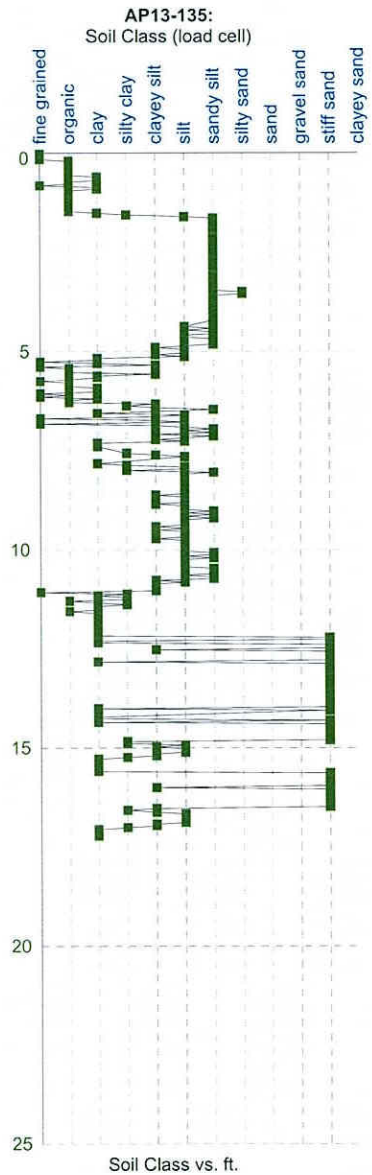

AP13-134:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

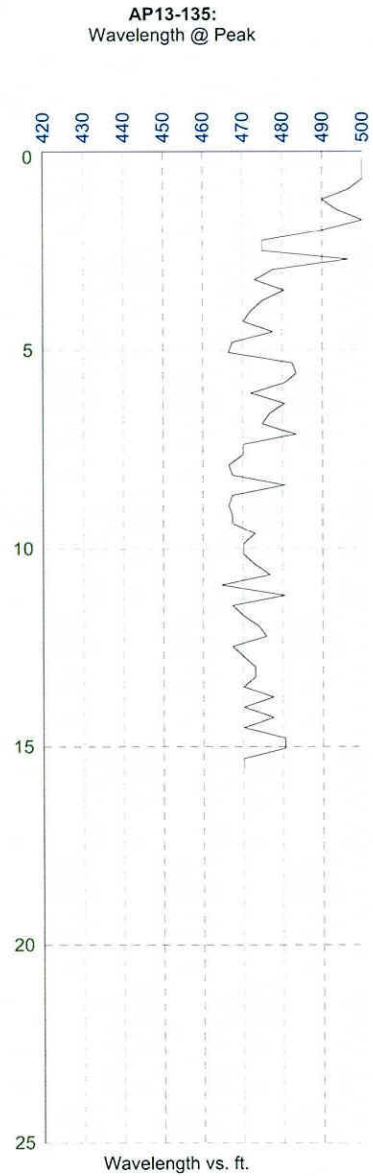

AP13-134:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

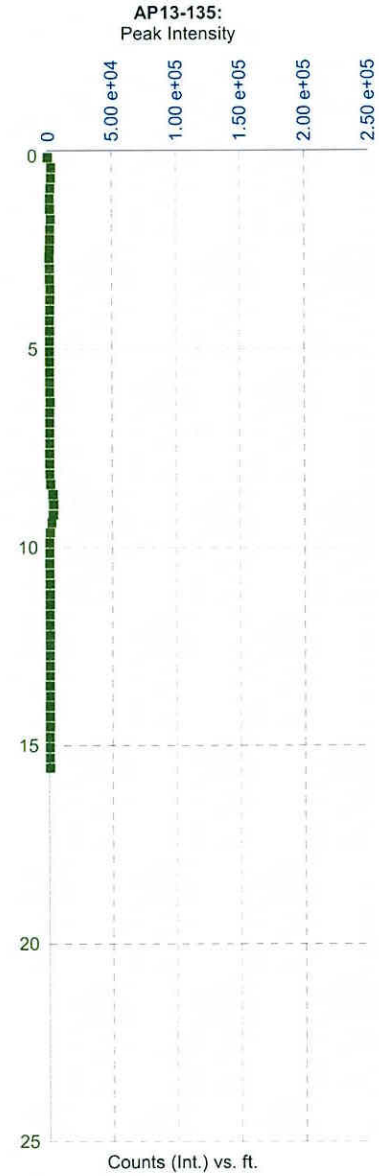

AP13-134:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

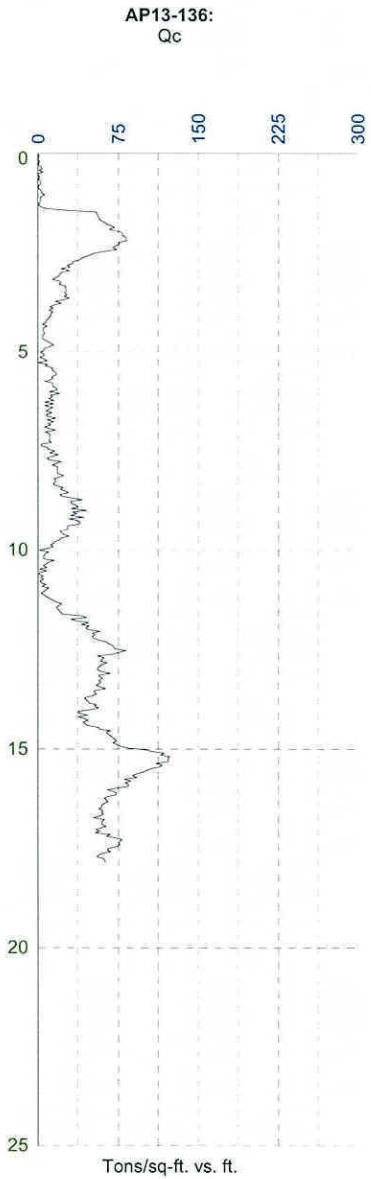

AP13-135:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

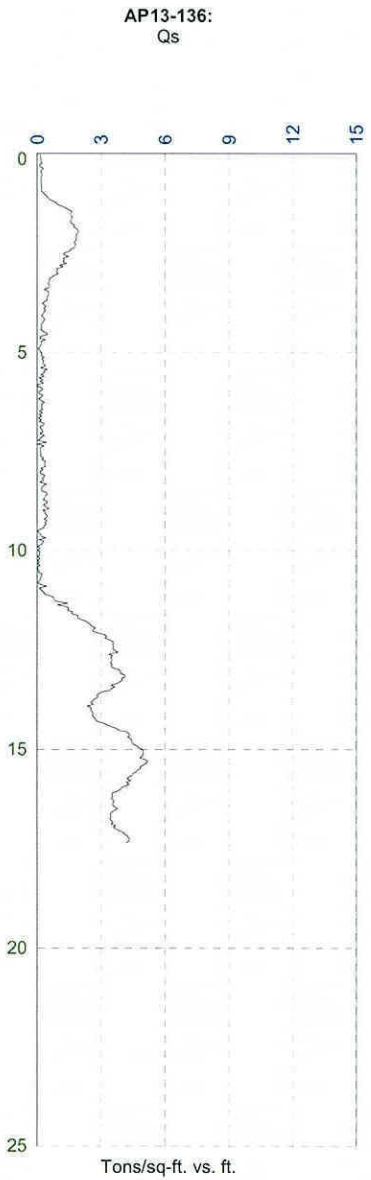

AP13-135:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

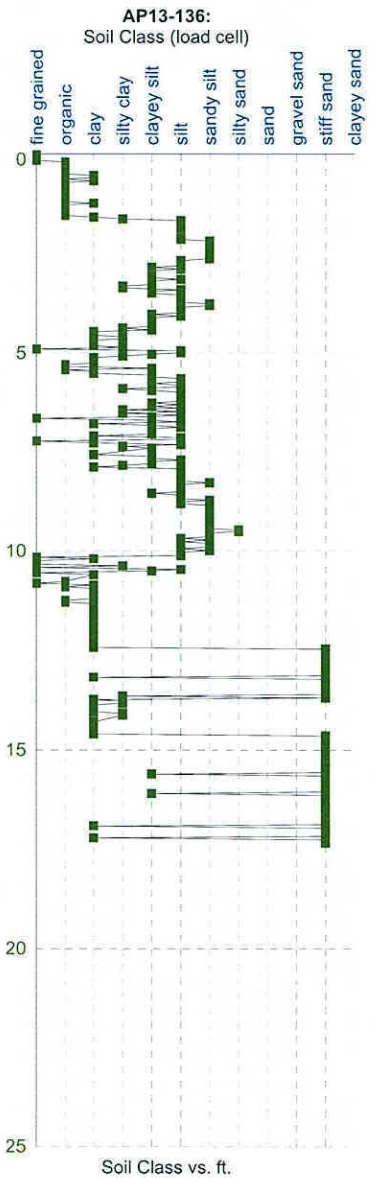

AP13-135:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

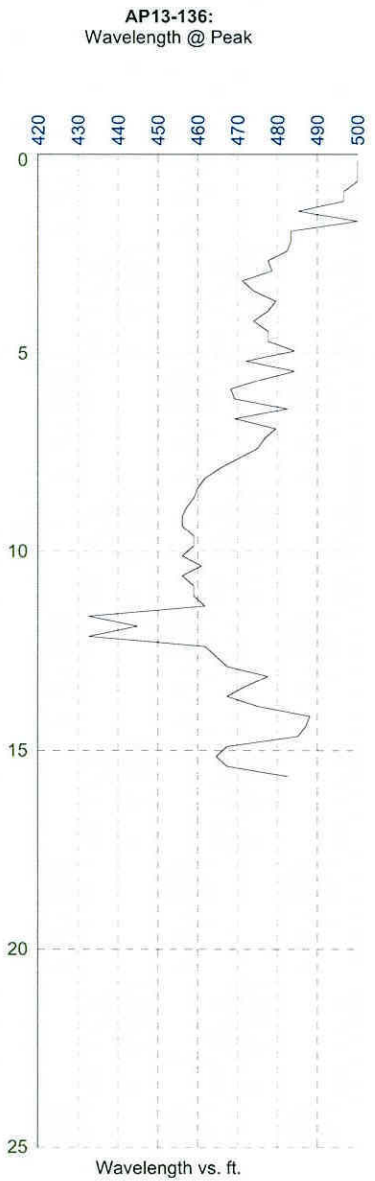

AP13-135:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

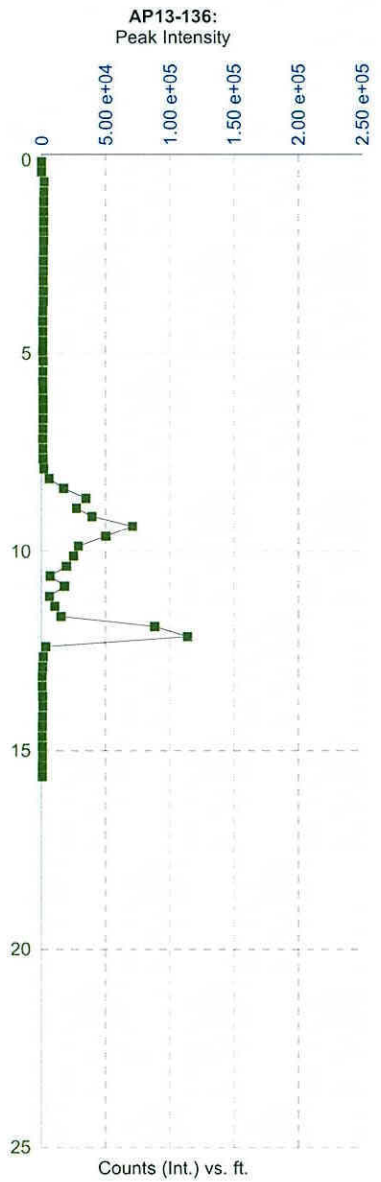

AP13-135:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

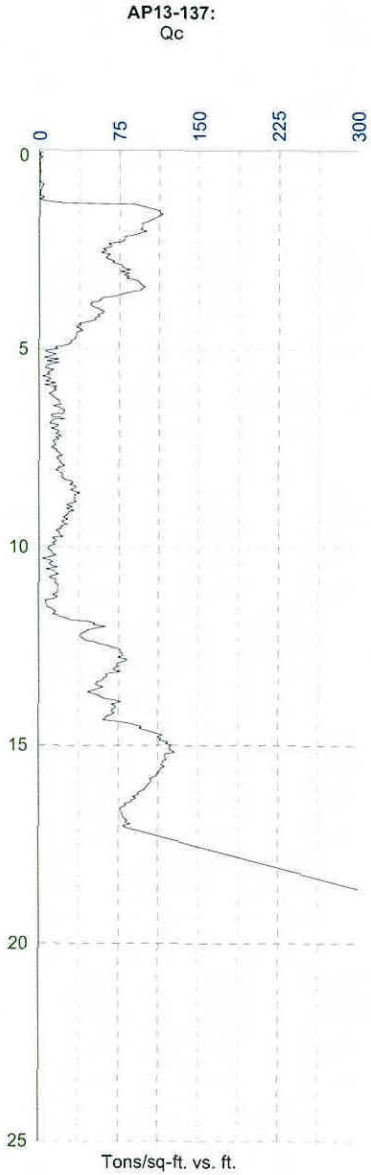

AP13-136:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

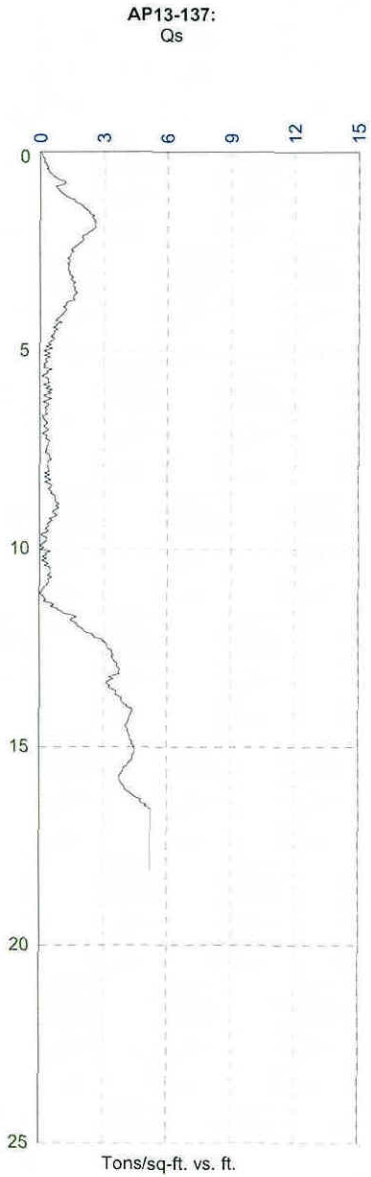

AP13-136:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

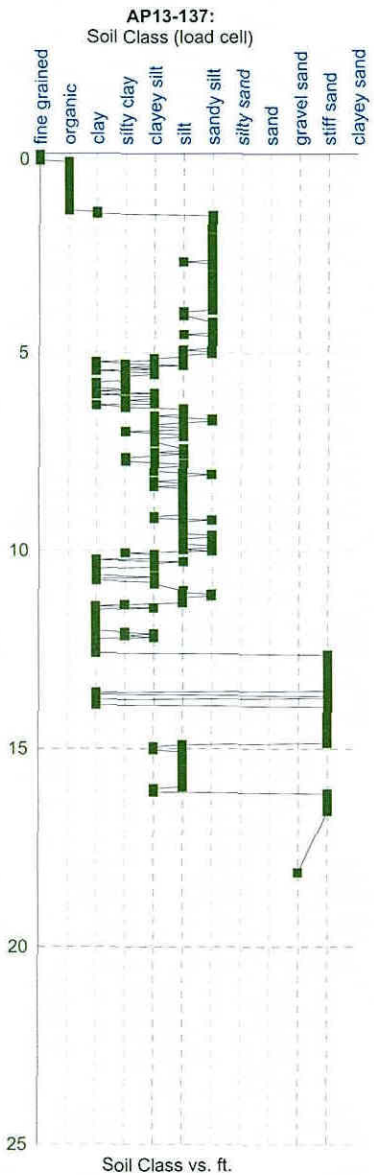

AP13-136:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

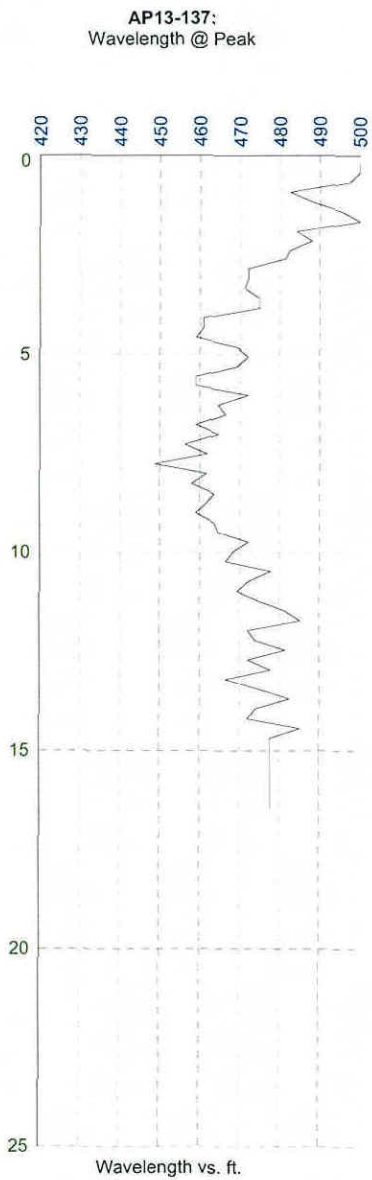

AP13-136:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

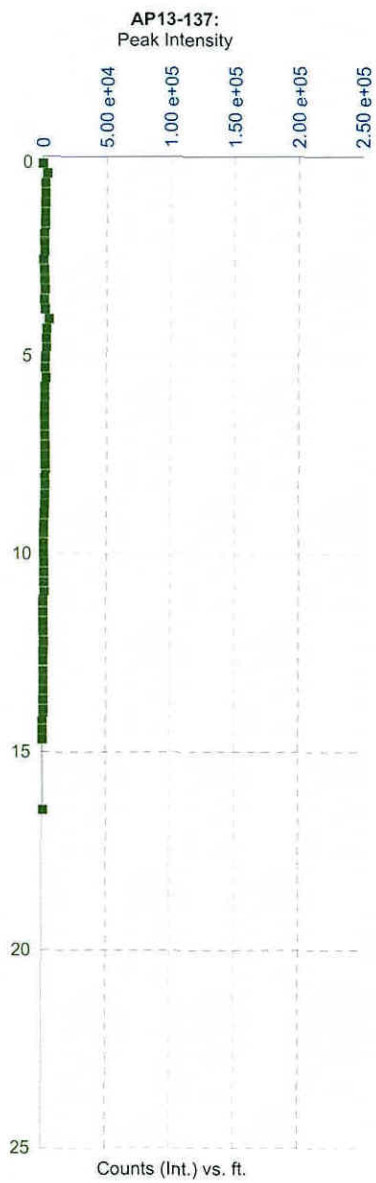

AP13-136:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

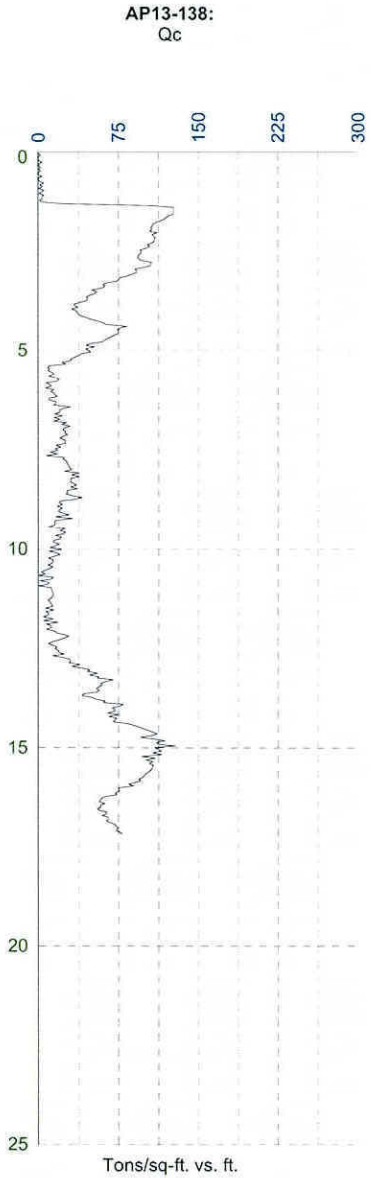

AP13-137:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

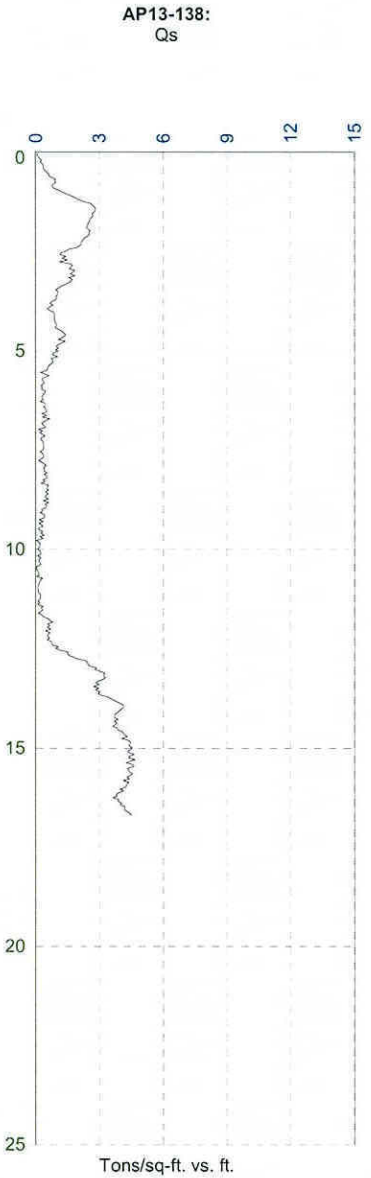

AP13-137:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

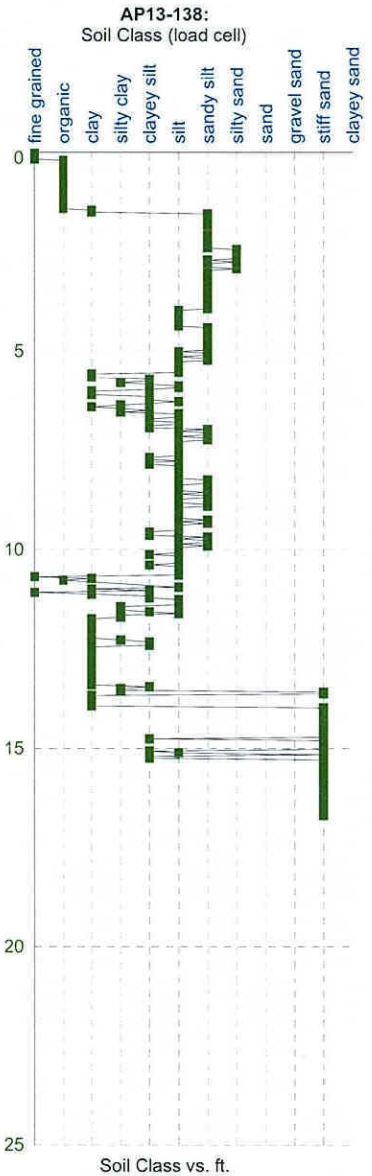

AP13-137:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

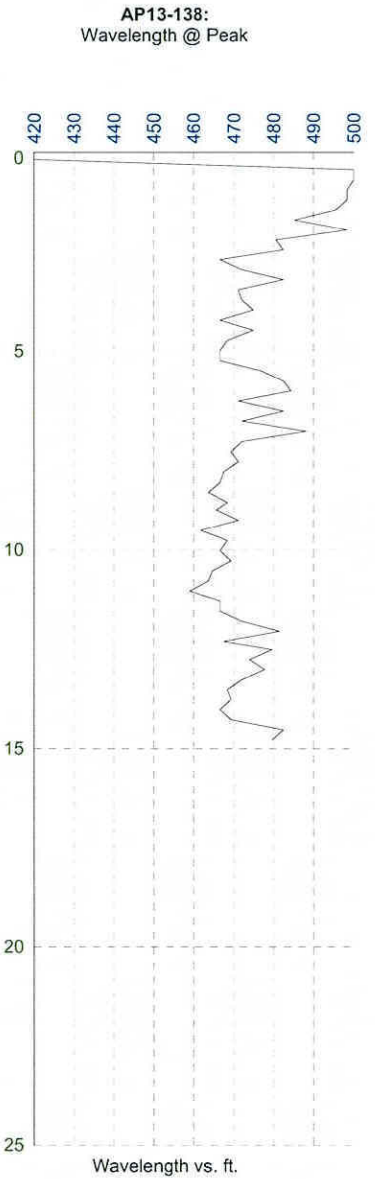

AP13-137:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

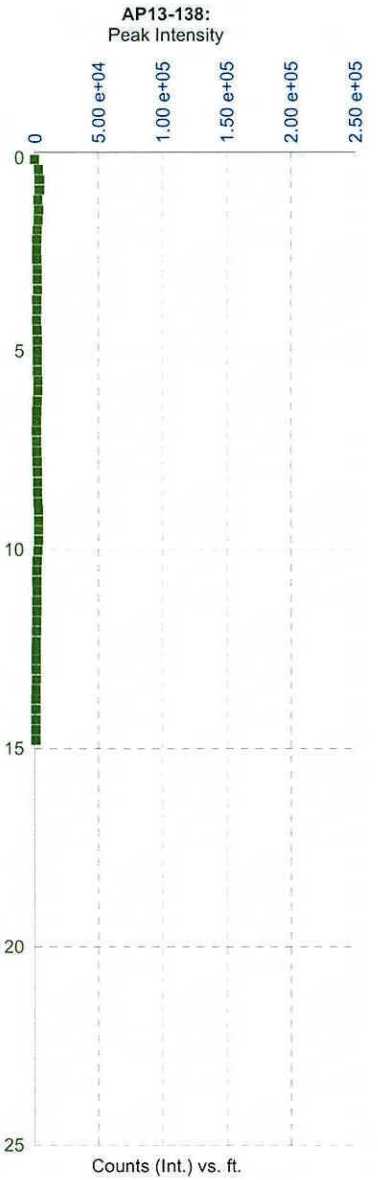

AP13-137:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

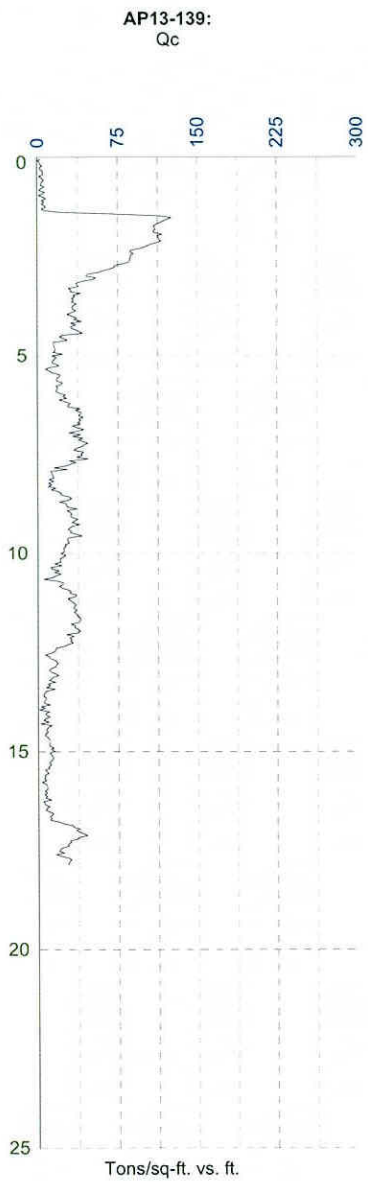

AP13-138:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

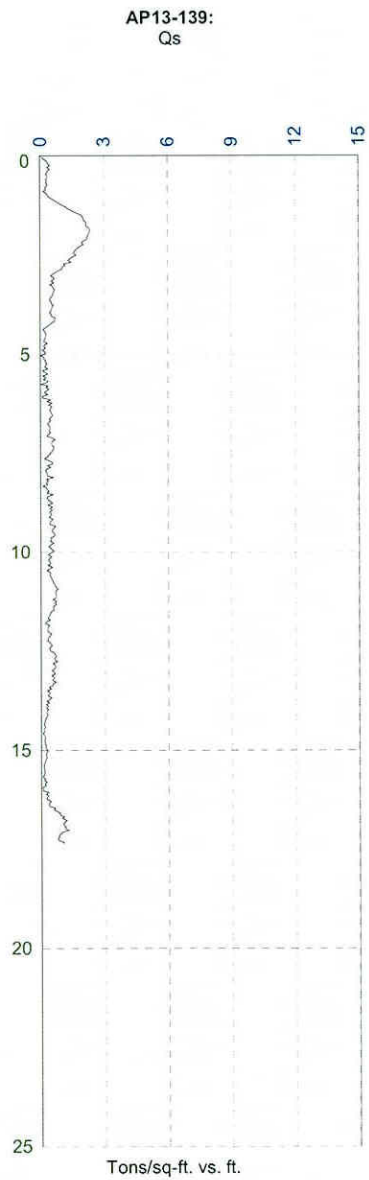

AP13-138:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

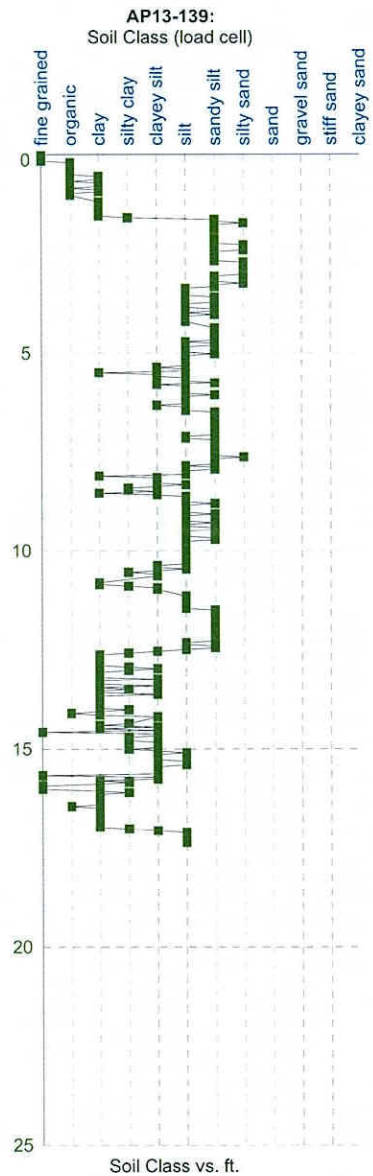

AP13-138:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

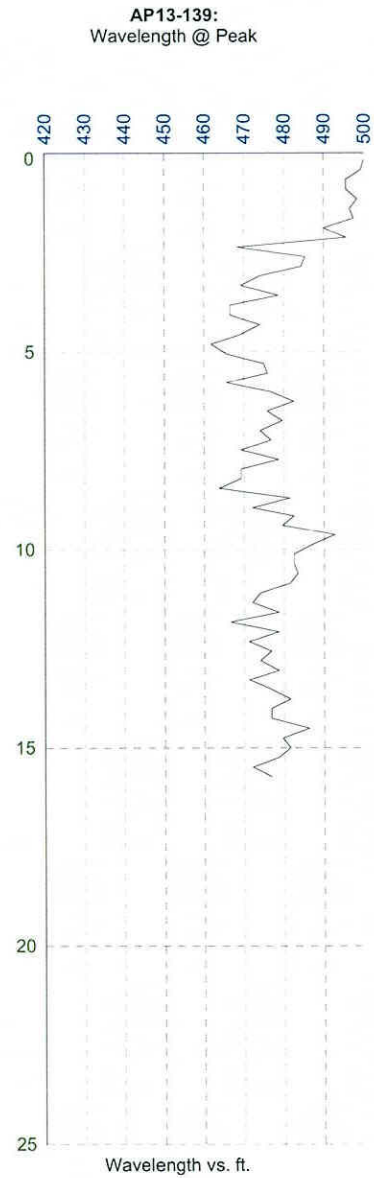

AP13-138:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

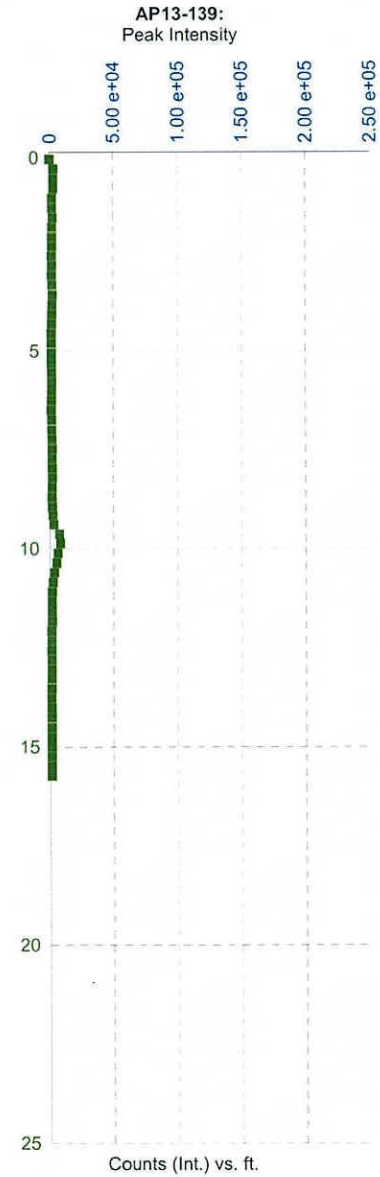

AP13-138:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

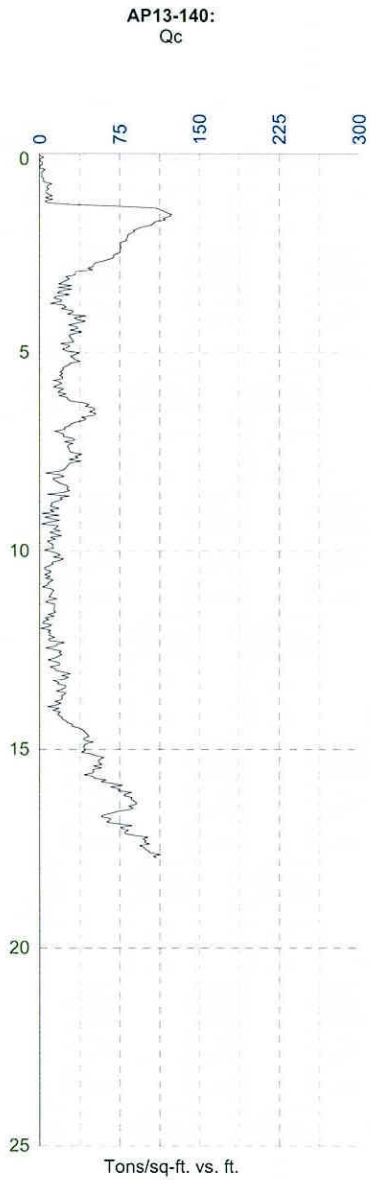

AP13-139:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

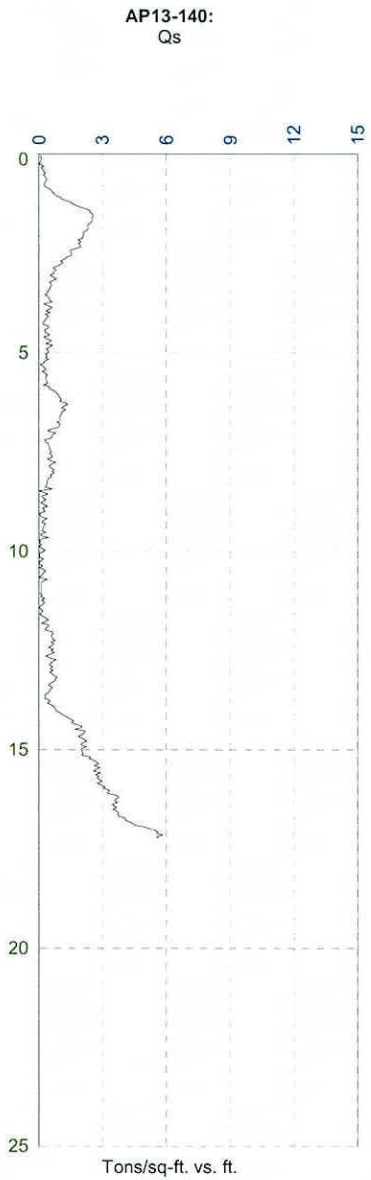

AP13-139:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

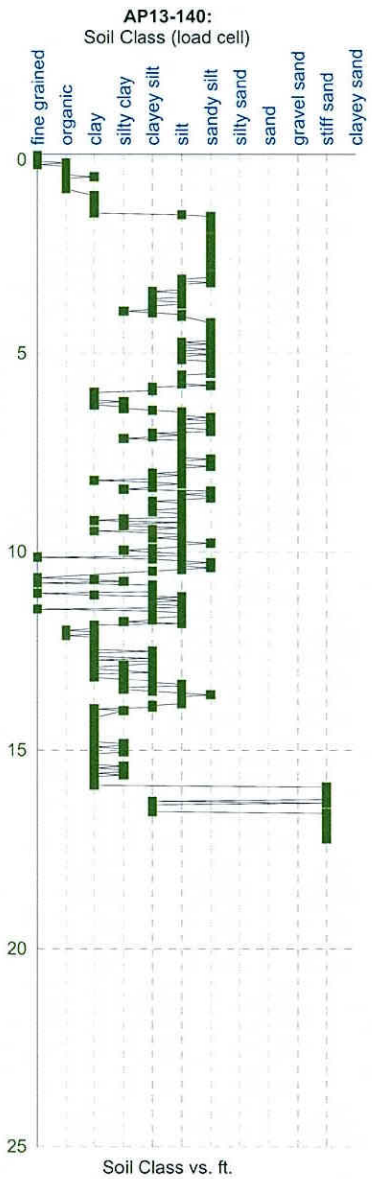

AP13-139:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

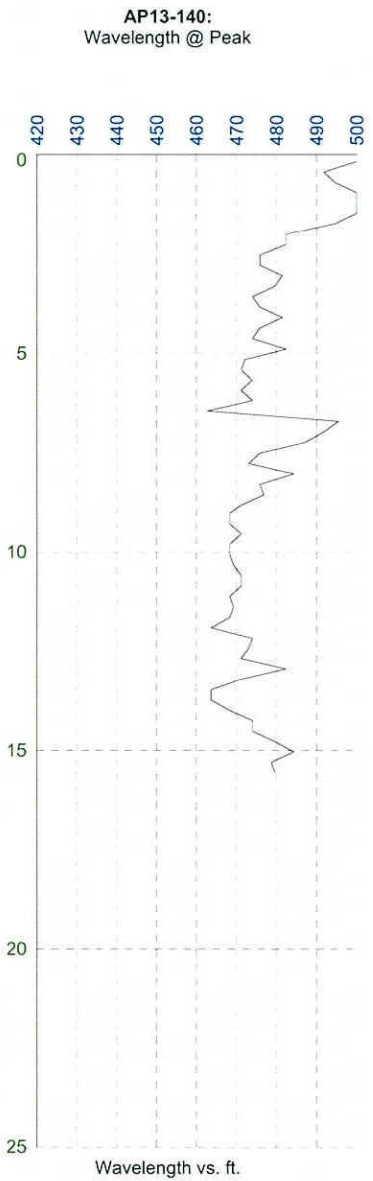

AP13-139:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

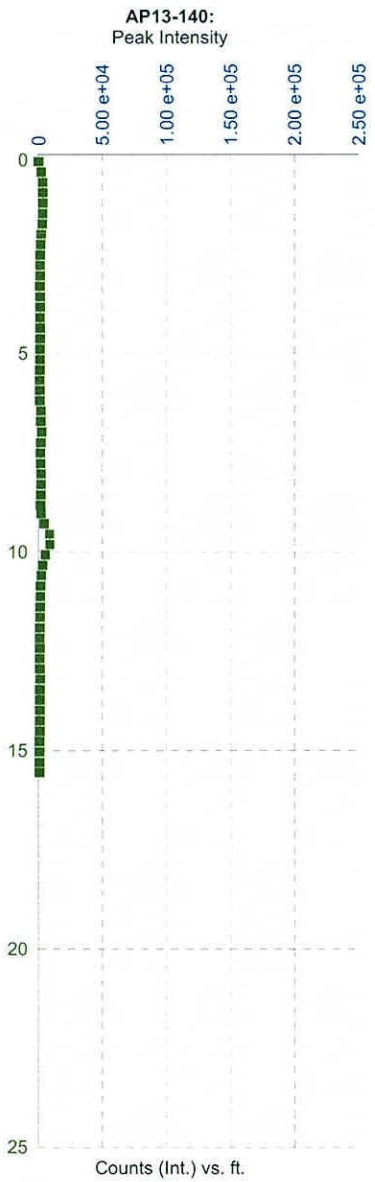

AP13-139:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

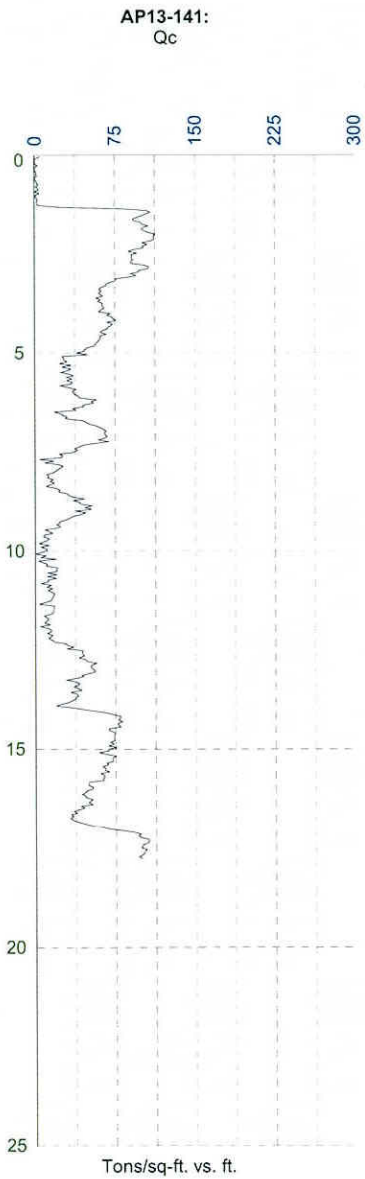

AP13-140:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

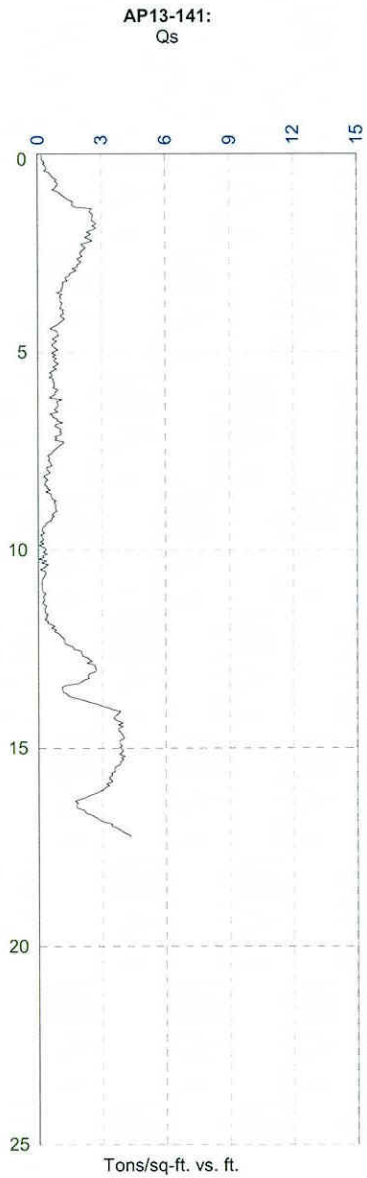

AP13-140:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

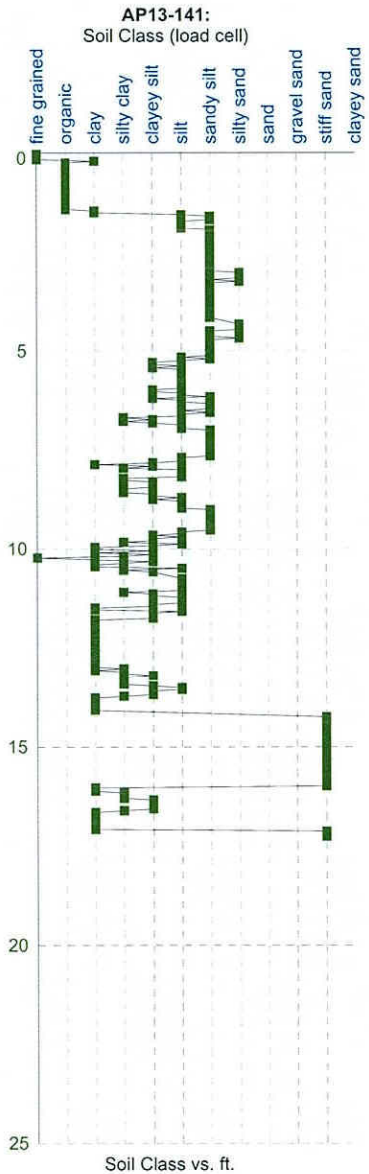

AP13-140:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

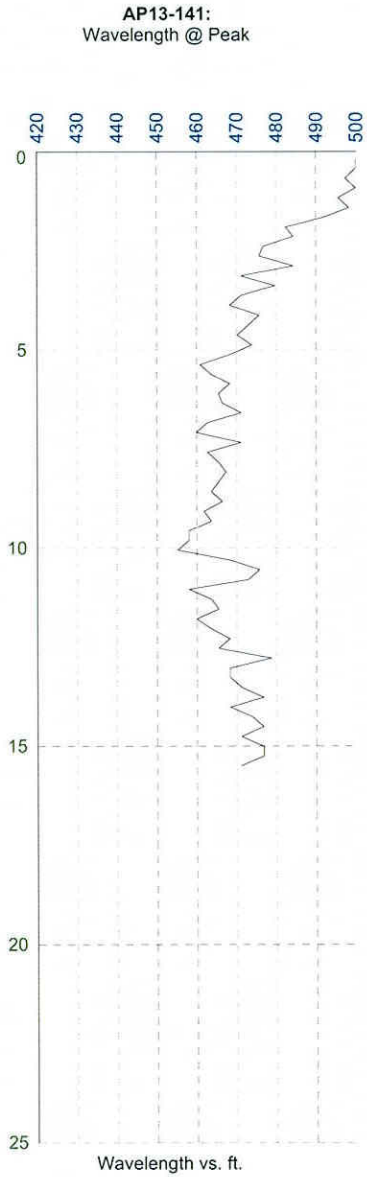

AP13-140:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

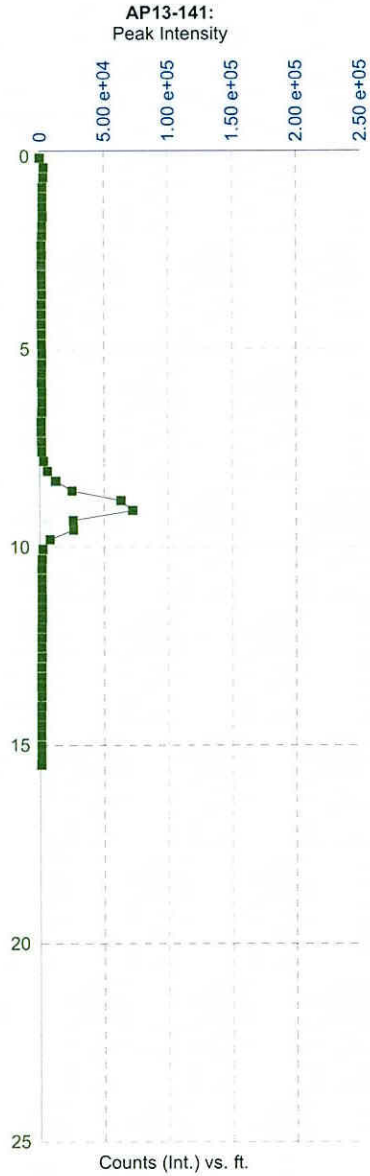

AP13-140:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

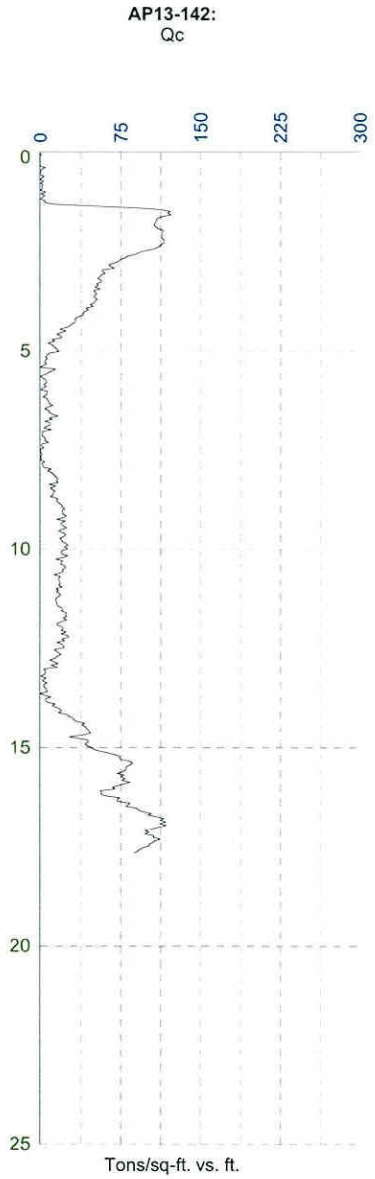

AP13-141:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

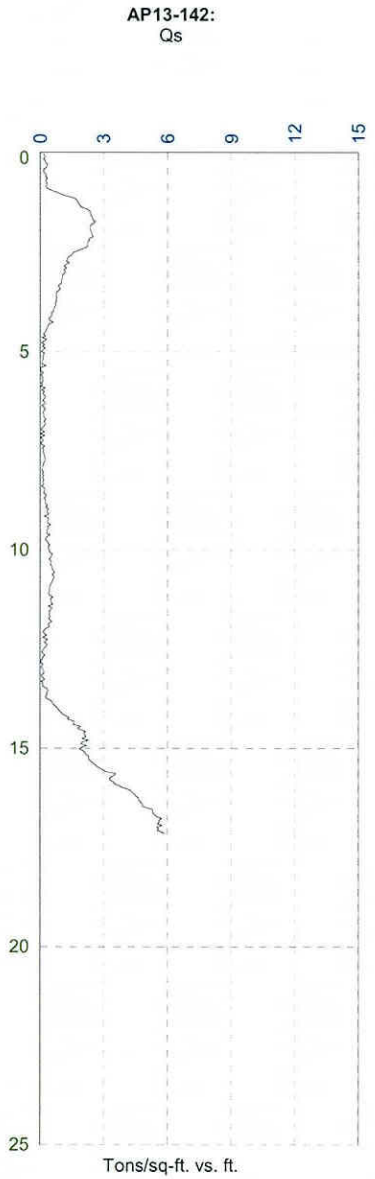

AP13-141:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

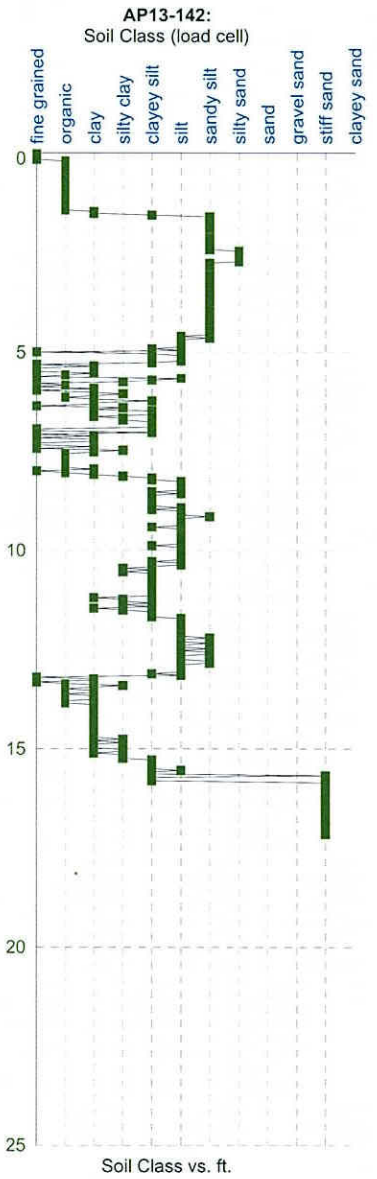

AP13-141:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

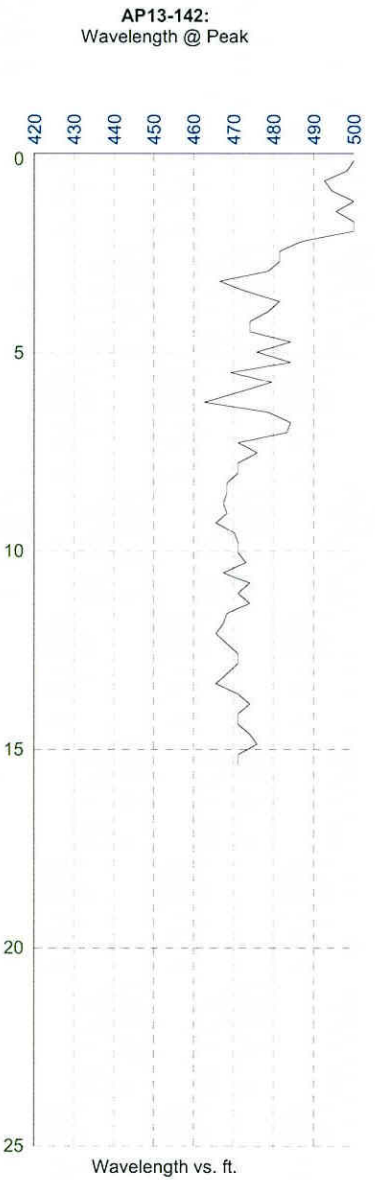

AP13-141:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

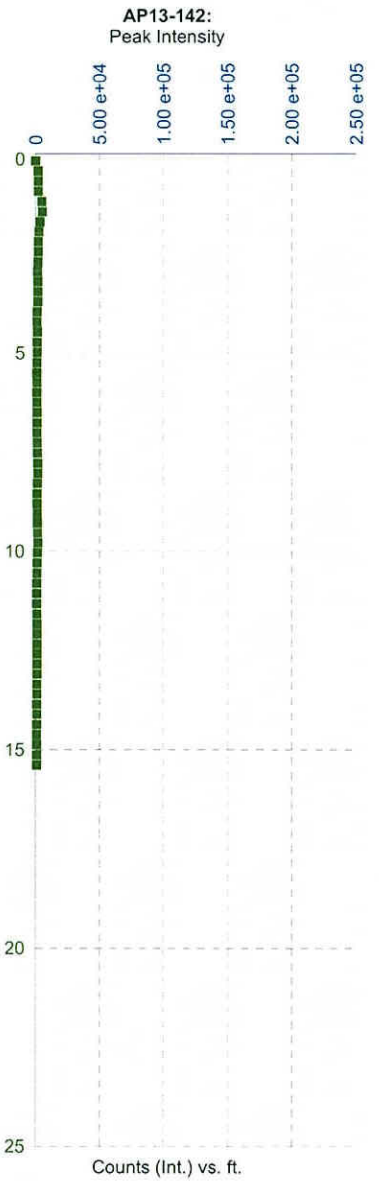

AP13-141:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.


AP13-142:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

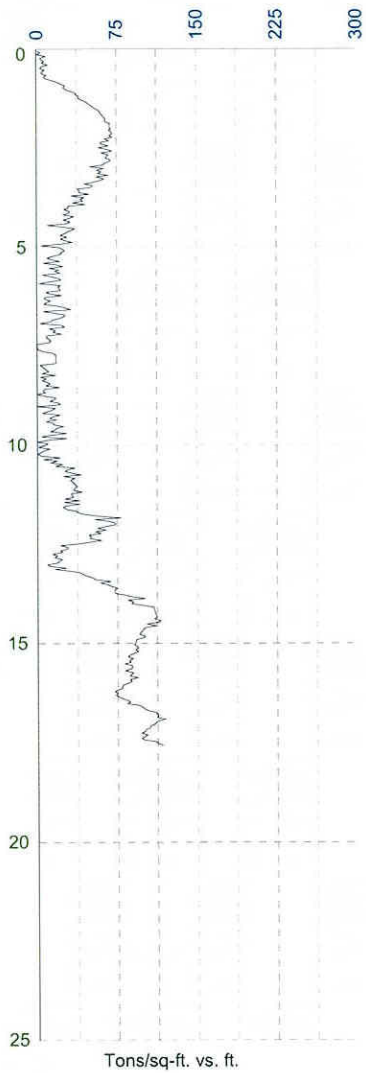

AP13-142:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.


AP13-142:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

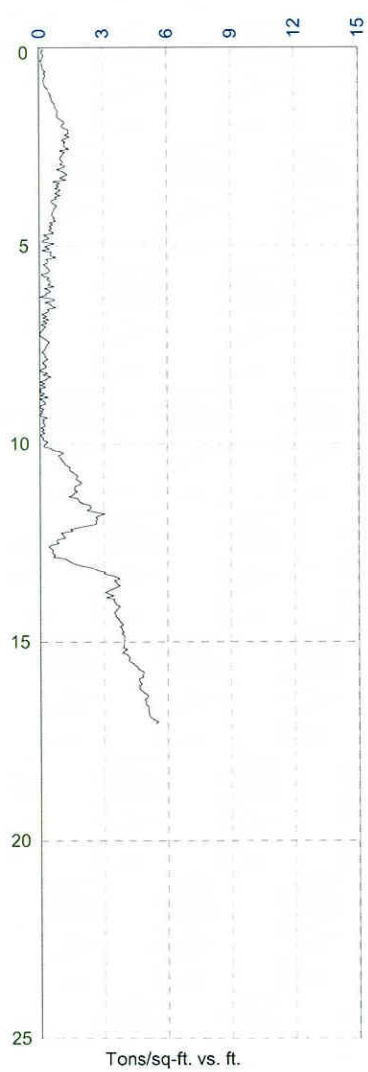

AP13-142:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.


AP13-142:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

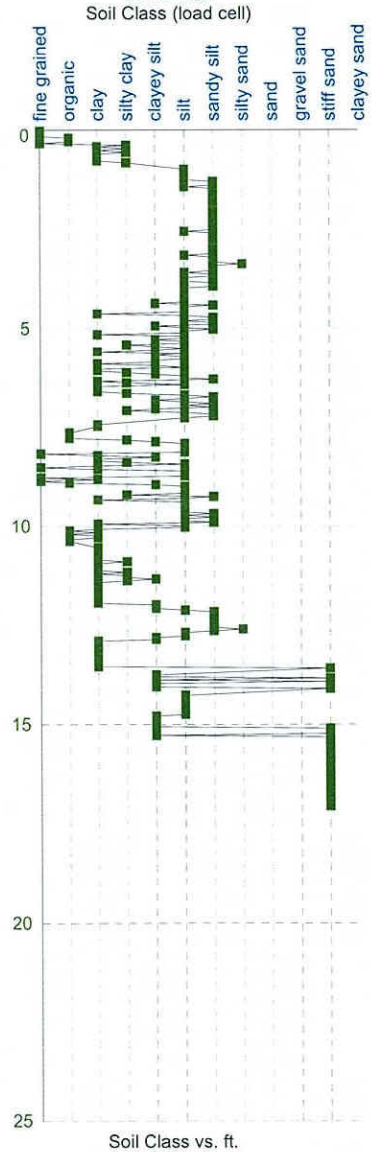
**AP13-143:**
Qc



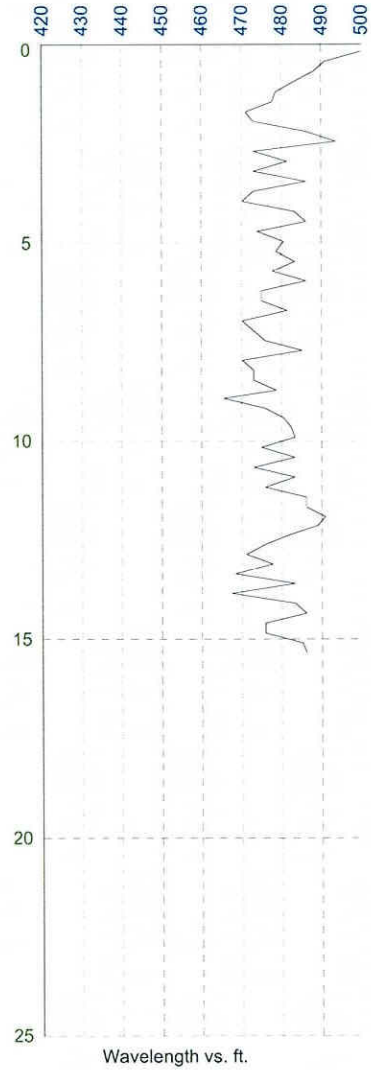

**AP13-143:**
Qs



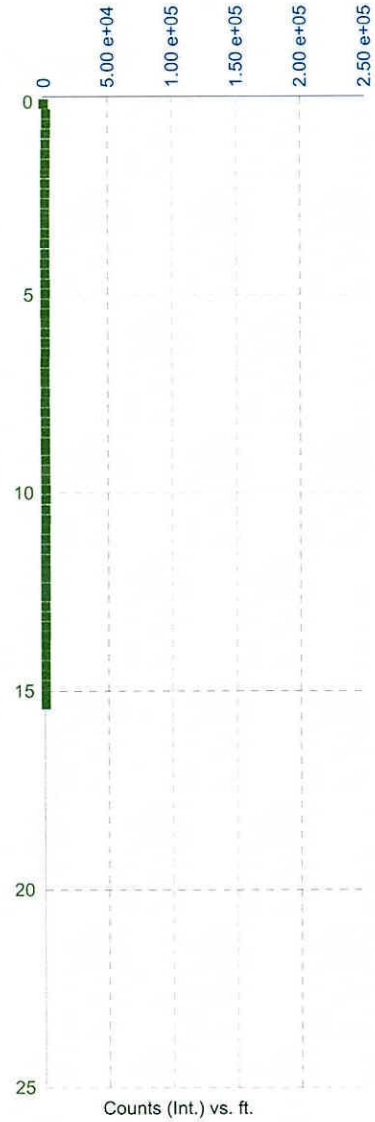

**AP13-143:**
Soil Class (load cell)

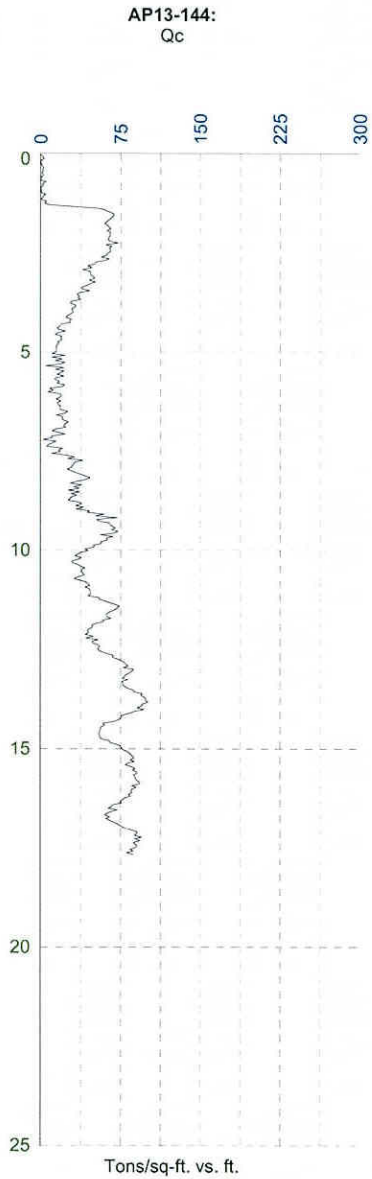


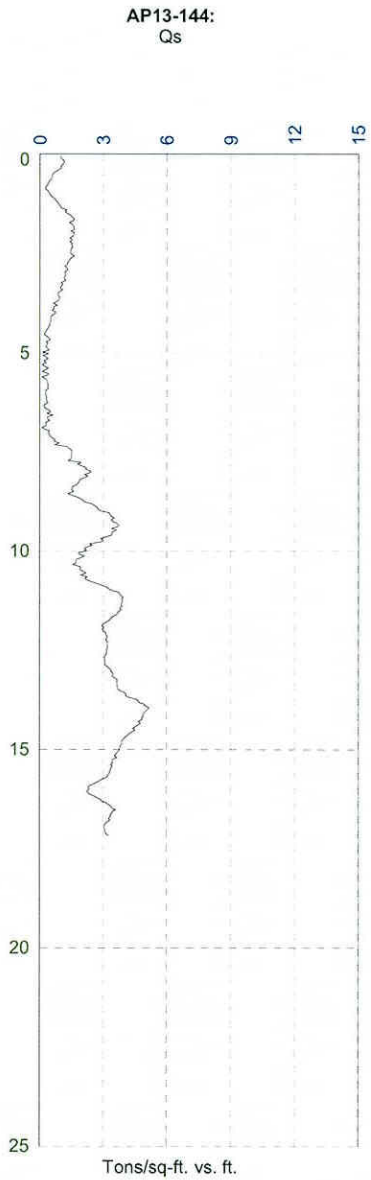

**AP13-143:**
Wavelength @ Peak

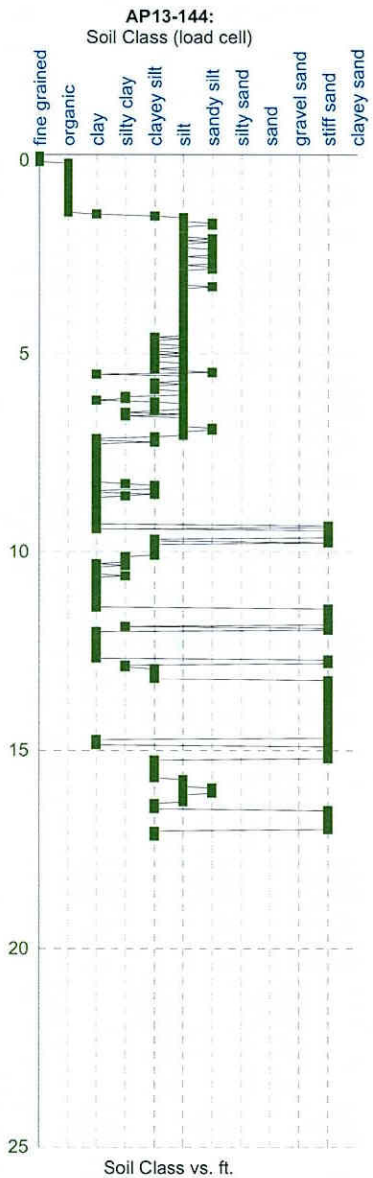


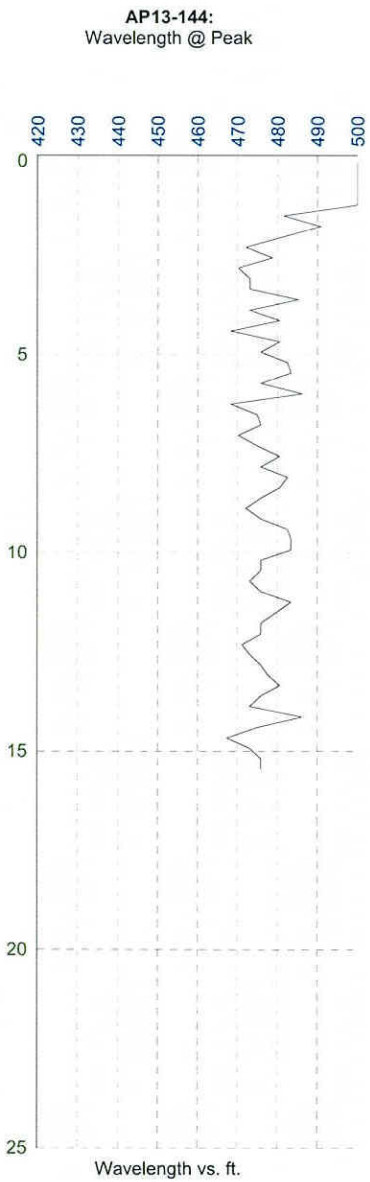

**AP13-143:**
Peak Intensity

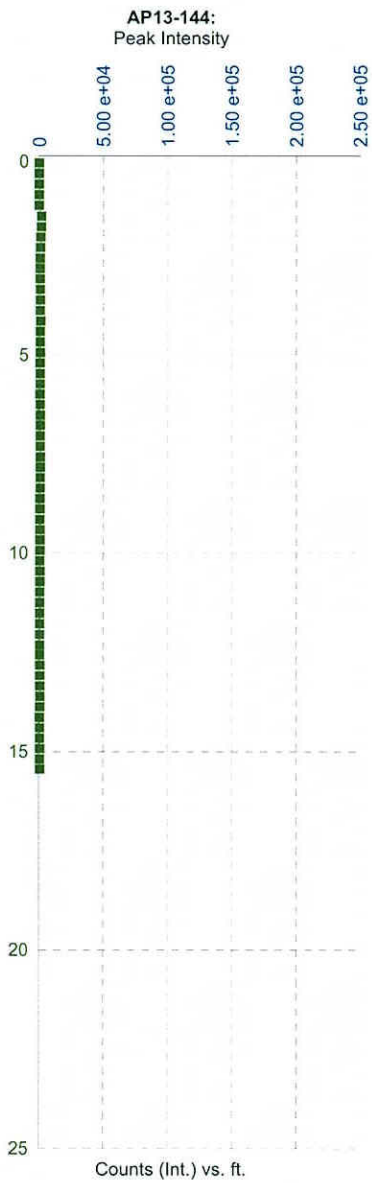


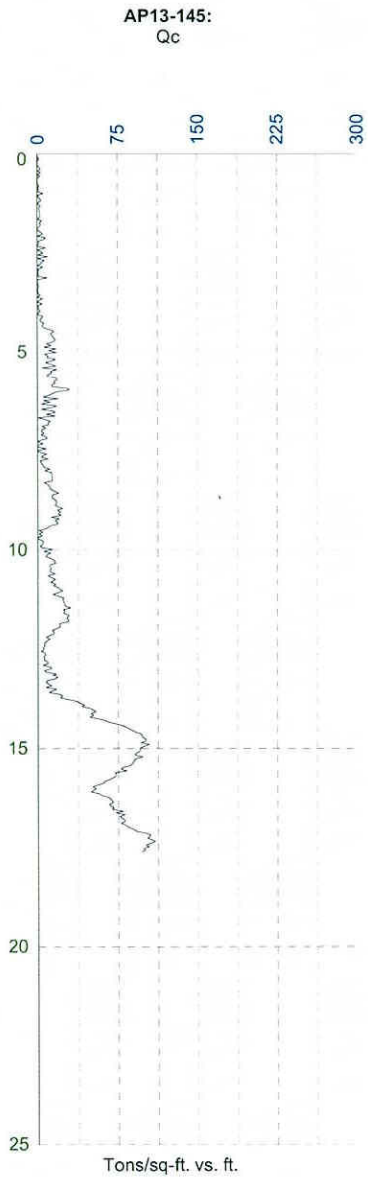

AP13-144:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

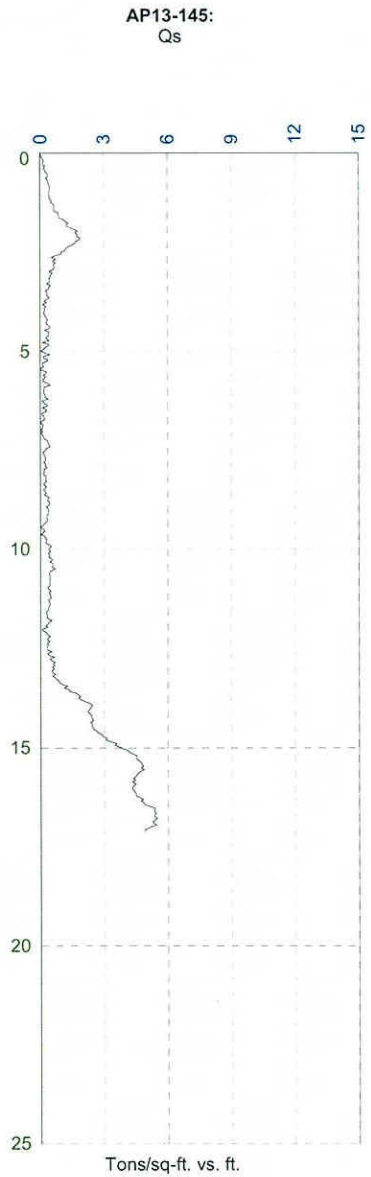

AP13-144:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

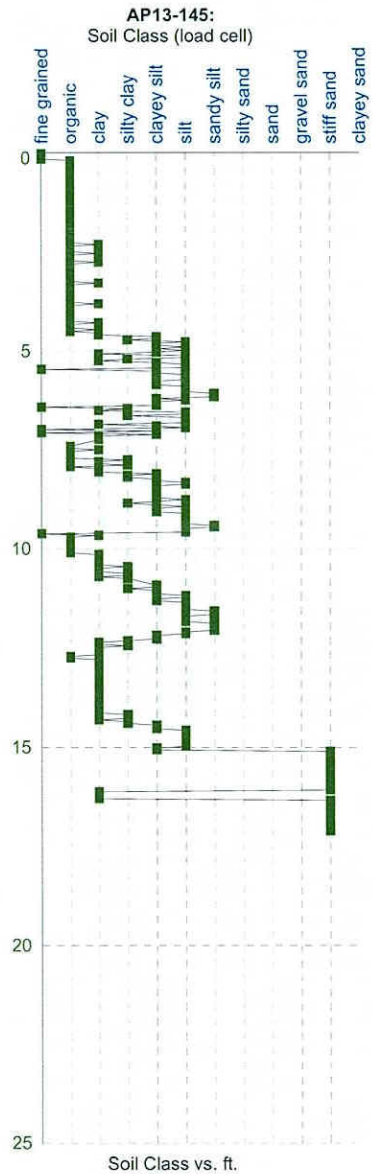

AP13-144:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

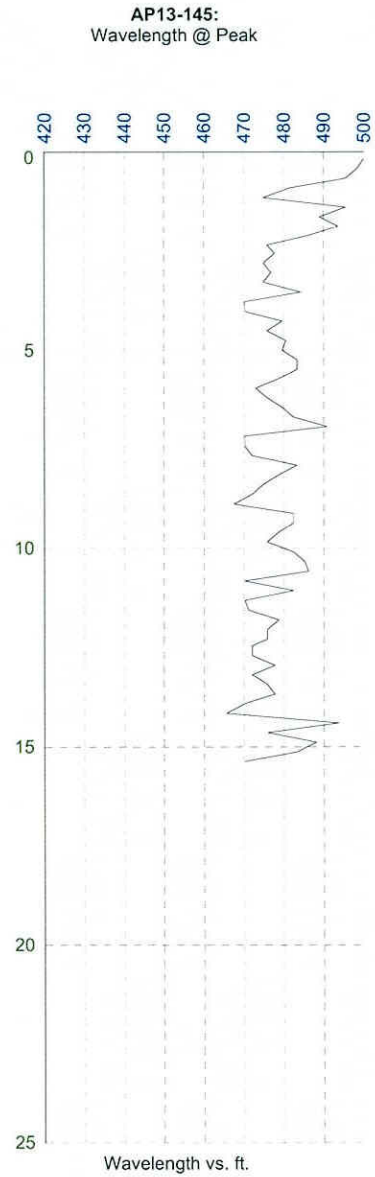

AP13-144:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

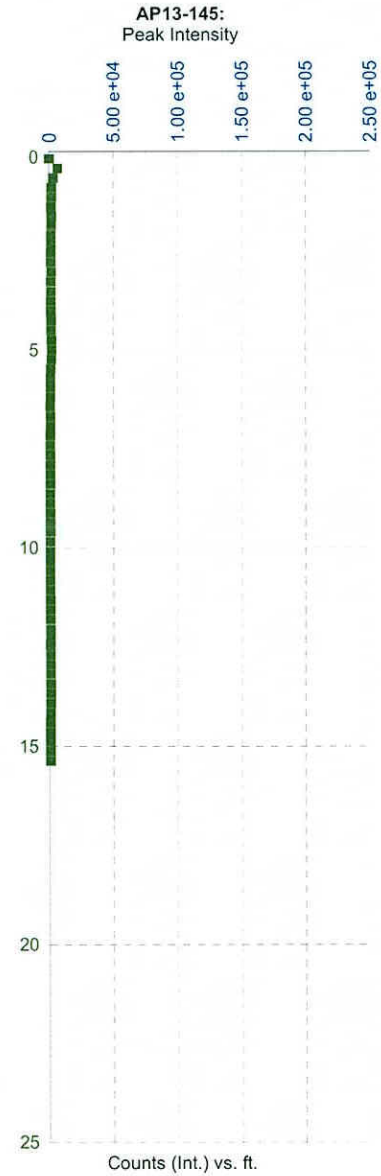

AP13-144:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

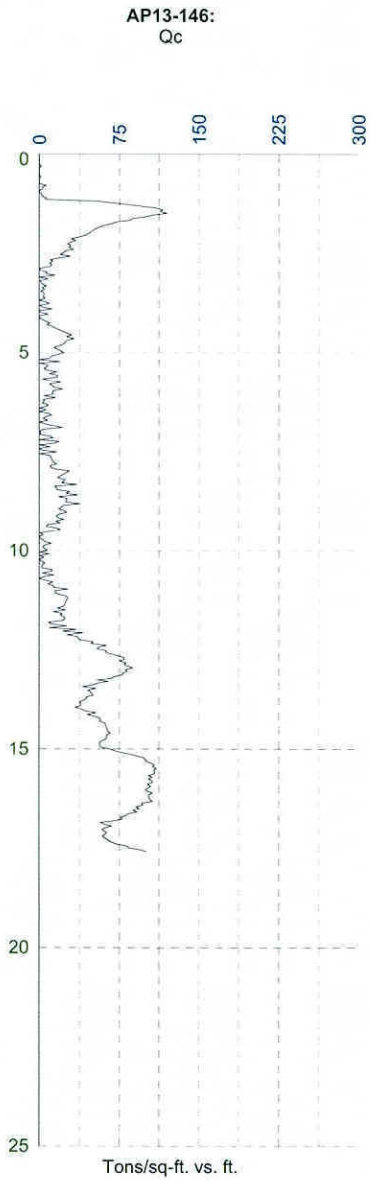

AP13-145:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

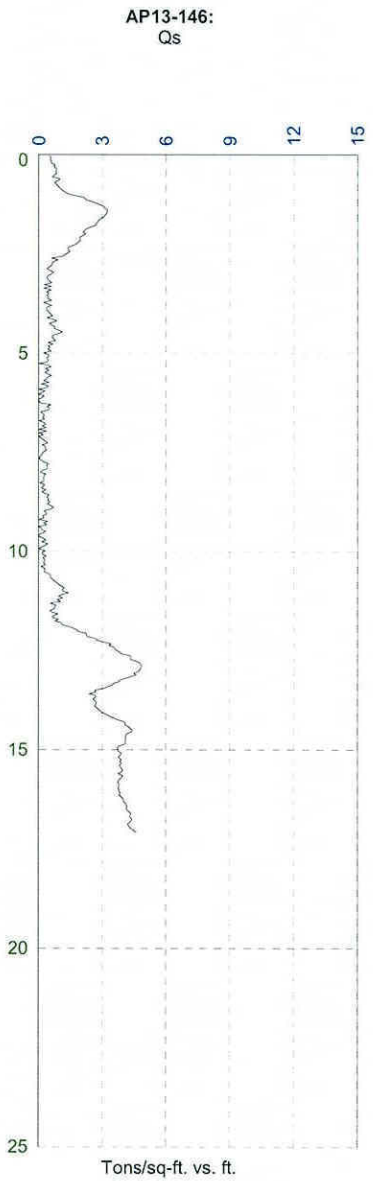

AP13-145:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

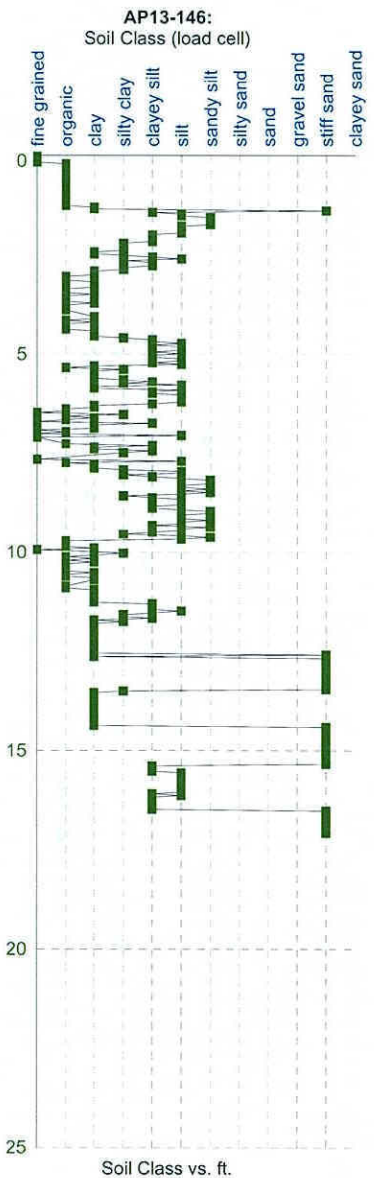

AP13-145:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

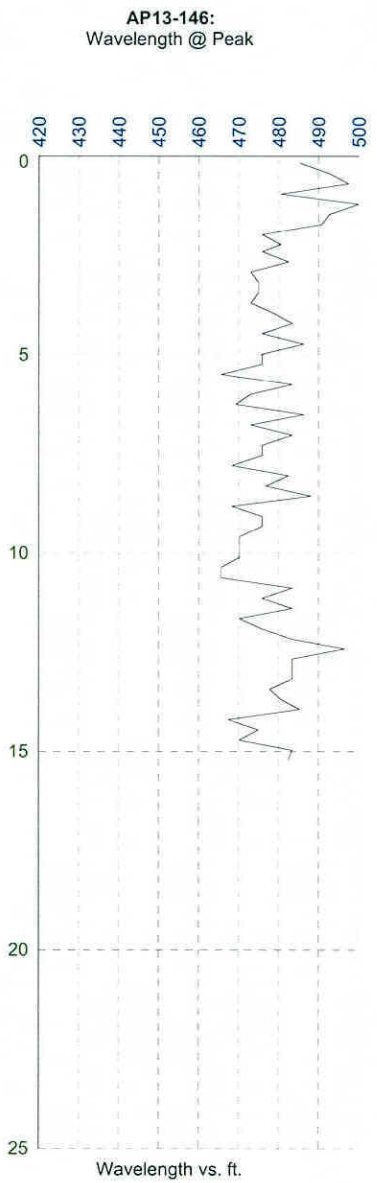

AP13-145:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

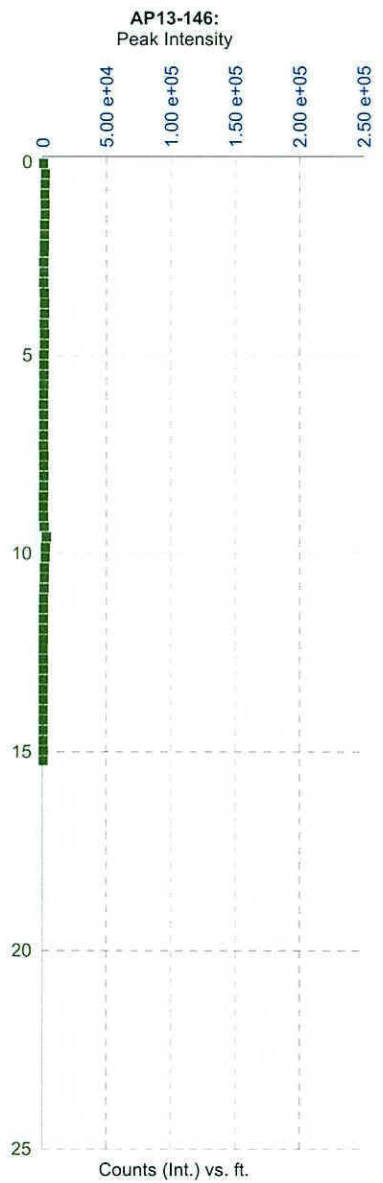

AP13-145:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

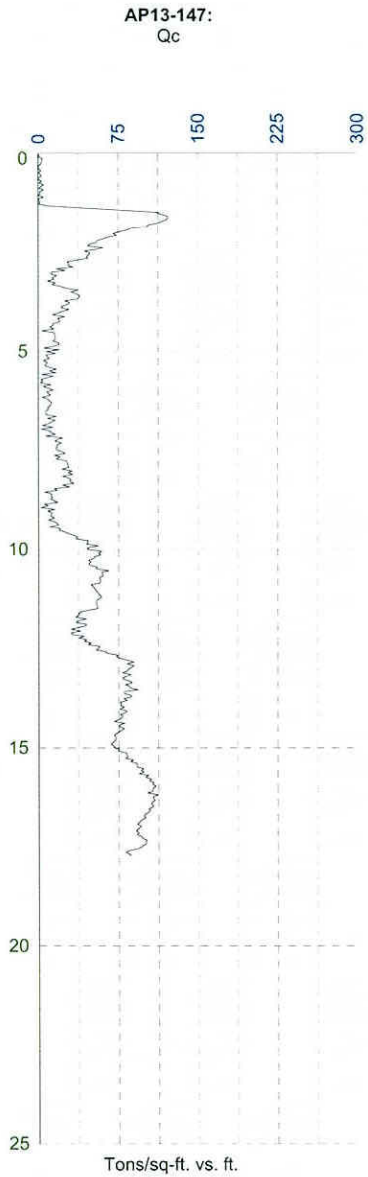

AP13-146:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

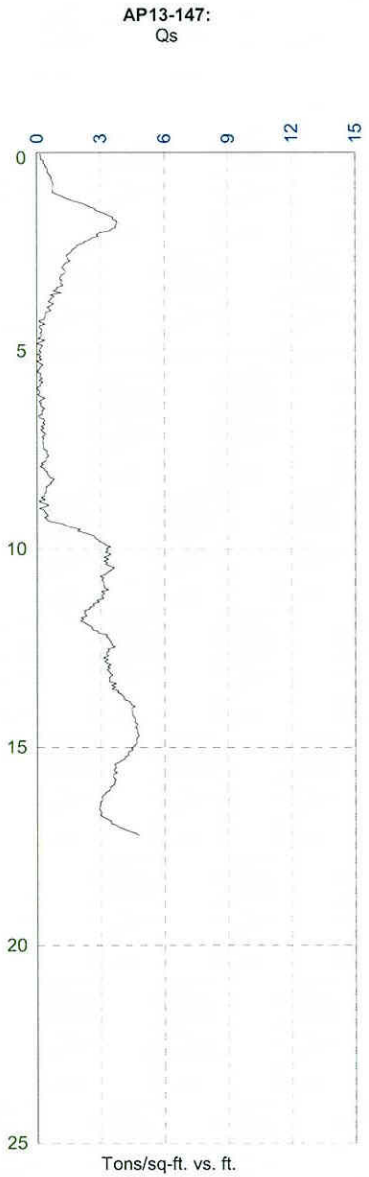

AP13-146:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

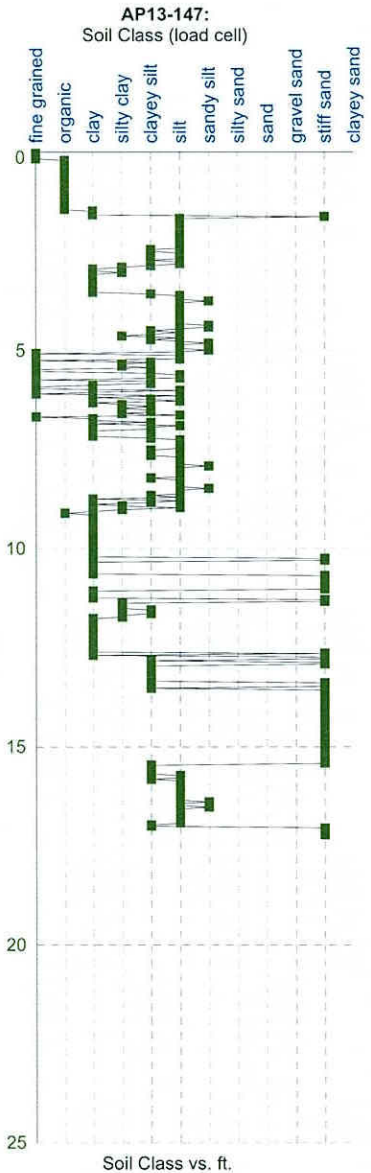

AP13-146:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

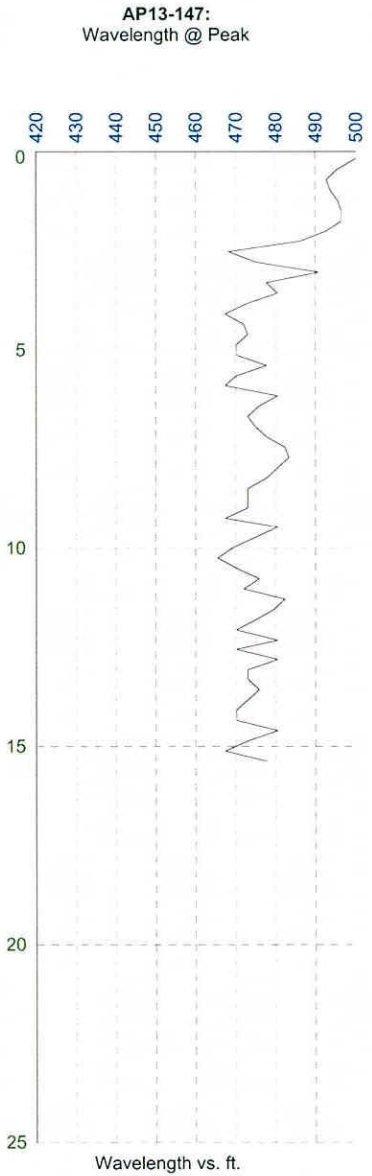

AP13-146:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

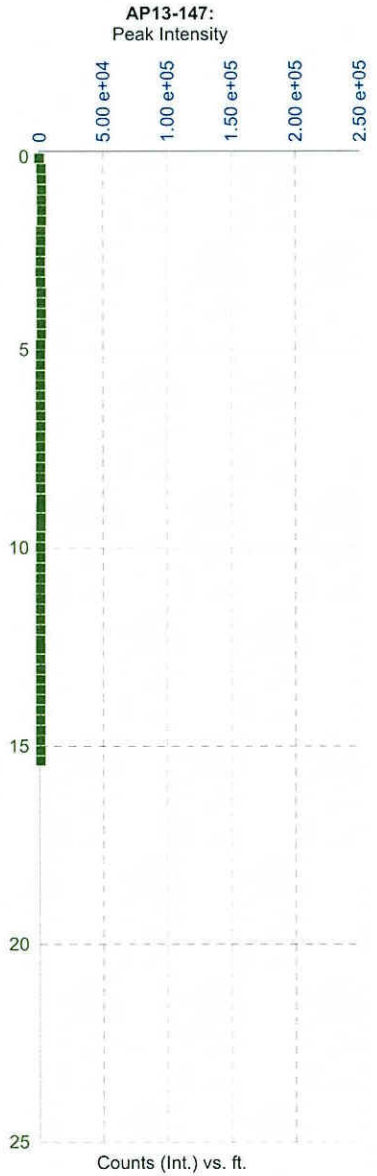

AP13-146:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

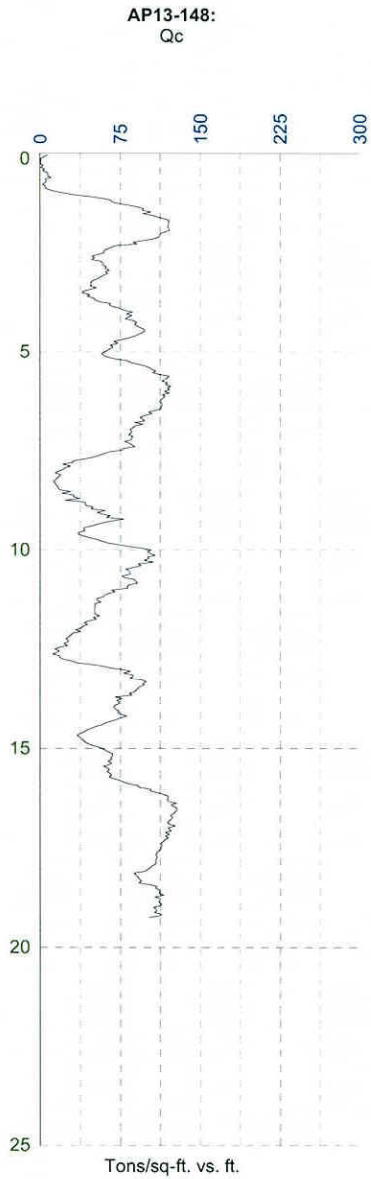

AP13-147:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

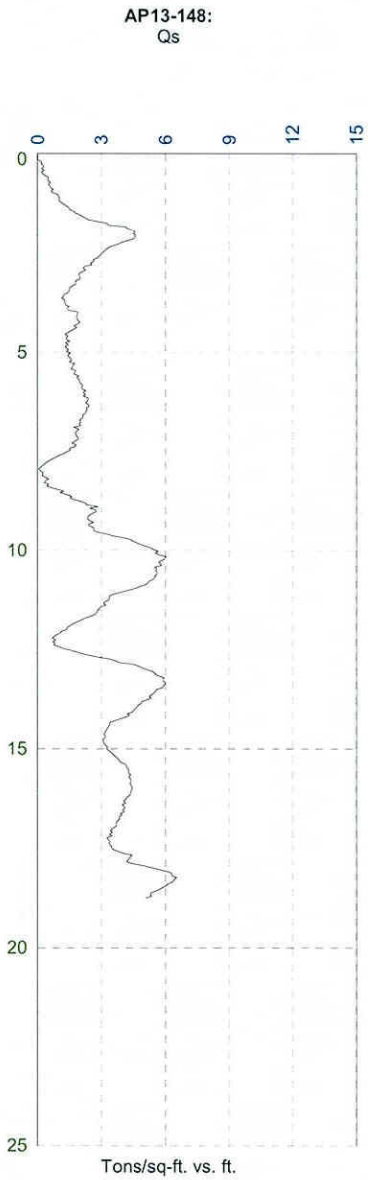

AP13-147:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

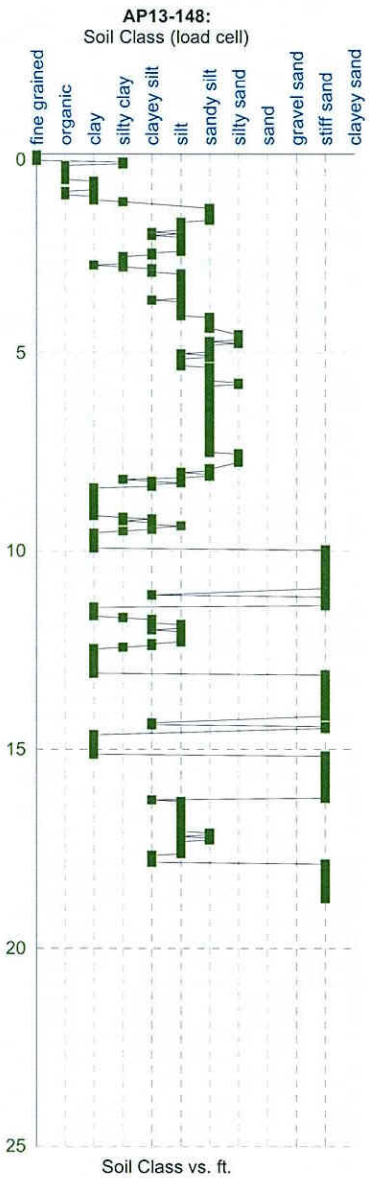

AP13-147:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

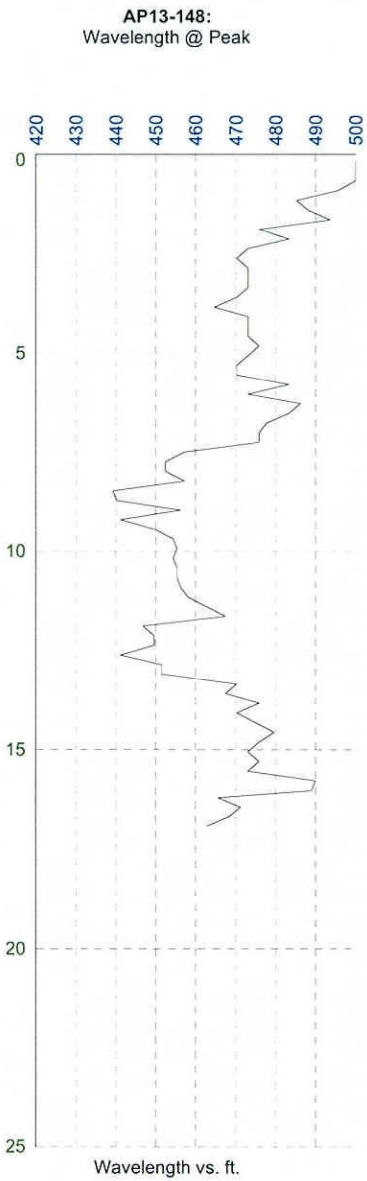

AP13-147:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

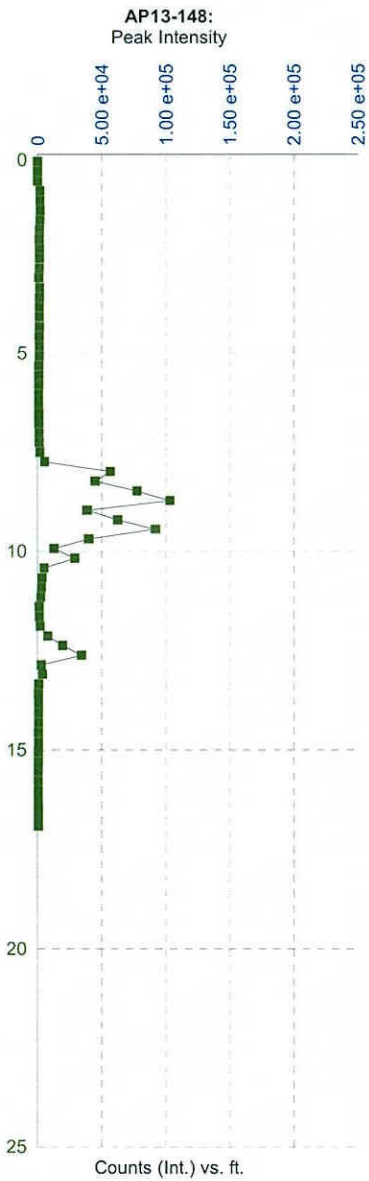

AP13-147:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

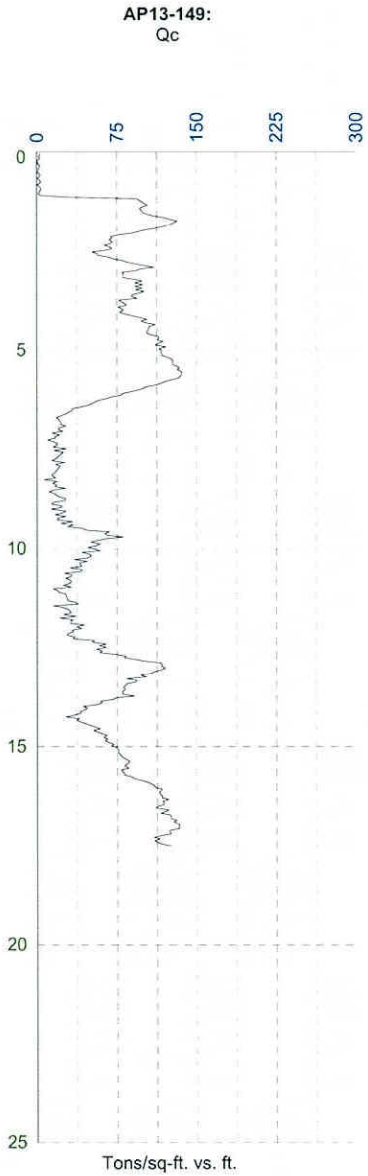

AP13-148:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

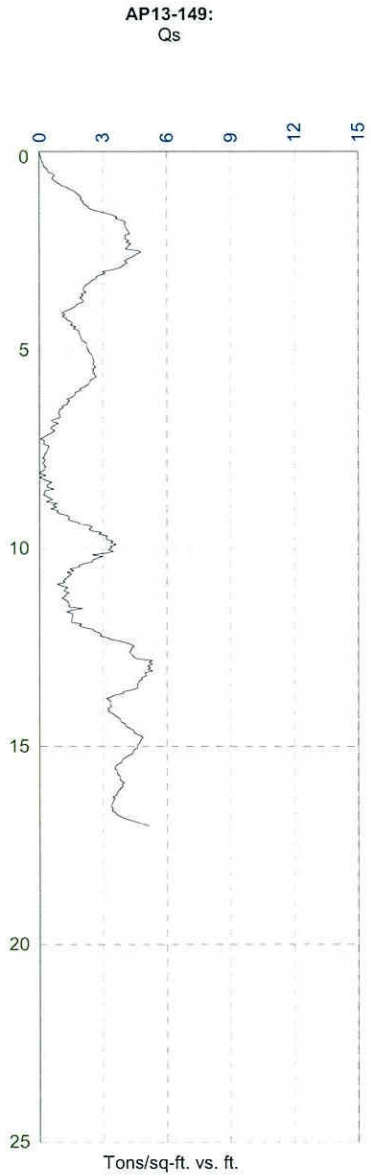

AP13-148:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

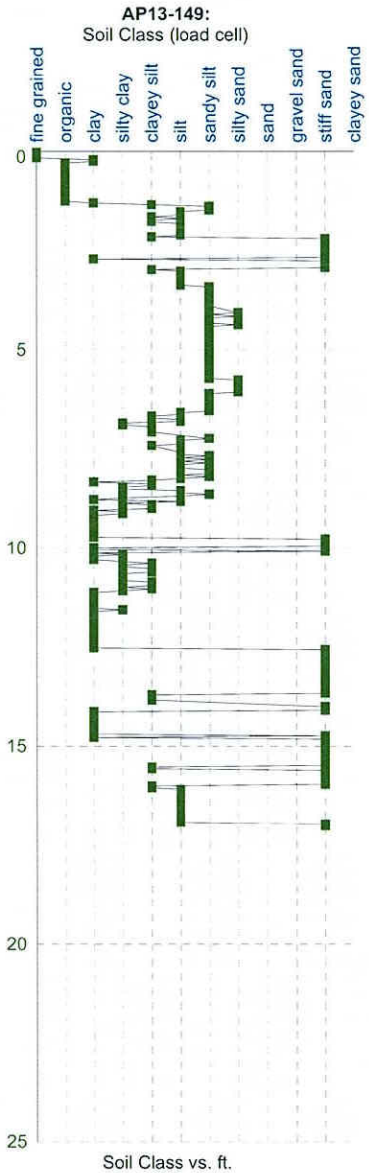

AP13-148:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

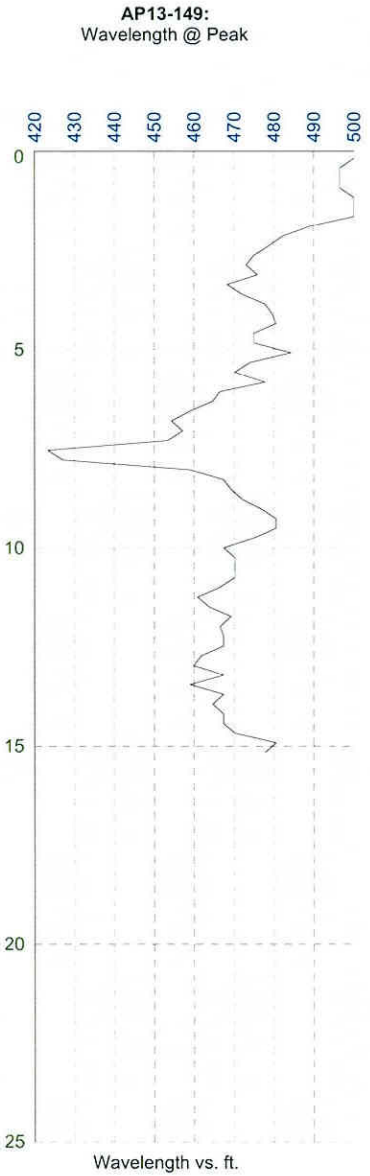

AP13-148:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

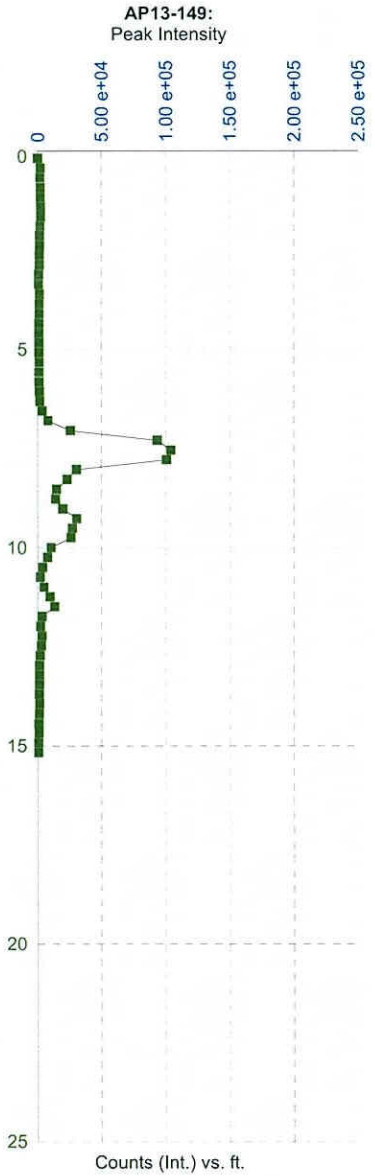

AP13-148:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

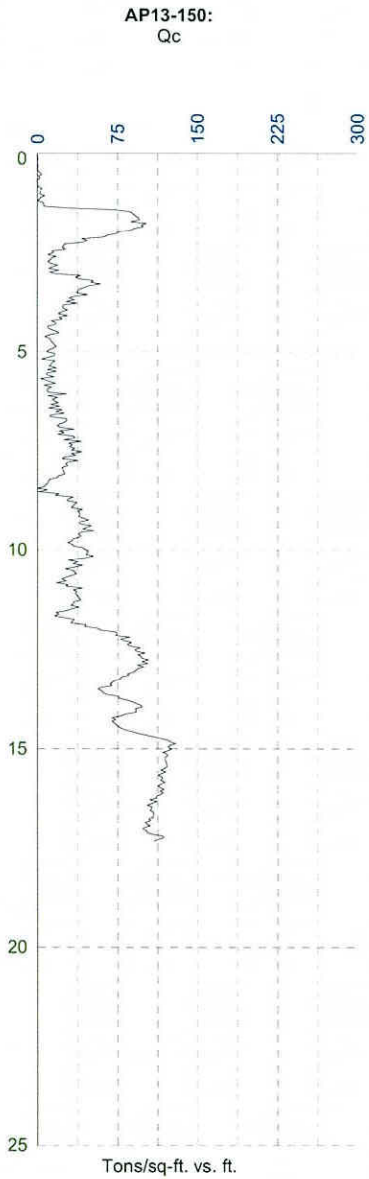

AP13-149:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

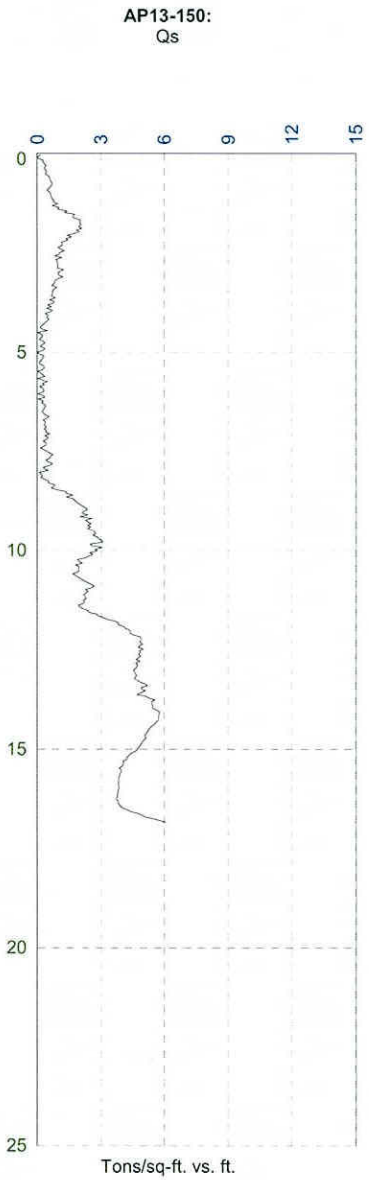

AP13-149:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

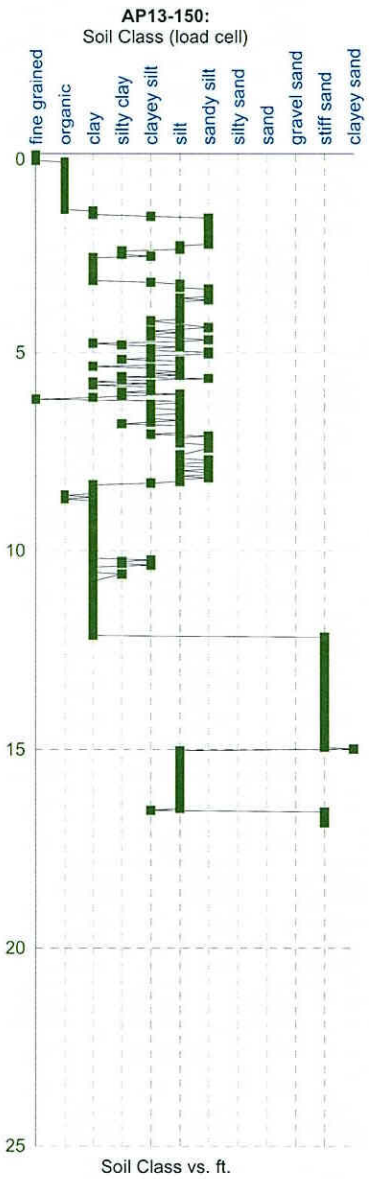

AP13-149:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

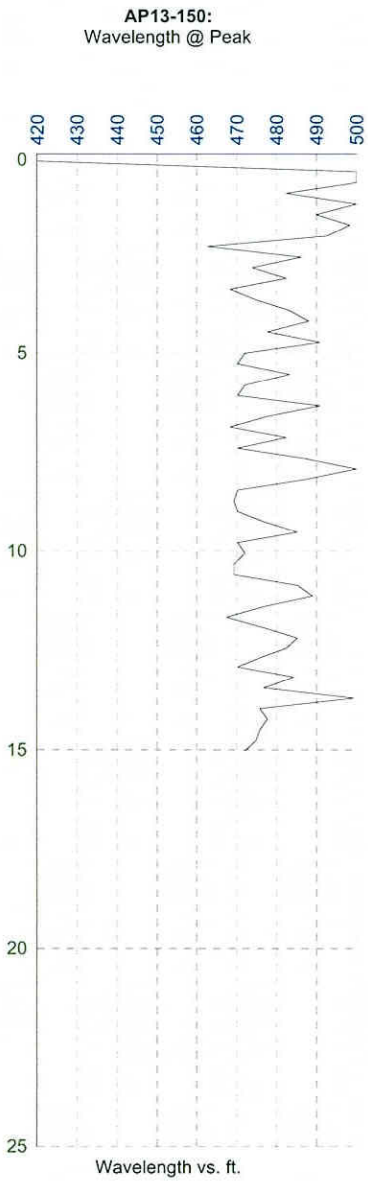

AP13-149:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

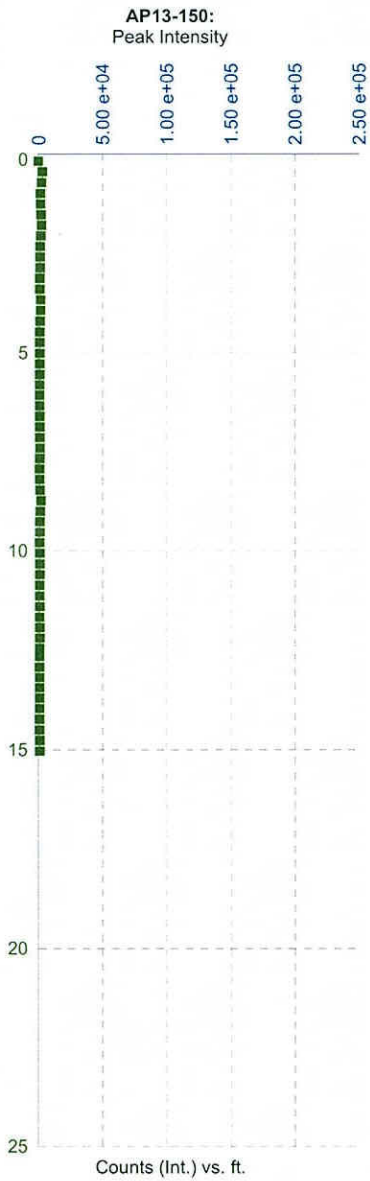

AP13-149:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

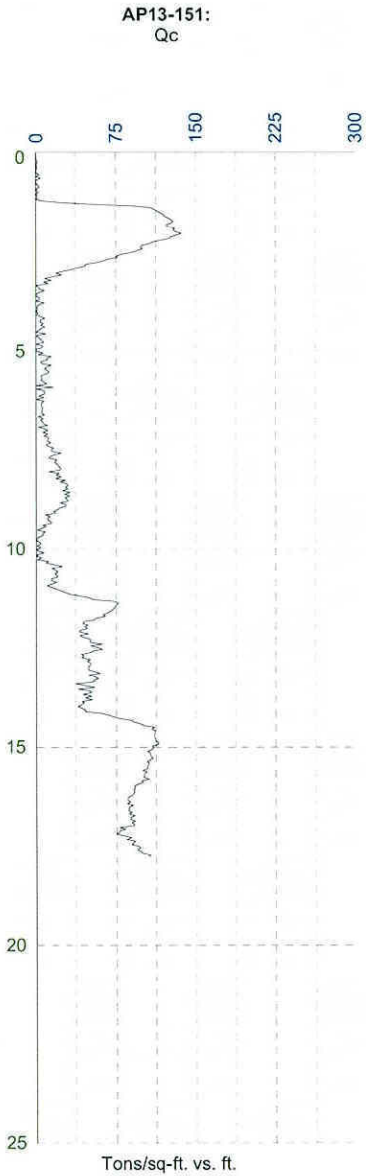

AP13-150:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

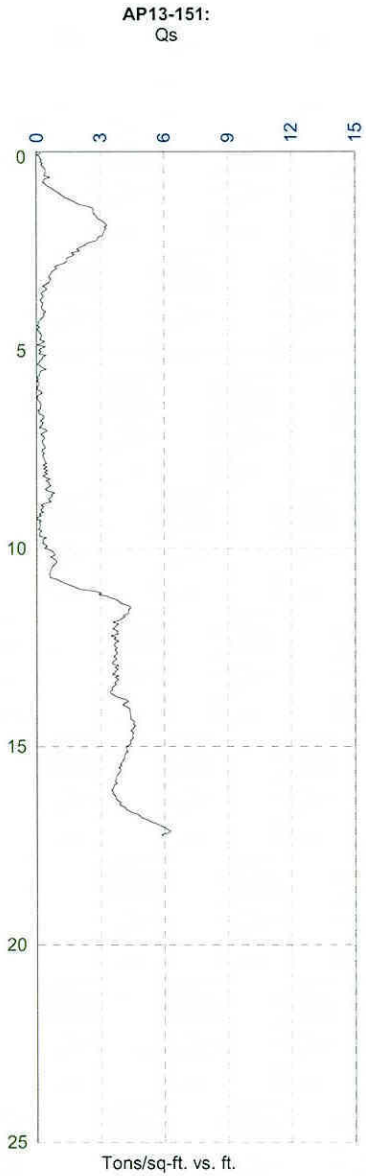

AP13-150:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

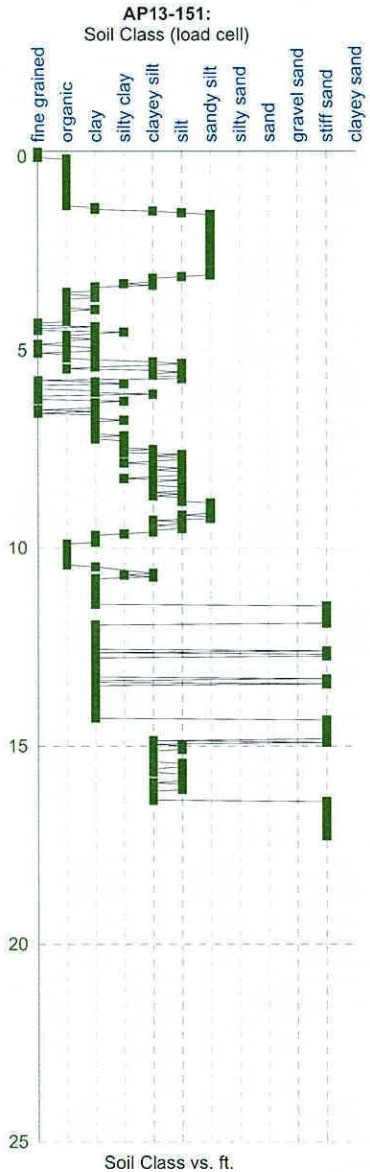

AP13-150:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

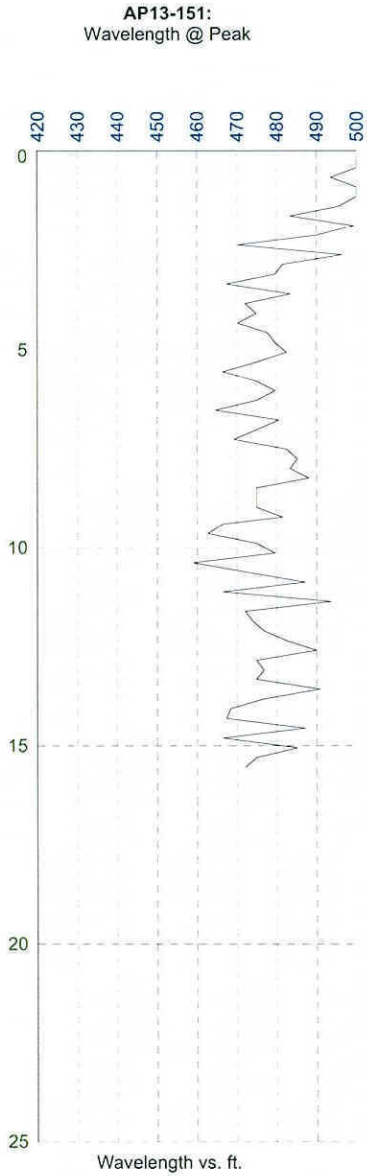

AP13-150:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

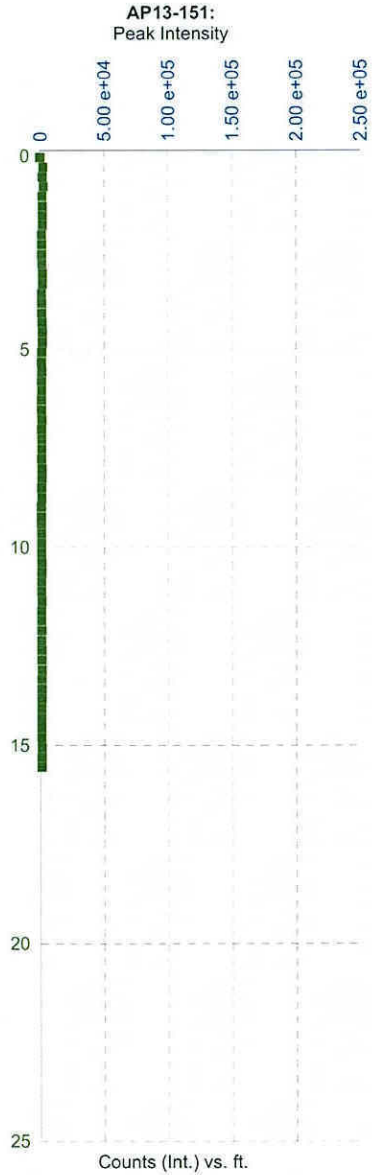

AP13-150:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

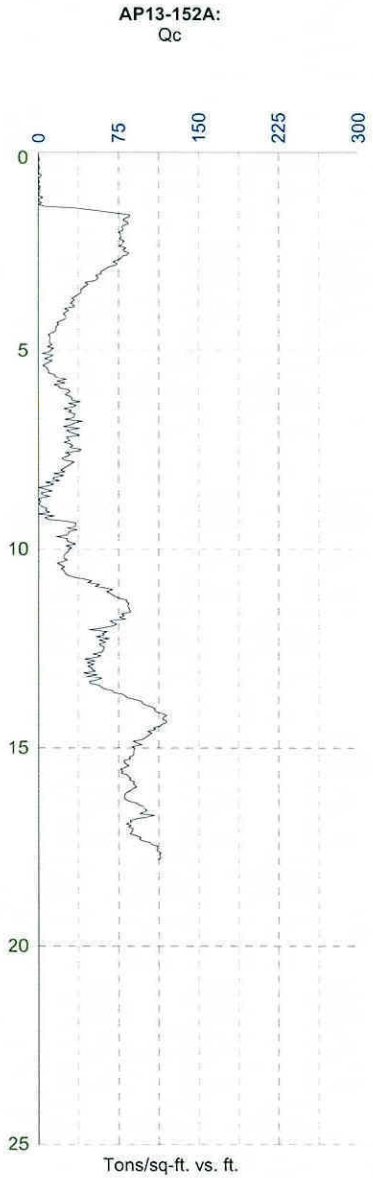

AP13-151:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

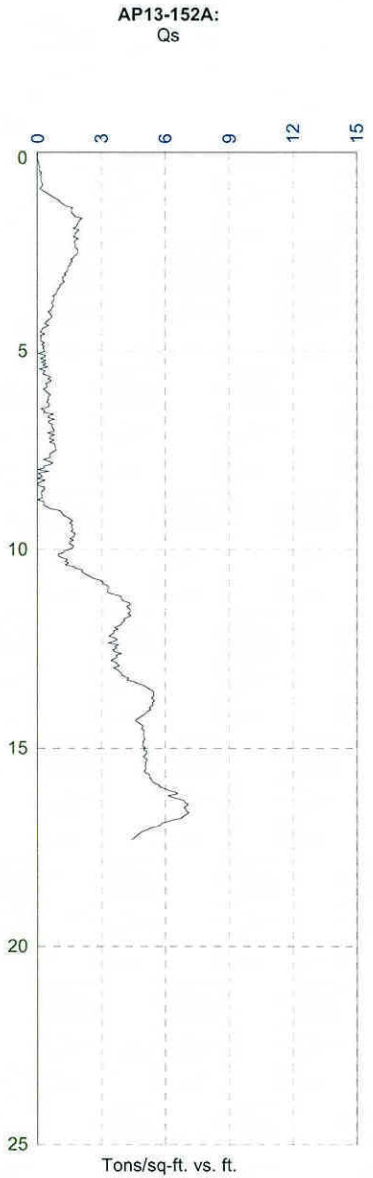

AP13-151:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

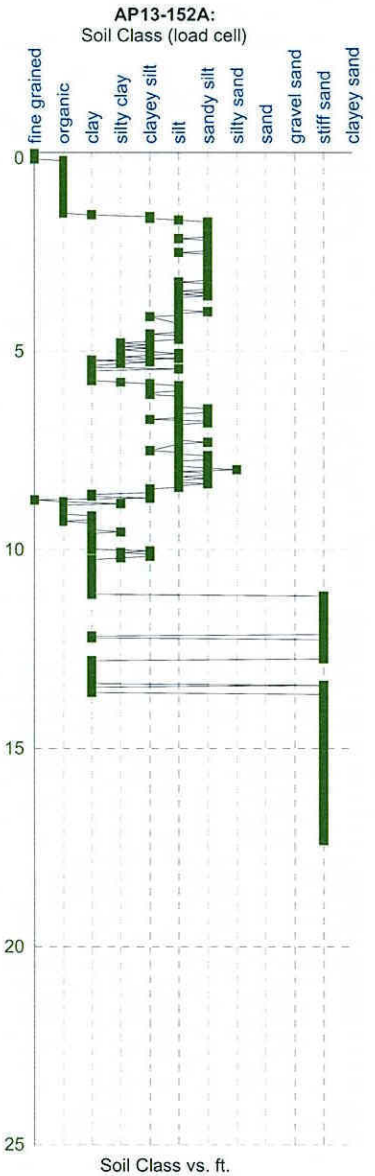

AP13-151:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

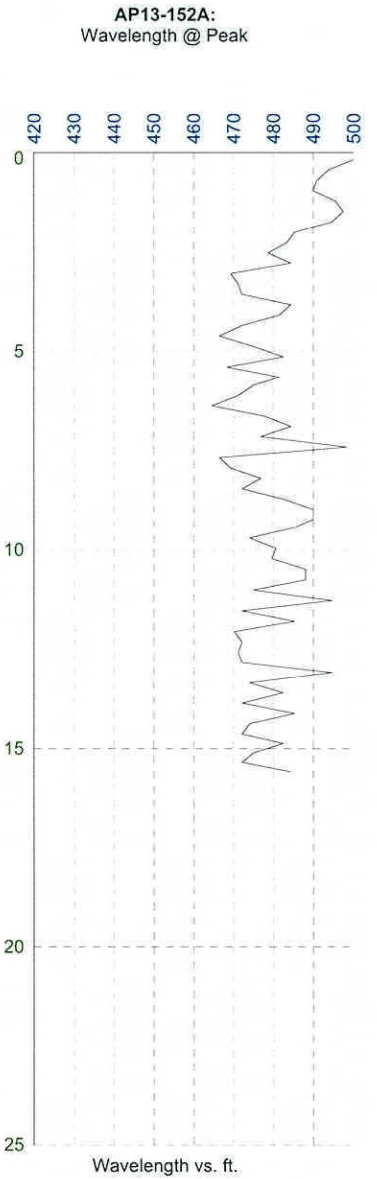

AP13-151:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

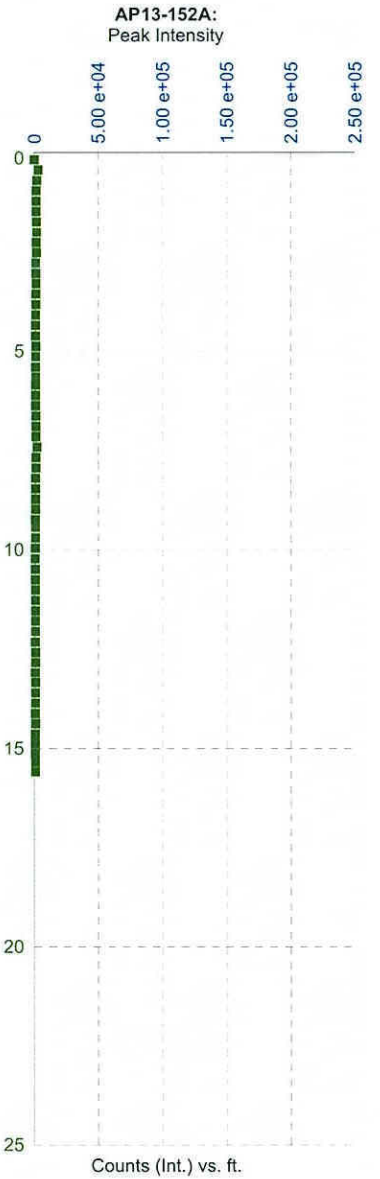

AP13-151:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

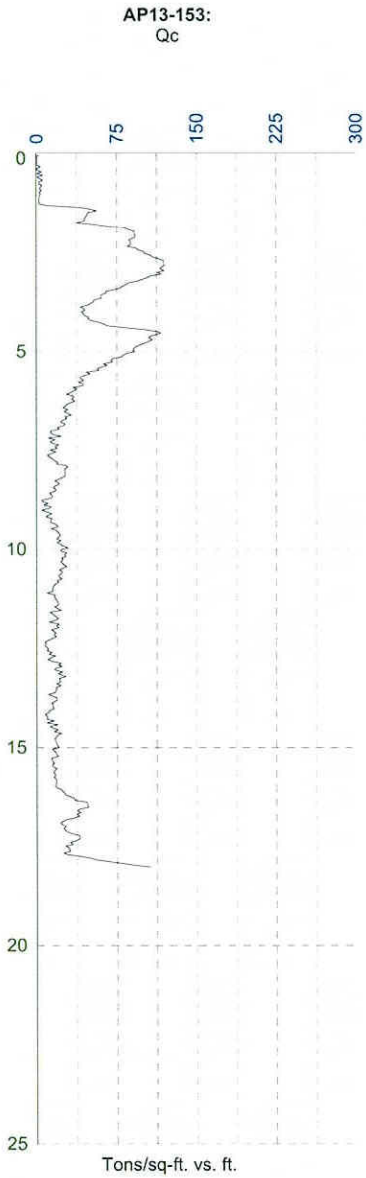

AP13-152A:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

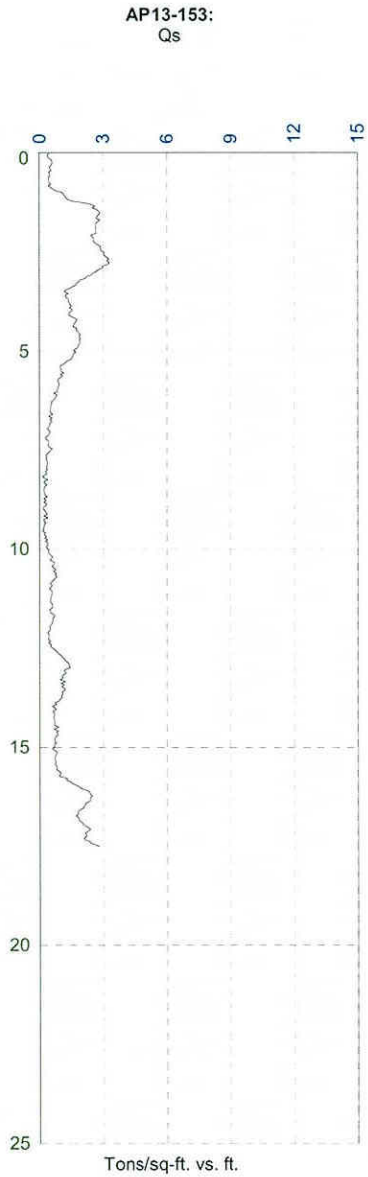

AP13-152A:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

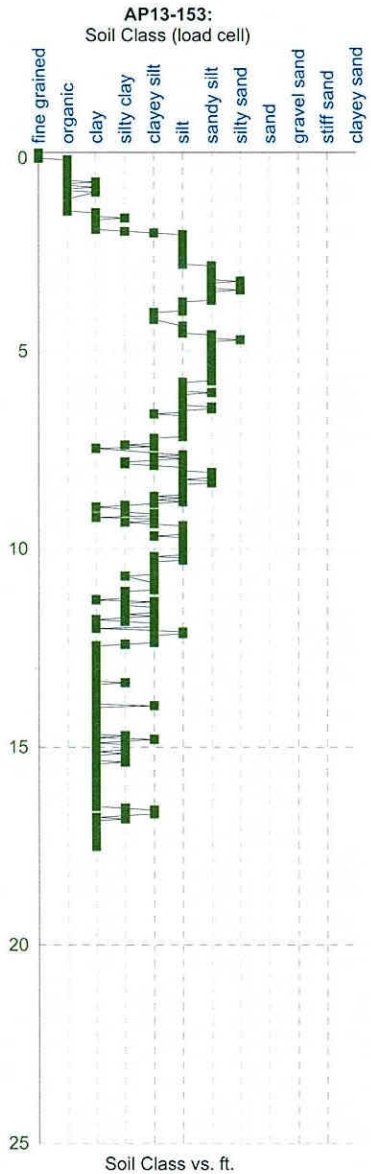

AP13-152A:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

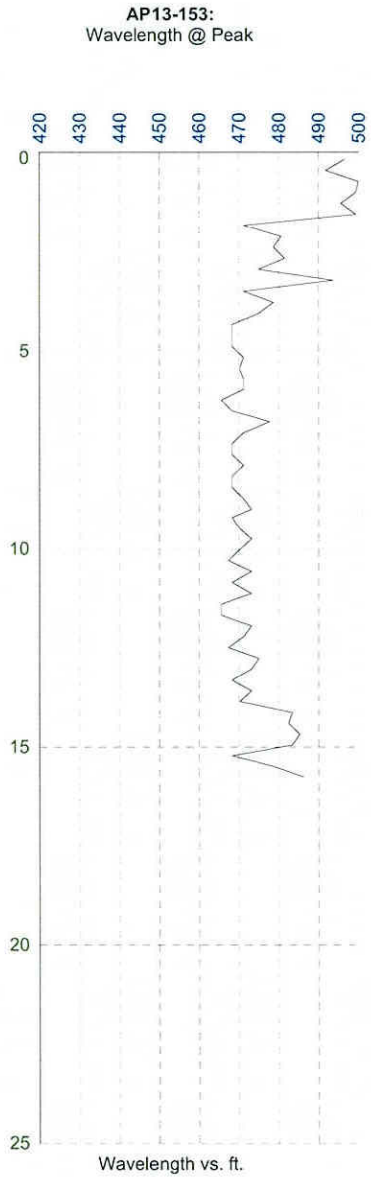

AP13-152A:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

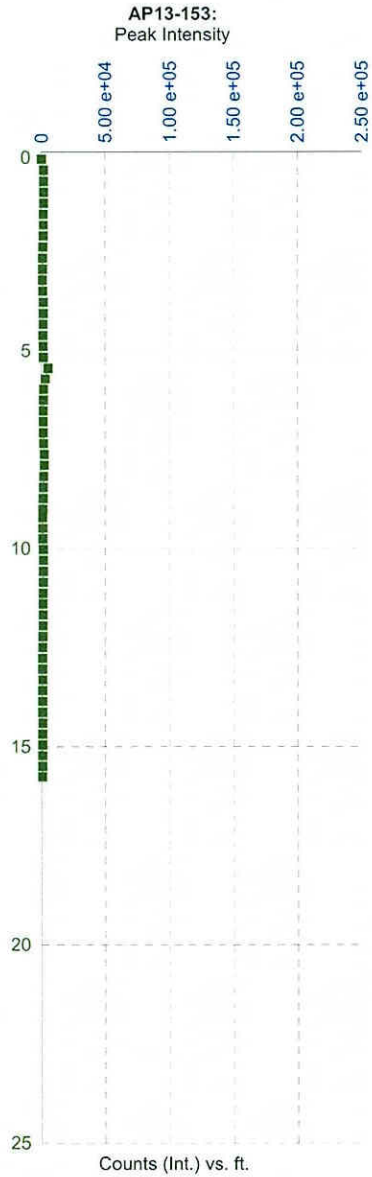

AP13-152A:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

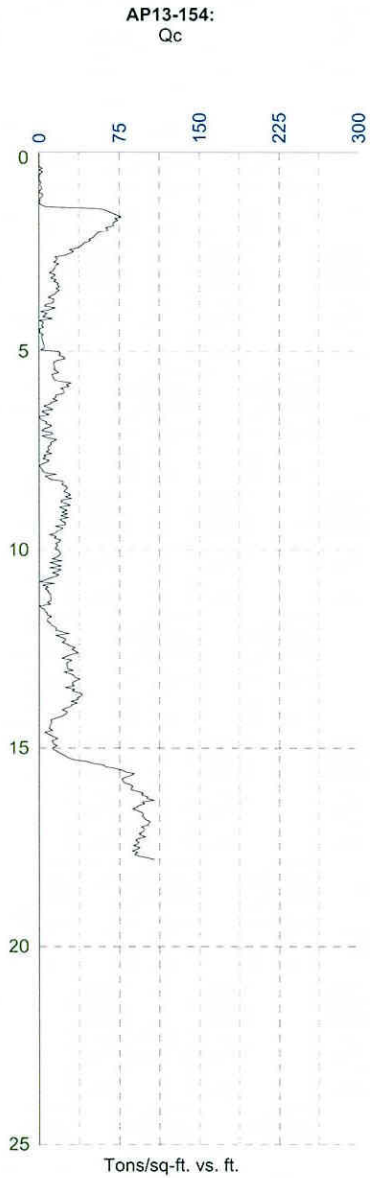

AP13-153:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

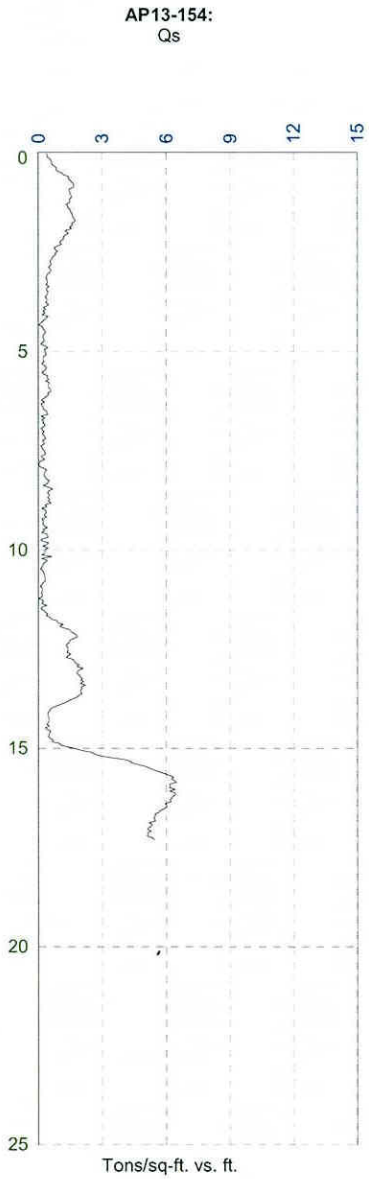

AP13-153:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

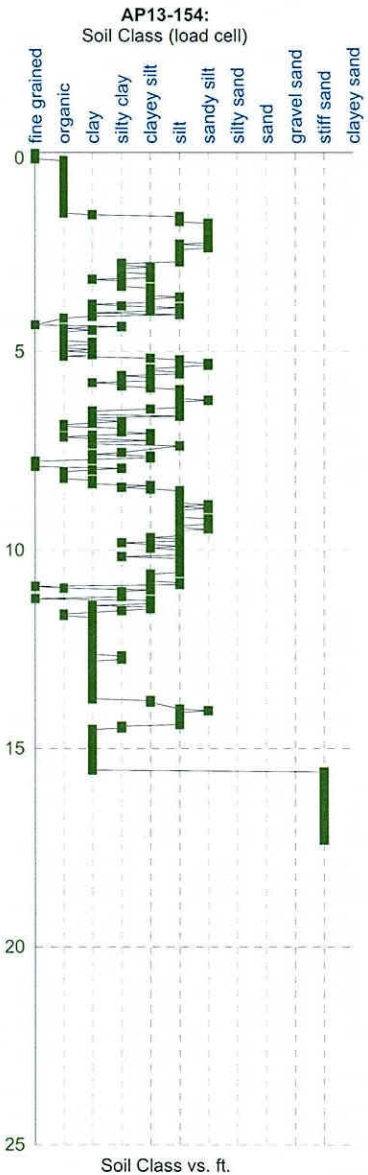

AP13-153:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

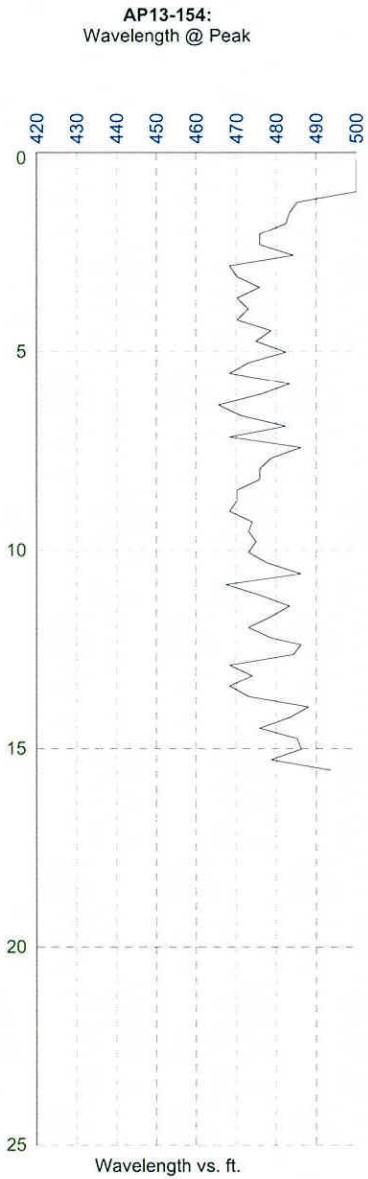

AP13-153:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

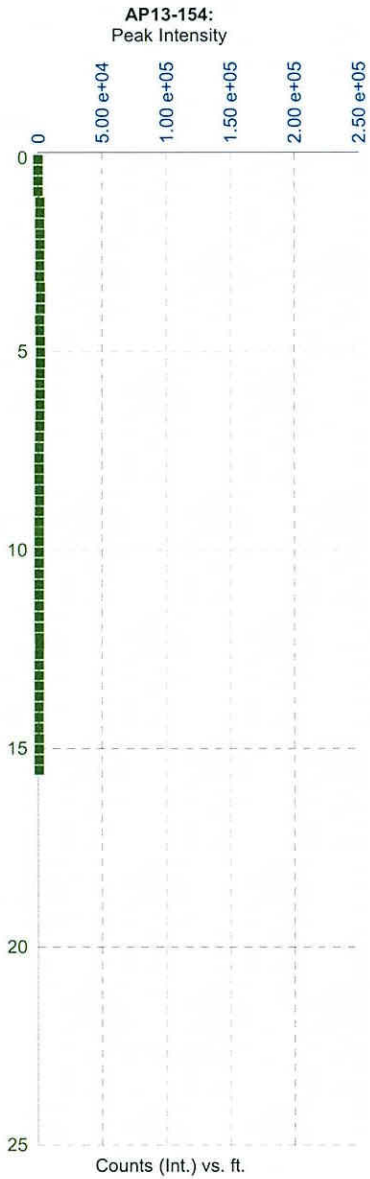

AP13-153:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

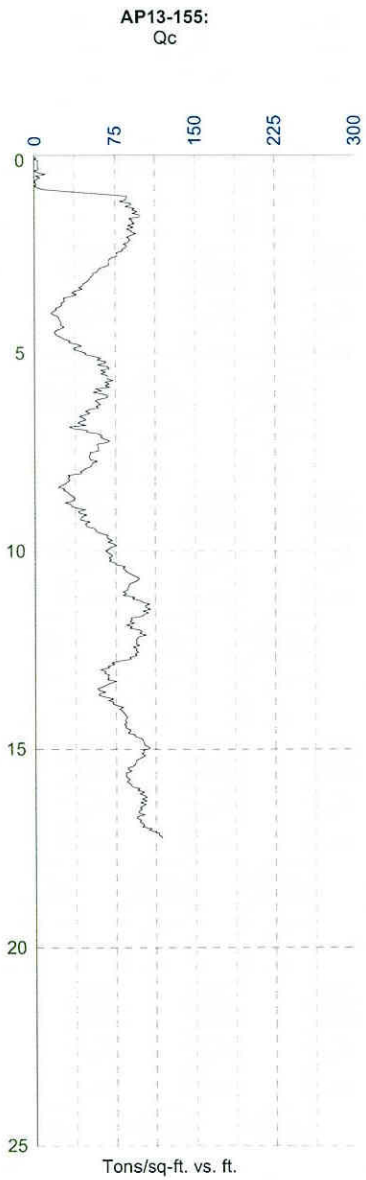

AP13-154:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

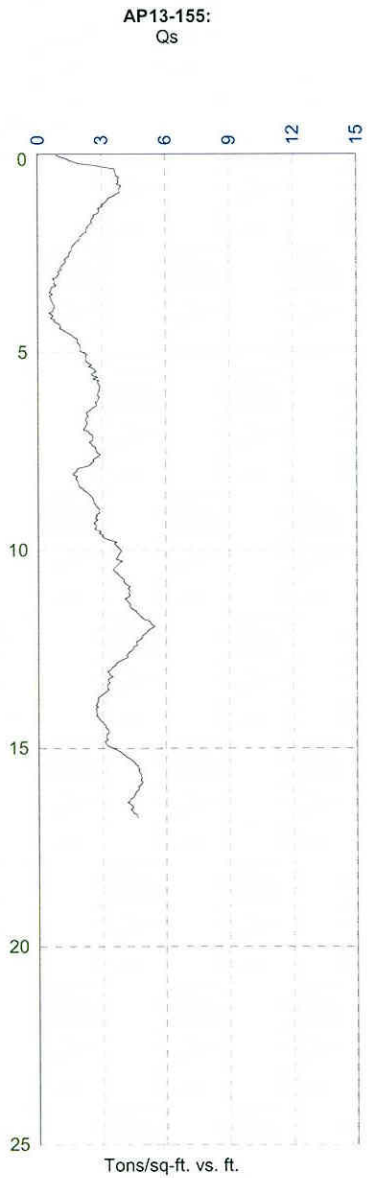

AP13-154:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

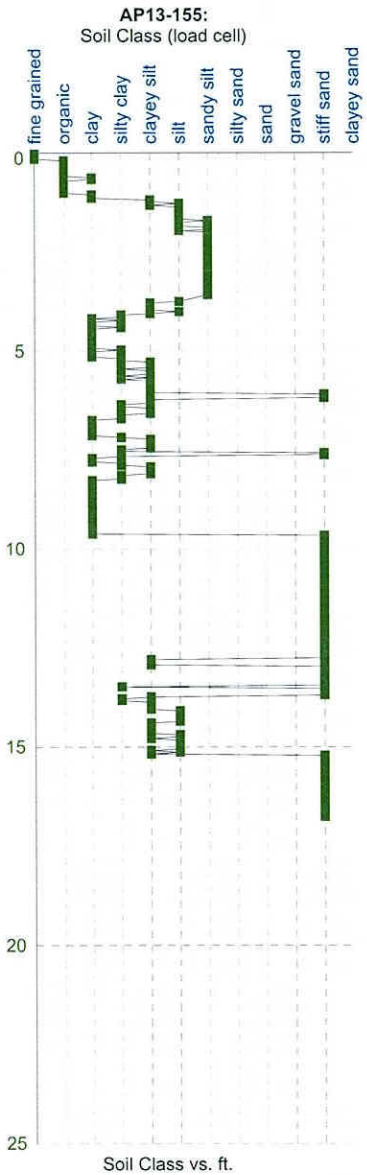

AP13-154:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

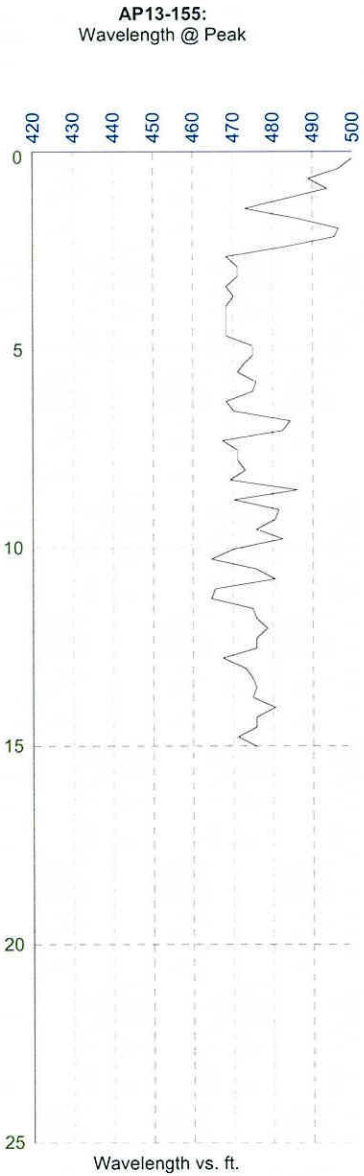

AP13-154:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

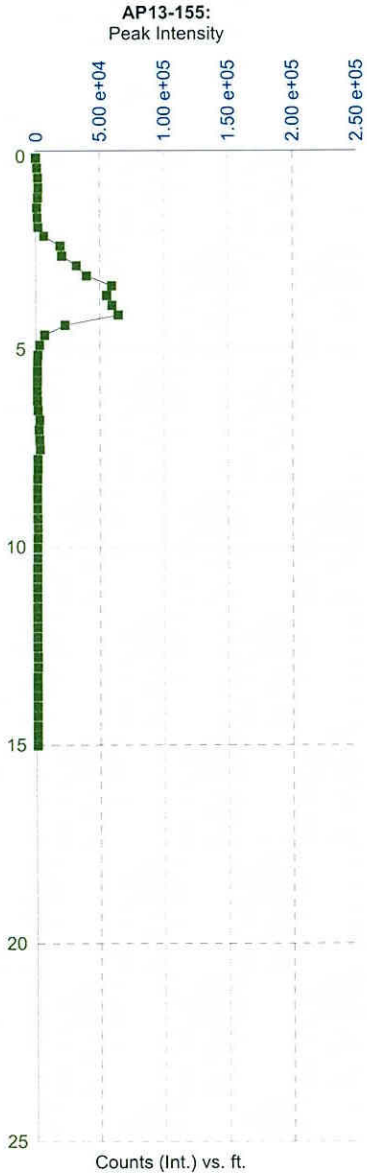

AP13-154:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

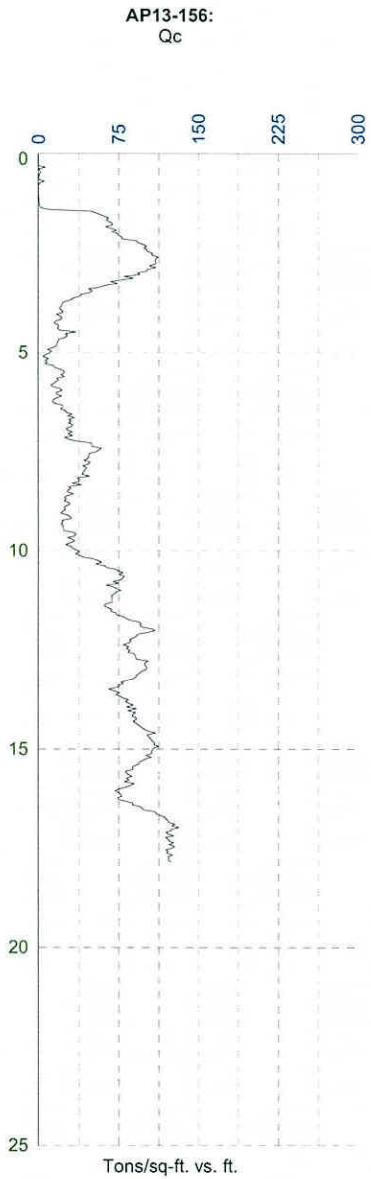

AP13-155:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

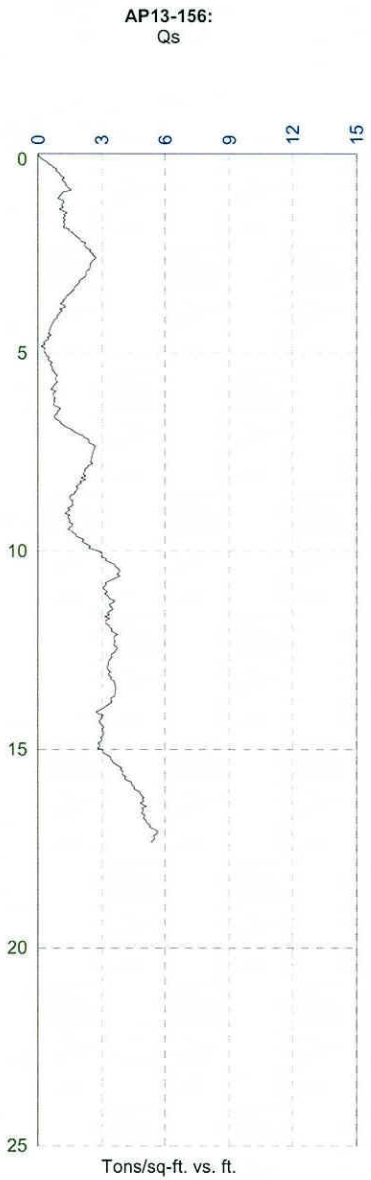

AP13-155:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

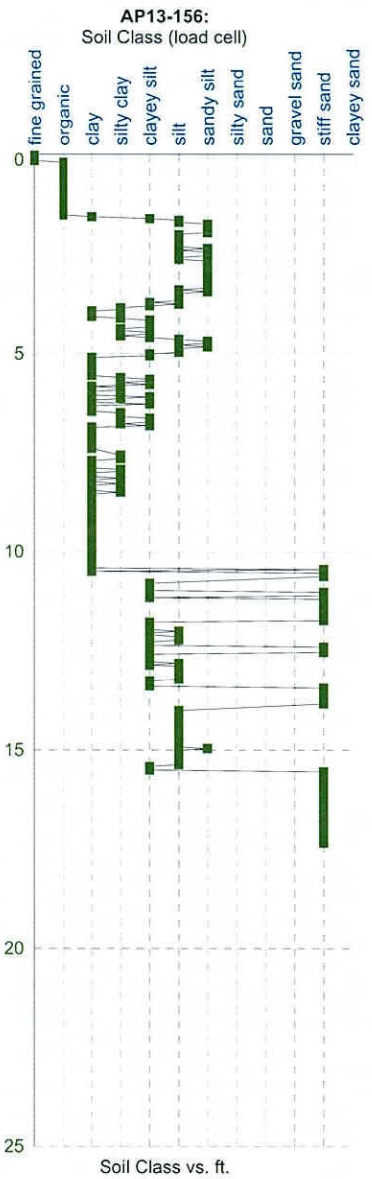

AP13-155:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

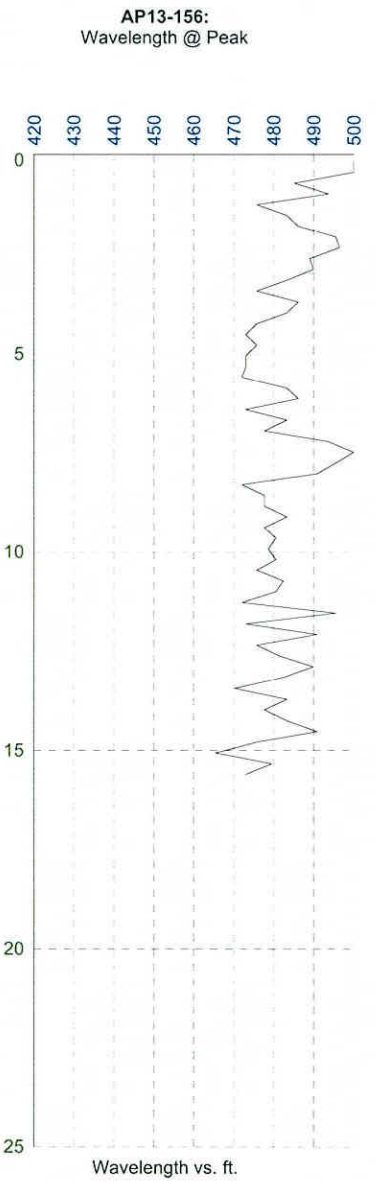

AP13-155:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

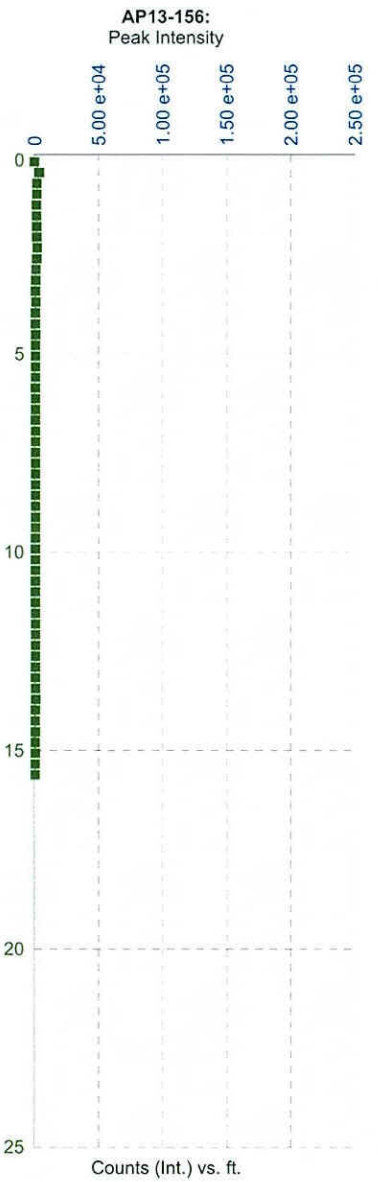

AP13-155:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

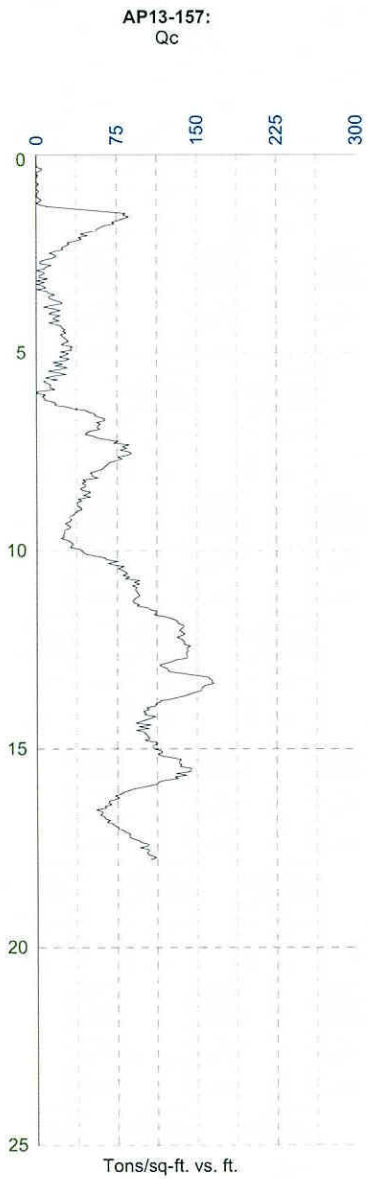

AP13-156:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

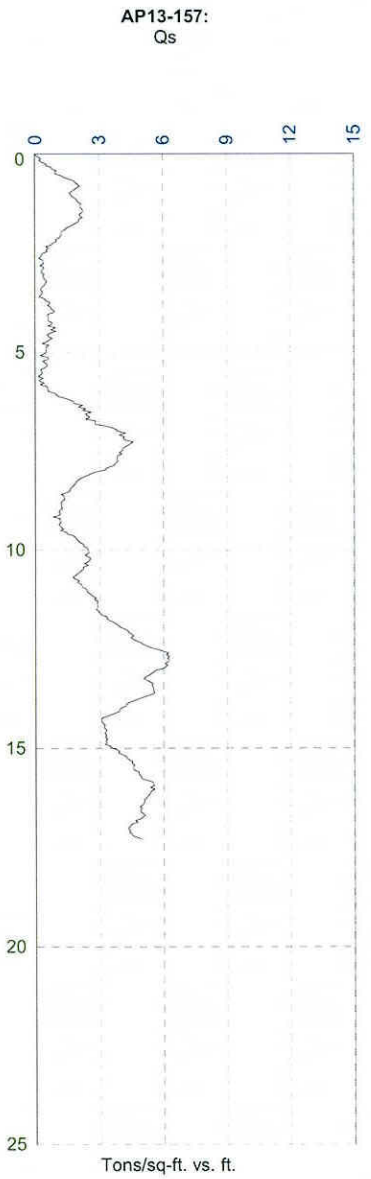

AP13-156:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

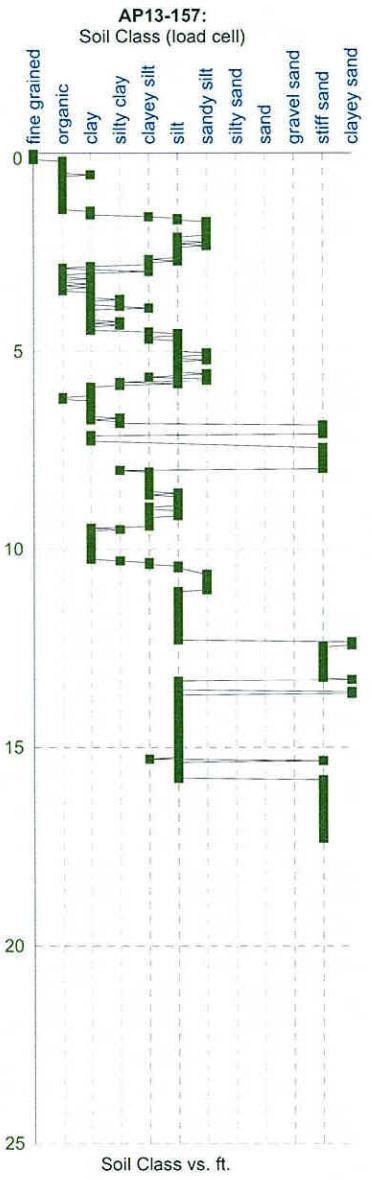

AP13-156:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

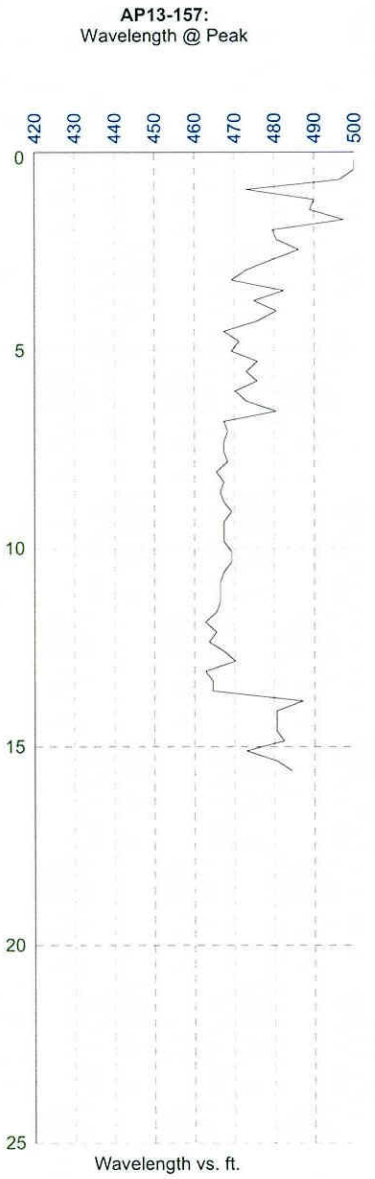

AP13-156:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

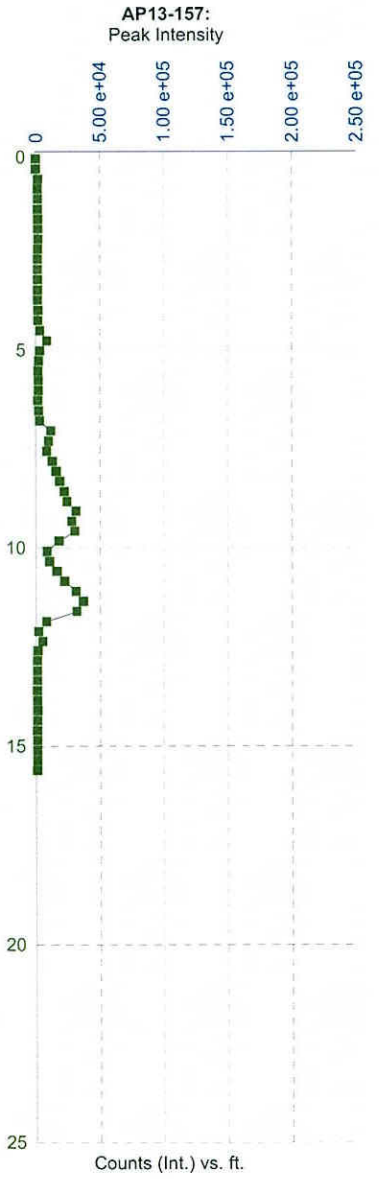

AP13-156:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

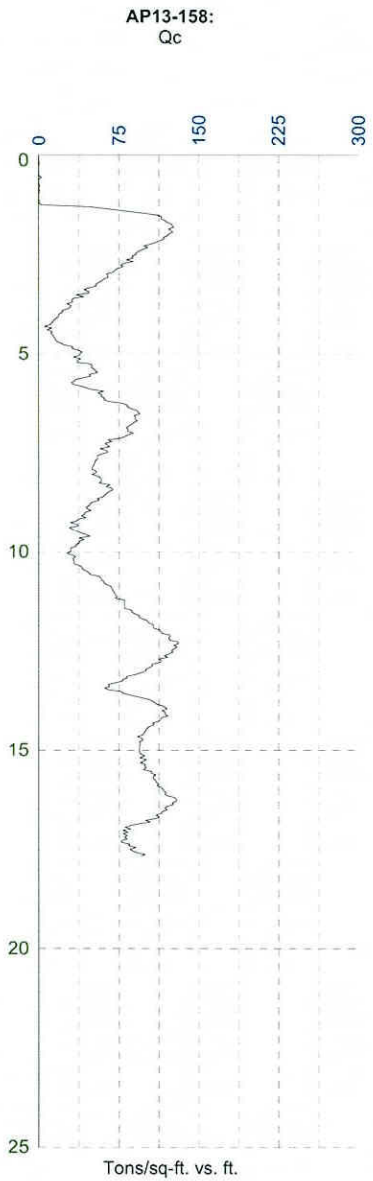

AP13-157:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

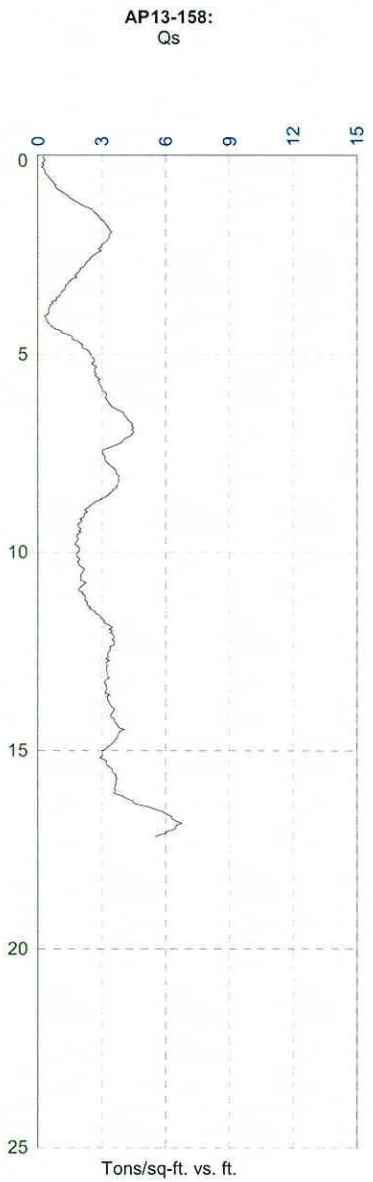

AP13-157:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

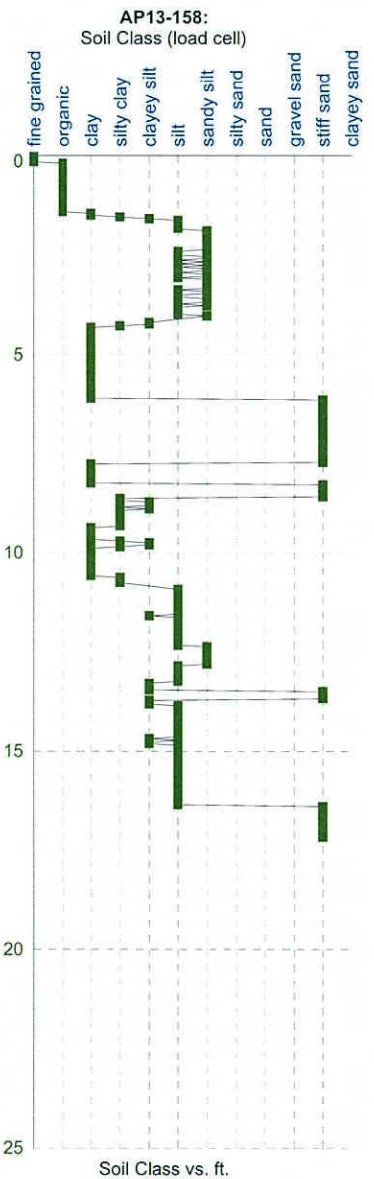

AP13-157:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

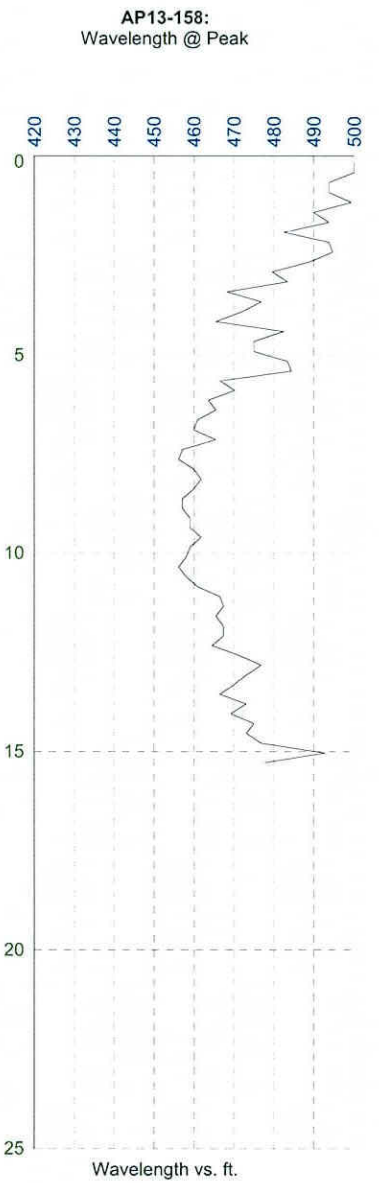

AP13-157:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

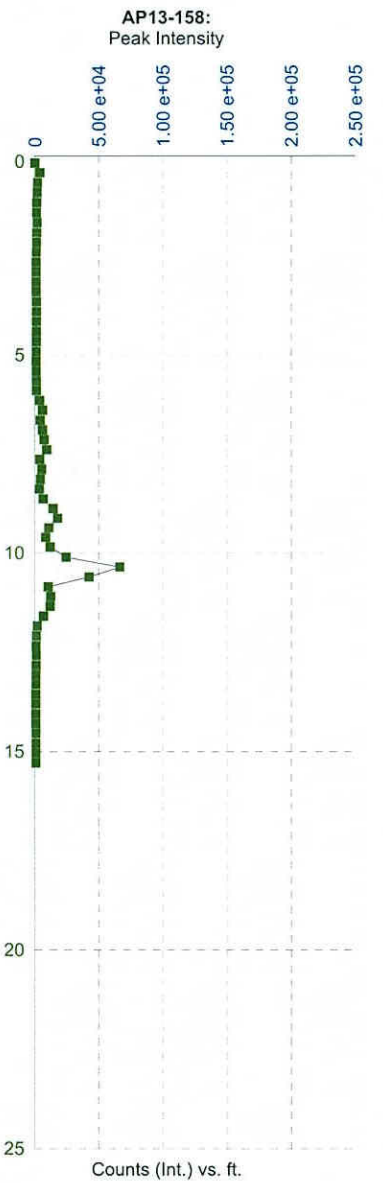

AP13-157:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

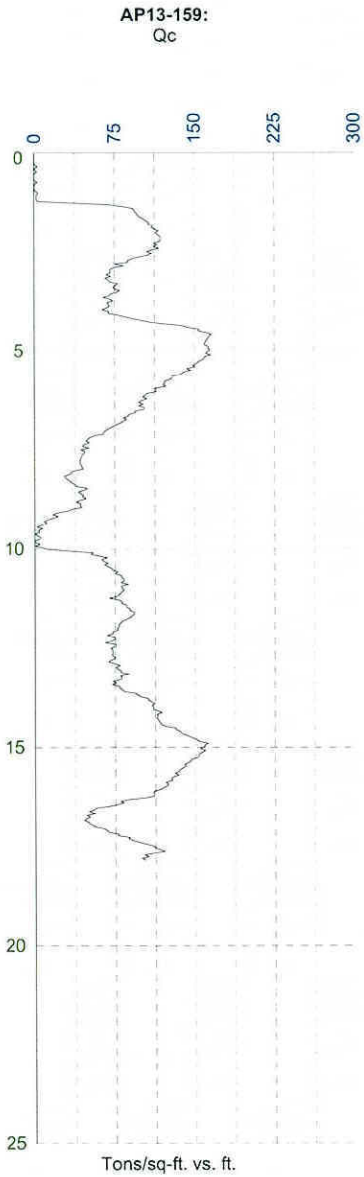

AP13-158:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

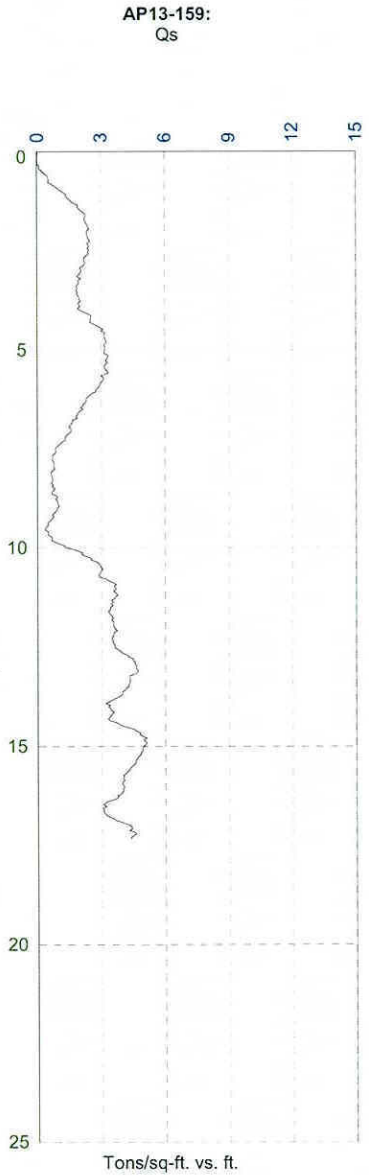

AP13-158:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

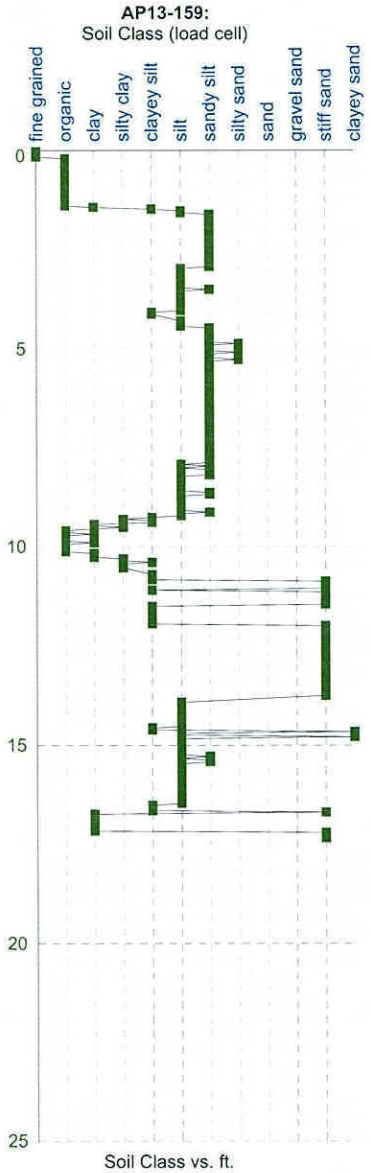

AP13-158:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

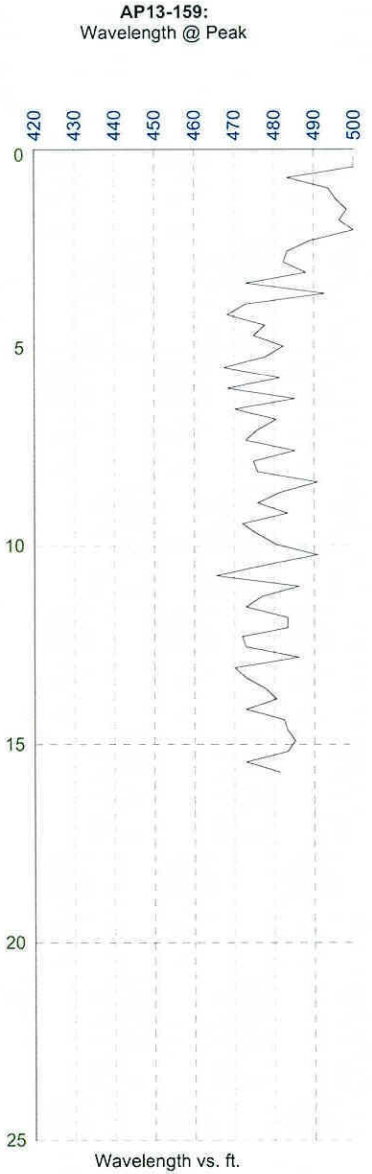

AP13-158:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

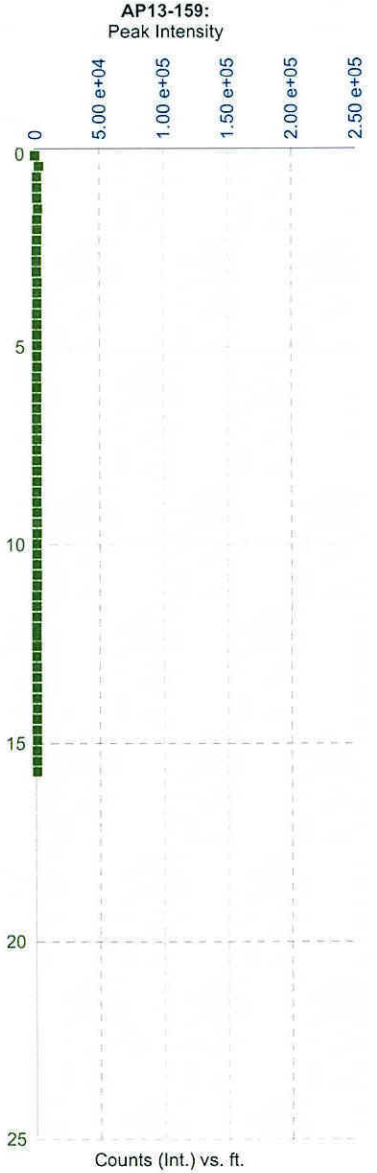

AP13-158:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

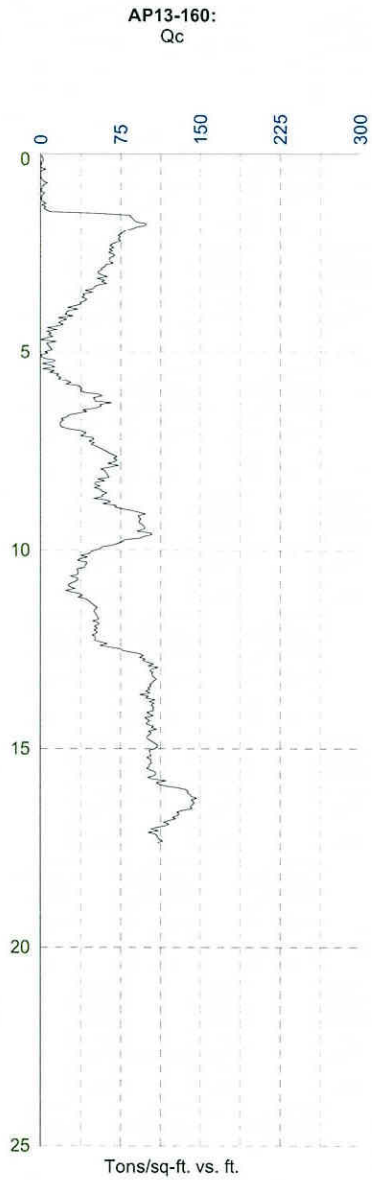

AP13-159:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

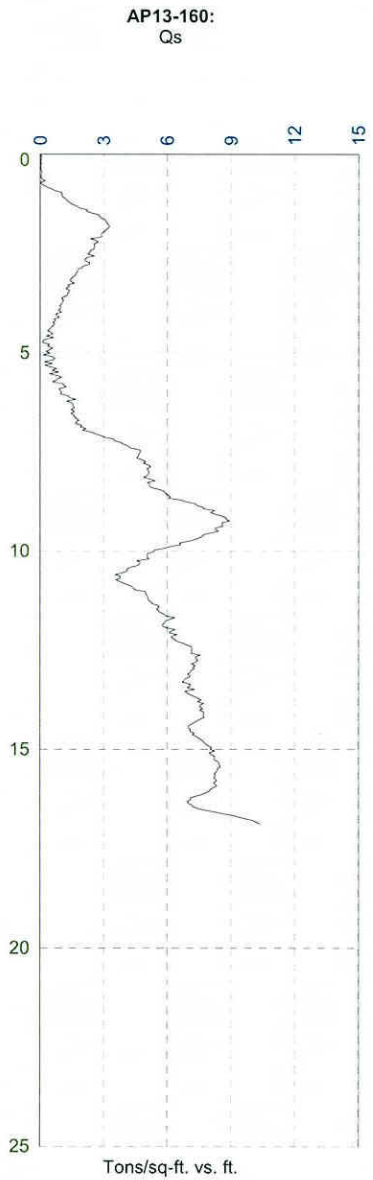

AP13-159:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

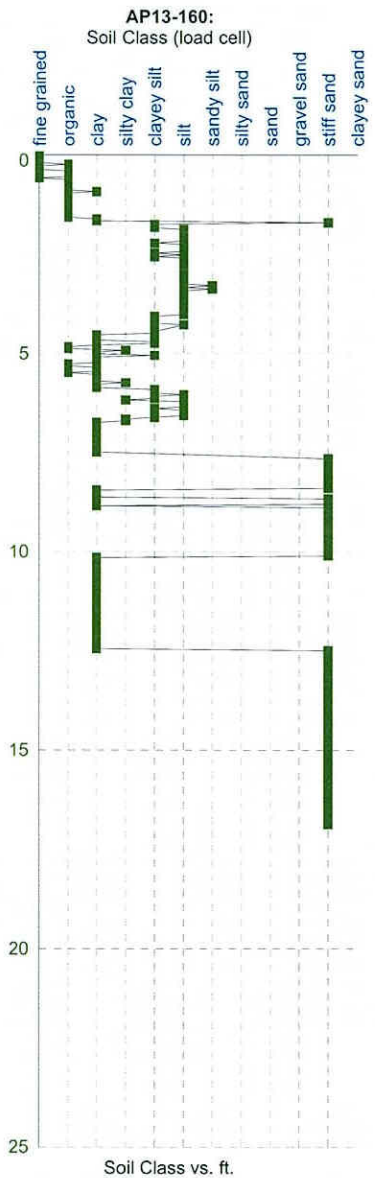

AP13-159:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

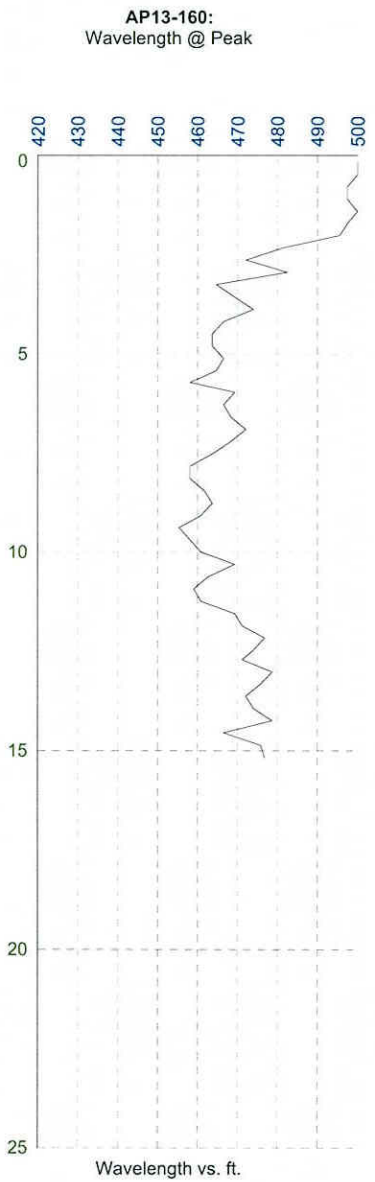

AP13-159:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

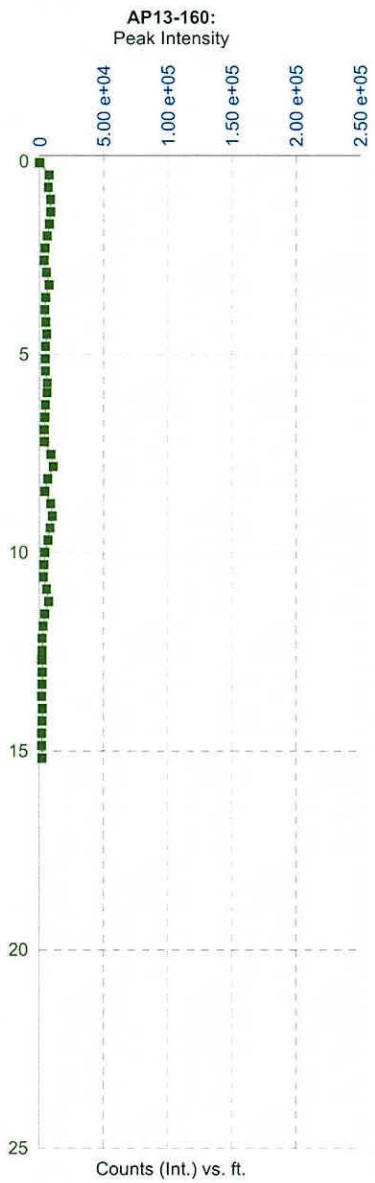

AP13-159:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

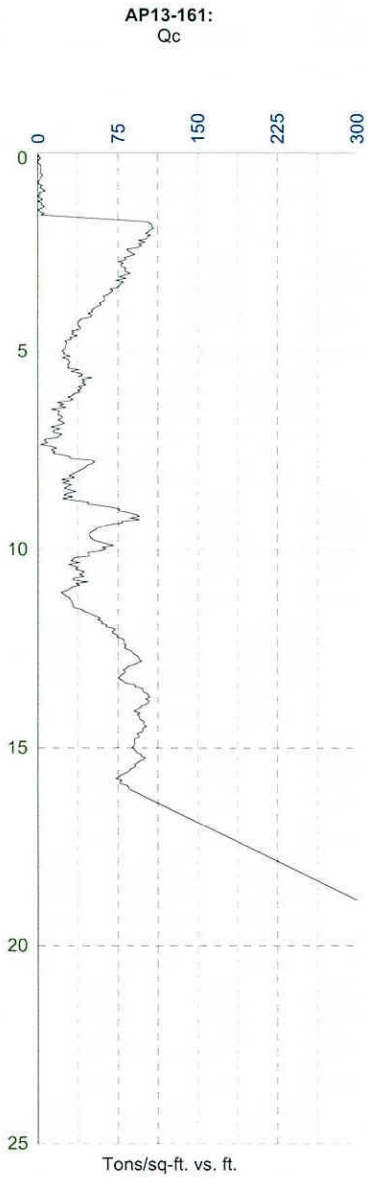

AP13-160:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

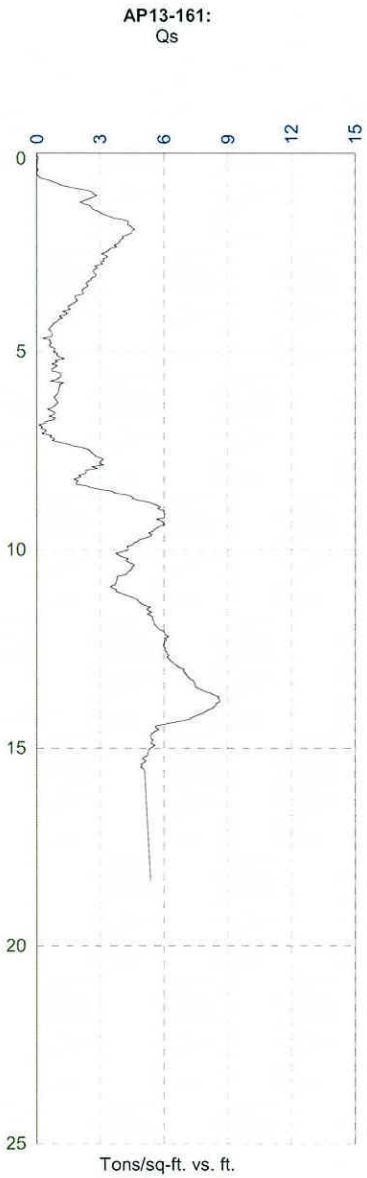

AP13-160:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

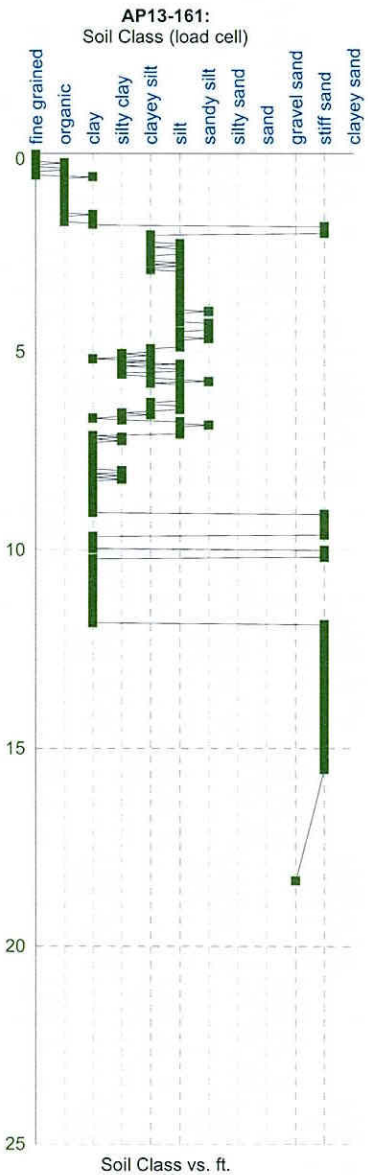

AP13-160:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

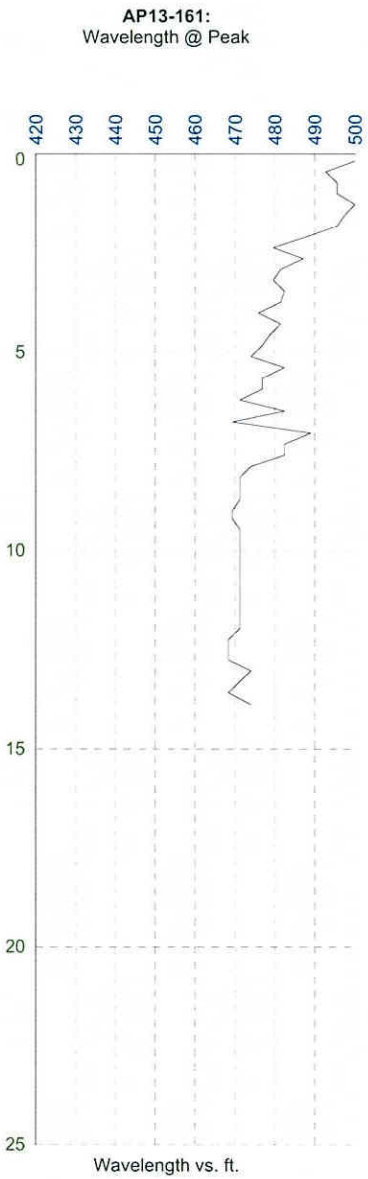

AP13-160:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

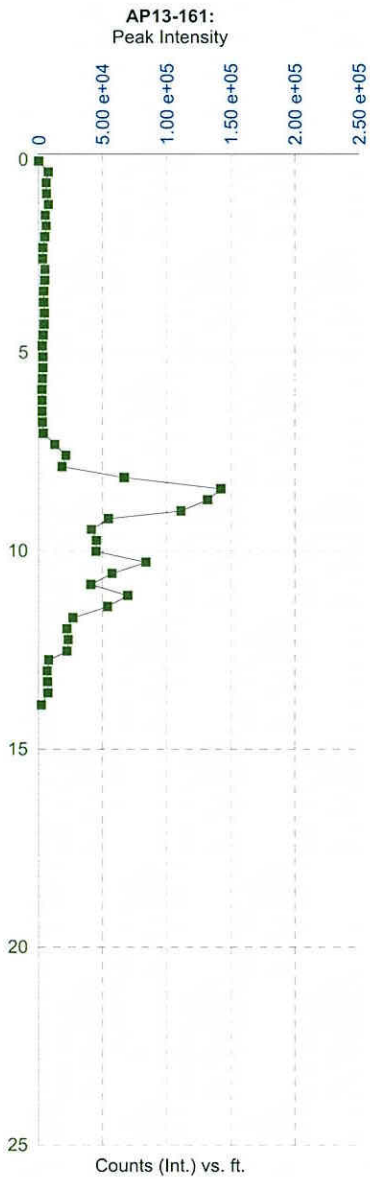

AP13-160:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

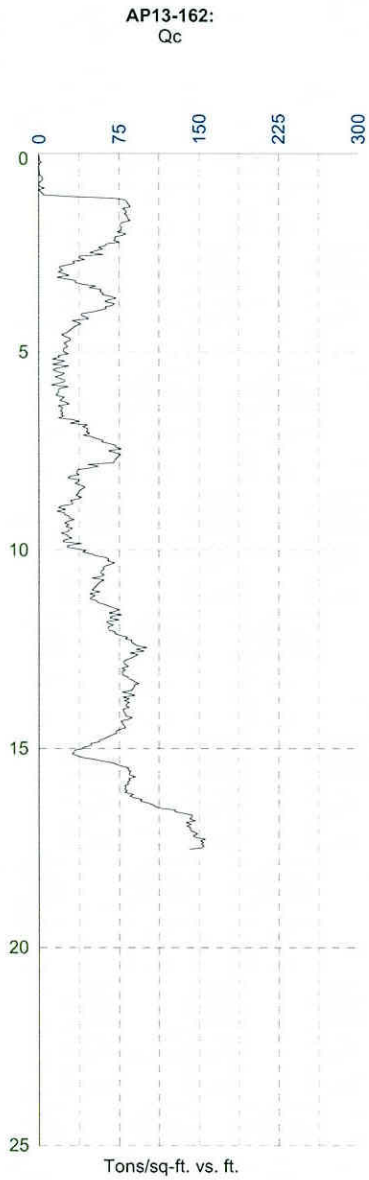

AP13-161:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

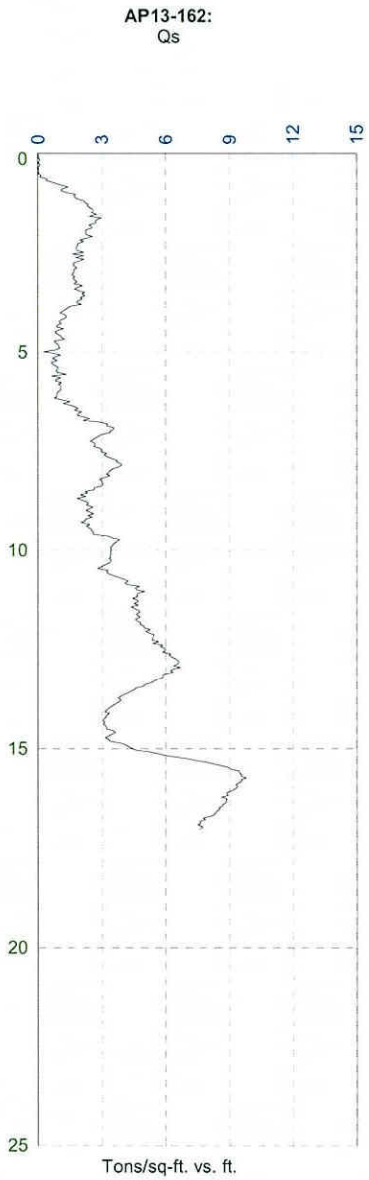

AP13-161:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

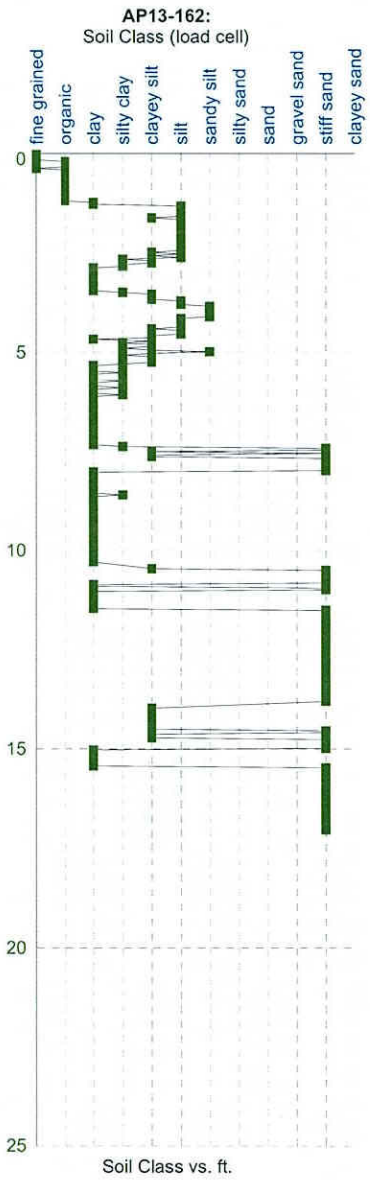

AP13-161:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

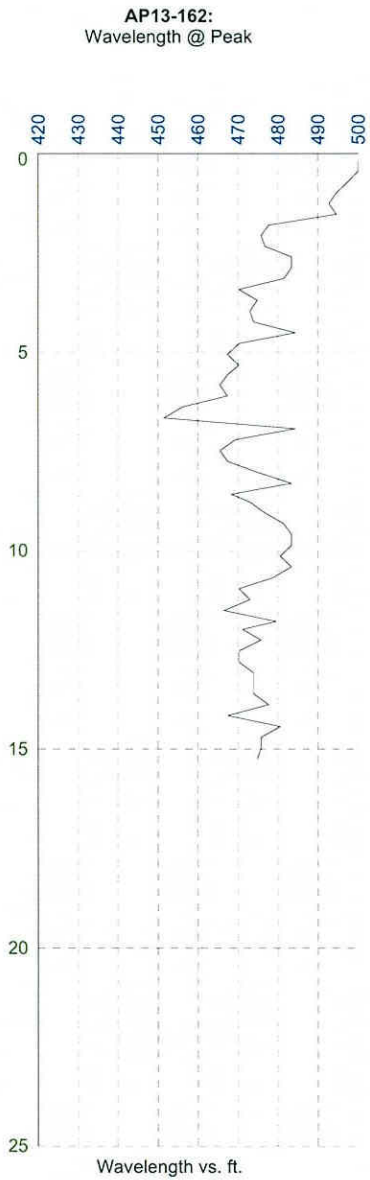

AP13-161:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

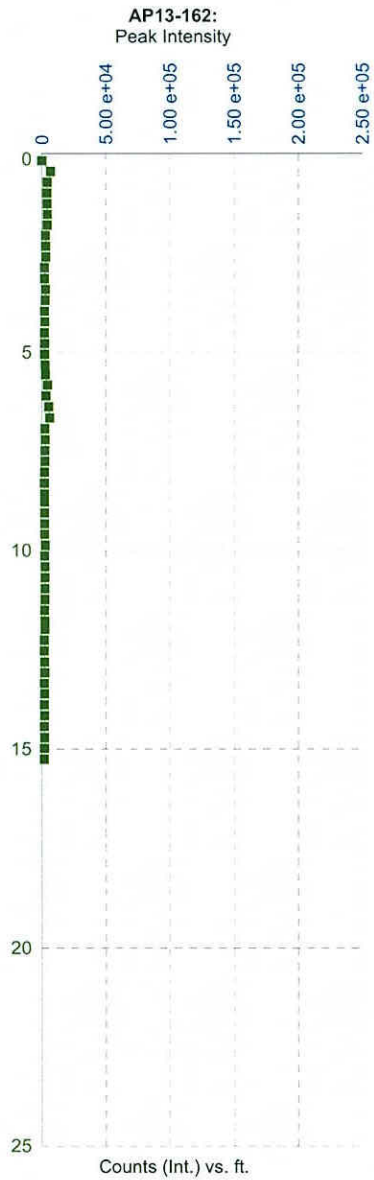

AP13-161:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

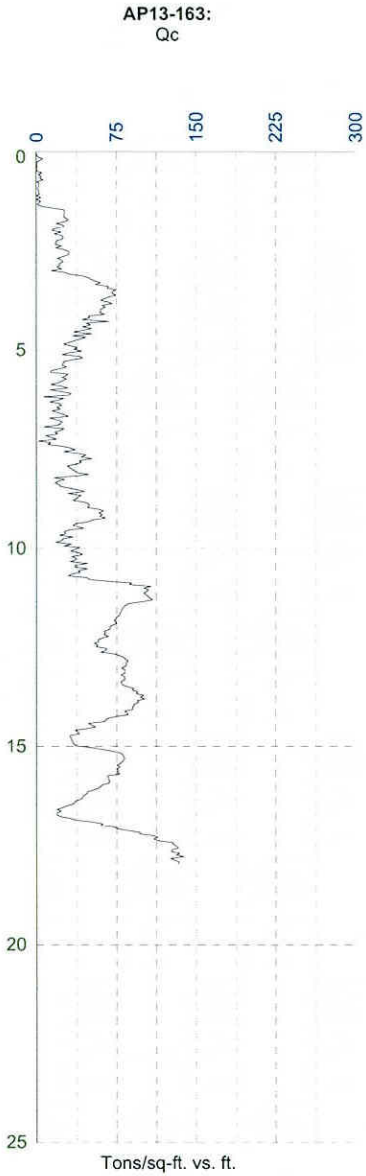

AP13-162:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

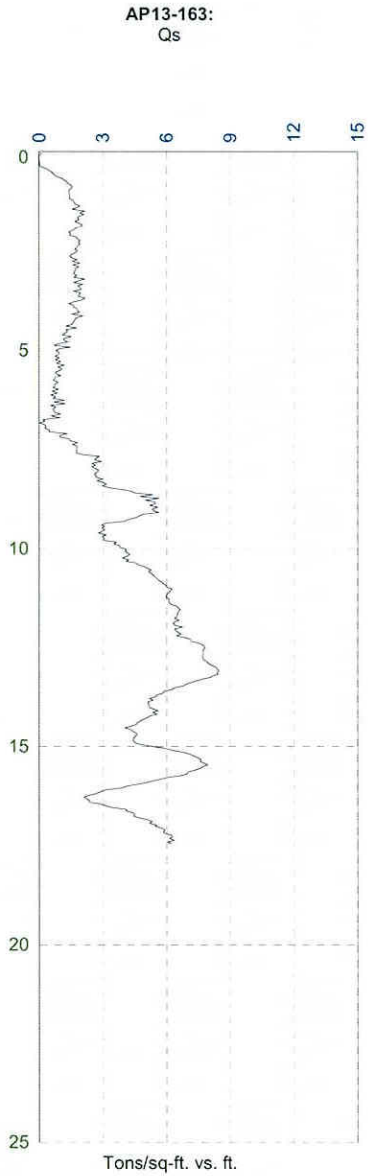

AP13-162:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

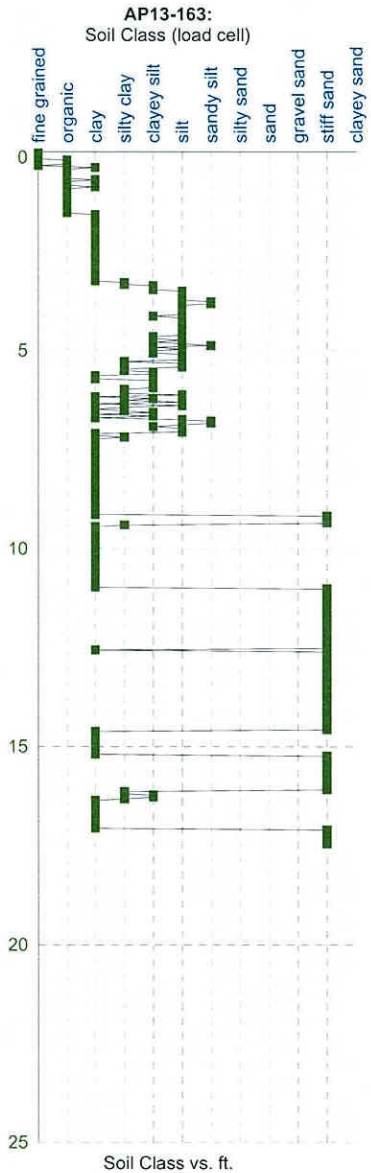

AP13-162:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

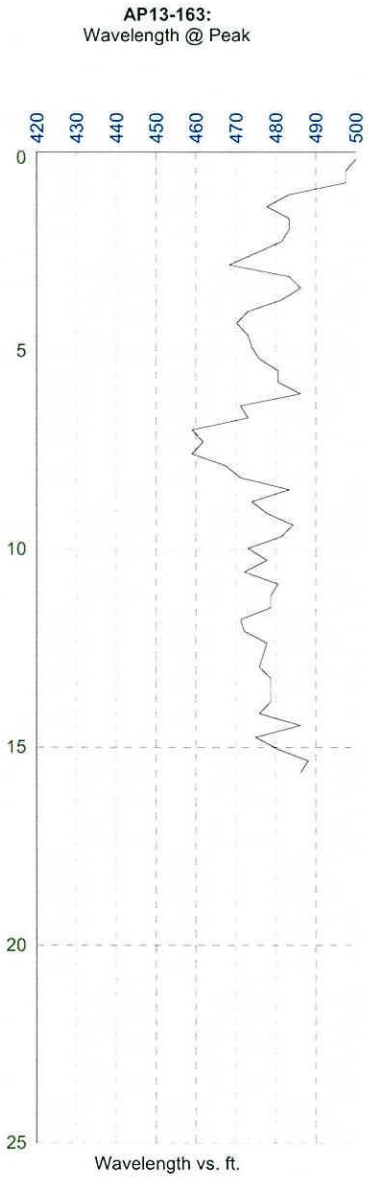

AP13-162:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

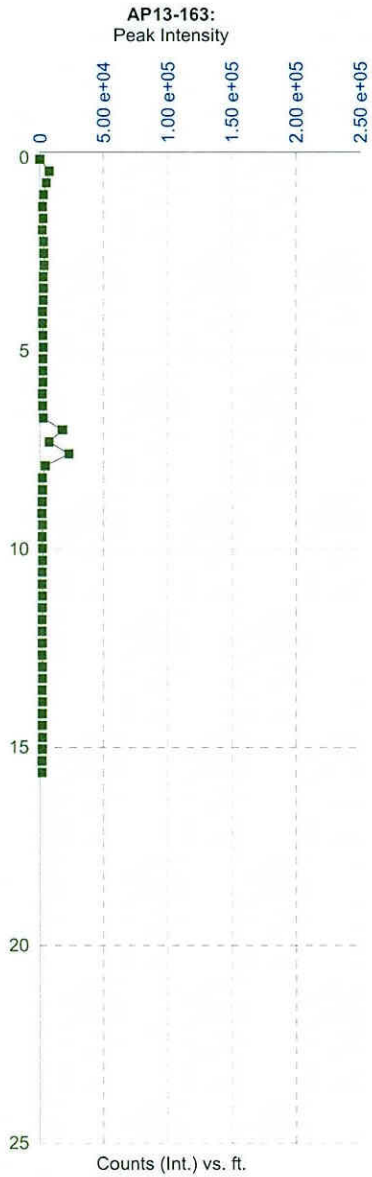

AP13-162:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

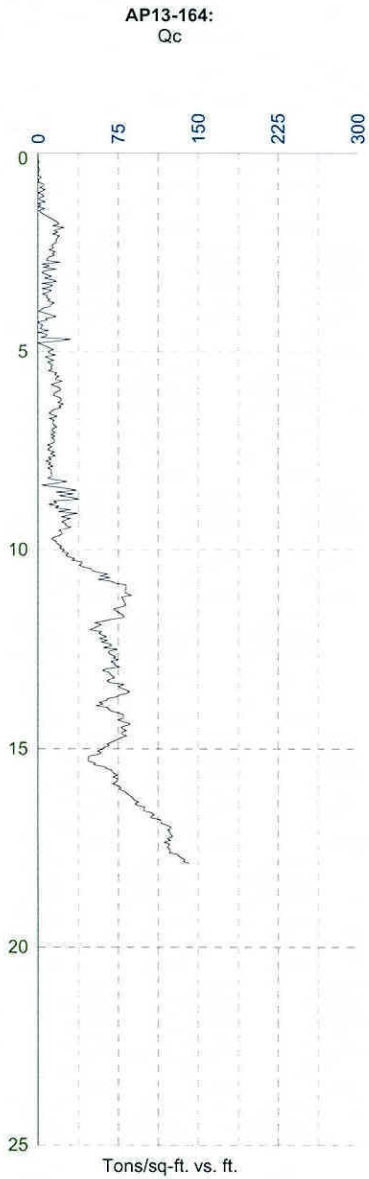

AP13-163:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

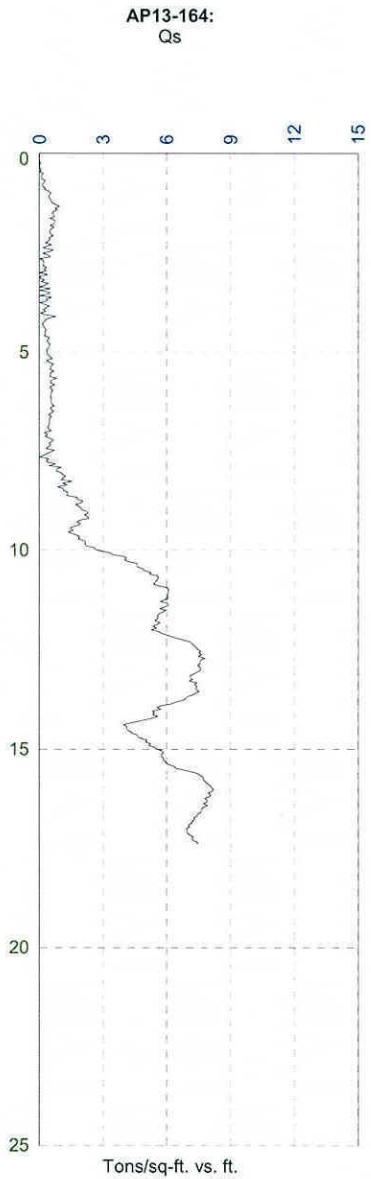

AP13-163:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

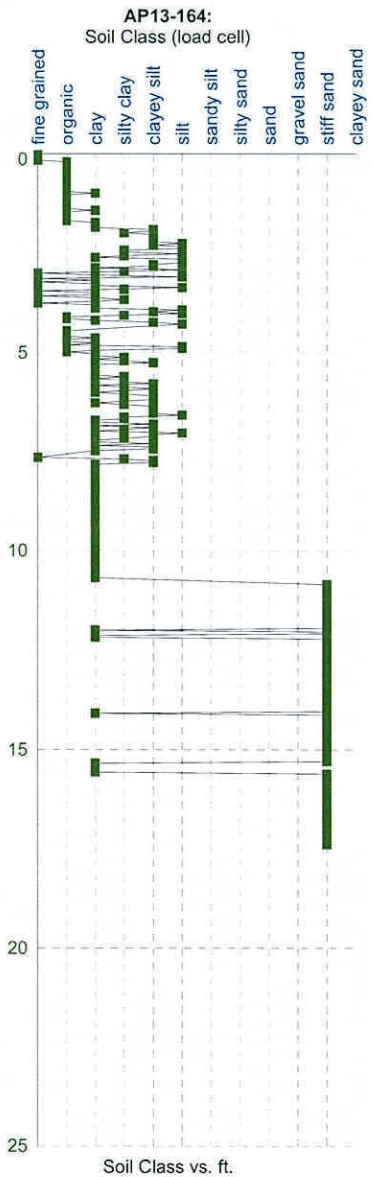

AP13-163:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

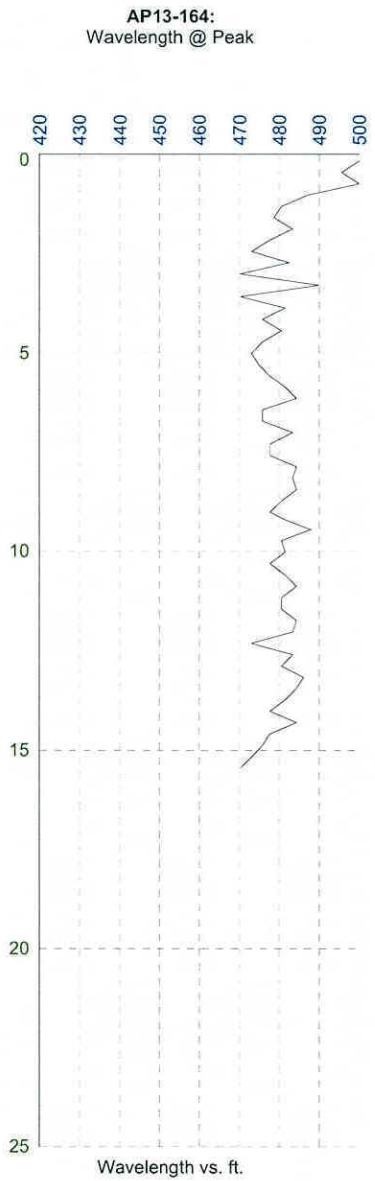

AP13-163:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

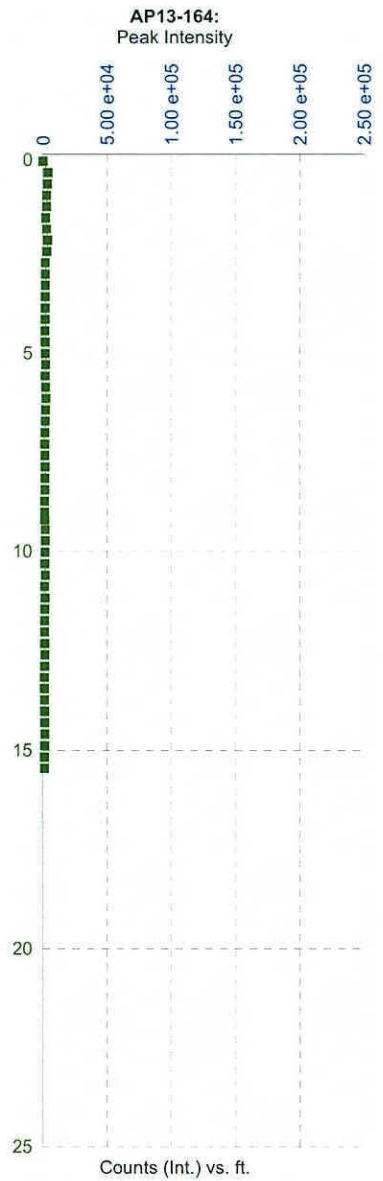

AP13-163:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

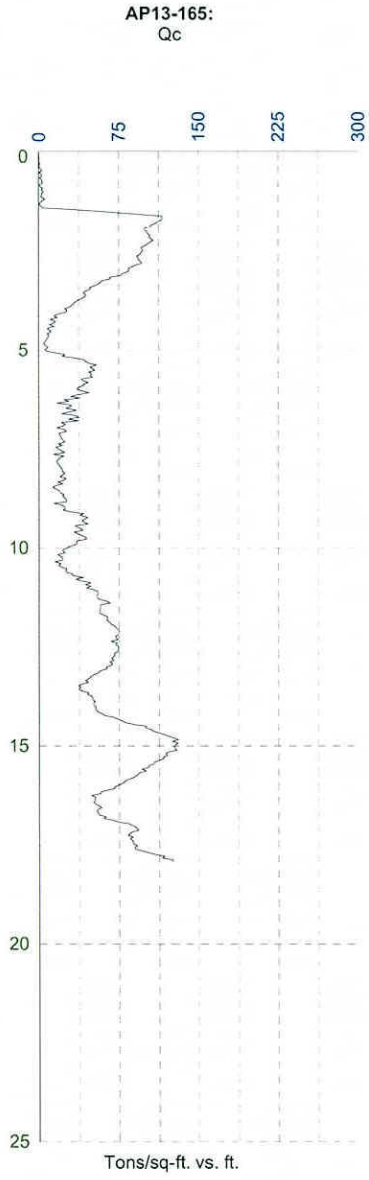

AP13-164:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

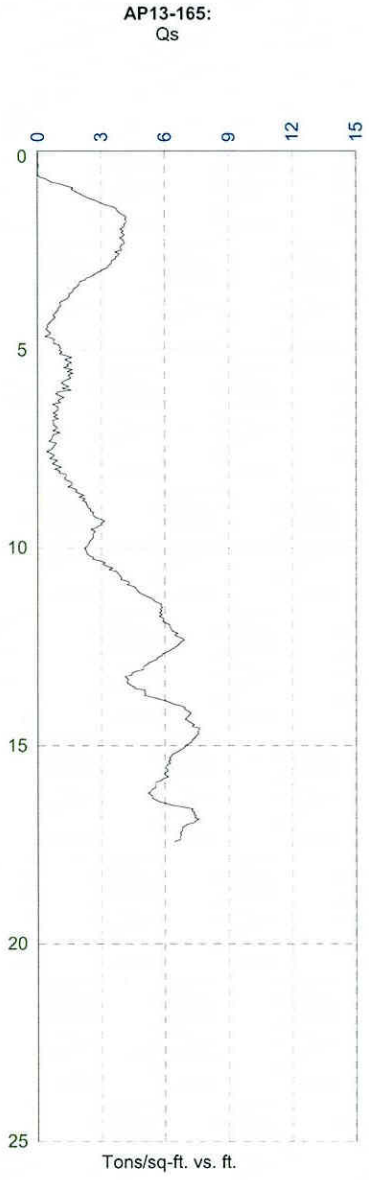

AP13-164:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

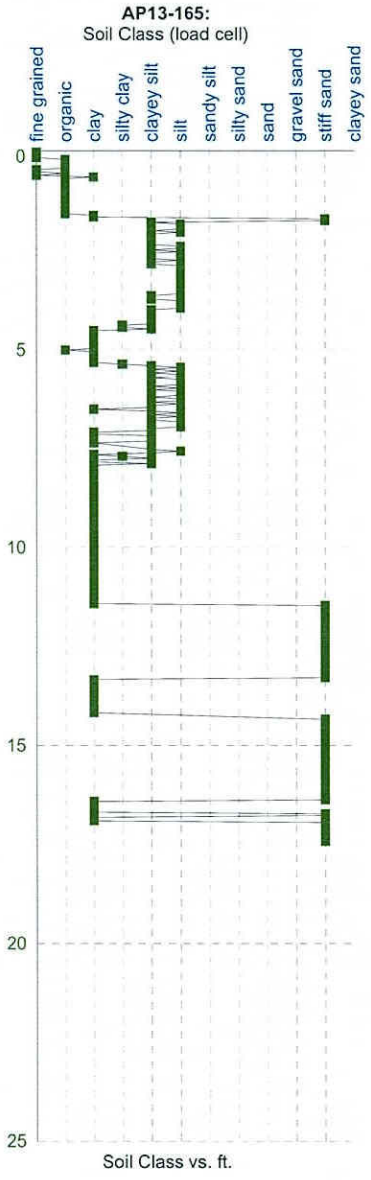

AP13-164:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

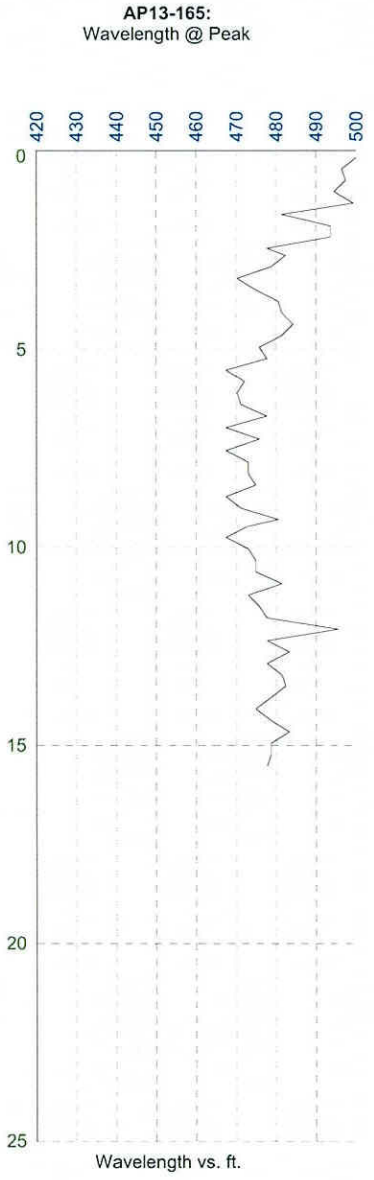

AP13-164:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

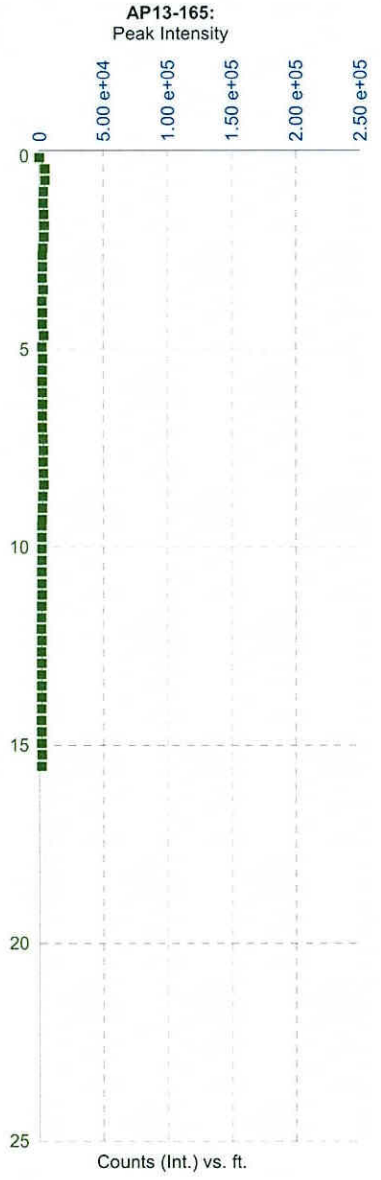

AP13-164:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

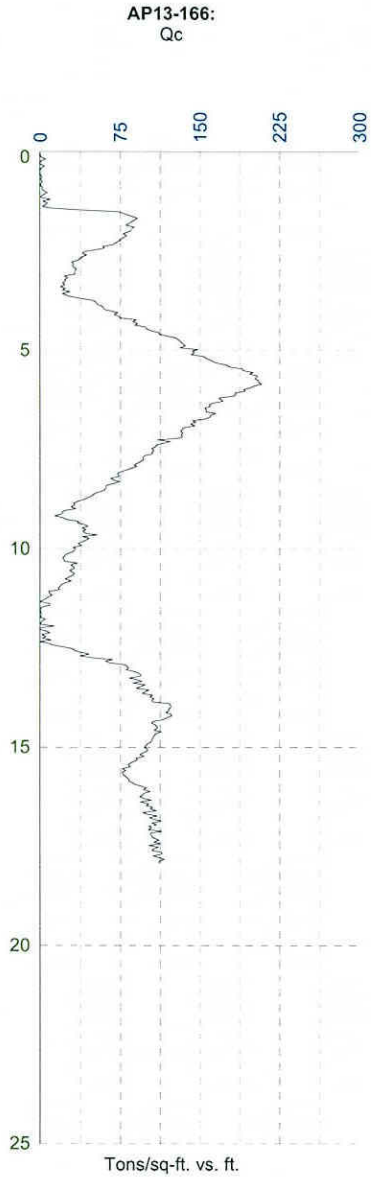

AP13-165:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

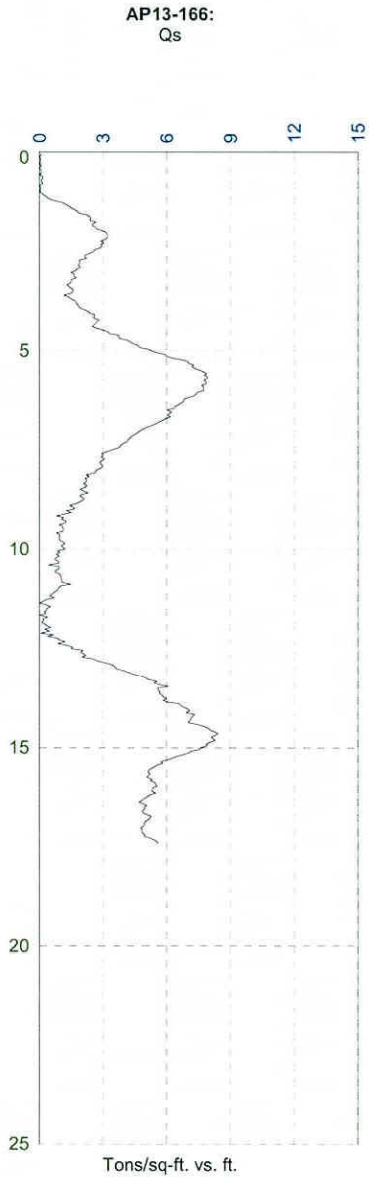

AP13-165:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

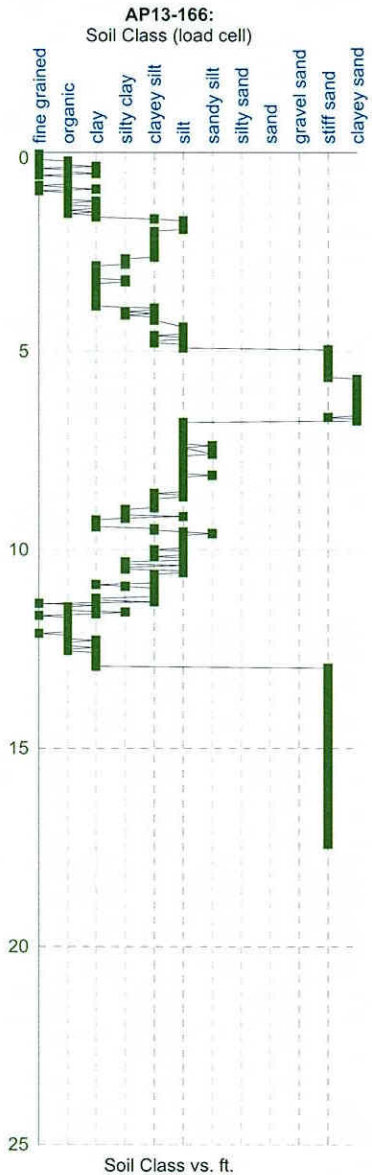

AP13-165:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

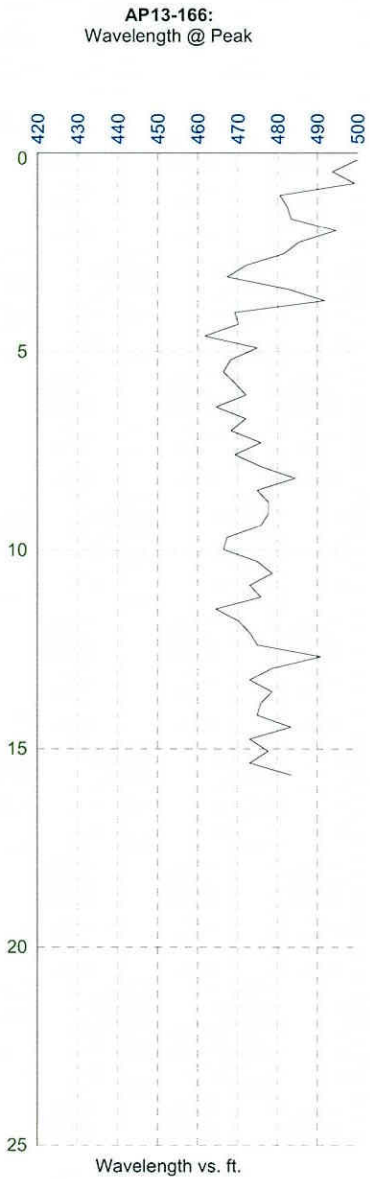

AP13-165:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

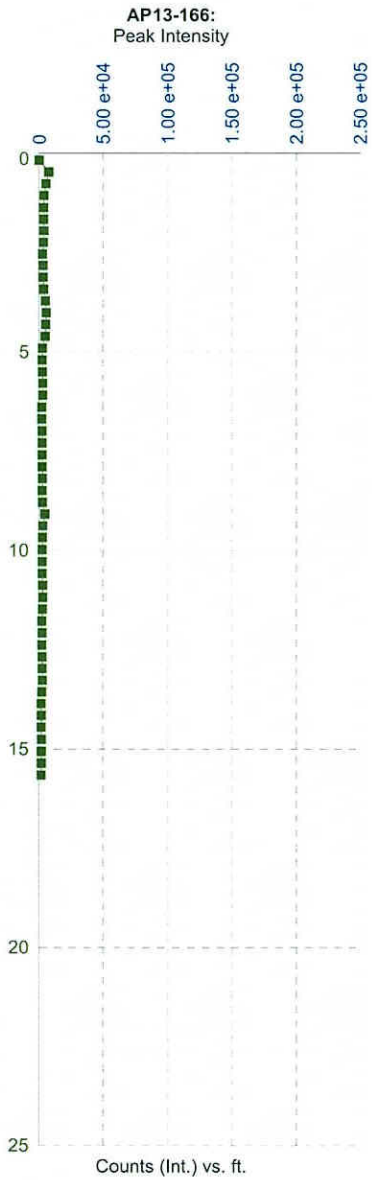

AP13-165:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

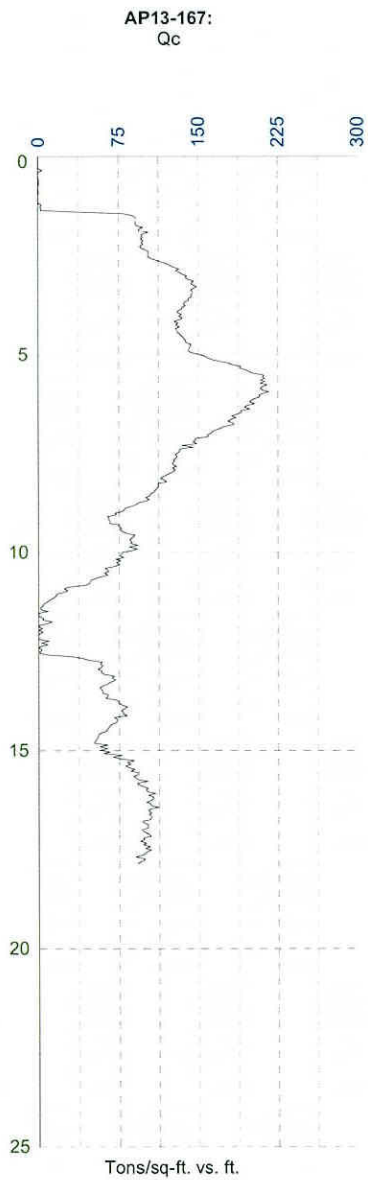

AP13-166:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

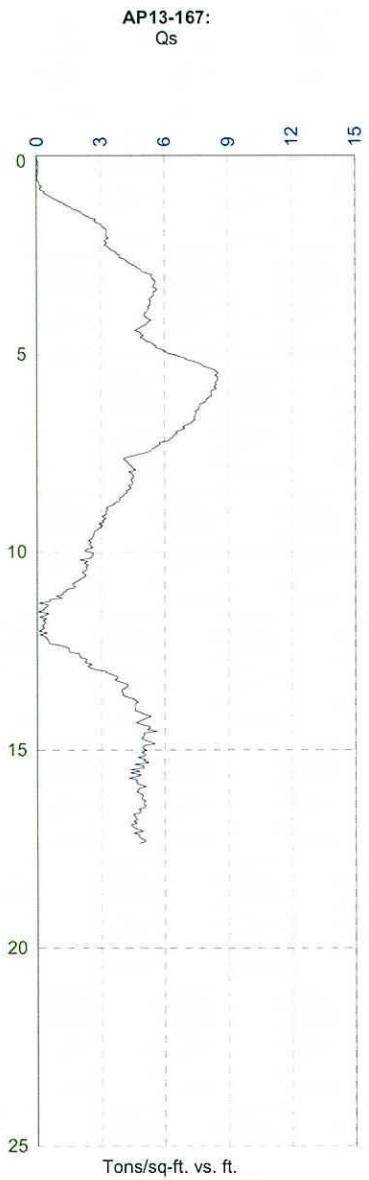

AP13-166:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

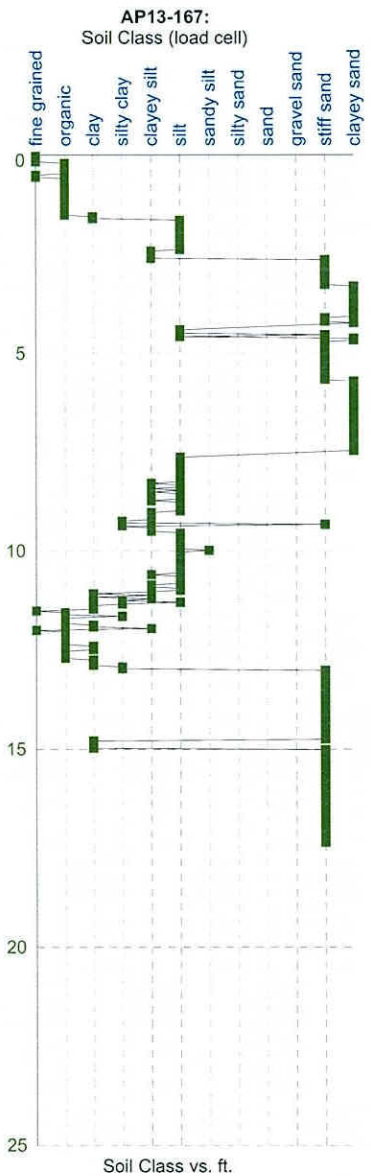

AP13-166:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

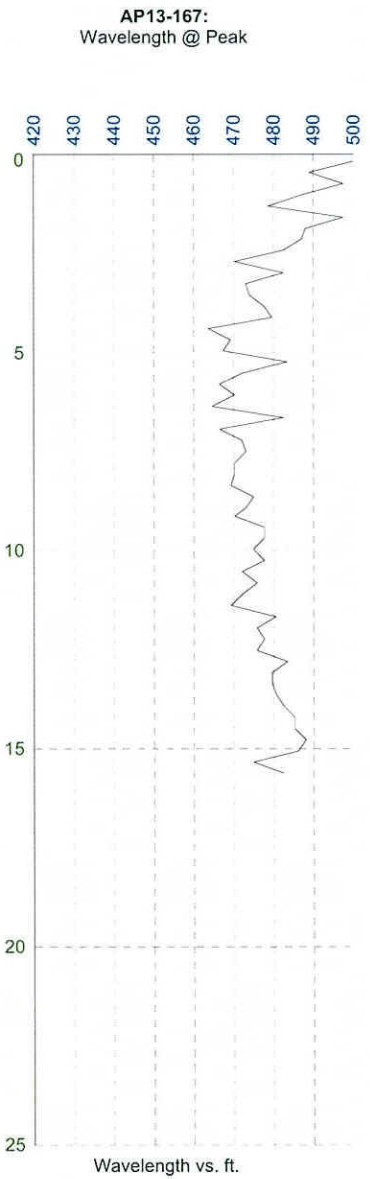

AP13-166:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

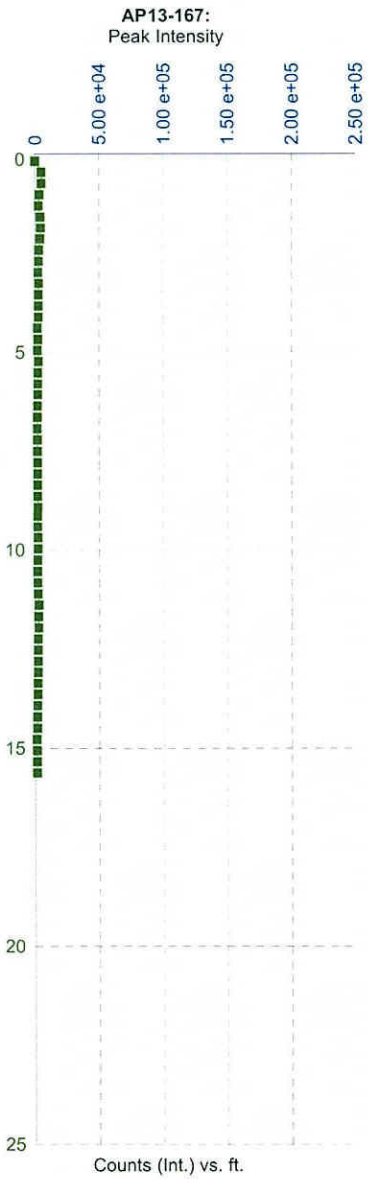

AP13-166:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

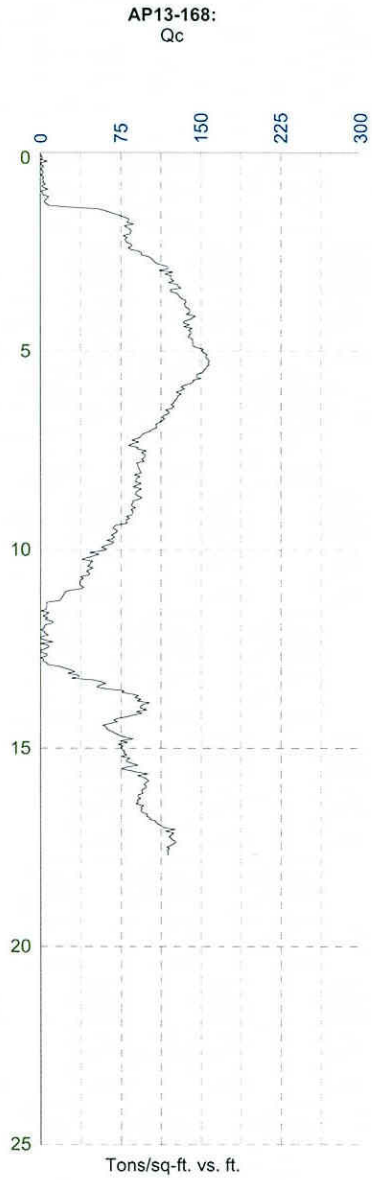

AP13-167:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

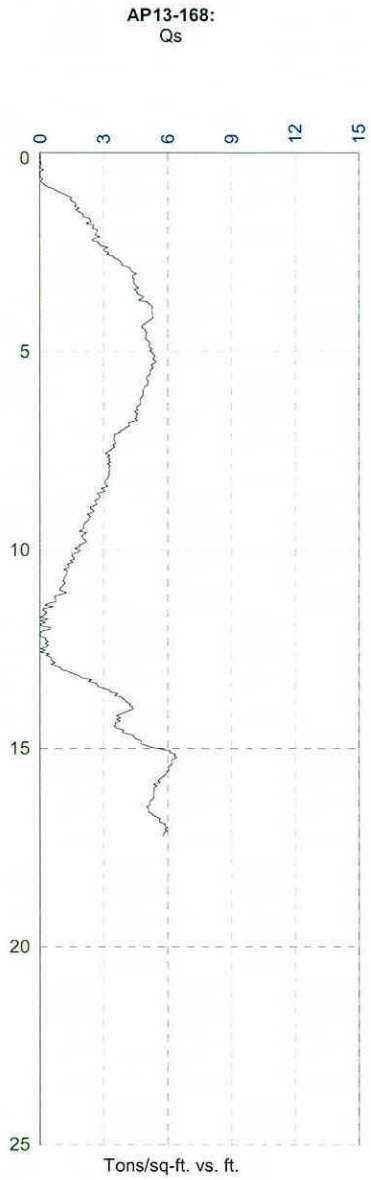

AP13-167:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

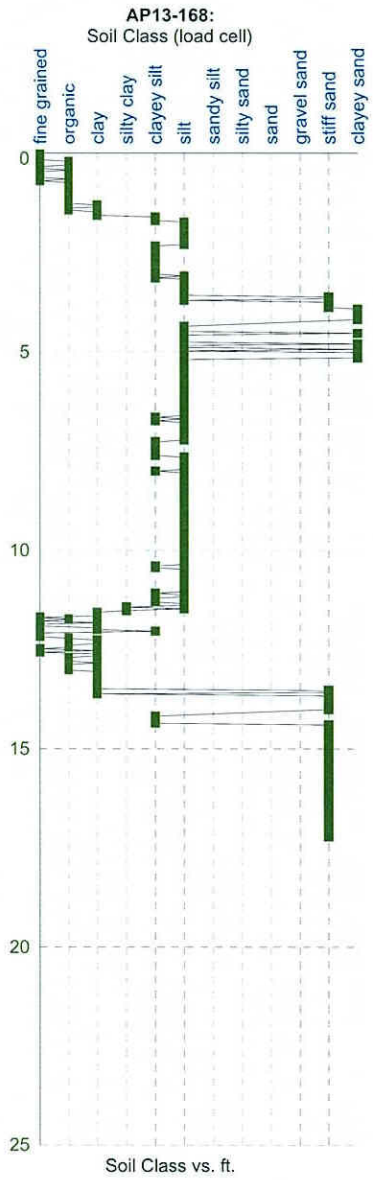

AP13-167:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

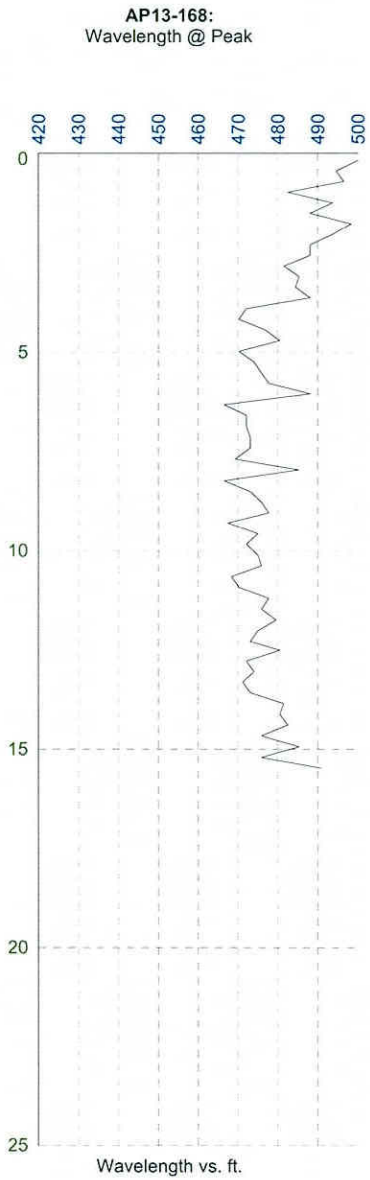

AP13-167:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

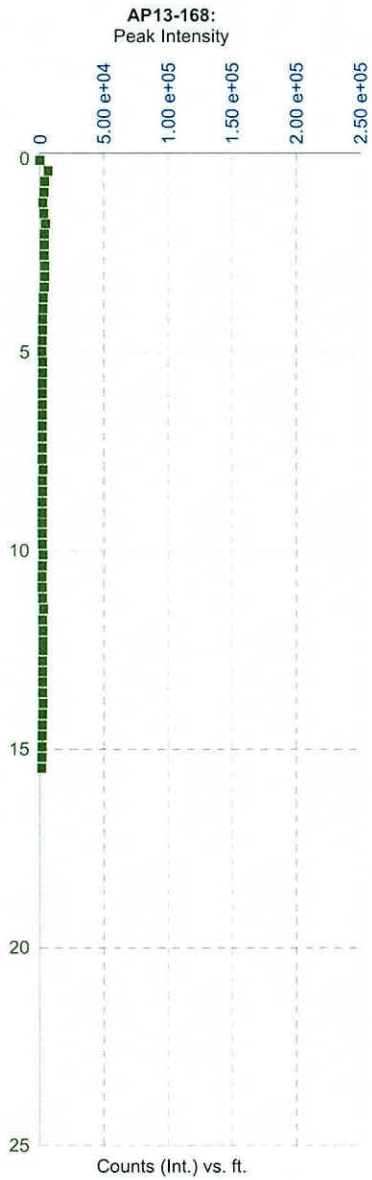

AP13-167:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

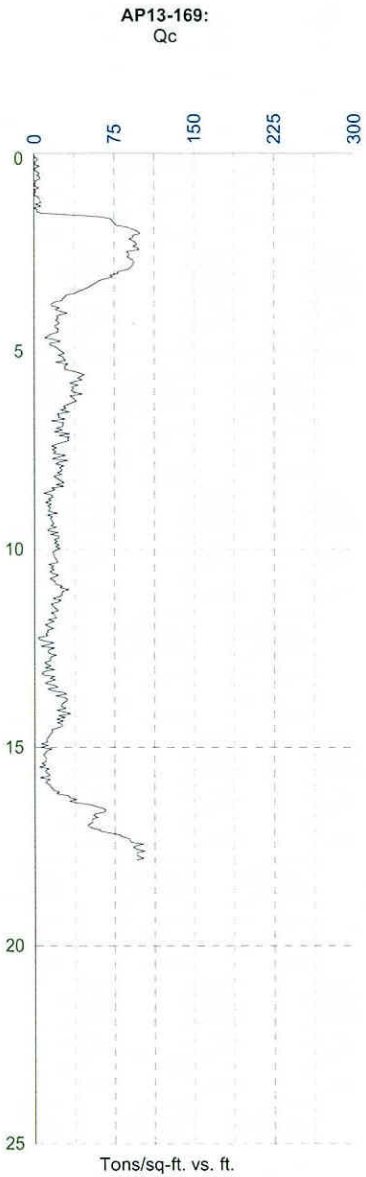

AP13-168:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

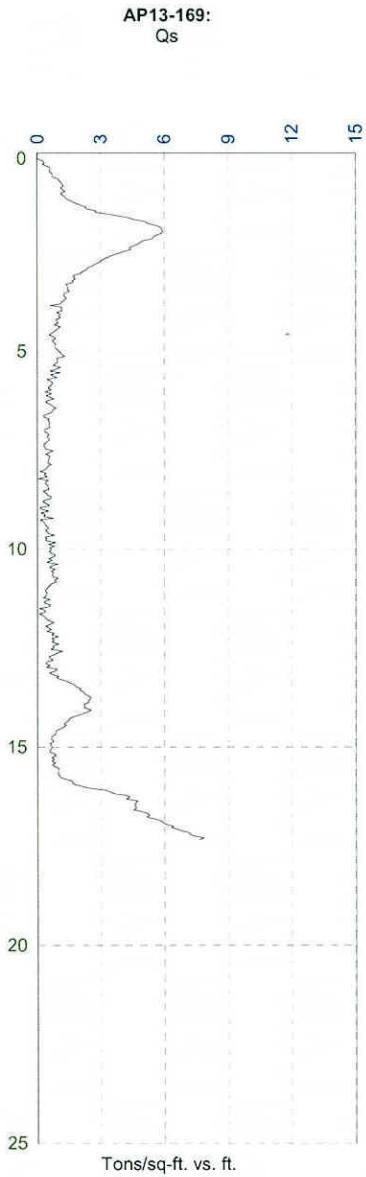

AP13-168:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

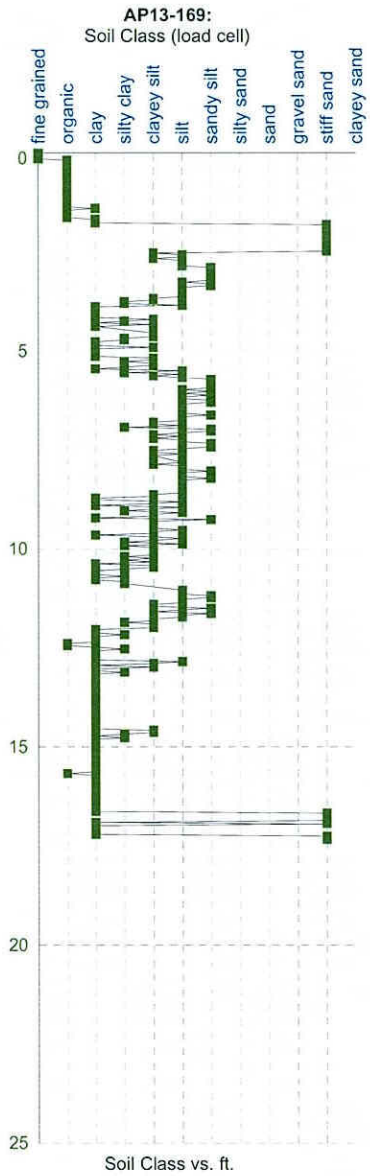

AP13-168:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

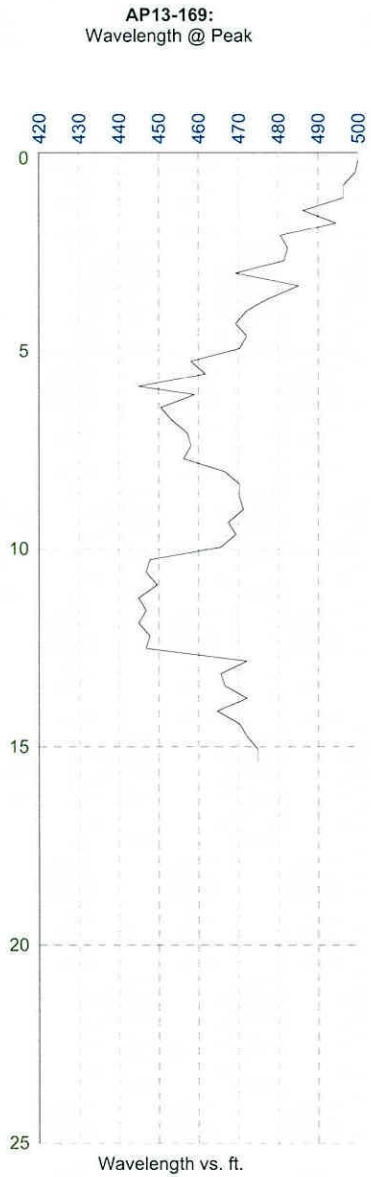

AP13-168:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

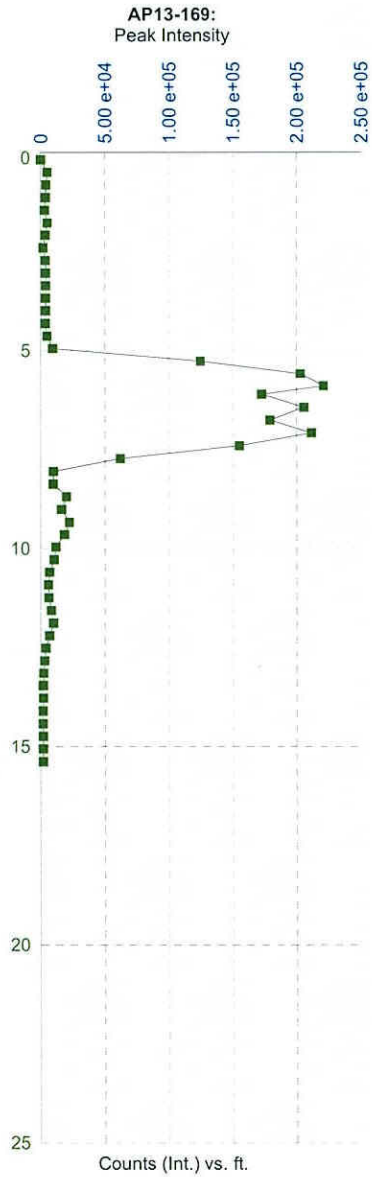

AP13-168:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

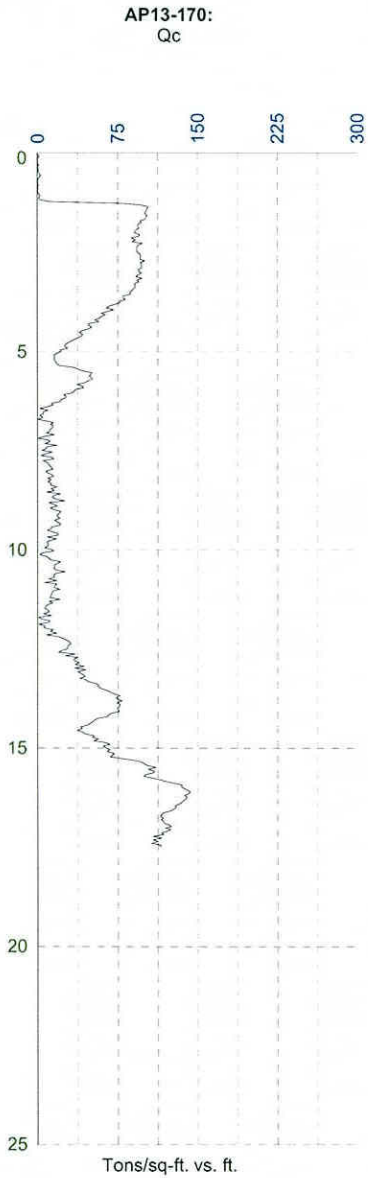

AP13-169:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

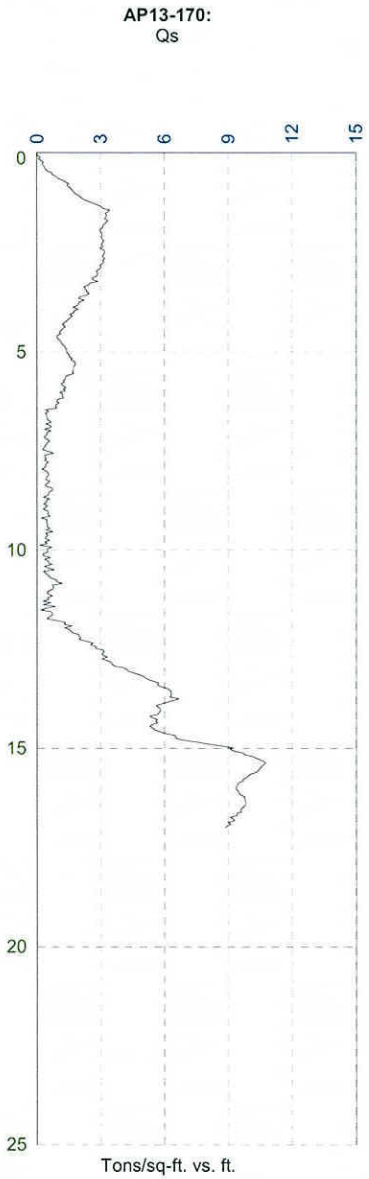

AP13-169:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

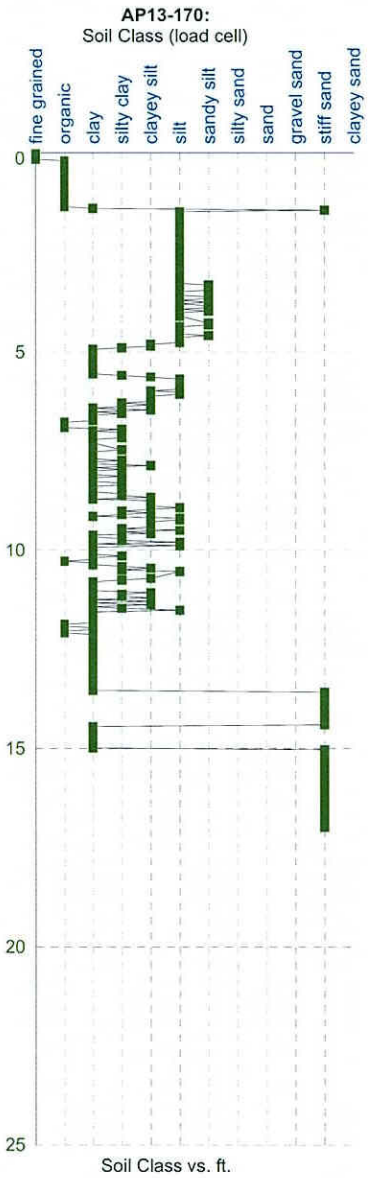

AP13-169:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

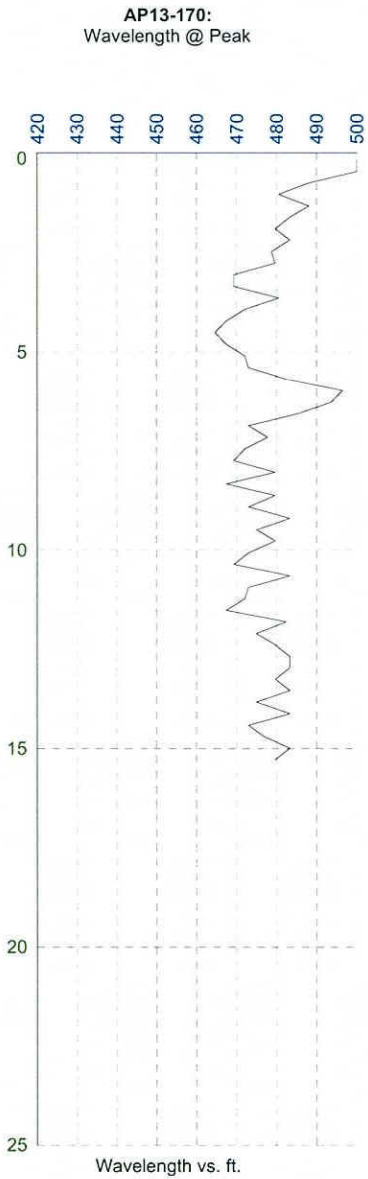

AP13-169:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

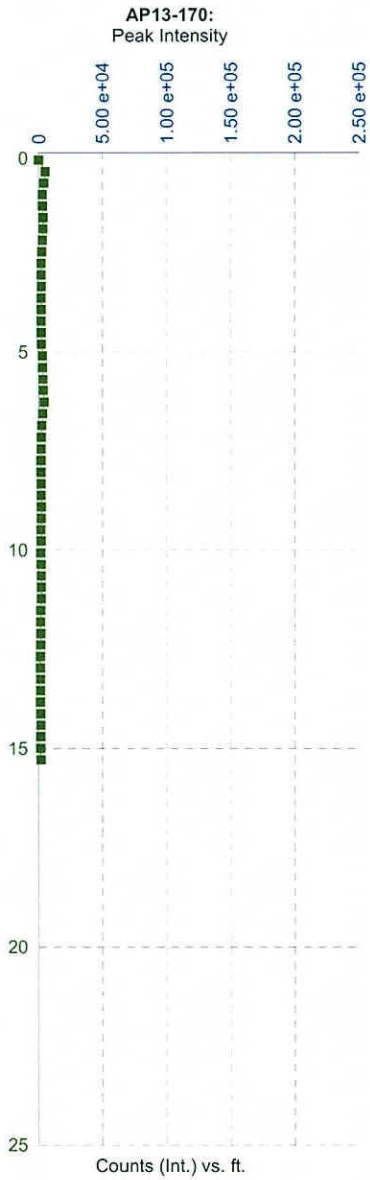

AP13-169:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

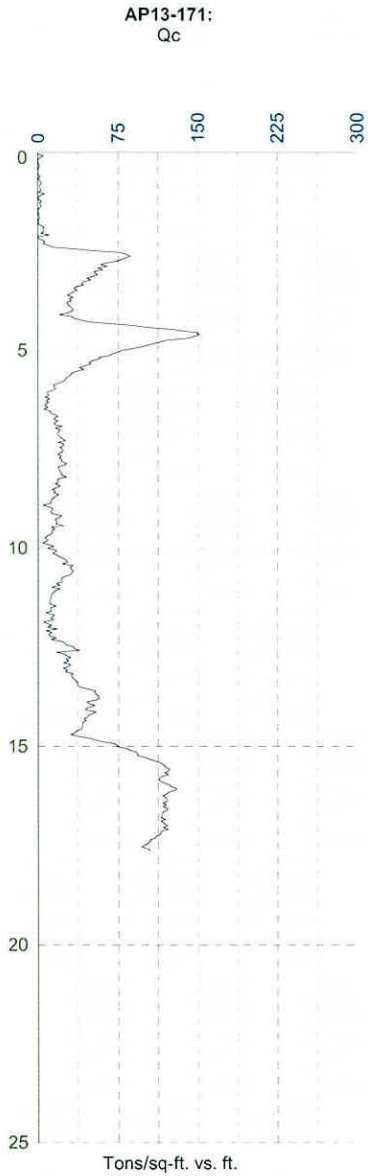

AP13-170:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

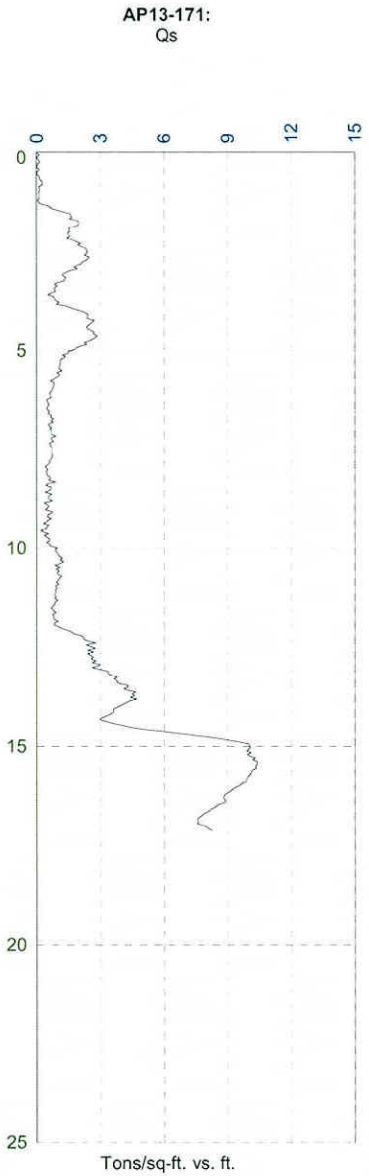

AP13-170:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

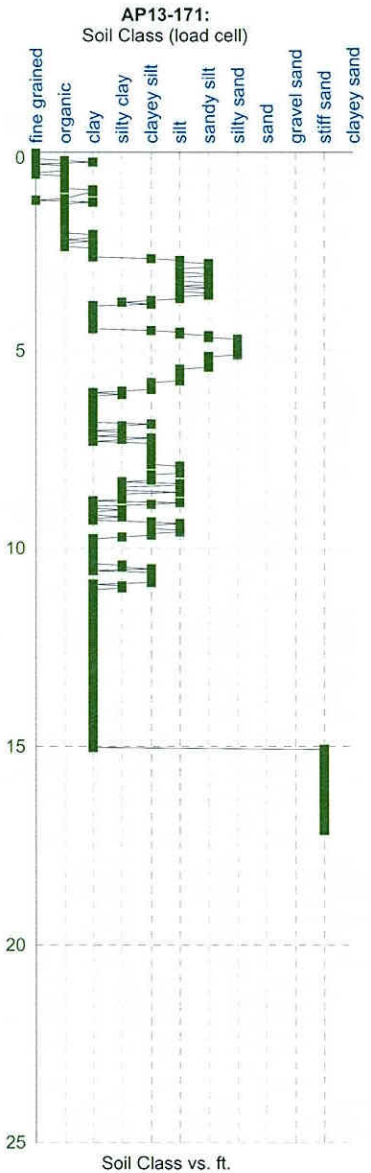

AP13-170:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

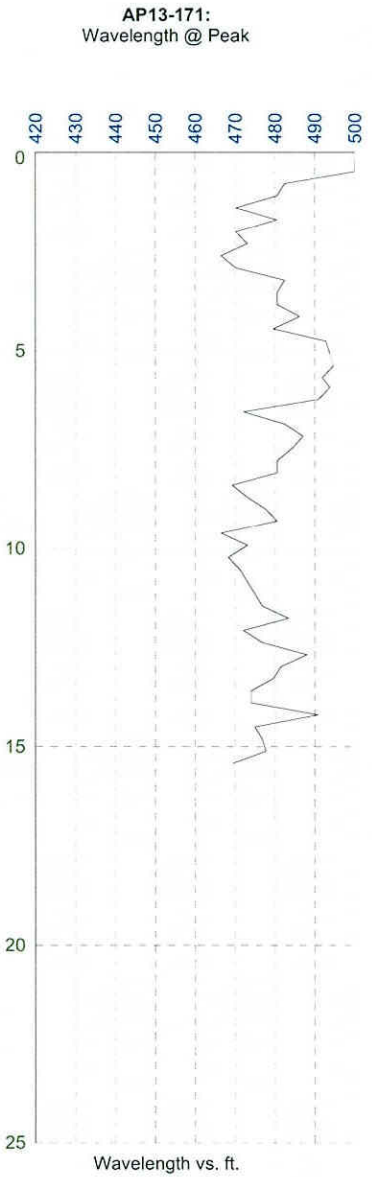

AP13-170:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

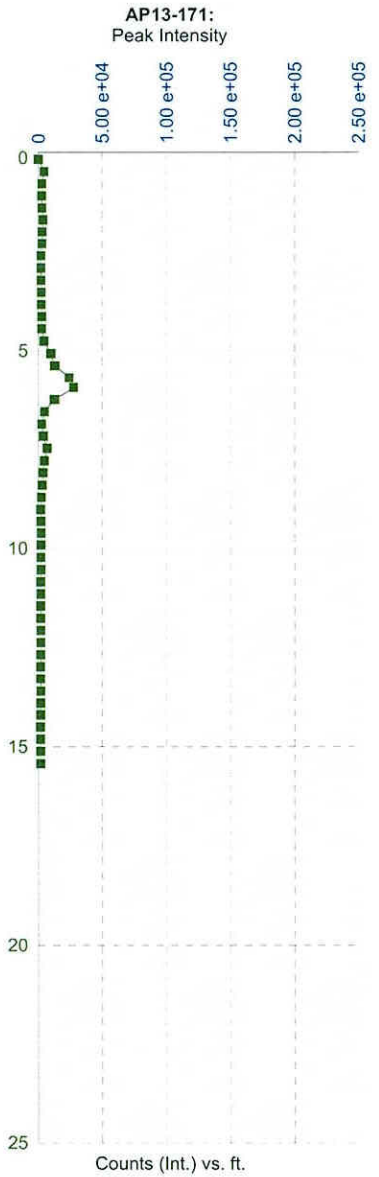

AP13-170:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

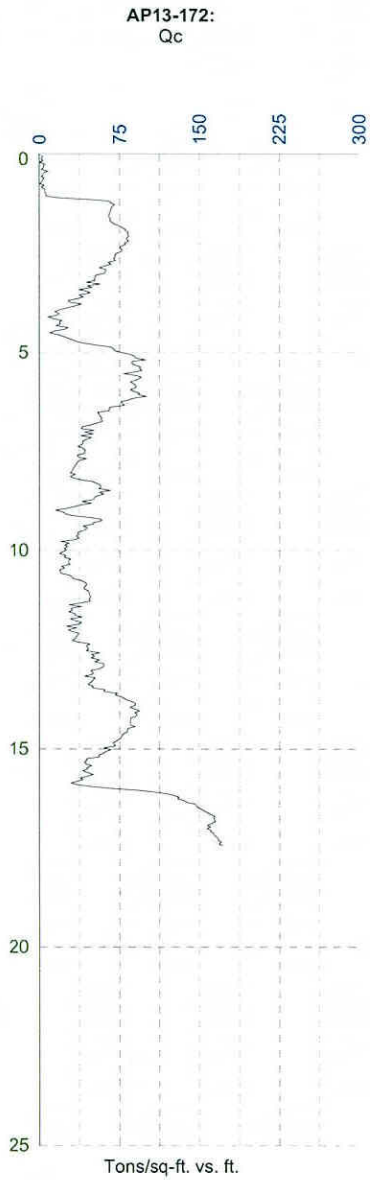

AP13-171:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

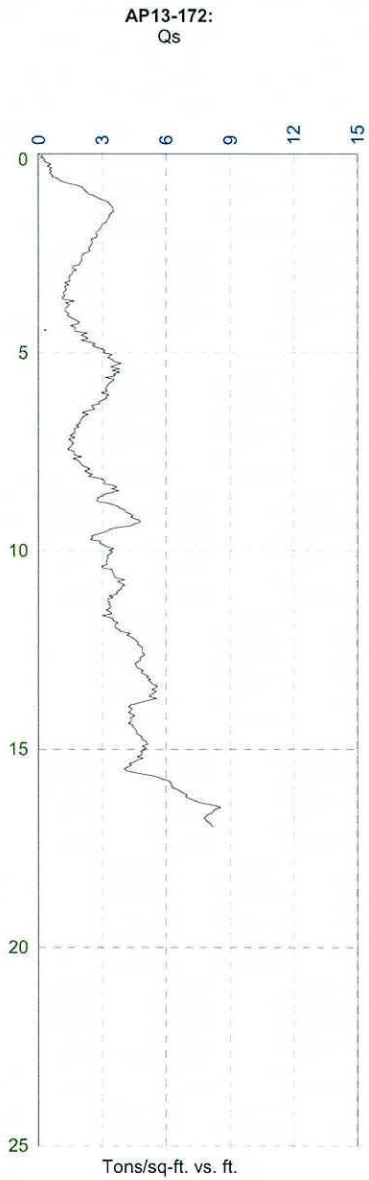

AP13-171:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

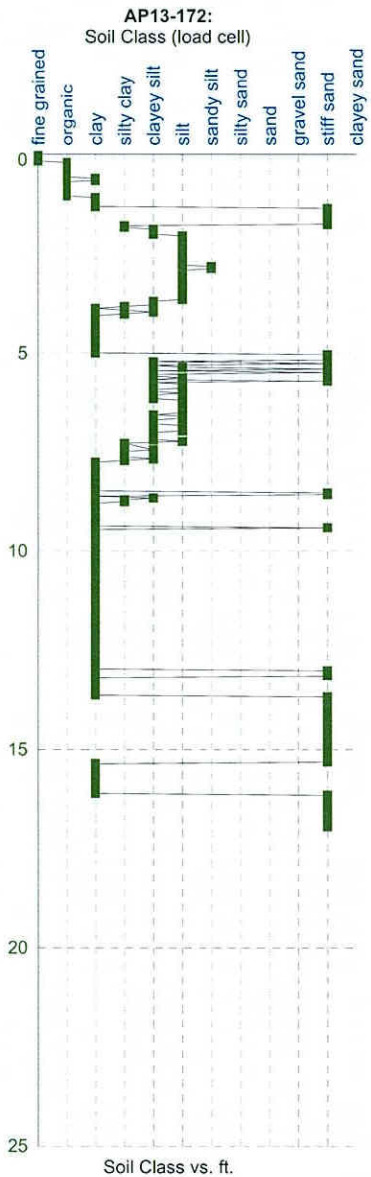

AP13-171:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

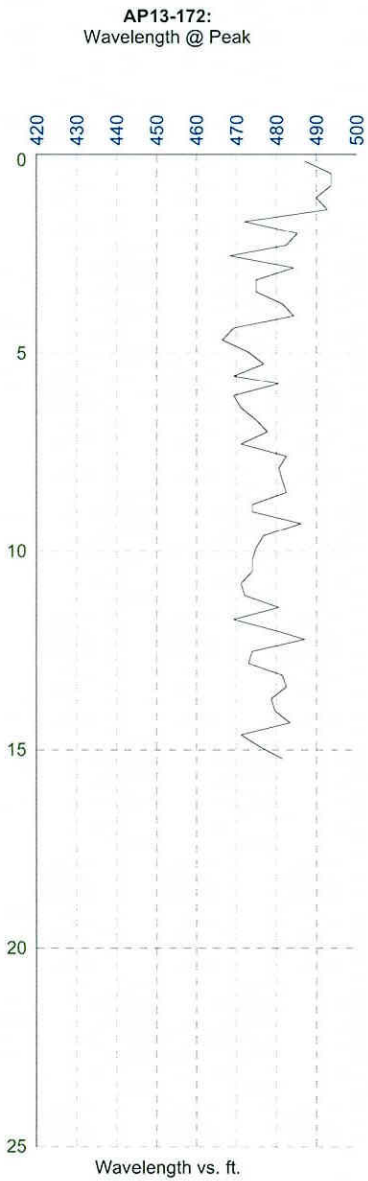

AP13-171:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

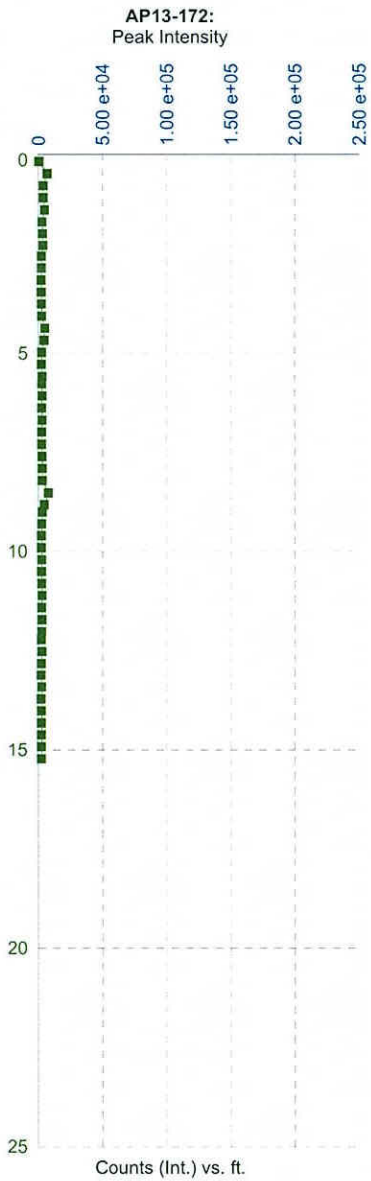

AP13-171:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

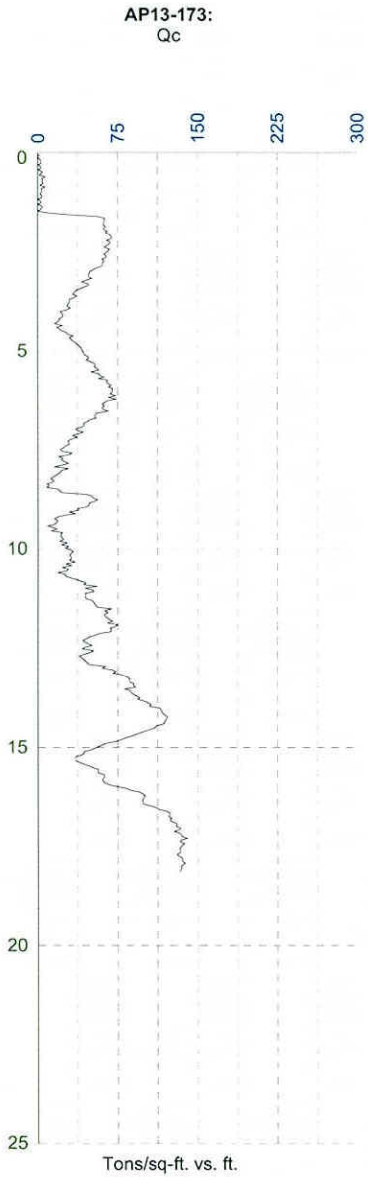

AP13-172:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

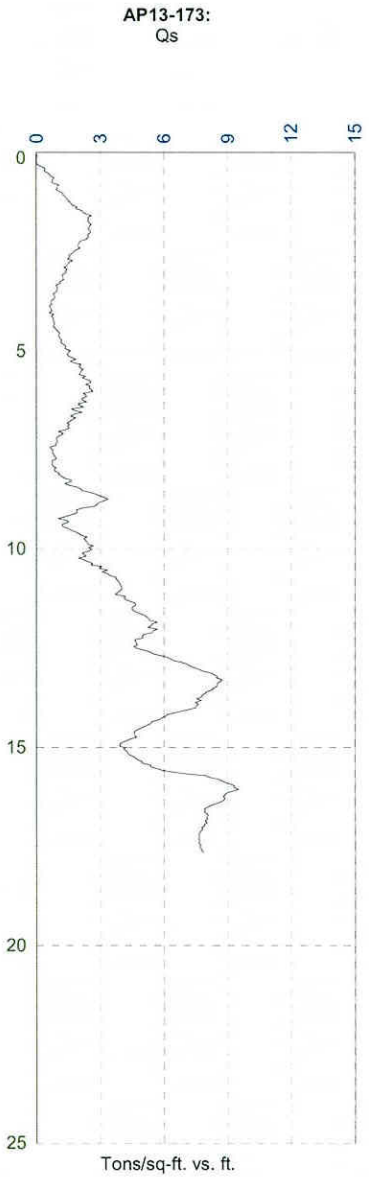

AP13-172:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

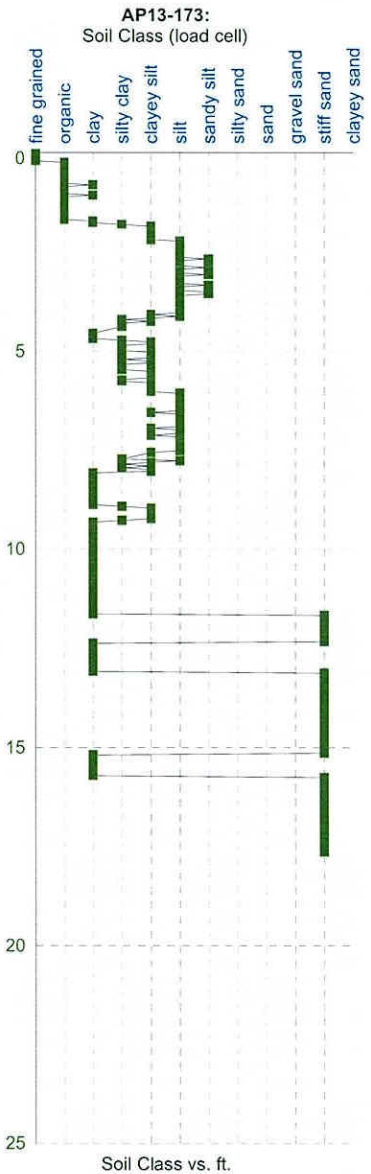

AP13-172:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

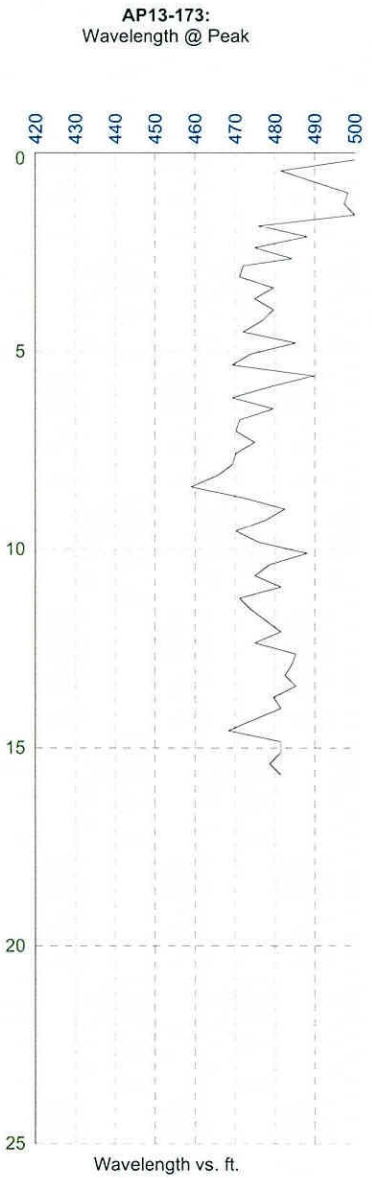

AP13-172:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

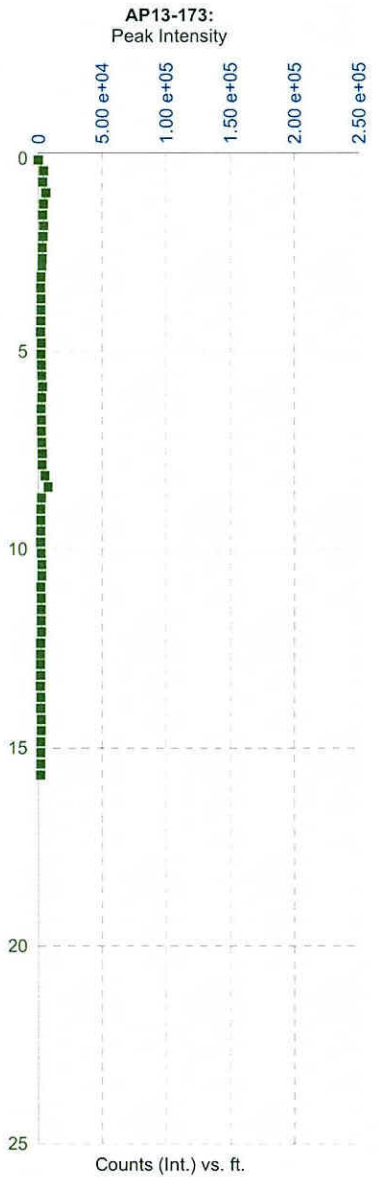

AP13-172:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

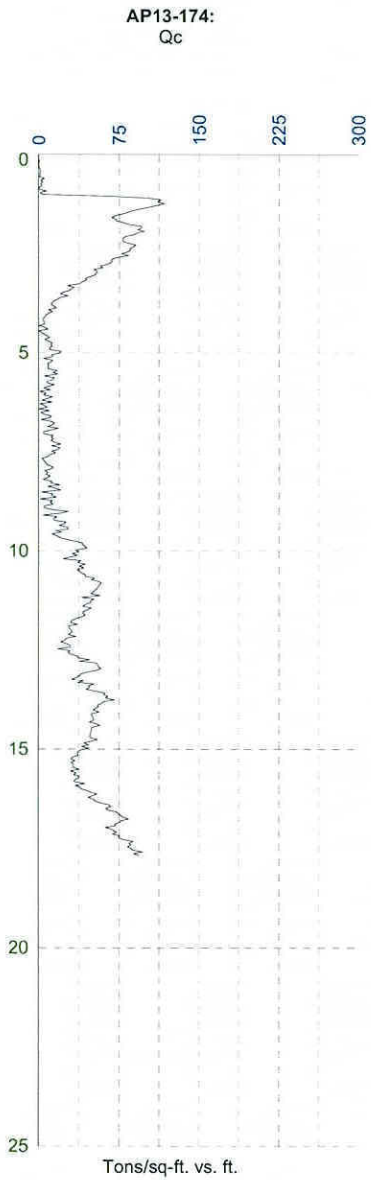

AP13-173:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

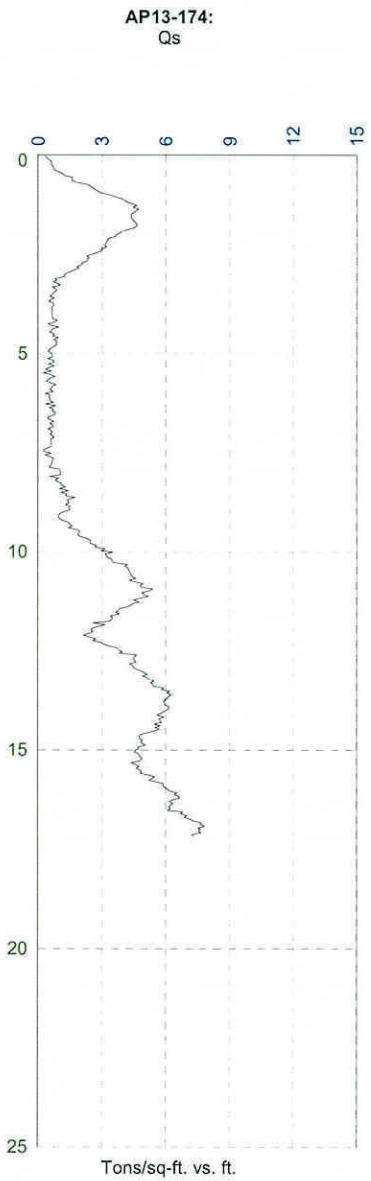

AP13-173:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

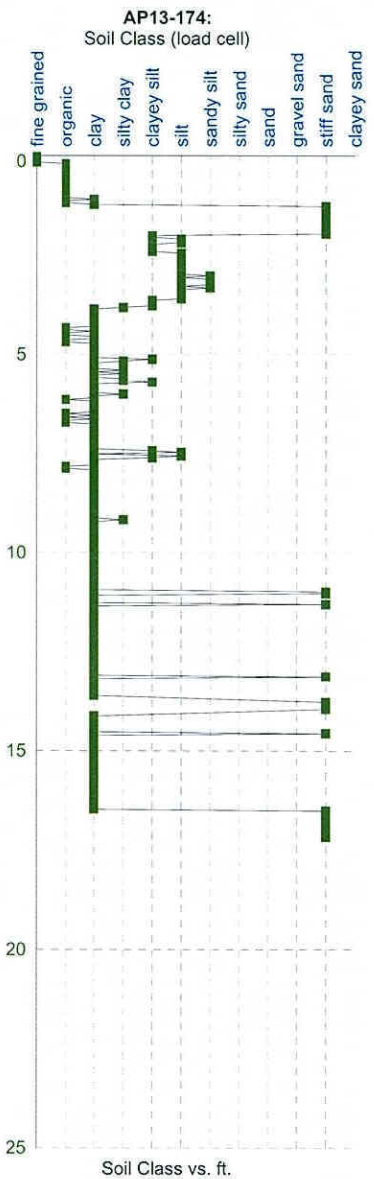

AP13-173:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

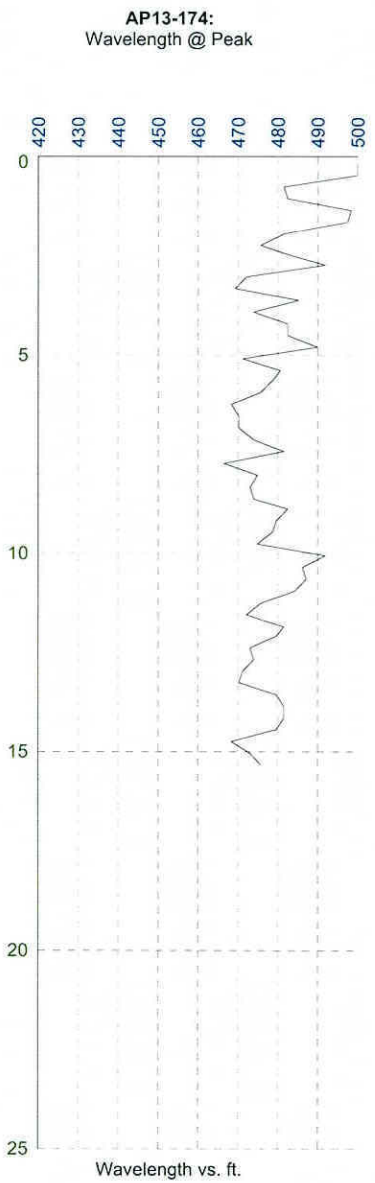

AP13-173:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

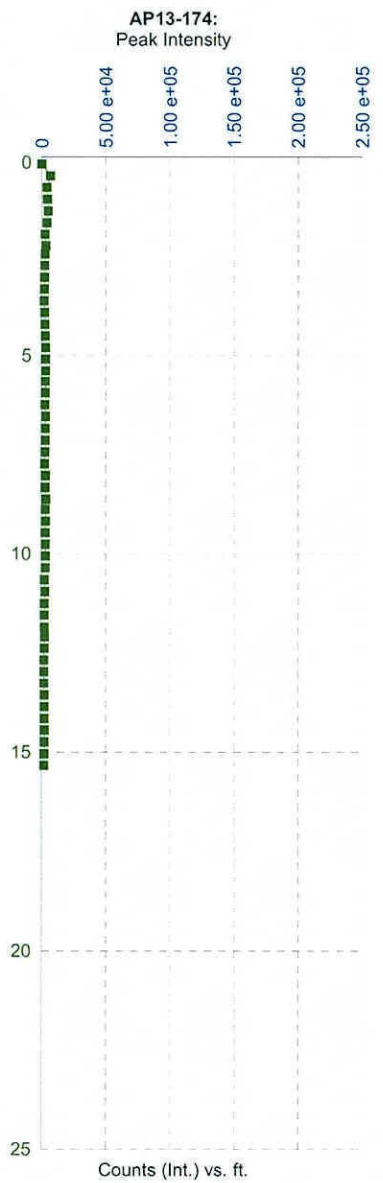

AP13-173:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

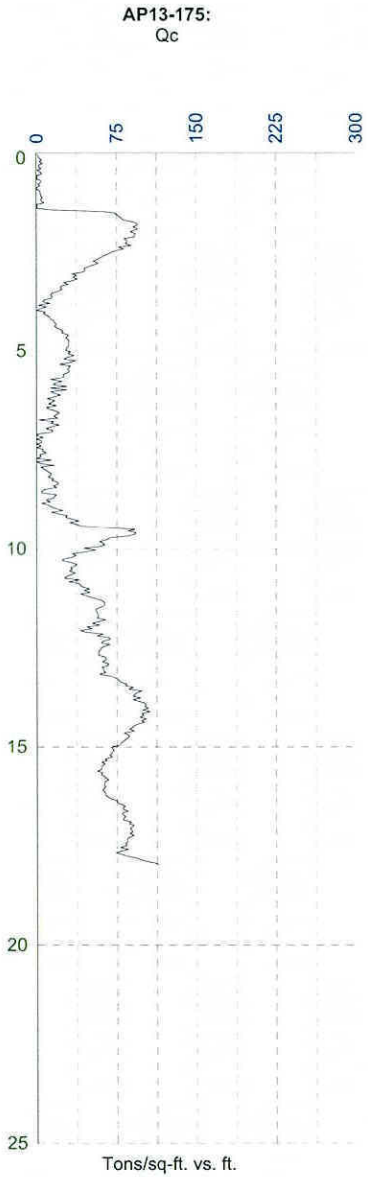

AP13-174:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

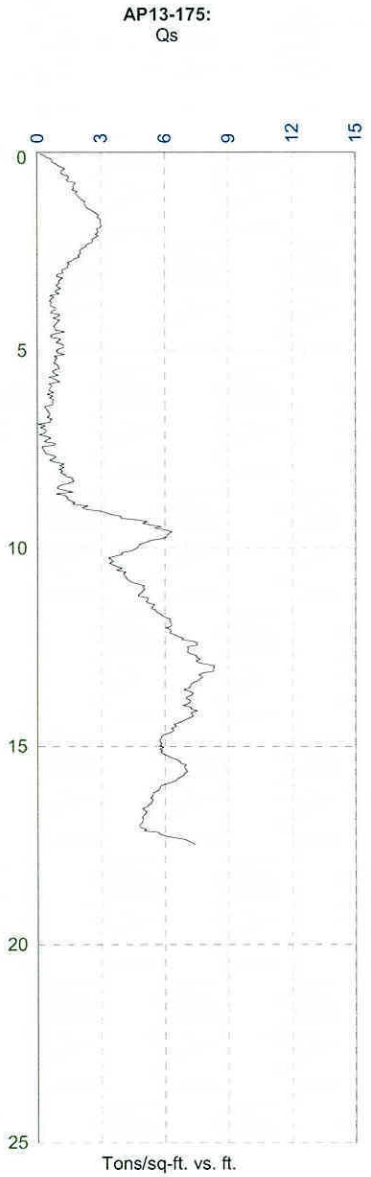

AP13-174:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

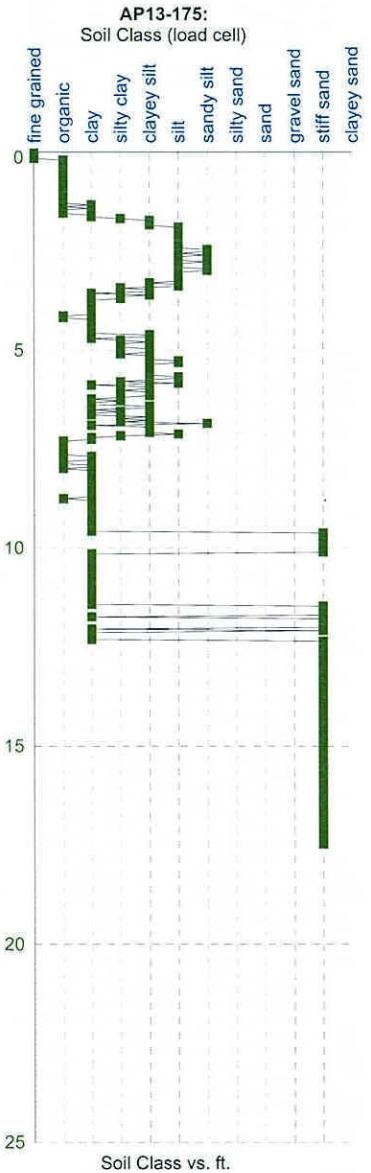

AP13-174:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

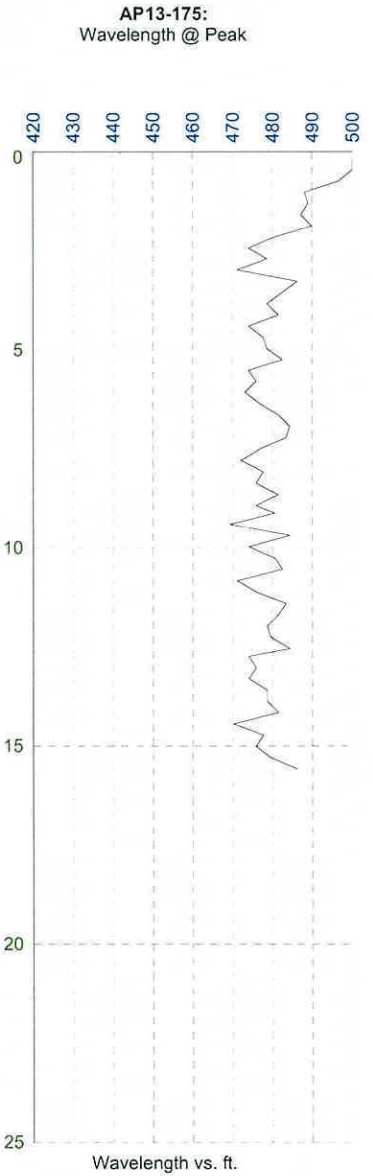

AP13-174:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

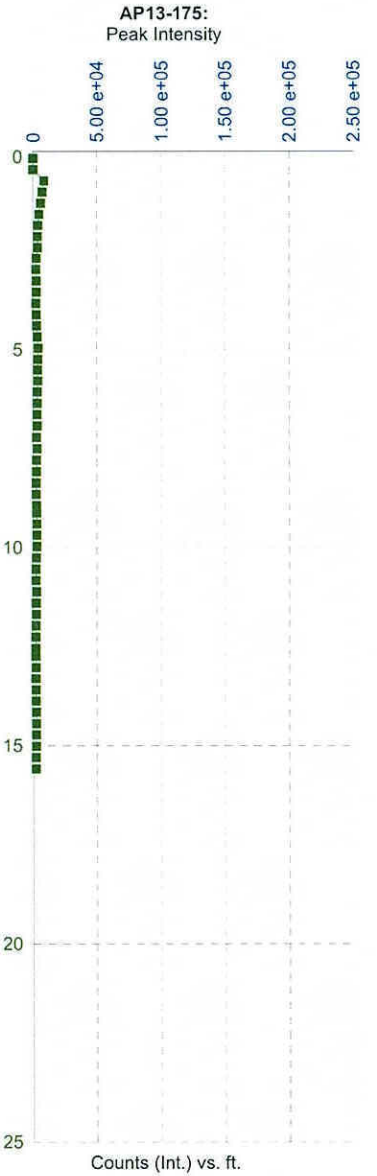

AP13-174:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

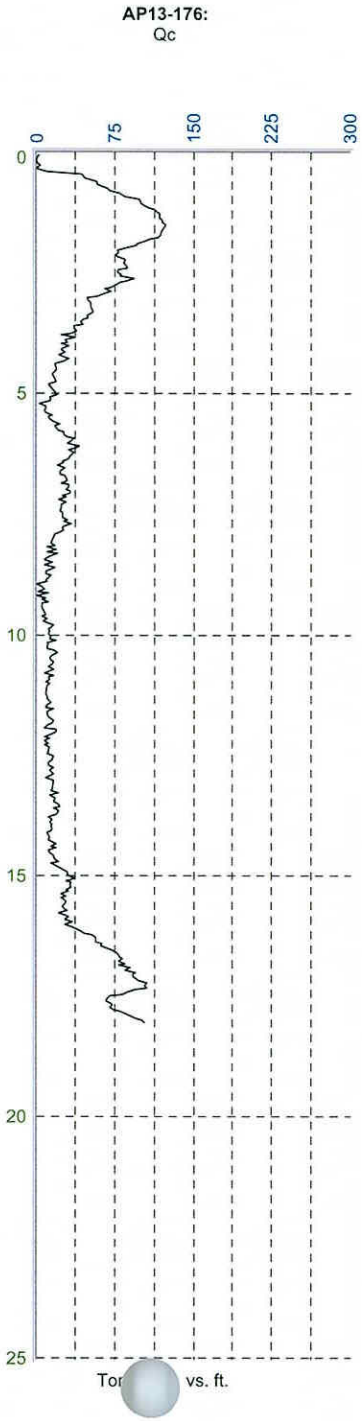

AP13-175:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

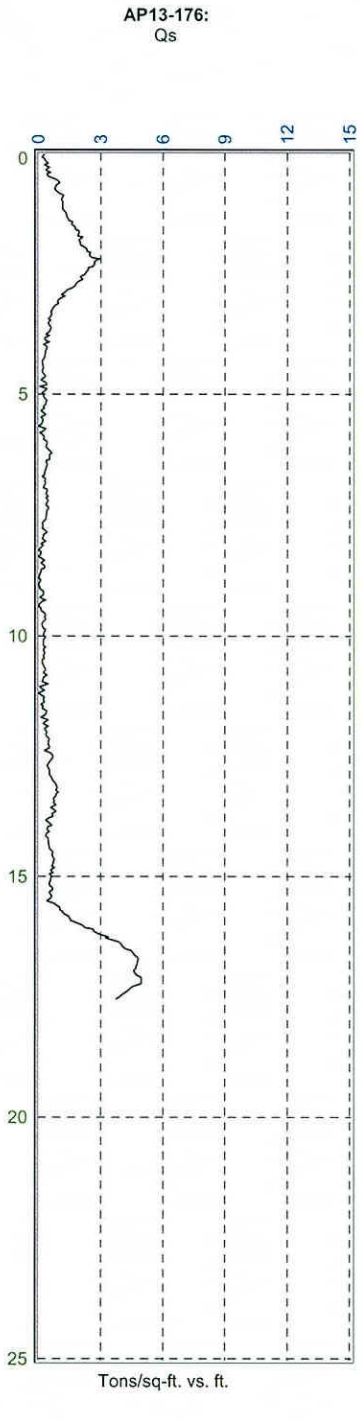

AP13-175:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

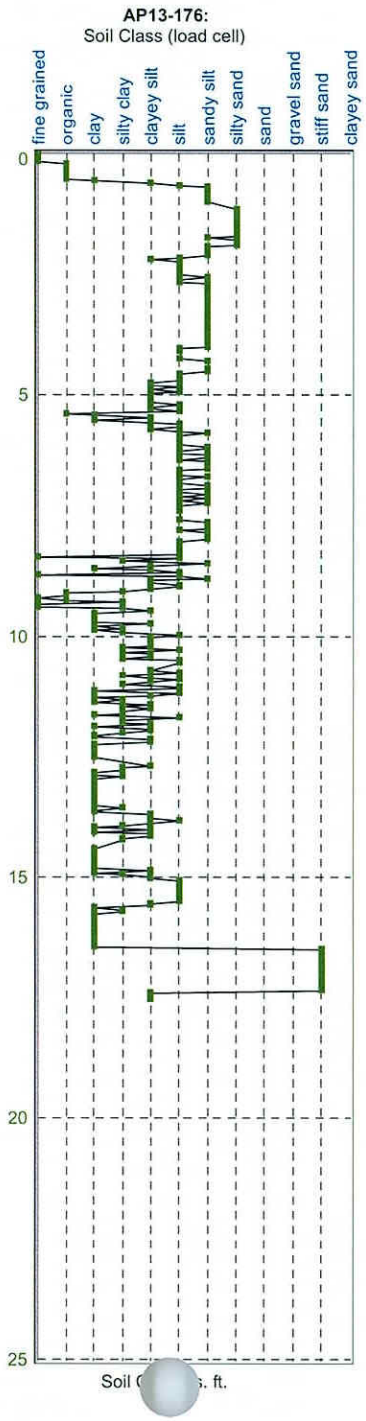

AP13-175:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

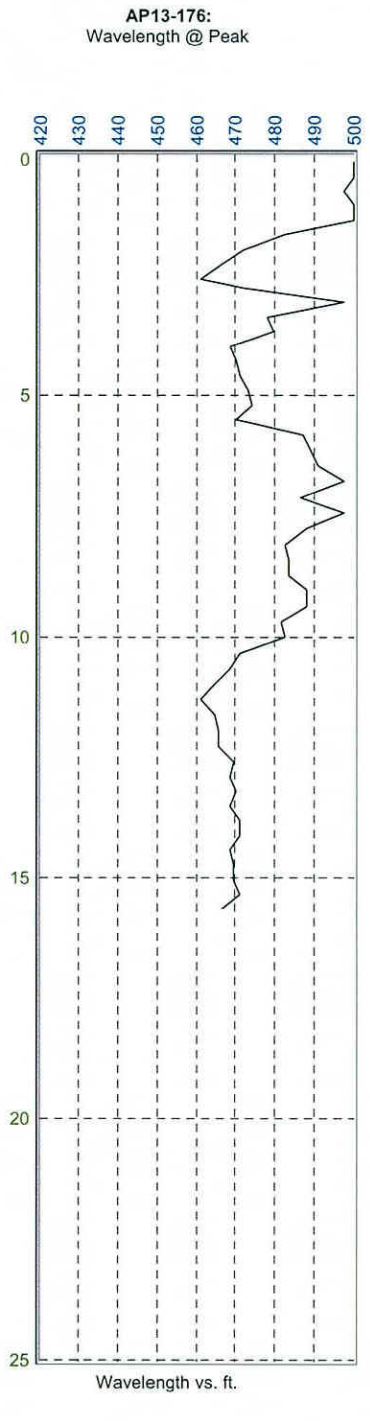

AP13-175:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

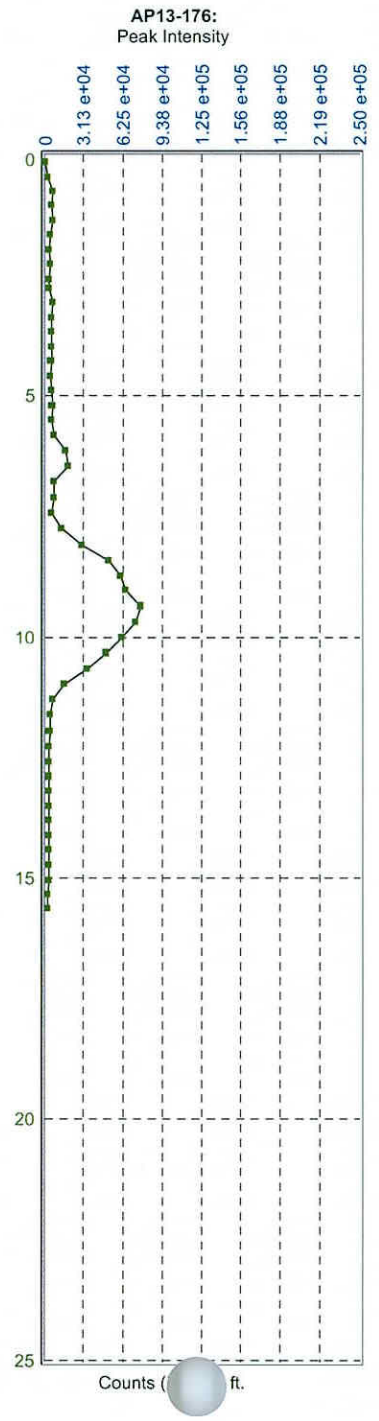

AP13-175:
Peak Intensity
0
5.00 e+04
1.00 e+05
1.50 e+05
2.00 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

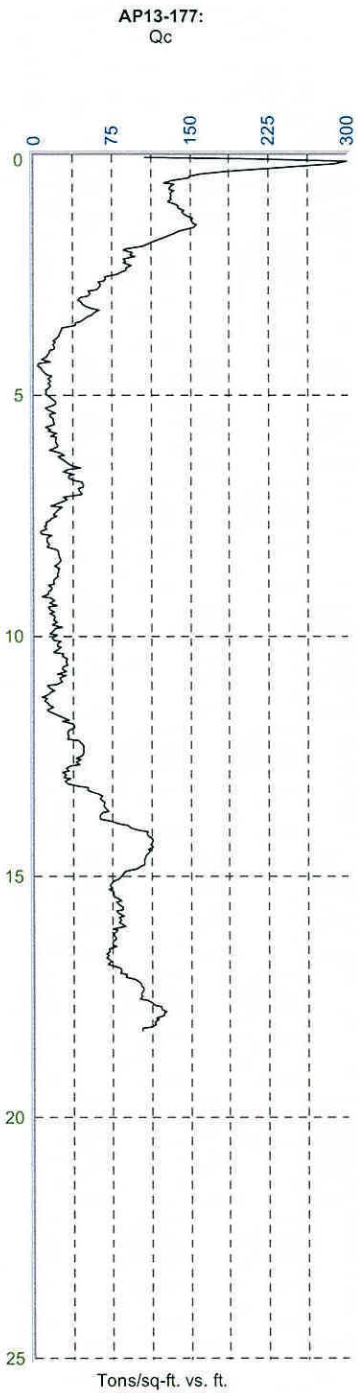

AP13-176:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tor vs. ft.

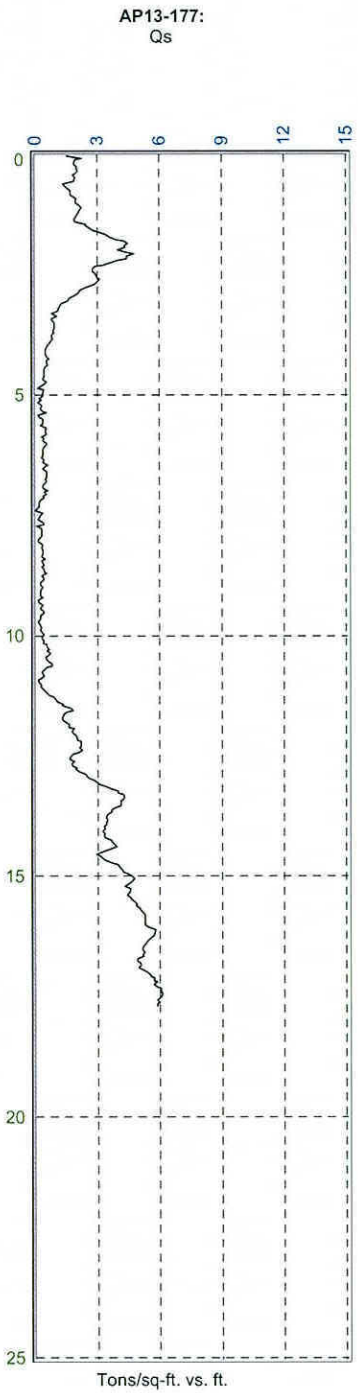

AP13-176:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

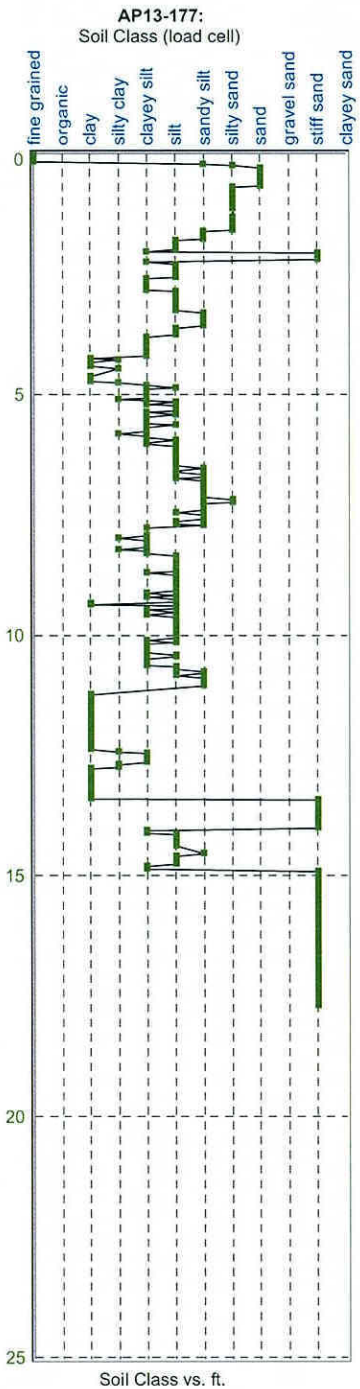

AP13-176:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil ft.

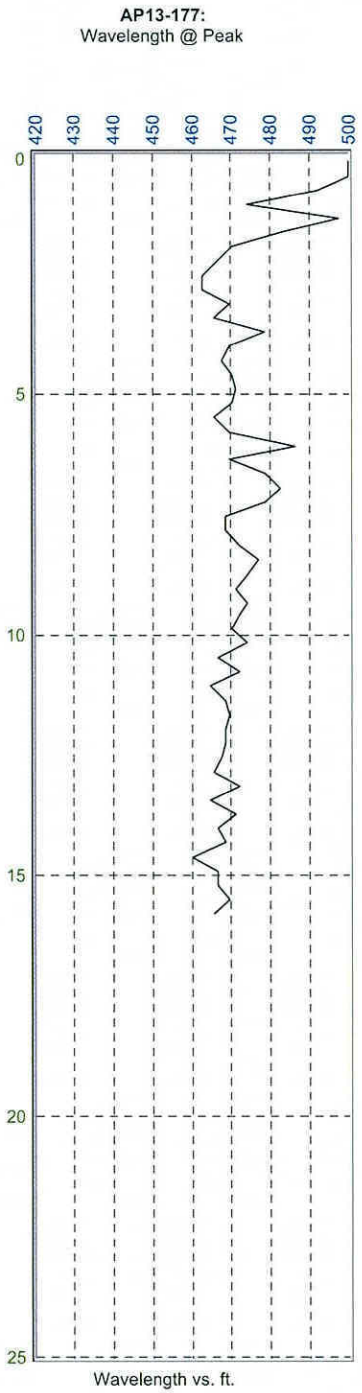

AP13-176:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

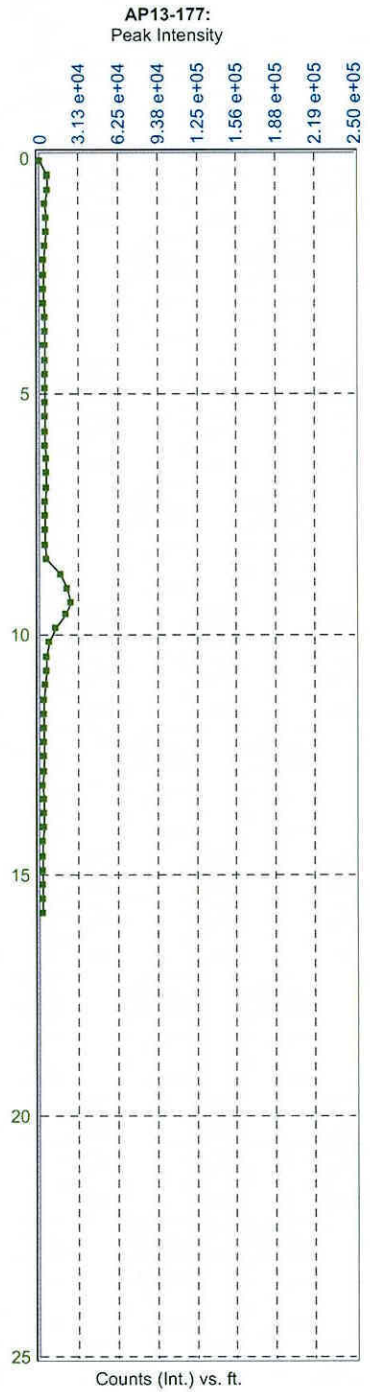

AP13-176:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts ft.

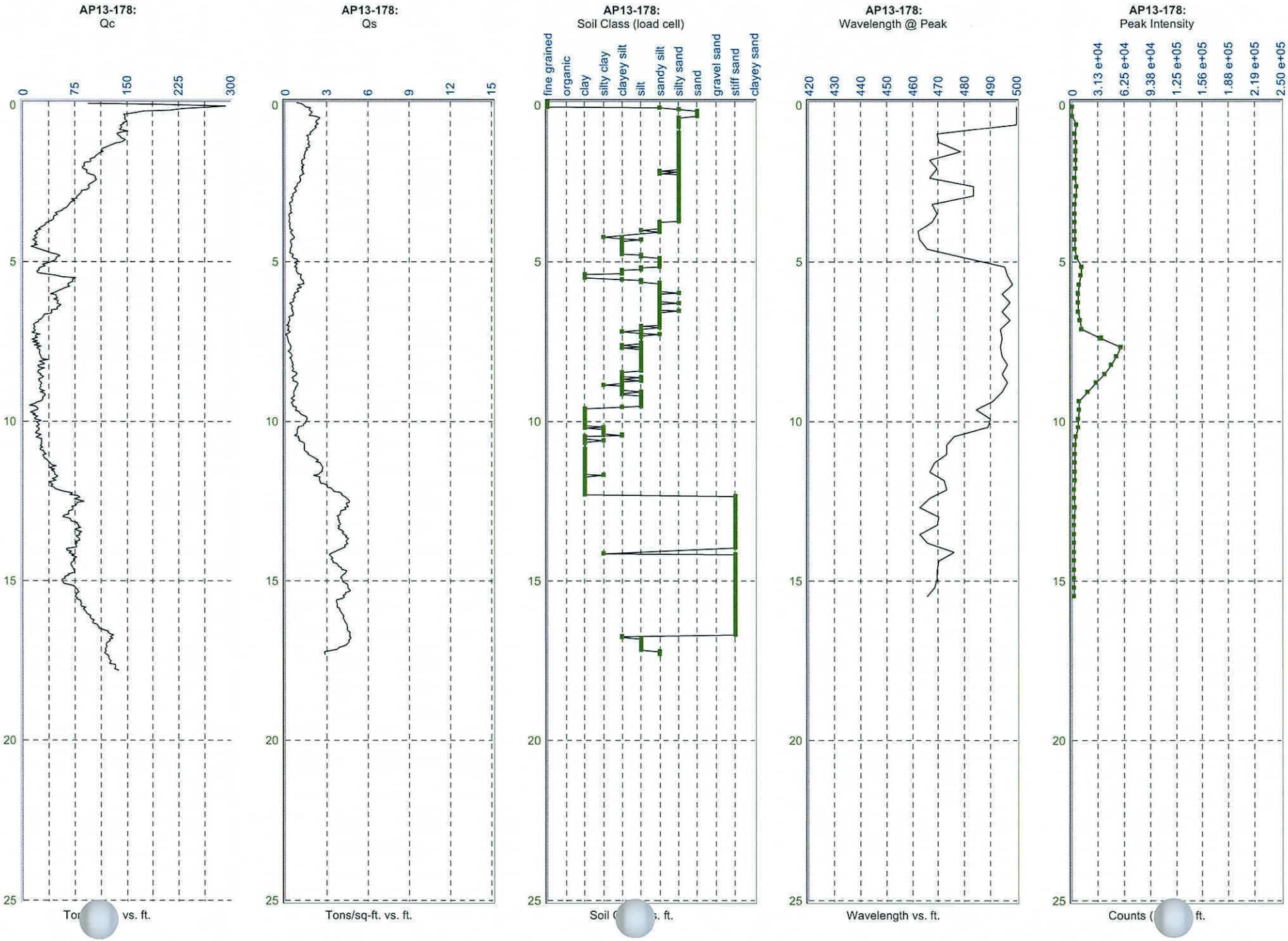

AP13-177:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

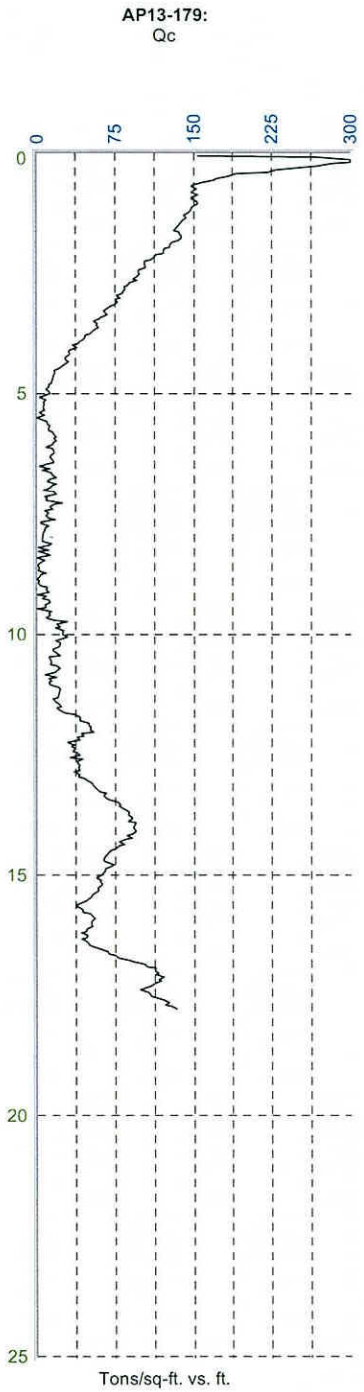

AP13-177:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

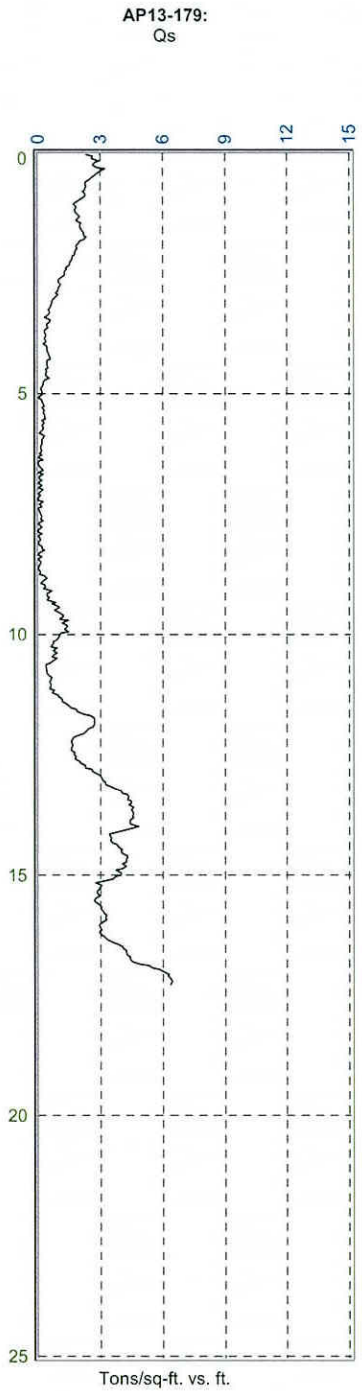

AP13-177:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

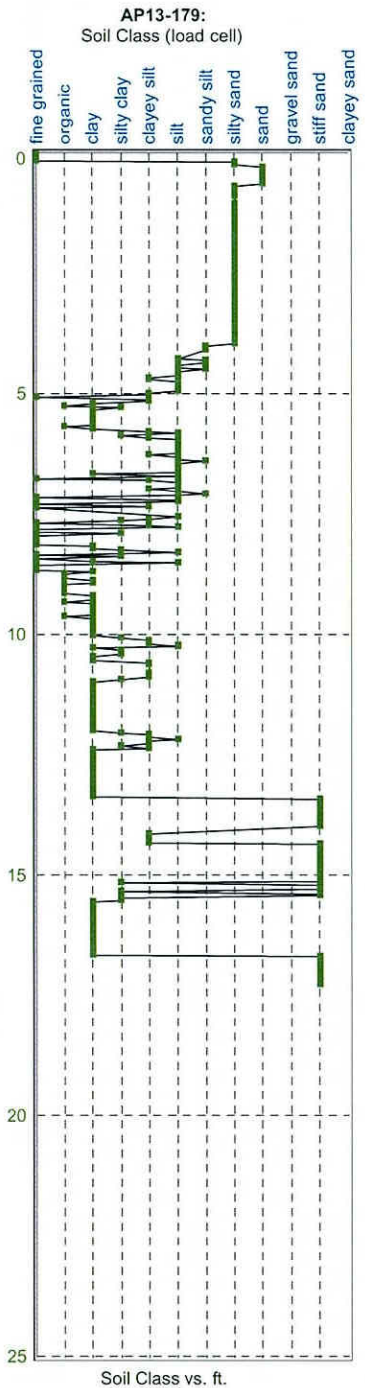

AP13-177:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

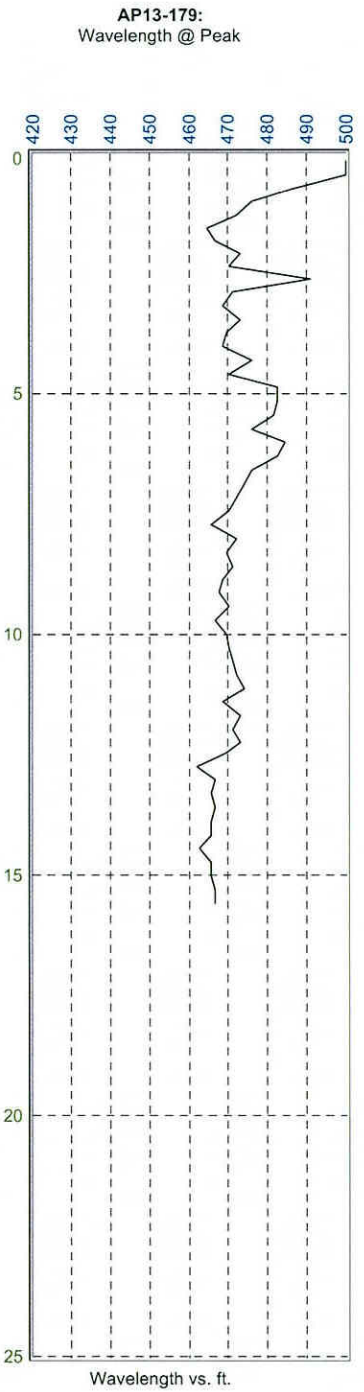

AP13-177:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

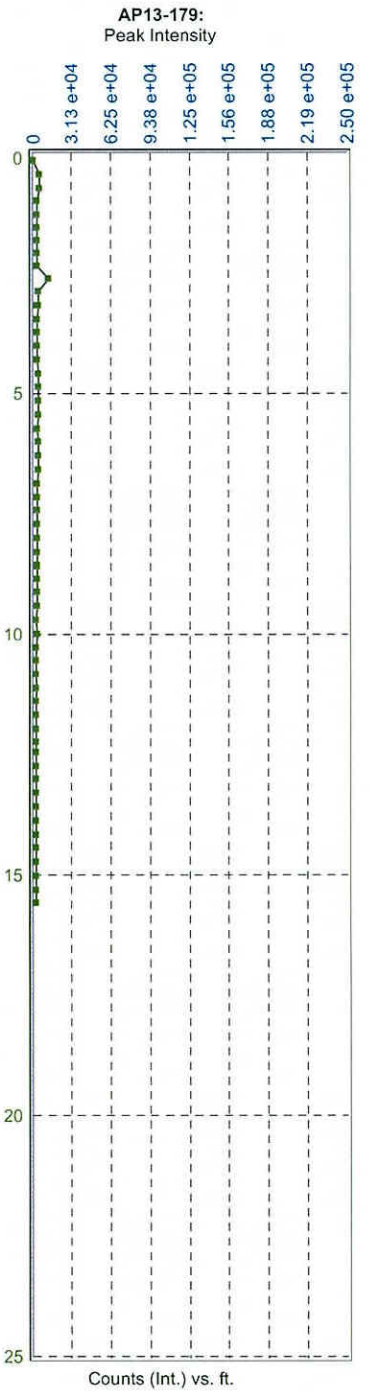

AP13-178:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tor vs. ft.
AP13-178:
Qs
0
3
6
9
12
15
Tons/sq-ft. vs. ft.
AP13-178:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
Soil ( . ft.
AP13-178:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
Wavelength vs. ft.
AP13-178:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
Counts ( ft.

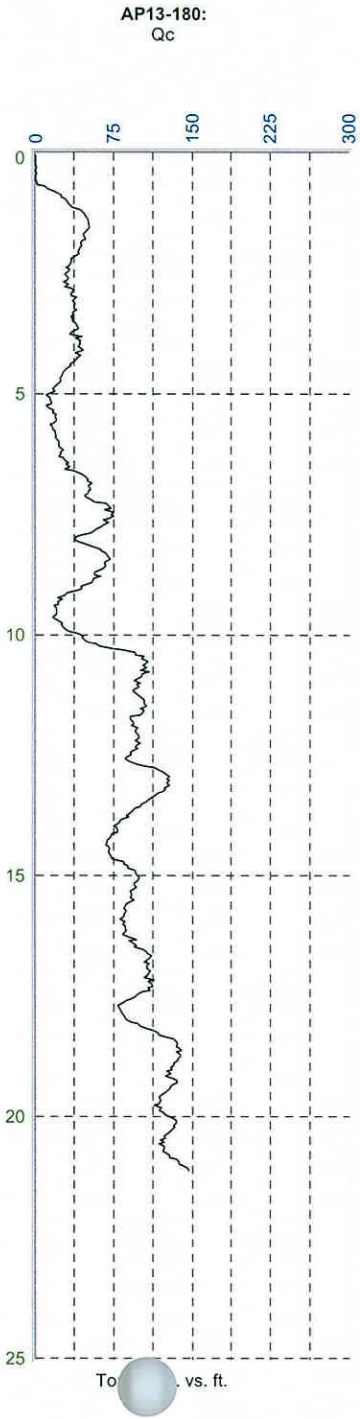

AP13-179:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

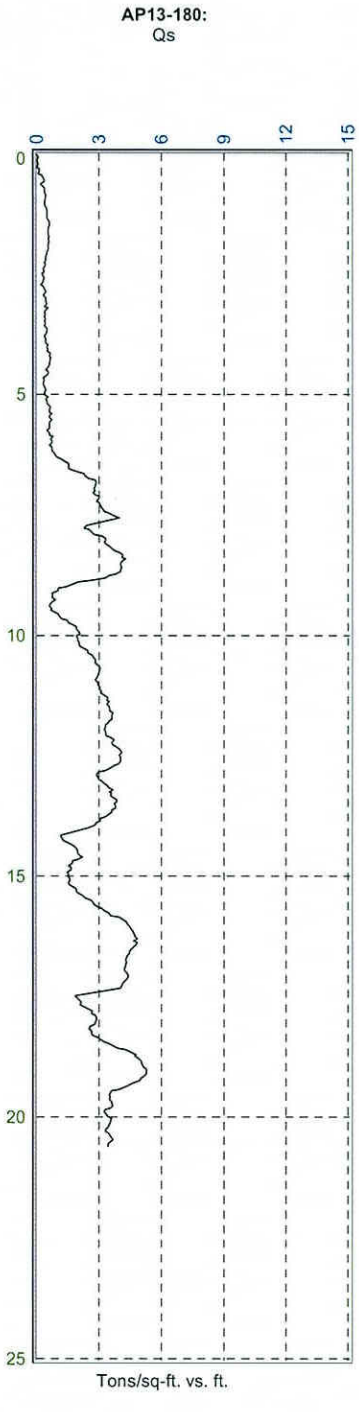

AP13-179:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

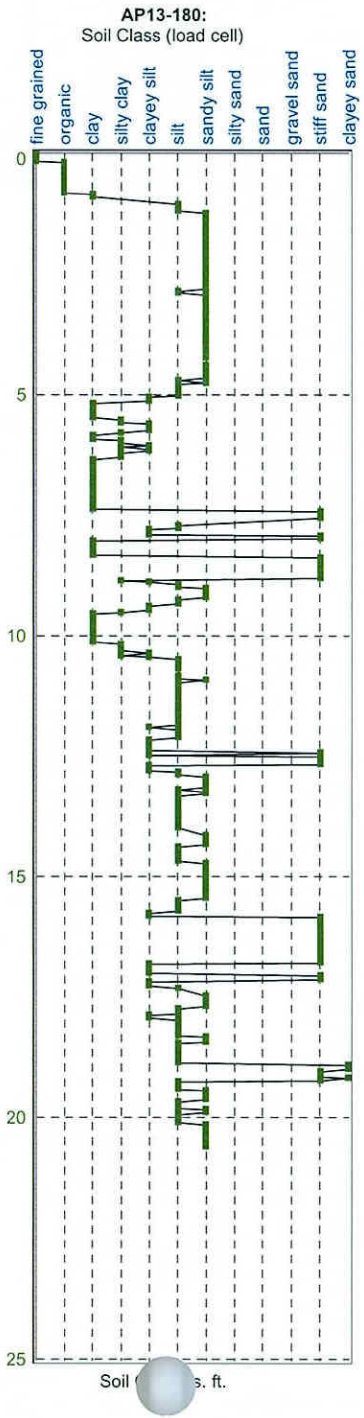

AP13-179:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

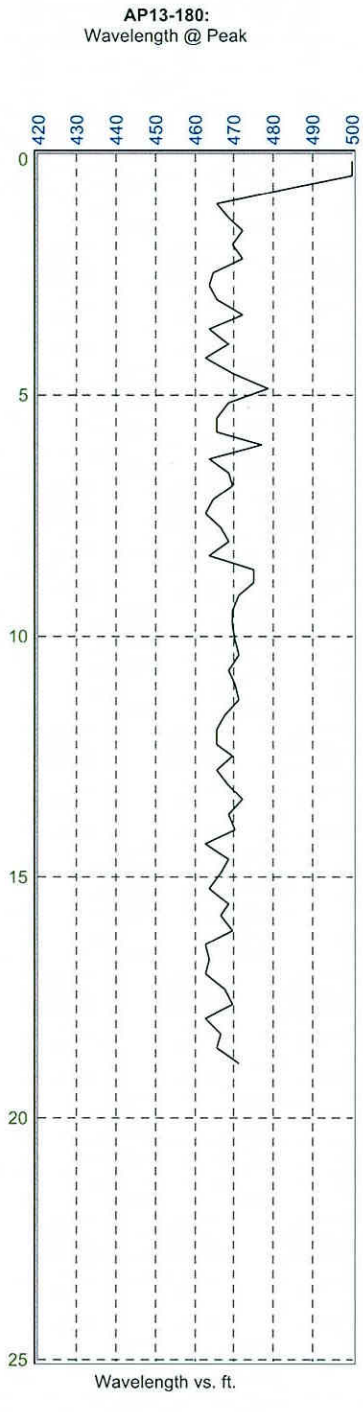

AP13-179:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

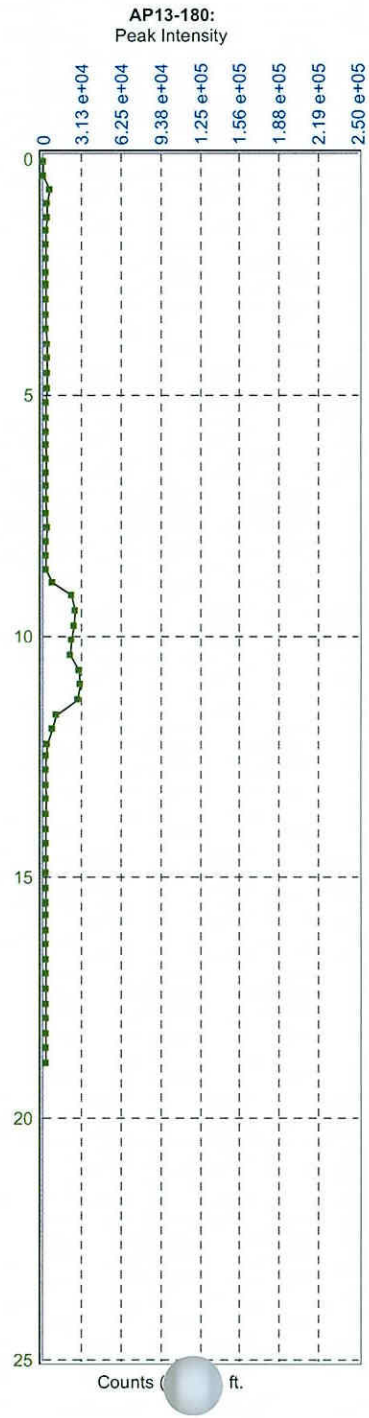

AP13-179:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.

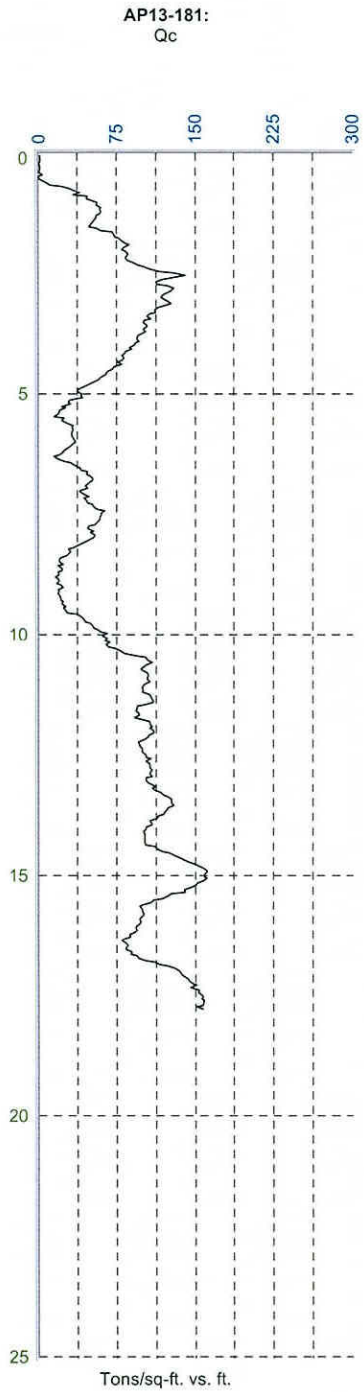

AP13-180:
Qc
0
75
150
225
300
0
5
10
15
20
25
To vs. ft.

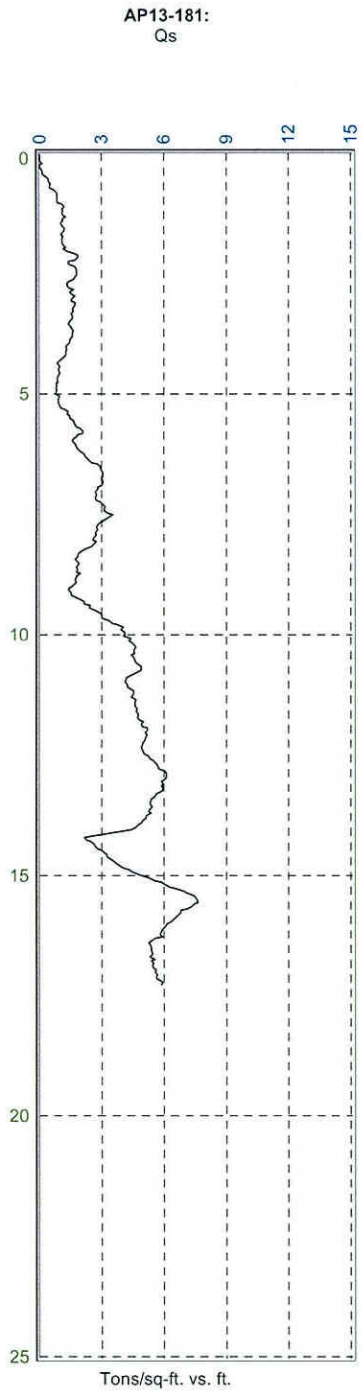

AP13-180:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

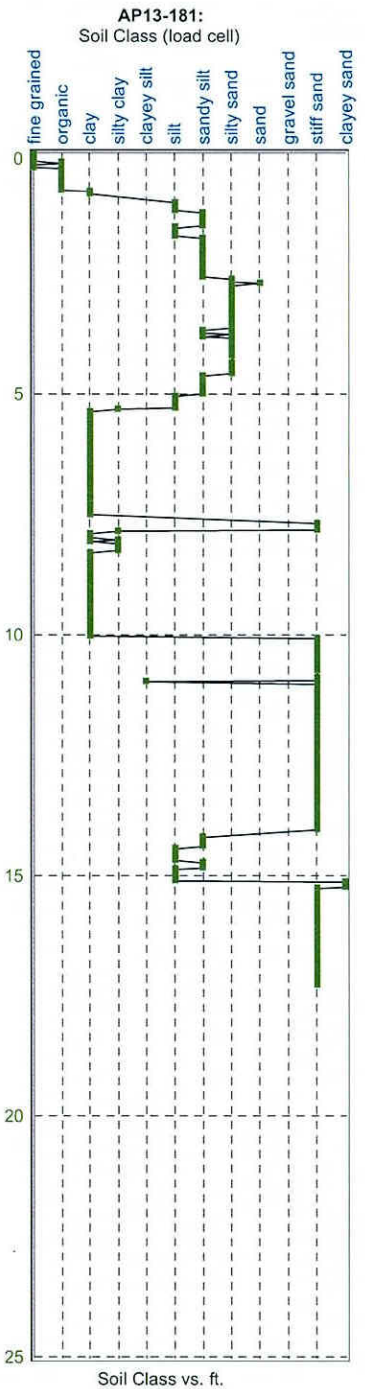

AP13-180:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil s. ft.

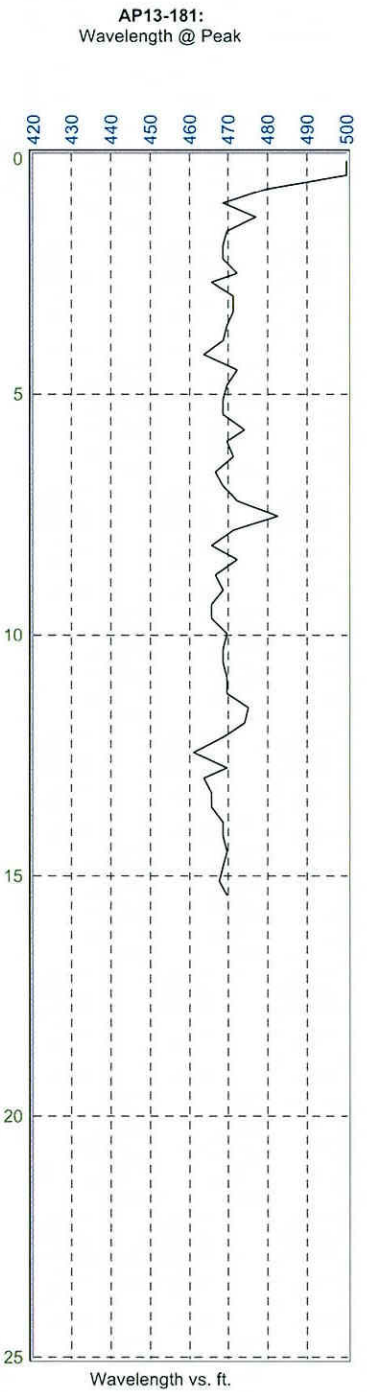

AP13-180:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

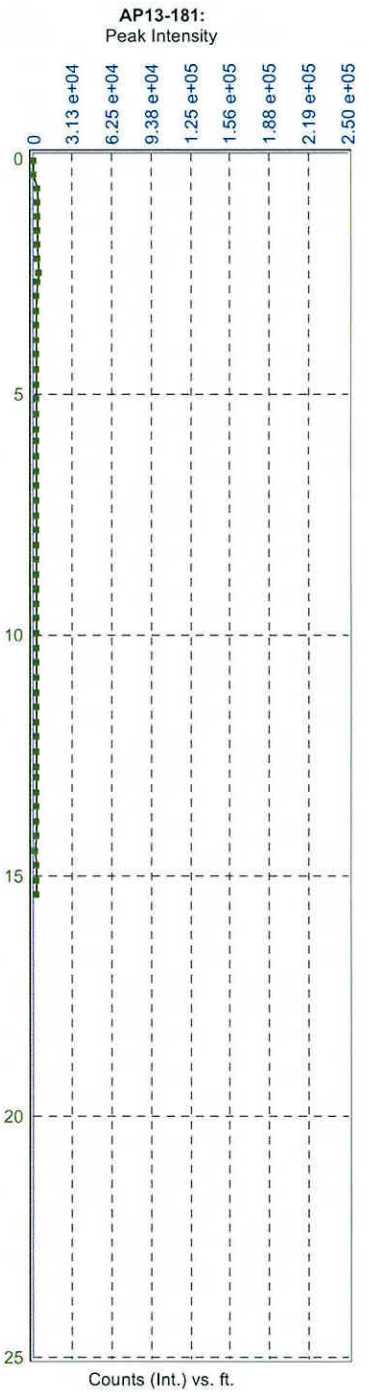

AP13-180:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts ft.

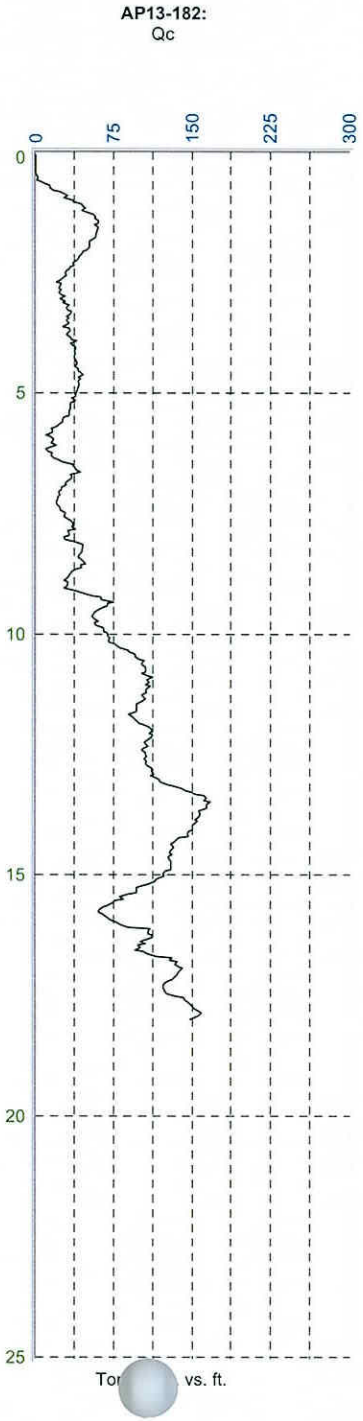

AP13-181:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

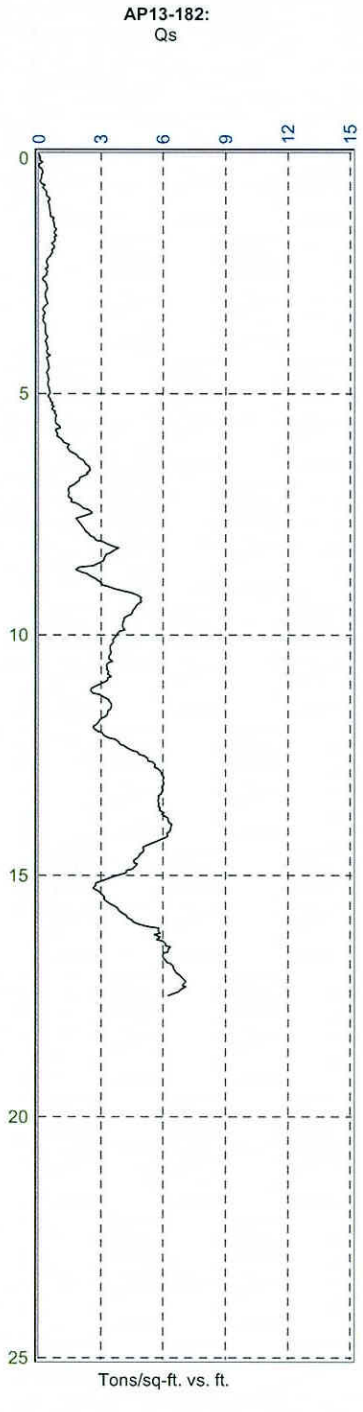

AP13-181:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.

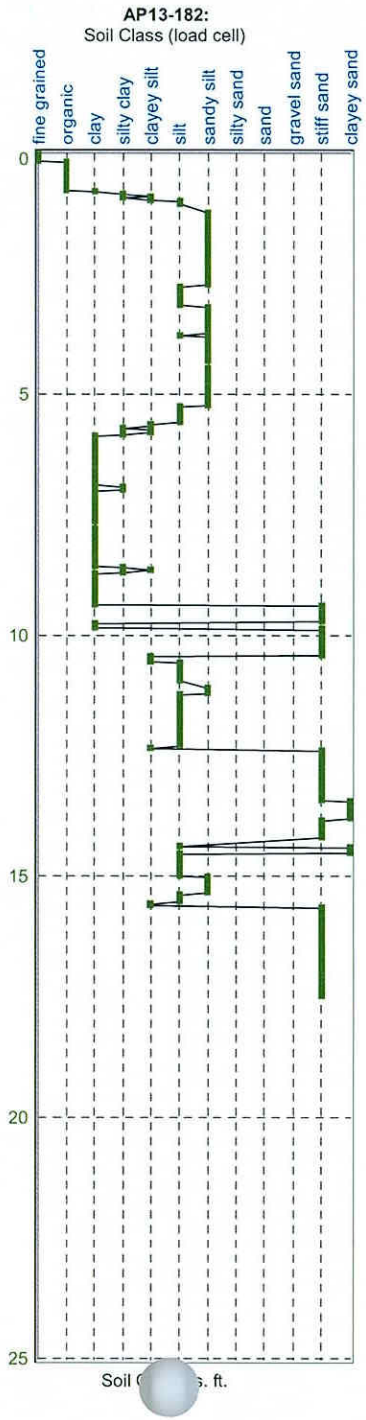

AP13-181:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil Class vs. ft.

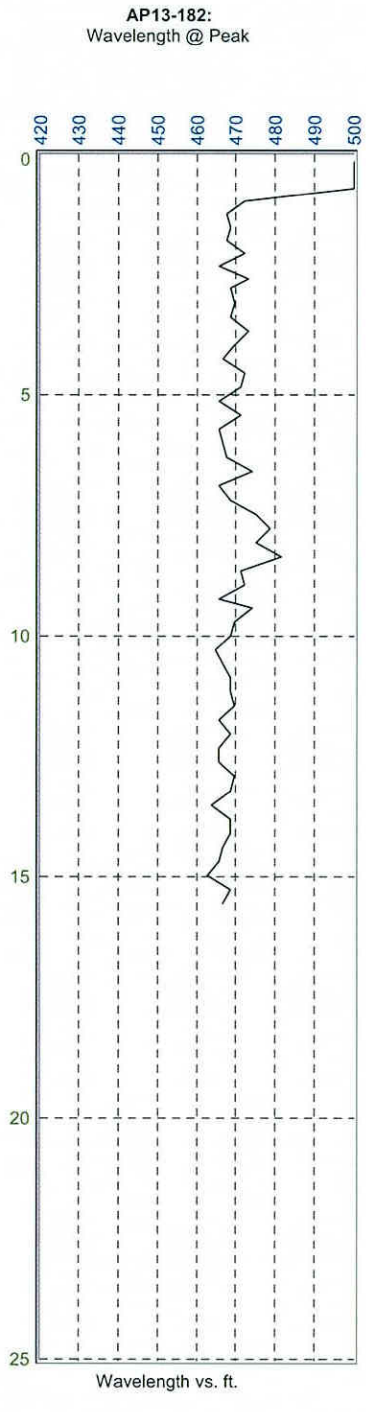

AP13-181:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.

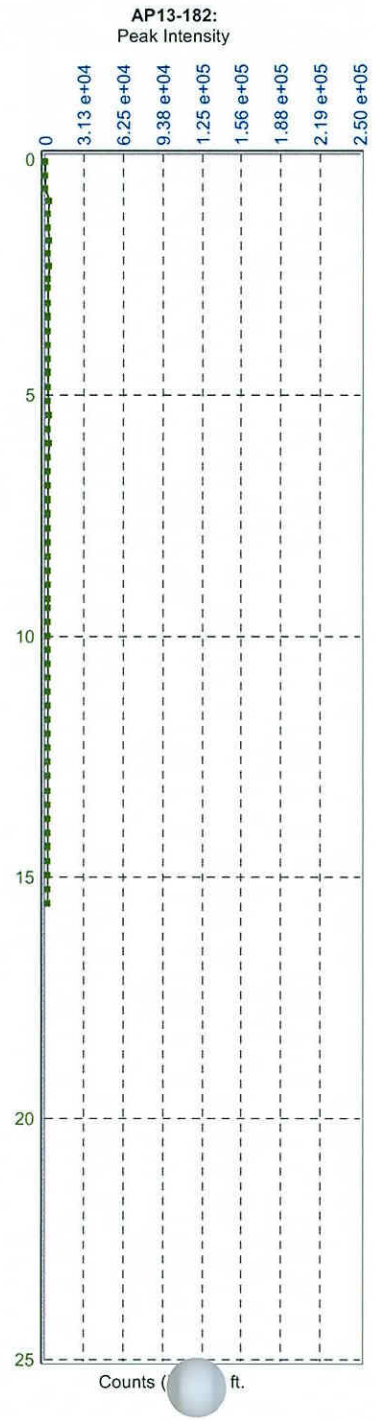

AP13-181:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts (Int.) vs. ft.


AP13-182:
Qc
0
75
150
225
300
0
5
10
15
20
25
Tor vs. ft.


AP13-182:
Qs
0
3
6
9
12
15
0
5
10
15
20
25
Tons/sq-ft. vs. ft.


AP13-182:
Soil Class (load cell)
fine grained
organic
clay
silty clay
clayey silt
silt
sandy silt
silty sand
sand
gravel sand
stiff sand
clayey sand
0
5
10
15
20
25
Soil s. ft.

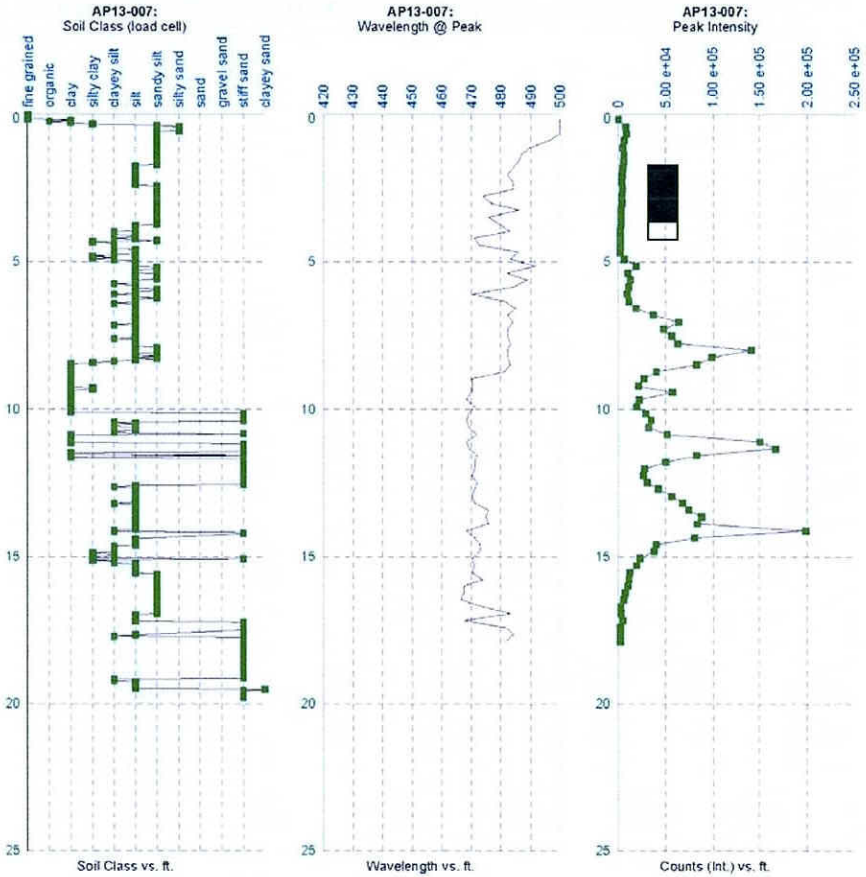

AP13-182:
Wavelength @ Peak
420
430
440
450
460
470
480
490
500
0
5
10
15
20
25
Wavelength vs. ft.


AP13-182:
Peak Intensity
0
3.13 e+04
6.25 e+04
9.38 e+04
1.25 e+05
1.56 e+05
1.88 e+05
2.19 e+05
2.50 e+05
0
5
10
15
20
25
Counts ( ft.

# APPENDIX E

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-007-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **2.5-4.0'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT throughout the sample interval.

**Sample Description –**
Predominately fine Sand and some SILT (SM), brown (10 YR 5/3), wet with no stain or odor.

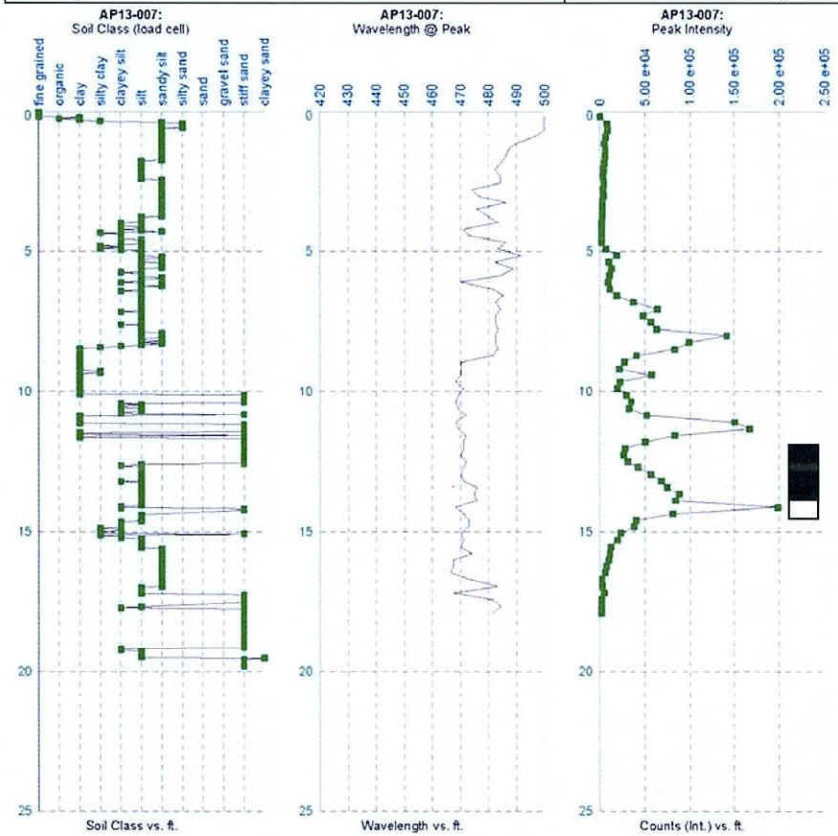
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 1.23 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | |
|---|---|
| Arsenic | 1.23 mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-007-S-02** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **13.0-14.5'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample targeted a fluorescence response that showed a wavelength typical of fuel contamination. The CPT log indicates Silty SAND with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine Sand with some Silty SAND (SM), dark greenish grey (5 GY 4/1), wet and strong hydrocarbon odor dark green/grey stain.

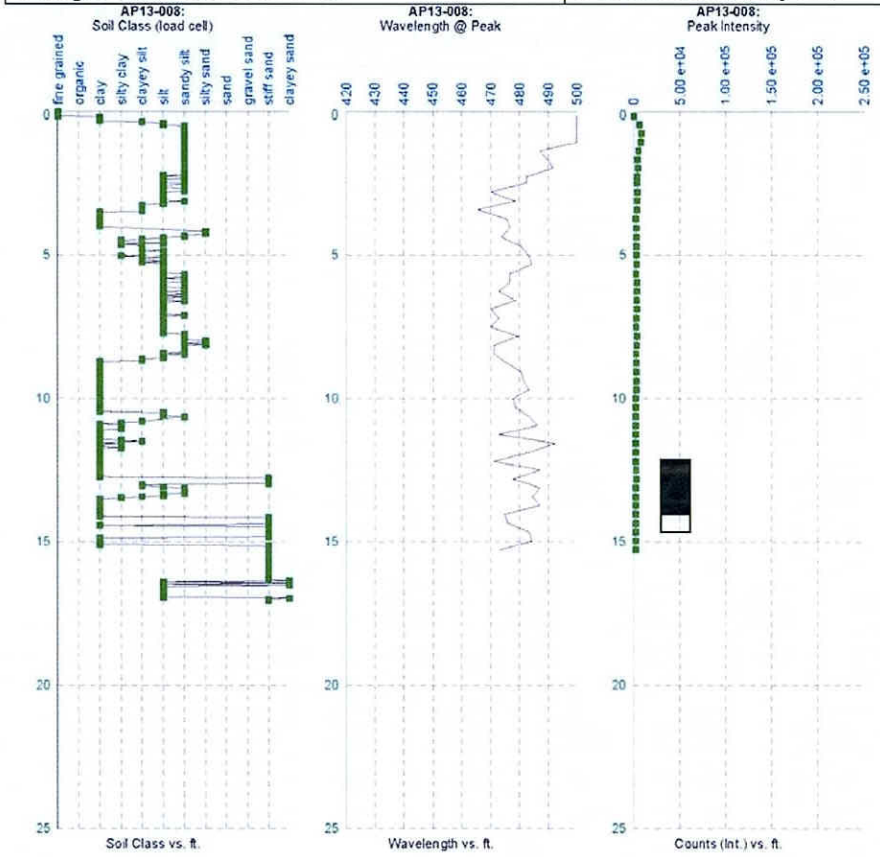
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 2.69 mg/kg and TPH-d at 2900 mg/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| TPH-diesel (estimated) | 2900 | mg/kg |
| Arsenic | 2.69 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-008-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **13.0-14.5'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates predominately Sandy SILT throughout the sample interval.

**Sample Description –**
Predominately fine SAND, some silt, trace clay (SM), brown (10 YR 5/3), wet with no stain or odor.

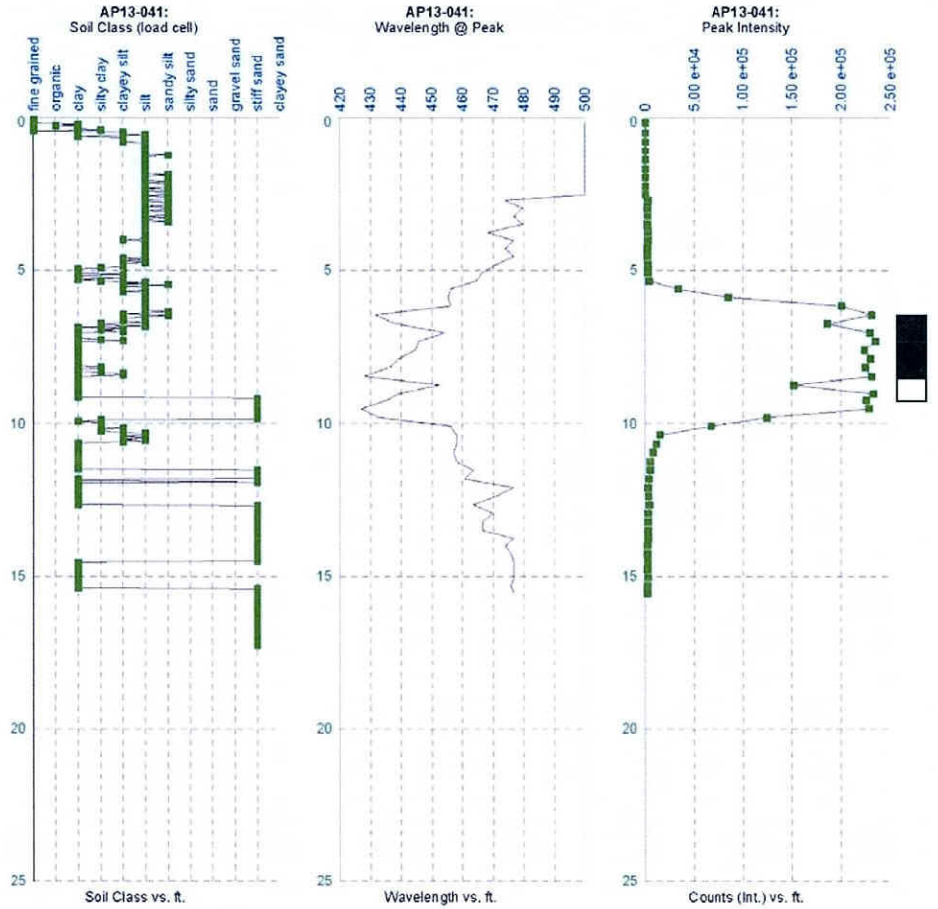
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 1.34 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | | |
|---|---|---|
| Arsenic | 1.34 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-041-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **7.0-8.5'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample targeted a fluorescence response that showed a wavelength typical of fuel contamination. The CPT log indicates SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Upper tube (7.0-7.25) Silty Clay trace sand (CL), Tip (8.25) SAND trace Silt (SP)(10 GY 4/1), moist to wet, dark greenish grey stain and strong hydrocarbon odor odor.

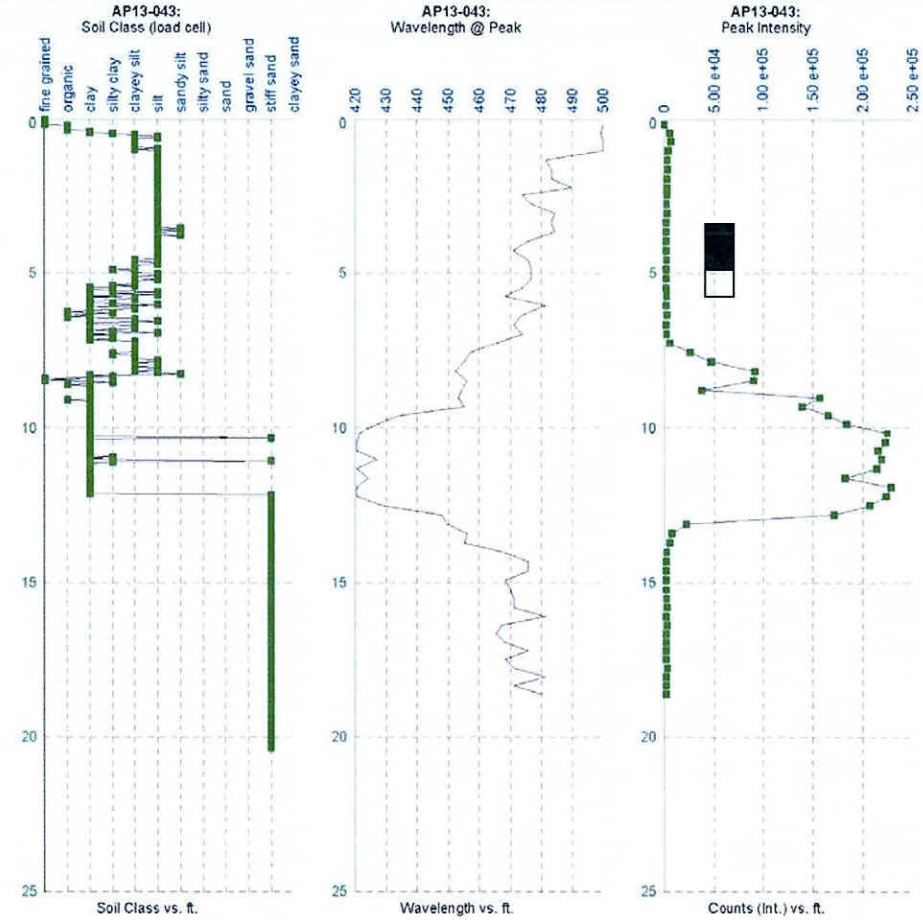
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 4.76 mg/kg TPH-d at 4000 mg/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| TPH-diesel | 4000 | mg/kg |
| Arsenic | 4.76 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-043-S-01** | Sample Date **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **4.5-6.0'** | Percent Recovery: 50 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT throughout the sample interval.

**Sample Description –**
Predominately fine SAND (SP), dark greenish grey (10 GY 4/1), saturated no stain or odor.

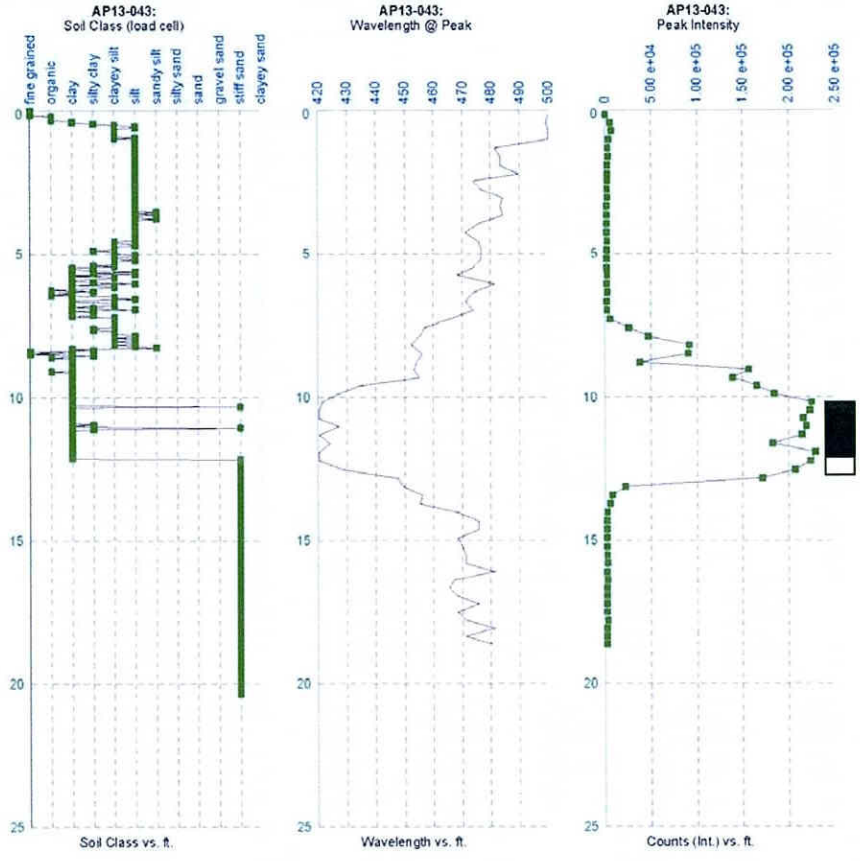
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 2.82 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | | |
|---|---|---|
| Arsenic | 2.82 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-043-S-02** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **10.5-12.0'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample targeted a fluorescence response that showed a wavelength typical of fuel contamination. The CPT log indicates Clayey SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine sand some silt, Silty SAND (SM), dark greenish grey (10 GY 4/1), moist to wet, strong hydrocarbon odor and dark greenish/grey staining on entire sample with grading to sand (SP) with trace silt at 11.75 feet.

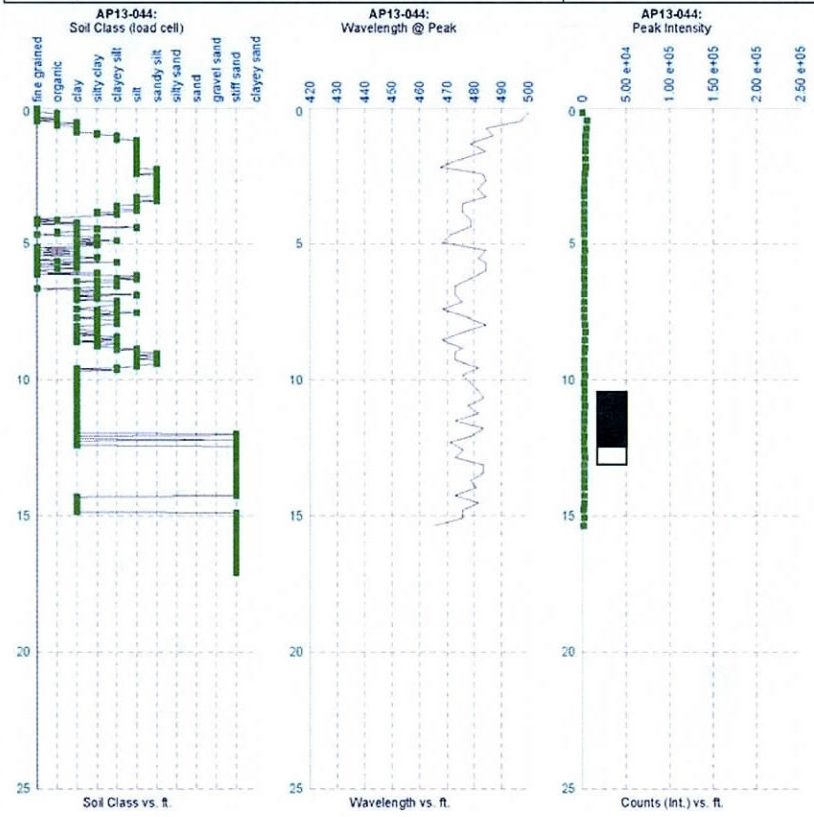
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 4.13 mg/kg and TPH-d at 4400 mg/kg.

| **Analytical Results Exceeding PRC and Residential PRG** | | |
|---|---|---|
| TPH-diesel | 4400 | mg/kg |
| Arsenic | 4.13 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-044-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **10.5-12.0'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates CLAY then SAND in the sample interval.

**Sample Description –**
Silty CLAY (CL) from 10.5-11.0 feet (10 YR 3/2) very dark grey brown.SAND (SP) 11.0-11.75 feet (10 GY 3/1) dark greenish grey.Saturated with no odor or stain.

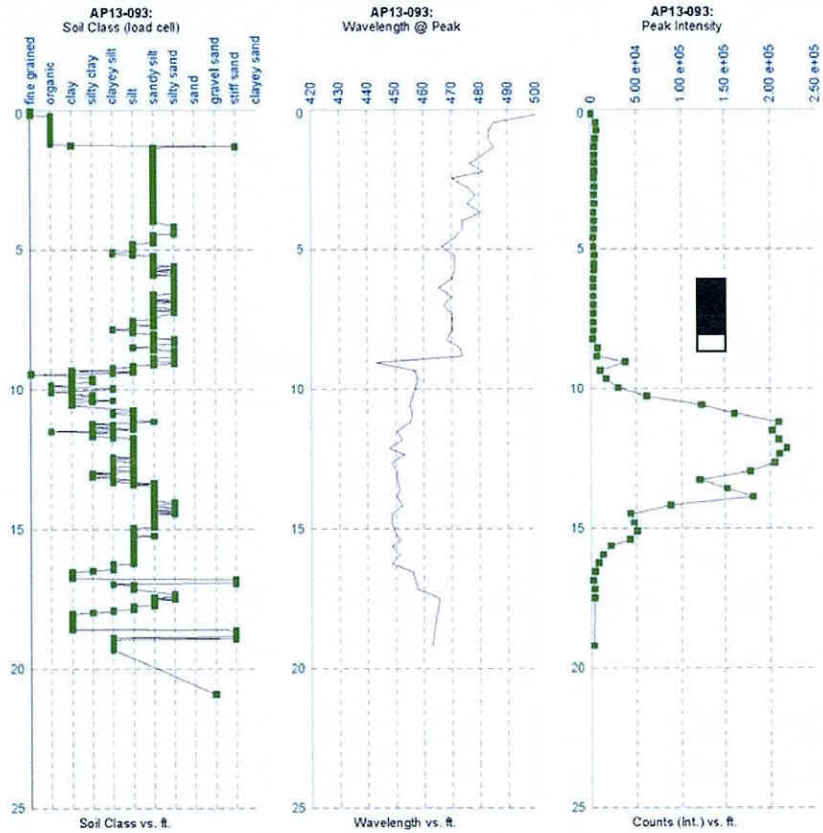
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 5.26 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | | |
|---|---|---|
| Arsenic | 5.26 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-093-S-01** | Sample Date: **12-05-07** | Logged By: **F. Essig** |
| Sample Interval: **6.5-8.0'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Silty SAND with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine grained SAND (SP), dark blueish grey (10 B 4/1)), saturated and a possibly a faint fuel odor.

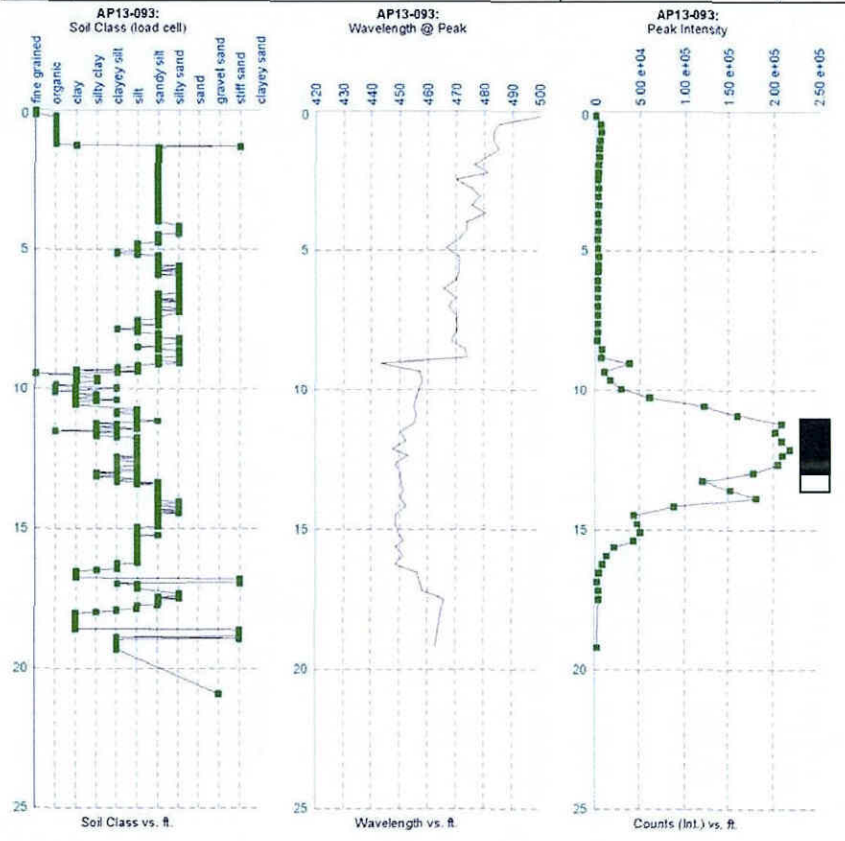
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 0.715 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | | |
|---|---|---|
| Arsenic | 0.715 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-093-S-02** | Sample Date: **12-05-07** | Logged By: **F. Essig** |
| Sample Interval: **11.5-13.0'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample targeted a fluorescence response that showed a wavelength typical of fuel contamination. The CPT log indicates silt with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine SAND trace Silt (SP), redish brown (5 GY 3/1), saturated, sheen in entire sample and a very strong fuel odor.

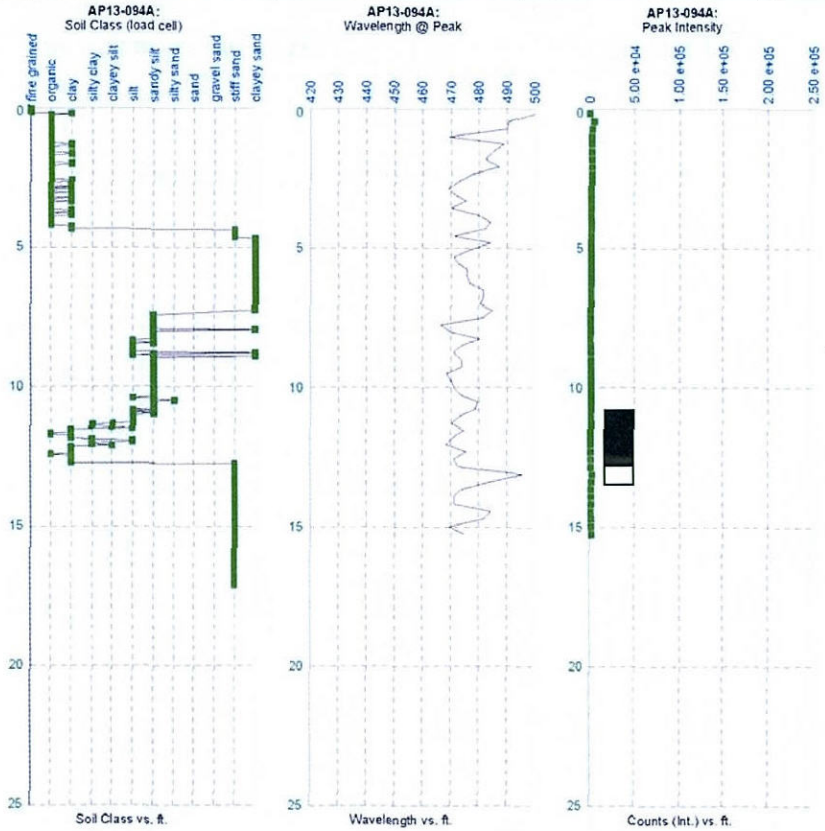
***Discussion of Results –***
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 2.27 mg/kg and TPH-d at 6000 mg/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| TPH-diesel | 6000 | mg/kg |
| Arsenic | 2.27 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-094 -S-01** | Sample Date: **12-05-07** | Logged By: **F. Essig** |
| Sample Interval: **11.5-13.0'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately Clayey SILT (CL), dark greenish grey (10 YR BG 3/1), saturated with a possible faint odor.

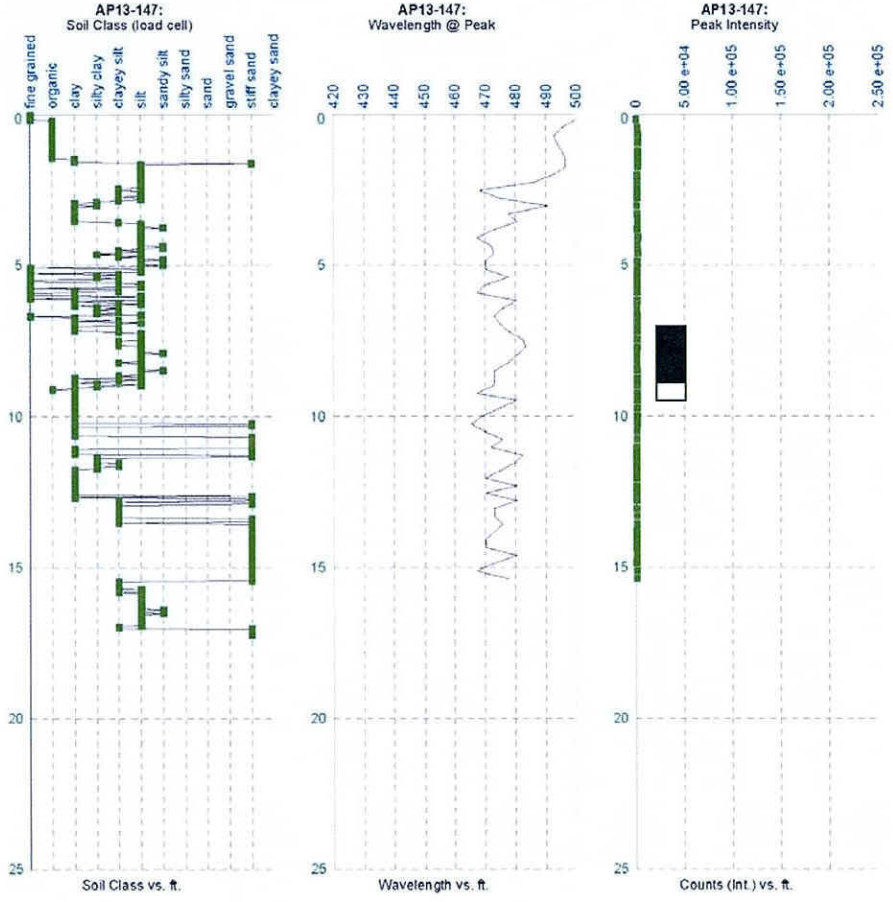
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 11.1 mg/kg and Vanadium at 79.0 mg/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| Arsenic | 11.1 | mg/kg |
| Vanadium | 79.0 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-147-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **8.0-9.5'** | Percent Recovery: 80 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates SILT with finer interbeds throughout the sample interval.

**Sample Description-**
SAND fine Clay, Silty SAND 8.0 to 8.5 feet
Sandy CLAY 8.5 to 9.25 feet, dark greenish grey (10 GY 4/1), saturated with a faint hydrocarbon odor.

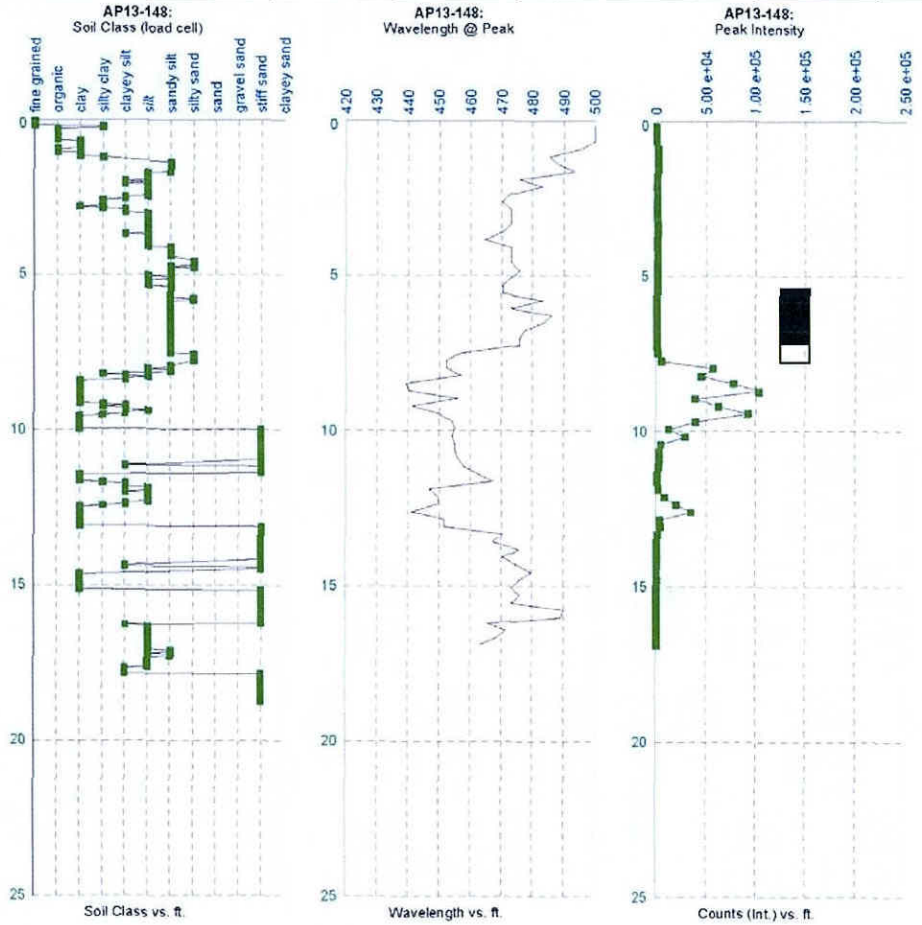
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported Arsenic above the Residential PRG at 2.64 mg/kg.

| **Analytical Results Exceeding Residential PRG*** | | |
|---|---|---|
| Arsenic | 2.64 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-148-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **5.5-7.0'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT throughout the sample interval.

**Sample Description –**
Predominately fine SAND (SP), dark greenish grey (10 GY 4/1), moist to light hydrocarbon odor.

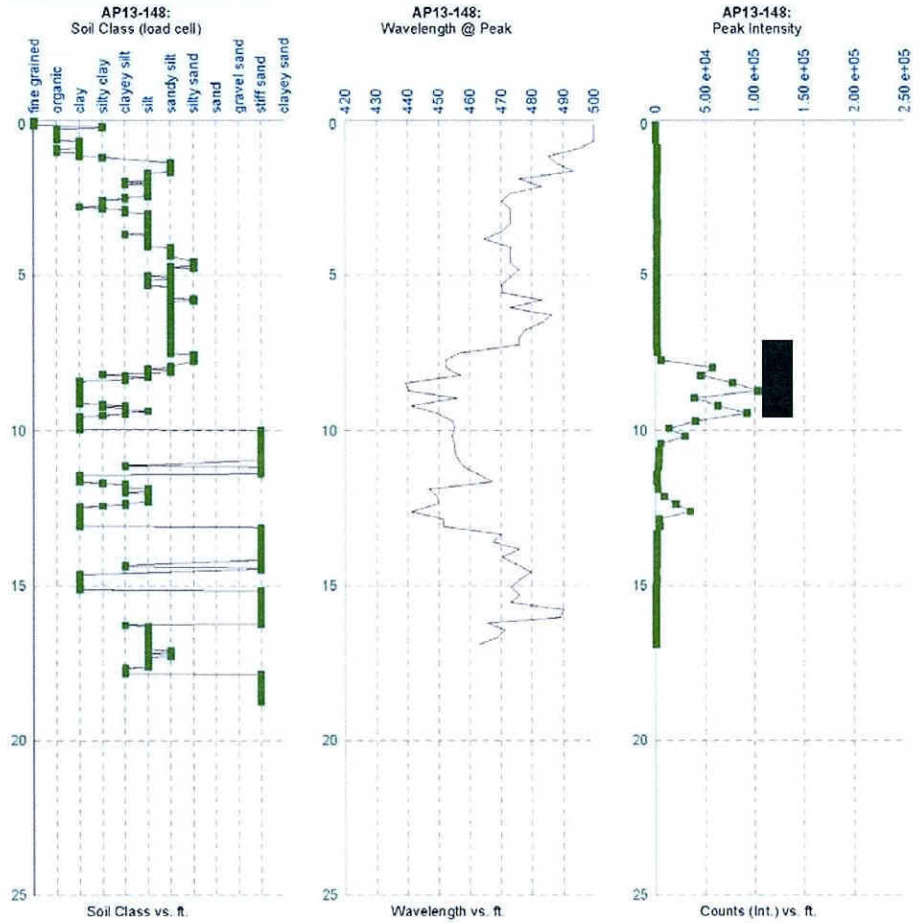
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 1.17 mg/kg and Benzene at 1900 ug/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| Arsenic | 1.17 | mg/kg |
| Benzene | 1900 | ug/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-148-S-02** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **8.0-9.5'** | Percent Recovery: 100 | |




**Description of Data and Sampling Rational–**
The sample targeted a fluorescence response that showed a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine grained Sandy SILT (CL/SM), dark greenish grey (10 GY 4/1), wet with localized brown and greenish brown stain and light to moderate hydrocarbon odor.

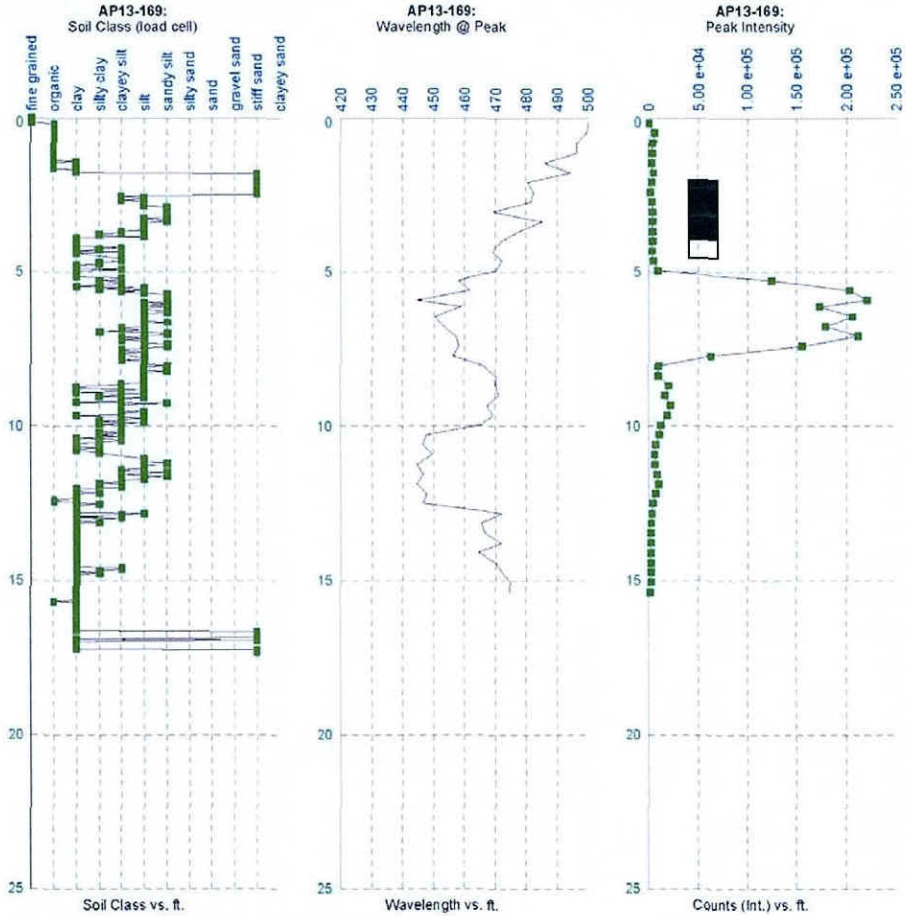
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are Arsenic at 1.17 mg/kg and Benzene at 1900 ug/kg.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| Arsenic | 1.17 | mg/kg |
| Benzene | 1900 | ug/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-169-S-01** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **3.0-4.5'** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sand and then Sandy SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine Sand, siltorganics and Silty SAND (SM), greenish black (10 Y 2.5/1), wet, dark stain and a strong $H_2S$ odor.

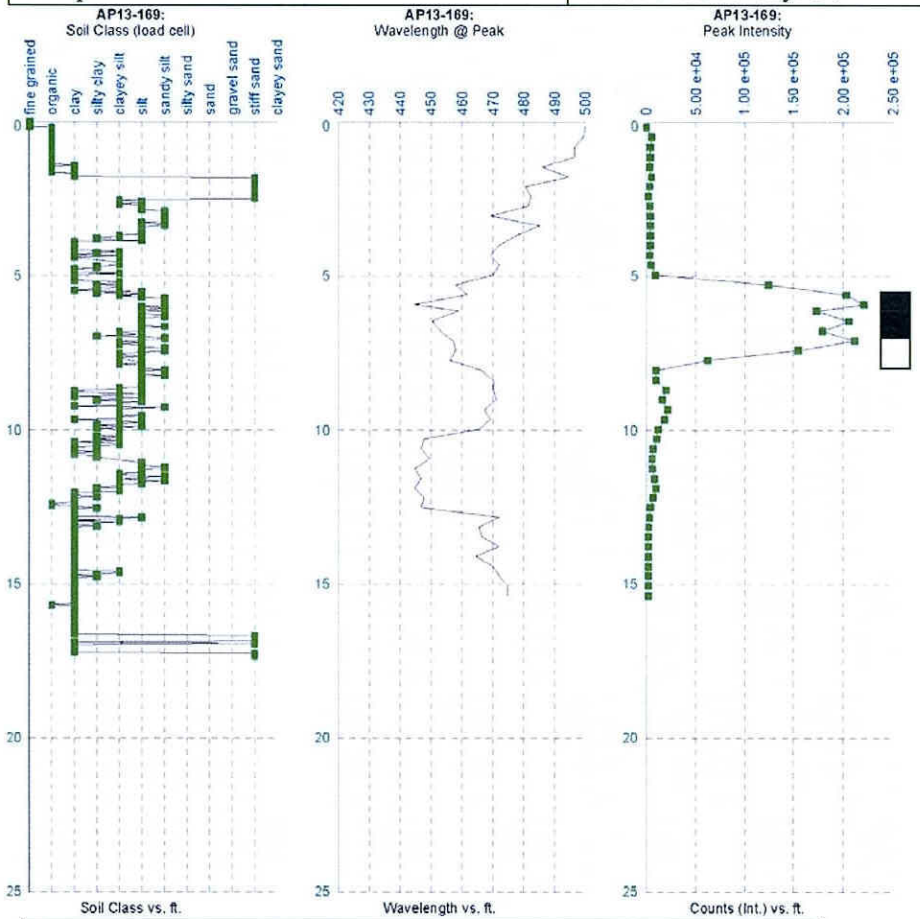
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are TPH-oil at 5300 mg/kg, 1900 mg/kg for TPH-diesel and 1.94 mg/kg for Arsenic.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| TPH-oil | 5300 | mg/kg |
| TPH-diesel | 1900 | mg/kg |
| Arsenic | 1.94 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-169-S-02** | Sample Date: **12-04-07** | Logged By: **F. Essig** |
| Sample Interval: **5.5-7.0'** | Percent Recovery: 50 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Fine SAND, trace medium silt (SM), black (N 2.5/), saturated, faint hydrocarbon odor.

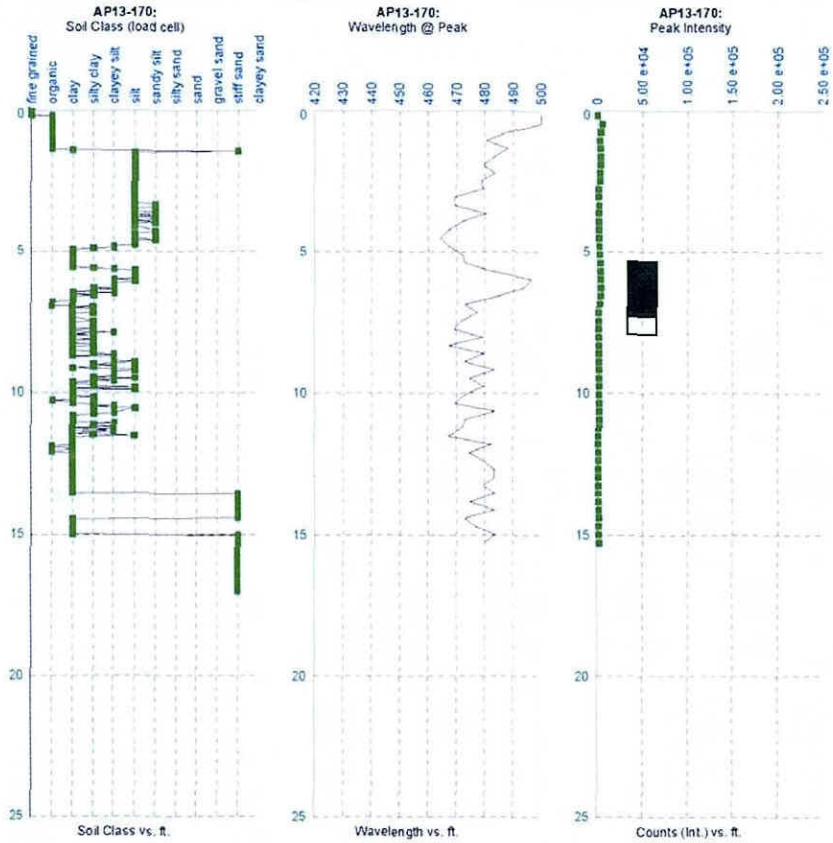
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are TPH-d at 17000 mg/kg, 24000 mg/kg for TPH-oil and 8.29 mg/kg for Arsenic. PAH's found can be seen in the table at left.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| TPH-diesel | 17000 | mg/kg |
| TPH-oil | 24000 | mg/kg |
| Arsenic | 8.29 | mg/kg |
| Benzo[A]Pyrene | 1900 | ug/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-170-S-01** | Sample Date: **12-05-07** | Logged By: **F. Essig** |
| Sample Interval: **5.5-7.0** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine sand, silt variable organic (SM/SP), dark reddish brown (5 YR 2.5/2), moist to wet, organic and possible asphalt odor, roots locally abundant with organic matter found at 6.5' bgs.

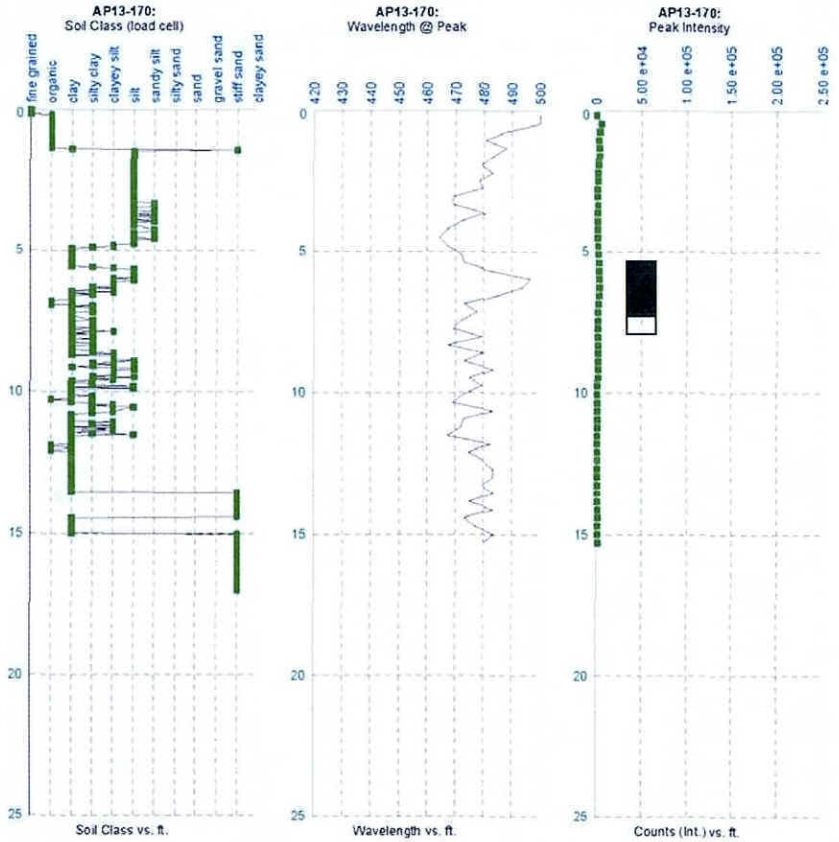
**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are TPH-d at 2100 mg/kg, 6700 mg/kg for TPH-oil and 1.38 mg/kg for Arsenic.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| Arsenic | 1.38 | mg/kg |
| TPH-diesel | 2100 | mg/kg |
| TPH-oil | 6700 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

**SCAPS Soil Sample Log**
**IR Site**
**Alameda Point, California**

| | | |
|---|---|---|
| Sample ID: **AP13-170-S-01** | Sample Date: **12-05-07** | Logged By: **F. Essig** |
| Sample Interval: **5.5-7.0** | Percent Recovery: 70 | |




**Description of Data and Sampling Rational–**
The sample was collected from a depth interval of background fluorescence that did not show a wavelength typical of fuel contamination. The CPT log indicates Sandy SILT with finer interbeds throughout the sample interval.

**Sample Description –**
Predominately fine sand, silt variable organic (SM/SP), dark reddish brown (5 YR 2.5/2), moist to wet, organic and possible asphalt odor, roots locally abundant with organic matter found at 6.5' bgs.

**Discussion of Results –**
The sample was analyzed for TPH as diesel and gasoline, VOC's, SVOC's, Metals and PAH's. Analytical results reported above the PRC and Residential PRG are TPH-d at 2100 mg/kg, 6700 mg/kg for TPH-oil and 1.38 mg/kg for Arsenic.

| **Analytical Results Exceeding PRC* and Residential PRG*** | | |
|---|---|---|
| Arsenic | 1.38 | mg/kg |
| TPH-diesel | 2100 | mg/kg |
| TPH-oil | 6700 | mg/kg |

*PRG: US EPA Region 9 Preliminary Remediation Goal
*PRC: Project Remediation Criteria

# APPENDIX F

AR_N00236_003182
ALAMEDA POINT
SSIC NO. 5090.3.A

# APPENDIX F – FINAL LABORATORY REPORT

RAW ANALYTICAL DATA IS NOT REQUIRED TO BE LOCATED AT OR NEAR THE INSTALLATION AND INFORMATION REPOSITORY.

FOR ADDITIONAL INFORMATION, CONTACT:

DIANE C. SILVA, RECORDS MANAGER
NAVAL FACILITIES ENGINEERING COMMAND, SOUTHWEST
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676
E-MAIL: diane.silva@navy.mil

# APPENDIX G

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

Richard Brady & Associates
3710 Ruffin Road
San Diego, CA 92123
ATTN: Mr. Jesse MacNeill

January 31, 2008

SUBJECT: NAS Alameda Point, Ir Site 13, Data Validation

Dear Mr. MacNiell,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on January 11, 2008. Attachment 1 is a summary of the samples that were reviewed for each analysis.

**LDC Project # 18116:**

| SDG # | Fraction |
|---|---|
| 07L053, 07L082 | Volatiles, Semivolatiles, Polynuclear Aromatic Hydrocarbons, Metals, Total Petroleum Hydrocarbons as Extractables |

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

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

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

Sincerely,

Erlinda T. Rauto
Operations Manager/Senior Chemist

V:\LOGIN\RBA\Alameda\18116COV.wpd

Attachment 1

90/10 EDD

# LDC #18116 (Richard Brady & Associates / NAS Alameda Point, IR Site 13)

Project #SHAWIN.001.002.00

| LDC | SDG# | DATE REC'D | (3) DATE DUE | VOA (8260B) | | SVOA (8270C) | | PAHs (8270C -SIM) | | Metals (SW846) | | TPH-E (8015) | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Matrix: | Water/Soil | | | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S | W | S |
| A | 07L053 | 01/11/08 | 02/01/08 | 2 | 15 | 1 | 8 | 1 | 7 | 1 | 12 | 1 | 12 | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 07L082 | 01/11/08 | 02/01/08 | 3 | 1 | 2 | 0 | 2 | 1 | 2 | 2 | 2 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 07L082 | 01/11/08 | 02/01/08 | 0 | 3 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 2 | | | | | | | | | | | | | | | | | | | | | | | | |
| Total | B/LR | | | 5 | 19 | 3 | 9 | 3 | 10 | 3 | 16 | 3 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 87 |

S cells indicate Level IV validation (all other cells are Level III validation). These sample cou not include MS, MSD, or DUP's.

181 wpd

**NAS Alameda Point, IR Site 13**
**Data Validation Reports**
**LDC# 18116**

Volatiles

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 4, 2007

**LDC Report Date:** January 30, 2008

**Matrix:** Soil/Water

**Parameters:** Volatiles

**Validation Level:** NFESC Level III

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L053

**Sample Identification**

AP13-008-S-01
AP13-007-S-01
AP13-007-W-01
AP13-007-S-02
AP13-044-S-01
AP13-043-S-01
AP13-043-S-02
AP13-041-S-01
AP13-169-S-01
AP13-169-S-02
AP13-169-S-02RE
AP13-147-S-01
AP13-148-S-01
AP13-148-S-01DL
AP13-148-S-02
AP13-148-S-02DL
AP13-148-W-01
AP13-044-S-01MS
AP13-044-S-01MSD

## Introduction

This data review covers 17 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination ($r^2$) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 12/17/07 | 2-Hexanone | 26.1 | AP13-044-S-01<br>AP13-043-S-02<br>AP13-169-S-01<br>AP13-169-S-02<br>AP13-147-S-01<br>AP13-148-S-01<br>AP13-044-S-01MS<br>AP13-044-S-01MSD<br>MBLK7S | J (all detects)<br>UJ (all non-detects) | A |
| 12/18/07 | Chloromethane<br>Carbon tetrachloride<br>1,2-Dichloroethane | 32.2<br>29.6<br>25.5 | All water samples in SDG 07L053 | J (all detects)<br>UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria.

## V. Blanks

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

Sample AP13-007-W-01 was identified as a trip blank. No volatile contaminants were found in this blank.

Sample AP13-148-W-01 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-148-W-01 | 12/14/07 | Carbon disulfide | 15 ug/L | All soil samples in SDG 07L053 |

Sample AP13-170-W-02 was identified as a field blank. No volatile contaminants were found in this blank.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks.

## VI. Surrogate Spikes

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

| Sample | Surrogate | %R (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-007-S-02 | Bromofluorobenzene | 925 (70-150) | All TCL compounds | J (all detects) | A |
| AP13-043-S-02 | Bromofluorobenzene<br>Toluene-d8 | 3439 (70-150)<br>242 (70-140) | All TCL compounds | J (all detects) | A |
| AP13-041-S-01 | Bromofluorobenzene | 168 (70-150) | All TCL compounds | J (all detects) | A |
| AP13-147-S-01 | Bromofluorobenzene | 877 (70-150) | All TCL compounds | J (all detects) | A |
| AP13-148-S-01 | Bromofluorobenzene | 756 (70-150) | All TCL compounds | J (all detects) | A |
| AP13-148-S-01DL | Bromofluorobenzene | 154 (70-150) | All TCL compounds | J (all detects) | A |
| AP13-148-S-02 | 1,2-Dichloroethane-d4<br>Bromofluorobenzene<br>Toluene-d8 | 162 (60-160)<br>179 (70-150)<br>157 (70-140) | All TCL compounds | J (all detects) | A |
| AP13-148-S-02DL | 1,2-Dichloroethane-d4<br>Bromofluorobenzene<br>Toluene-d8 | 184 (60-160)<br>223 (70-150)<br>156 (70-140) | All TCL compounds | J (all detects) | A |

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| VO03L45L/C (All water samples in SDG 07L053) | Chloromethane | 58 (60-130) | 59 (70-130) | - | J (all detects)<br>UJ (all non-detects) | P |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-169-S-02RE | Chlorobenzene-d5<br>1,2-Dichlorobenzene-d4 | 935504 (1088714-4354854)<br>263909 (494271-1977084) | 1,2-Dichloroethane<br>Carbon tetrachloride<br>Bromodichloromethane<br>1,2-Dichloropropane<br>cis-1,3-Dichloropropene<br>Trichloroethene<br>Dibromochloromethane<br>1,1,2-Trichloroethane<br>Benzene<br>trans-1,3-Dichloropropene<br>4-Methyl-2-pentanone<br>2-Hexanone<br>Tetrachloroethene<br>Toluene<br>Chlorobenzene<br>Ethylbenzene<br>Styrene<br>m,p-Xylenes<br>o-Xylene<br>1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A |
| AP13-169-S-02 | 1,2-Dichlorobenzene-d4 | 219956 (353242-1412966) | 1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A |

## XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| AP13-148-S-01 | Benzene<br>Ethylbenzene | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects)<br>J (all detects) | A |

Raw data were not reviewed for this SDG.

## XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment of Data

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| AP13-169-S-02RE<br>AP13-148-S-02DL | All TCL compounds | R | A |
| AP13-148-S-01 | Benzene<br>Ethylbenzene | R<br>R | A |
| AP13-148-S-01DL | All TCL compounds except<br>Benzene<br>Ethylbenzene | R | A |

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Volatiles - Data Qualification Summary - SDG 07L053

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-044-S-01<br>AP13-043-S-02<br>AP13-169-S-01<br>AP13-169-S-02<br>AP13-147-S-01<br>AP13-148-S-01 | 2-Hexanone | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (%D) |
| 07L053 | AP13-007-W-01<br>AP13-148-W-01 | Chloromethane<br>Carbon tetrachloride<br>1,2-Dichloroethane | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (%D) |
| 07L053 | AP13-007-S-02<br>AP13-043-S-02<br>AP13-041-S-01<br>AP13-147-S-01<br>AP13-148-S-01<br>AP13-148-S-01DL<br>AP13-148-S-02<br>AP13-148-S-02DL | All TCL compounds | J (all detects) | A | Surrogate spikes (%R) |
| 07L053 | AP13-007-W-01<br>AP13-148-W-01 | Chloromethane | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (%R) |
| 07L053 | AP13-169-S-02RE | 1,2-Dichloroethane<br>Carbon tetrachloride<br>Bromodichloromethane<br>1,2-Dichloropropane<br>cis-1,3-Dichloropropene<br>Trichloroethene<br>Dibromochloromethane<br>1,1,2-Trichloroethane<br>Benzene<br>trans-1,3-Dichloropropene<br>4-Methyl-2-pentanone<br>2-Hexanone<br>Tetrachloroethene<br>Toluene<br>Chlorobenzene<br>Ethylbenzene<br>Styrene<br>m,p-Xylenes<br>o-Xylene<br>1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A | Internal standards (area) |
| 07L053 | AP13-169-S-02 | 1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A | Internal standards (area) |
| 07L053 | AP13-148-S-01 | Benzene<br>Ethylbenzene | J (all detects)<br>J (all detects) | A | Compound quantitation and CRQLs |

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-169-S-02RE<br>AP13-148-S-02DL | All TCL compounds | R | A | Overall assessment of data |
| 07L053 | AP13-148-S-01 | Benzene<br>Ethylbenzene | R<br>R | A | Overall assessment of data |
| 07L053 | AP13-148-S-01DL | All TCL compounds except<br>Benzene<br>Ethylbenzene | R | A | Overall assessment of data |

**NAS Alameda Point, IR Site 13**
**Volatiles - Laboratory Blank Data Qualification Summary - SDG 07L053**

No Sample Data Qualified in this SDG

**NAS Alameda Point, IR Site 13**
**Volatiles - Field Blank Data Qualification Summary - SDG 07L053**

No Sample Data Qualified in this SDG

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 18:36 |
| Sample ID: | AP13-008-S-01 | Date Analyzed: | 12/15/07 18:36 |
| Lab Samp ID: | L053-01 | Dilution Factor: | .79 |
| Lab File ID: | RLB356 | Matrix | : SOIL |
| Ext Btch ID: | V003L31 | % Moisture | : 16.5 |
| Calib. Ref.: | RLB091 | Instrument ID | : T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1,2-TRICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1-DICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1-DICHLOROETHENE | ND | 4.7 | 1.9 |
| 1,2-DICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,2-DICHLOROPROPANE | ND | 4.7 | 1.9 |
| 2-BUTANONE | ND | 9.5 | 4.7 |
| 2-HEXANONE | ND | 9.5 | 4.7 |
| 4-METHYL-2-PENTANONE | ND | 9.5 | 4.7 |
| ACETONE | ND | 9.5 | 4.7 |
| BENZENE | ND | 4.7 | 1.9 |
| BROMODICHLOROMETHANE | ND | 4.7 | 1.9 |
| BROMOFORM | ND | 4.7 | 1.9 |
| BROMOMETHANE | ND | 9.5 | 1.9 |
| CARBON DISULFIDE | ND | 4.7 | 1.9 |
| CARBON TETRACHLORIDE | ND | 4.7 | 1.9 |
| CHLOROBENZENE | ND | 4.7 | 1.9 |
| CHLOROETHANE | ND | 4.7 | 1.9 |
| CHLOROFORM | ND | 4.7 | 1.9 |
| CHLOROMETHANE | ND | 9.5 | 1.9 |
| CIS-1,2-DICHLOROETHENE | ND | 4.7 | 1.9 |
| CIS-1,3-DICHLOROPROPENE | ND | 4.7 | 1.9 |
| DIBROMOCHLOROMETHANE | ND | 4.7 | 1.9 |
| ETHYLBENZENE | ND | 4.7 | 1.9 |
| M/P-XYLENES | ND | 9.5 | 1.9 |
| MTBE | ND | 4.7 | 1.9 |
| METHYLENE CHLORIDE | ND | 9.5 | 1.9 |
| O-XYLENE | ND | 4.7 | 1.9 |
| STYRENE | ND | 4.7 | 1.9 |
| TETRACHLOROETHENE | ND | 4.7 | 1.9 |
| TOLUENE | ND | 4.7 | 1.9 |
| TRANS-1,2-DICHLOROETHENE | ND | 4.7 | 1.9 |
| TRANS-1,3-DICHLOROPROPENE | ND | 4.7 | 1.9 |
| TRICHLOROETHENE | ND | 4.7 | 1.9 |
| VINYL CHLORIDE | ND | 4.7 | 1.9 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 114 | 60-160 |
| 4-BROMOFLUOROBENZENE | 107 | 70-150 |
| TOLUENE-D8 | 102 | 70-140 |

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2004

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 19:14 |
| Sample ID: | AP13-007-S-01 | Date Analyzed: | 12/15/07 19:14 |
| Lab Samp ID: | L053-02 | Dilution Factor: | .91 |
| Lab File ID: | RLB357 | Matrix : | SOIL |
| Ext Btch ID: | V003L31 | % Moisture : | 16.4 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.4 | 2.2 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.4 | 2.2 |
| 1,1,2-TRICHLOROETHANE | ND | 5.4 | 2.2 |
| 1,1-DICHLOROETHANE | ND | 5.4 | 2.2 |
| 1,1-DICHLOROETHENE | ND | 5.4 | 2.2 |
| 1,2-DICHLOROETHANE | ND | 5.4 | 2.2 |
| 1,2-DICHLOROPROPANE | ND | 5.4 | 2.2 |
| 2-BUTANONE | ND | 11 | 5.4 |
| 2-HEXANONE | ND | 11 | 5.4 |
| 4-METHYL-2-PENTANONE | ND | 11 | 5.4 |
| ACETONE | ND | 11 | 5.4 |
| BENZENE | ND | 5.4 | 2.2 |
| BROMODICHLOROMETHANE | ND | 5.4 | 2.2 |
| BROMOFORM | ND | 5.4 | 2.2 |
| BROMOMETHANE | ND | 11 | 2.2 |
| CARBON DISULFIDE | ND | 5.4 | 2.2 |
| CARBON TETRACHLORIDE | ND | 5.4 | 2.2 |
| CHLOROBENZENE | ND | 5.4 | 2.2 |
| CHLOROETHANE | ND | 5.4 | 2.2 |
| CHLOROFORM | ND | 5.4 | 2.2 |
| CHLOROMETHANE | ND | 11 | 2.2 |
| CIS-1,2-DICHLOROETHENE | ND | 5.4 | 2.2 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.4 | 2.2 |
| DIBROMOCHLOROMETHANE | ND | 5.4 | 2.2 |
| ETHYLBENZENE | ND | 5.4 | 2.2 |
| M/P-XYLENES | ND | 11 | 2.2 |
| MTBE | ND | 5.4 | 2.2 |
| METHYLENE CHLORIDE | ND | 11 | 2.2 |
| O-XYLENE | ND | 5.4 | 2.2 |
| STYRENE | ND | 5.4 | 2.2 |
| TETRACHLOROETHENE | ND | 5.4 | 2.2 |
| TOLUENE | ND | 5.4 | 2.2 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.4 | 2.2 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.4 | 2.2 |
| TRICHLOROETHENE | ND | 5.4 | 2.2 |
| VINYL CHLORIDE | ND | 5.4 | 2.2 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 113 | 60-160 |
| 4-BROMOFLUOROBENZENE | 111 | 70-150 |
| TOLUENE-D8 | 101 | 70-140 |

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2006

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 19:52 |
| Sample ID: | AP13-007-S-02 | Date Analyzed: | 12/15/07 19:52 |
| Lab Samp ID: | L053-04 | Dilution Factor: | .82 |
| Lab File ID: | RLB358 | Matrix : | SOIL |
| Ext Btch ID: | V003L31 | % Moisture : | 16.9 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 4.9 | 2.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1,2-TRICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1-DICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1-DICHLOROETHENE | ND | 4.9 | 2.0 |
| 1,2-DICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,2-DICHLOROPROPANE | ND | 4.9 | 2.0 |
| 2-BUTANONE | ND | 9.9 | 4.9 |
| 2-HEXANONE | ND | 9.9 | 4.9 |
| 4-METHYL-2-PENTANONE | ND | 9.9 | 4.9 |
| ACETONE | 10 J | 9.9 | 4.9 |
| BENZENE | ND U | 4.9 | 2.0 |
| BROMODICHLOROMETHANE | ND | 4.9 | 2.0 |
| BROMOFORM | ND | 4.9 | 2.0 |
| BROMOMETHANE | ND | 9.9 | 2.0 |
| CARBON DISULFIDE | ND | 4.9 | 2.0 |
| CARBON TETRACHLORIDE | ND | 4.9 | 2.0 |
| CHLOROBENZENE | ND | 4.9 | 2.0 |
| CHLOROETHANE | ND | 4.9 | 2.0 |
| CHLOROFORM | ND | 4.9 | 2.0 |
| CHLOROMETHANE | ND | 9.9 | 2.0 |
| CIS-1,2-DICHLOROETHENE | ND | 4.9 | 2.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 4.9 | 2.0 |
| DIBROMOCHLOROMETHANE | ND | 4.9 | 2.0 |
| ETHYLBENZENE | 7.3 J | 4.9 | 2.0 |
| M/P-XYLENES | ND U | 9.9 | 2.0 |
| [illegible] | ND | 4.9 | 2.0 |
| [illegible]YLENE CHLORIDE | ND | 9.9 | 2.0 |
| O-XYLENE | ND | 4.9 | 2.0 |
| STYRENE | ND | 4.9 | 2.0 |
| TETRACHLOROETHENE | ND | 4.9 | 2.0 |
| TOLUENE | ND | 4.9 | 2.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 4.9 | 2.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 4.9 | 2.0 |
| TRICHLOROETHENE | ND | 4.9 | 2.0 |
| VINYL CHLORIDE | ND | 4.9 | 2.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 152 | 60-160 |
| 4-BROMOFLUOROBENZENE | 925* | 70-150 |
| TOLUENE-D8 | 127 | 70-140 |

L440130D8

2009

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 18:49 |
| Sample ID: | AP13-044-S-01 | Date Analyzed: | 12/17/07 18:49 |
| Lab Samp ID: | L053-05R | Dilution Factor: | .85 |
| Lab File ID: | RLP590 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 19.9 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.3 | 2.1 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.3 | 2.1 |
| 1,1,2-TRICHLOROETHANE | ND | 5.3 | 2.1 |
| 1,1-DICHLOROETHANE | ND | 5.3 | 2.1 |
| 1,1-DICHLOROETHENE | ND | 5.3 | 2.1 |
| 1,2-DICHLOROETHANE | ND | 5.3 | 2.1 |
| 1,2-DICHLOROPROPANE | ND | 5.3 | 2.1 |
| 2-BUTANONE | ND | 11 | 5.3 |
| 2-HEXANONE | ND UJ | 11 | 5.3 |
| 4-METHYL-2-PENTANONE | ND | 11 | 5.3 |
| ACETONE | ND | 11 | 5.3 |
| BENZENE | ND | 5.3 | 2.1 |
| BROMODICHLOROMETHANE | ND | 5.3 | 2.1 |
| BROMOFORM | ND | 5.3 | 2.1 |
| BROMOMETHANE | ND | 11 | 2.1 |
| CARBON DISULFIDE | ND | 5.3 | 2.1 |
| CARBON TETRACHLORIDE | ND | 5.3 | 2.1 |
| CHLOROBENZENE | ND | 5.3 | 2.1 |
| CHLOROETHANE | ND | 5.3 | 2.1 |
| CHLOROFORM | ND | 5.3 | 2.1 |
| CHLOROMETHANE | ND | 11 | 2.1 |
| CIS-1,2-DICHLOROETHENE | ND | 5.3 | 2.1 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.3 | 2.1 |
| DIBROMOCHLOROMETHANE | ND | 5.3 | 2.1 |
| ETHYLBENZENE | ND | 5.3 | 2.1 |
| M/P-XYLENES | ND | 11 | 2.1 |
| MTBE | ND | 5.3 | 2.1 |
| METHYLENE CHLORIDE | ND | 11 | 2.1 |
| O-XYLENE | ND | 5.3 | 2.1 |
| STYRENE | ND | 5.3 | 2.1 |
| TETRACHLOROETHENE | ND | 5.3 | 2.1 |
| TOLUENE | ND | 5.3 | 2.1 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.3 | 2.1 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.3 | 2.1 |
| TRICHLOROETHENE | ND | 5.3 | 2.1 |
| VINYL CHLORIDE | ND | 5.3 | 2.1 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 103 | 60-160 |
| 4-BROMOFLUOROBENZENE | 101 | 70-150 |
| TOLUENE-D8 | 106 | 70-140 |

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 20:30 |
| Sample ID: | AP13-043-S-01 | Date Analyzed: | 12/15/07 20:30 |
| Lab Samp ID: | L053-06 | Dilution Factor: | .85 |
| Lab File ID: | RLB359 | Matrix : | SOIL |
| Ext Btch ID: | VD03L31 | % Moisture : | 20.6 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1,2-TRICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1-DICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1-DICHLOROETHENE | ND | 5.4 | 2.1 |
| 1,2-DICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,2-DICHLOROPROPANE | ND | 5.4 | 2.1 |
| 2-BUTANONE | 6.0J | 11 | 5.4 |
| 2-HEXANONE | ND | 11 | 5.4 |
| 4-METHYL-2-PENTANONE | ND | 11 | 5.4 |
| ACETONE | ND | 11 | 5.4 |
| BENZENE | ND | 5.4 | 2.1 |
| BROMODICHLOROMETHANE | ND | 5.4 | 2.1 |
| BROMOFORM | ND | 5.4 | 2.1 |
| BROMOMETHANE | ND | 11 | 2.1 |
| CARBON DISULFIDE | ND | 5.4 | 2.1 |
| CARBON TETRACHLORIDE | ND | 5.4 | 2.1 |
| CHLOROBENZENE | ND | 5.4 | 2.1 |
| CHLOROETHANE | ND | 5.4 | 2.1 |
| CHLOROFORM | ND | 5.4 | 2.1 |
| CHLOROMETHANE | ND | 11 | 2.1 |
| CIS-1,2-DICHLOROETHENE | ND | 5.4 | 2.1 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.4 | 2.1 |
| DIBROMOCHLOROMETHANE | ND | 5.4 | 2.1 |
| ETHYLBENZENE | ND | 5.4 | 2.1 |
| M/P-XYLENES | ND | 11 | 2.1 |
| MTBE | ND | 5.4 | 2.1 |
| METHYLENE CHLORIDE | ND | 11 | 2.1 |
| O-XYLENE | ND | 5.4 | 2.1 |
| STYRENE | ND | 5.4 | 2.1 |
| TETRACHLOROETHENE | ND | 5.4 | 2.1 |
| TOLUENE | ND | 5.4 | 2.1 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.4 | 2.1 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.4 | 2.1 |
| TRICHLOROETHENE | ND | 5.4 | 2.1 |
| VINYL CHLORIDE | ND | 5.4 | 2.1 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 110 | 60-160 |
| 4-BROMOFLUOROBENZENE | 110 | 70-150 |
| TOLUENE-D8 | 106 | 70-140 |

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 01:11 |
| Sample ID: | AP13-043-S-02 | Date Analyzed: | 12/18/07 01:11 |
| Lab Samp ID: | L053-07R | Dilution Factor: | .81 |
| Lab File ID: | RLP600 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 17.0 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1,2-TRICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1-DICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,1-DICHLOROETHENE | ND | 4.9 | 2.0 |
| 1,2-DICHLOROETHANE | ND | 4.9 | 2.0 |
| 1,2-DICHLOROPROPANE | ND | 4.9 | 2.0 |
| 2-BUTANONE | ND | 9.8 | 4.9 |
| 2-HEXANONE | ND UJ | 9.8 | 4.9 |
| 4-METHYL-2-PENTANONE | ND U | 9.8 | 4.9 |
| ACETONE | 24 J | 9.8 | 4.9 |
| BENZENE | 7.2 J | 4.9 | 2.0 |
| BROMODICHLOROMETHANE | ND U | 4.9 | 2.0 |
| BROMOFORM | ND | 4.9 | 2.0 |
| BROMOMETHANE | ND | 9.8 | 2.0 |
| CARBON DISULFIDE | ND | 4.9 | 2.0 |
| CARBON TETRACHLORIDE | ND | 4.9 | 2.0 |
| CHLOROBENZENE | ND | 4.9 | 2.0 |
| CHLOROETHANE | ND | 4.9 | 2.0 |
| CHLOROFORM | ND | 4.9 | 2.0 |
| CHLOROMETHANE | ND | 9.8 | 2.0 |
| CIS-1,2-DICHLOROETHENE | ND | 4.9 | 2.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 4.9 | 2.0 |
| DIBROMOCHLOROMETHANE | ND | 4.9 | 2.0 |
| ETHYLBENZENE | 41 J | 4.9 | 2.0 |
| M/P-XYLENES | 21 J | 9.8 | 2.0 |
| MTBE | ND U | 4.9 | 2.0 |
| METHYLENE CHLORIDE | ND U | 9.8 | 2.0 |
| O-XYLENE | 18 J | 4.9 | 2.0 |
| STYRENE | ND U | 4.9 | 2.0 |
| TETRACHLOROETHENE | ND | 4.9 | 2.0 |
| TOLUENE | ND | 4.9 | 2.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 4.9 | 2.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 4.9 | 2.0 |
| TRICHLOROETHENE | ND | 4.9 | 2.0 |
| VINYL CHLORIDE | ND | 4.9 | 2.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 160 | 60-160 |
| 4-BROMOFLUOROBENZENE | 3439* | 70-150 |
| TOLUENE-D8 | 242* | 70-140 |

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 14:11 |
| Sample ID: | AP13-041-S-01 | Date Analyzed: | 12/17/07 14:11 |
| Lab Samp ID: | L053-08T | Dilution Factor: | 40 |
| Lab File ID: | RLE477 | Matrix : | SOIL |
| Ext Btch ID: | VOD3L41 | % Moisture : | 12.2 |
| Calib. Ref.: | RLE270 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 230 | 91 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 230 | 91 |
| 1,1,2-TRICHLOROETHANE | ND | 230 | 91 |
| 1,1-DICHLOROETHANE | ND | 230 | 91 |
| 1,1-DICHLOROETHENE | ND | 230 | 91 |
| 1,2-DICHLOROETHANE | ND | 230 | 91 |
| 1,2-DICHLOROPROPANE | ND | 230 | 91 |
| 2-BUTANONE | ND | 460 | 230 |
| 2-HEXANONE | ND | 460 | 230 |
| 4-METHYL-2-PENTANONE | ND | 460 | 230 |
| ACETONE | ND | 460 | 230 |
| BENZENE | ND | 230 | 91 |
| BROMODICHLOROMETHANE | ND | 230 | 91 |
| BROMOFORM | ND | 230 | 91 |
| BROMOMETHANE | ND | 460 | 91 |
| CARBON DISULFIDE | ND | 230 | 91 |
| CARBON TETRACHLORIDE | ND | 230 | 91 |
| CHLOROBENZENE | ND | 230 | 91 |
| CHLOROETHANE | ND | 230 | 91 |
| CHLOROFORM | ND | 230 | 91 |
| CHLOROMETHANE | ND | 460 | 91 |
| CIS-1,2-DICHLOROETHENE | ND | 230 | 91 |
| 1,3-DICHLOROPROPENE | ND | 230 | 91 |
| BROMOCHLOROMETHANE | ND | 230 | 91 |
| ETHYLBENZENE | 2000 | 230 | 91 |
| M/P-XYLENES | 23000 | 460 | 91 |
| MTBE | ND | 230 | 91 |
| METHYLENE CHLORIDE | ND | 460 | 91 |
| O-XYLENE | 6200 | 230 | 91 |
| STYRENE | ND | 230 | 91 |
| TETRACHLOROETHENE | ND | 230 | 91 |
| TOLUENE | ND | 230 | 91 |
| TRANS-1,2-DICHLOROETHENE | ND | 230 | 91 |
| TRANS-1,3-DICHLOROPROPENE | ND | 230 | 91 |
| TRICHLOROETHENE | ND | 230 | 91 |
| VINYL CHLORIDE | ND | 230 | 91 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 94 | 60-160 |
| 4-BROMOFLUOROBENZENE | 168* | 70-150 |
| TOLUENE-D8 | 125 | 70-140 |

Methanol Extraction Date: 12/17/07 13:20

M401300 8

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 21:23 |
| Sample ID: | AP13-169-S-01 | Date Analyzed: | 12/17/07 21:23 |
| Lab Samp ID: | L053-09R | Dilution Factor: | 1.4 |
| Lab File ID: | RLP594 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 10.3 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 7.8 | 3.1 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 7.8 | 3.1 |
| 1,1,2-TRICHLOROETHANE | ND | 7.8 | 3.1 |
| 1,1-DICHLOROETHANE | ND | 7.8 | 3.1 |
| 1,1-DICHLOROETHENE | ND | 7.8 | 3.1 |
| 1,2-DICHLOROETHANE | ND | 7.8 | 3.1 |
| 1,2-DICHLOROPROPANE | ND | 7.8 | 3.1 |
| 2-BUTANONE | ND | 16 | 7.8 |
| 2-HEXANONE | ND UJ | 16 | 7.8 |
| 4-METHYL-2-PENTANONE | ND U | 16 | 7.8 |
| ACETONE | 24 | 16 | 7.8 |
| BENZENE | ND U | 7.8 | 3.1 |
| BROMODICHLOROMETHANE | ND | 7.8 | 3.1 |
| BROMOFORM | ND | 7.8 | 3.1 |
| BROMOMETHANE | ND | 16 | 3.1 |
| CARBON DISULFIDE | ND | 7.8 | 3.1 |
| CARBON TETRACHLORIDE | ND | 7.8 | 3.1 |
| CHLOROBENZENE | ND | 7.8 | 3.1 |
| CHLOROETHANE | ND | 7.8 | 3.1 |
| CHLOROFORM | ND | 7.8 | 3.1 |
| CHLOROMETHANE | ND | 16 | 3.1 |
| CIS-1,2-DICHLOROETHENE | ND | 7.8 | 3.1 |
| CIS-1,3-DICHLOROPROPENE | ND | 7.8 | 3.1 |
| DIBROMOCHLOROMETHANE | ND | 7.8 | 3.1 |
| ETHYLBENZENE | ND | 7.8 | 3.1 |
| M/P-XYLENES | ND | 16 | 3.1 |
| MTBE | ND | 7.8 | 3.1 |
| METHYLENE CHLORIDE | ND | 16 | 3.1 |
| O-XYLENE | ND | 7.8 | 3.1 |
| STYRENE | ND | 7.8 | 3.1 |
| TETRACHLOROETHENE | ND | 7.8 | 3.1 |
| TOLUENE | ND | 7.8 | 3.1 |
| TRANS-1,2-DICHLOROETHENE | ND | 7.8 | 3.1 |
| TRANS-1,3-DICHLOROPROPENE | ND | 7.8 | 3.1 |
| TRICHLOROETHENE | ND | 7.8 | 3.1 |
| VINYL CHLORIDE | ND | 7.8 | 3.1 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 107 | 60-160 |
| 4-BROMOFLUOROBENZENE | 110 | 70-150 |
| TOLUENE-D8 | 110 | 70-140 |

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 22:01 |
| Sample ID: | AP13-169-S-02 | Date Analyzed: | 12/17/07 22:01 |
| Lab Samp ID: | L053-10R | Dilution Factor: | .98 |
| Lab File ID: | RLP595 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 25.8 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 6.6 | 2.6 |
| 1,1,2,2-TETRACHLOROETHANE | ND UJ | 6.6 | 2.6 |
| 1,1,2-TRICHLOROETHANE | ND U | 6.6 | 2.6 |
| 1,1-DICHLOROETHANE | ND | 6.6 | 2.6 |
| 1,1-DICHLOROETHENE | ND | 6.6 | 2.6 |
| 1,2-DICHLOROETHANE | ND | 6.6 | 2.6 |
| 1,2-DICHLOROPROPANE | ND | 6.6 | 2.6 |
| 2-BUTANONE | 23 | 13 | 6.6 |
| 2-HEXANONE | ND UJ | 13 | 6.6 |
| 4-METHYL-2-PENTANONE | ND U | 13 | 6.6 |
| ACETONE | 130 | 13 | 6.6 |
| BENZENE | 44 | 6.6 | 2.6 |
| BROMODICHLOROMETHANE | ND U | 6.6 | 2.6 |
| BROMOFORM | ND | 6.6 | 2.6 |
| BROMOMETHANE | ND | 13 | 2.6 |
| CARBON DISULFIDE | ND | 6.6 | 2.6 |
| CARBON TETRACHLORIDE | ND | 6.6 | 2.6 |
| CHLOROBENZENE | ND | 6.6 | 2.6 |
| CHLOROETHANE | ND | 6.6 | 2.6 |
| CHLOROFORM | ND | 6.6 | 2.6 |
| CHLOROMETHANE | ND | 13 | 2.6 |
| 1,2-DICHLOROETHENE | ND | 6.6 | 2.6 |
| 1,3-DICHLOROPROPENE | ND | 6.6 | 2.6 |
| BROMOCHLOROMETHANE | ND | 6.6 | 2.6 |
| ETHYLBENZENE | 58 | 6.6 | 2.6 |
| M/P-XYLENES | 110 | 13 | 2.6 |
| MTBE | ND U | 6.6 | 2.6 |
| METHYLENE CHLORIDE | ND U | 13 | 2.6 |
| O-XYLENE | 140 | 6.6 | 2.6 |
| STYRENE | ND U | 6.6 | 2.6 |
| TETRACHLOROETHENE | ND | 6.6 | 2.6 |
| TOLUENE | 11 | 6.6 | 2.6 |
| TRANS-1,2-DICHLOROETHENE | ND U | 6.6 | 2.6 |
| TRANS-1,3-DICHLOROPROPENE | ND | 6.6 | 2.6 |
| TRICHLOROETHENE | ND | 6.6 | 2.6 |
| VINYL CHLORIDE | ND | 6.6 | 2.6 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 117 | 60-160 |
| 4-BROMOFLUOROBENZENE | 139 | 70-150 |
| TOLUENE-D8 | 122 | 70-140 |

1440/3008

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 17:40 |
| Sample ID: | AP13-169-S-02RE | Date Analyzed: | 12/18/07 17:40 |
| Lab Samp ID: | L053-10N | Dilution Factor: | 1.1 |
| Lab File ID: | RLB390 | Matrix : | SOIL |
| Ext Btch ID: | V003L35 | % Moisture : | 25.8 |
| Calib. Ref.: | RLB369 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND R | 7.4 | 3.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 7.4 | 3.0 |
| 1,1,2-TRICHLOROETHANE | ND | 7.4 | 3.0 |
| 1,1-DICHLOROETHANE | ND | 7.4 | 3.0 |
| 1,1-DICHLOROETHENE | ND | 7.4 | 3.0 |
| 1,2-DICHLOROETHANE | ND | 7.4 | 3.0 |
| 1,2-DICHLOROPROPANE | ND | 7.4 | 3.0 |
| 2-BUTANONE | 14J | 15 | 7.4 |
| 2-HEXANONE | ND | 15 | 7.4 |
| 4-METHYL-2-PENTANONE | ND | 15 | 7.4 |
| ACETONE | 86 | 15 | 7.4 |
| BENZENE | 40 | 7.4 | 3.0 |
| BROMODICHLOROMETHANE | ND | 7.4 | 3.0 |
| BROMOFORM | ND | 7.4 | 3.0 |
| BROMOMETHANE | ND | 15 | 3.0 |
| CARBON DISULFIDE | 10 | 7.4 | 3.0 |
| CARBON TETRACHLORIDE | ND | 7.4 | 3.0 |
| CHLOROBENZENE | ND | 7.4 | 3.0 |
| CHLOROETHANE | ND | 7.4 | 3.0 |
| CHLOROFORM | ND | 7.4 | 3.0 |
| CHLOROMETHANE | ND | 15 | 3.0 |
| CIS-1,2-DICHLOROETHENE | ND | 7.4 | 3.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 7.4 | 3.0 |
| DIBROMOCHLOROMETHANE | ND | 7.4 | 3.0 |
| ETHYLBENZENE | 63 | 7.4 | 3.0 |
| M/P-XYLENES | 120 | 15 | 3.0 |
| MTBE | ND | 7.4 | 3.0 |
| METHYLENE CHLORIDE | ND | 15 | 3.0 |
| O-XYLENE | 150 | 7.4 | 3.0 |
| STYRENE | ND | 7.4 | 3.0 |
| TETRACHLOROETHENE | ND | 7.4 | 3.0 |
| TOLUENE | 11 | 7.4 | 3.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 7.4 | 3.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 7.4 | 3.0 |
| TRICHLOROETHENE | ND | 7.4 | 3.0 |
| VINYL CHLORIDE | ND | 7.4 | 3.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 141 | 60-160 |
| 4-BROMOFLUOROBENZENE | 141 | 70-150 |
| TOLUENE-D8 | 123 | 70-140 |

M40/3008

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 22:39 |
| Sample ID: | AP13-147-S-01 | Date Analyzed: | 12/17/07 22:39 |
| Lab Samp ID: | L053-11R | Dilution Factor: | .85 |
| Lab File ID: | RLP596 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 20.7 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1,2-TRICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1-DICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,1-DICHLOROETHENE | ND | 5.4 | 2.1 |
| 1,2-DICHLOROETHANE | ND | 5.4 | 2.1 |
| 1,2-DICHLOROPROPANE | ND | 5.4 | 2.1 |
| 2-BUTANONE | ND | 11 | 5.4 |
| 2-HEXANONE | ND UJ | 11 | 5.4 |
| 4-METHYL-2-PENTANONE | ND | 11 | 5.4 |
| ACETONE | ND | 11 | 5.4 |
| BENZENE | ND | 5.4 | 2.1 |
| BROMODICHLOROMETHANE | ND | 5.4 | 2.1 |
| BROMOFORM | ND | 5.4 | 2.1 |
| BROMOMETHANE | ND | 11 | 2.1 |
| CARBON DISULFIDE | ND | 5.4 | 2.1 |
| CARBON TETRACHLORIDE | ND | 5.4 | 2.1 |
| CHLOROBENZENE | ND | 5.4 | 2.1 |
| CHLOROETHANE | ND | 5.4 | 2.1 |
| CHLOROFORM | ND | 5.4 | 2.1 |
| CHLOROMETHANE | ND | 11 | 2.1 |
| 1,2-DICHLOROETHENE | ND | 5.4 | 2.1 |
| 1,3-DICHLOROPROPENE | ND | 5.4 | 2.1 |
| BROMOCHLOROMETHANE | ND | 5.4 | 2.1 |
| ETHYLBENZENE | ND | 5.4 | 2.1 |
| M/P-XYLENES | ND | 11 | 2.1 |
| MTBE | ND | 5.4 | 2.1 |
| METHYLENE CHLORIDE | ND | 11 | 2.1 |
| O-XYLENE | ND | 5.4 | 2.1 |
| STYRENE | ND | 5.4 | 2.1 |
| TETRACHLOROETHENE | ND | 5.4 | 2.1 |
| TOLUENE | ND | 5.4 | 2.1 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.4 | 2.1 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.4 | 2.1 |
| TRICHLOROETHENE | ND | 5.4 | 2.1 |
| VINYL CHLORIDE | ND | 5.4 | 2.1 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 107 | 60-160 |
| 4-BROMOFLUOROBENZENE | 877* | 70-150 |
| TOLUENE-D8 | 122 | 70-140 |

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/17/07 23:17 |
| Sample ID: | AP13-148-S-01 | Date Analyzed: | 12/17/07 23:17 |
| Lab Samp ID: | L053-12R | Dilution Factor: | .85 |
| Lab File ID: | RLP597 | Matrix : | SOIL |
| Ext Btch ID: | V002L58 | % Moisture : | 9.9 |
| Calib. Ref.: | RKP873 | Instrument ID : | T-002 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1,2-TRICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1-DICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,1-DICHLOROETHENE | ND | 4.7 | 1.9 |
| 1,2-DICHLOROETHANE | ND | 4.7 | 1.9 |
| 1,2-DICHLOROPROPANE | ND | 4.7 | 1.9 |
| 2-BUTANONE | 20 J | 9.4 | 4.7 |
| 2-HEXANONE | ND UJ | 9.4 | 4.7 |
| 4-METHYL-2-PENTANONE | ND | 9.4 | 4.7 |
| ACETONE | 90 J | 9.4 | 4.7 |
| BENZENE | 500E R | 4.7 | 1.9 |
| BROMODICHLOROMETHANE | ND | 4.7 | 1.9 |
| BROMOFORM | ND | 4.7 | 1.9 |
| BROMOMETHANE | ND | 9.4 | 1.9 |
| CARBON DISULFIDE | ND | 4.7 | 1.9 |
| CARBON TETRACHLORIDE | ND | 4.7 | 1.9 |
| CHLOROBENZENE | ND | 4.7 | 1.9 |
| CHLOROETHANE | ND | 4.7 | 1.9 |
| CHLOROFORM | ND | 4.7 | 1.9 |
| CHLOROMETHANE | ND | 9.4 | 1.9 |
| CIS-1,2-DICHLOROETHENE | ND | 4.7 | 1.9 |
| CIS-1,3-DICHLOROPROPENE | ND | 4.7 | 1.9 |
| DIBROMOCHLOROMETHANE | ND | 4.7 | 1.9 |
| ETHYLBENZENE | 460E R | 4.7 | 1.9 |
| M/P-XYLENES | 390 J | 9.4 | 1.9 |
| MTBE | ND | 4.7 | 1.9 |
| METHYLENE CHLORIDE | ND | 9.4 | 1.9 |
| O-XYLENE | 54 J | 4.7 | 1.9 |
| STYRENE | ND | 4.7 | 1.9 |
| TETRACHLOROETHENE | ND | 4.7 | 1.9 |
| TOLUENE | ND | 4.7 | 1.9 |
| TRANS-1,2-DICHLOROETHENE | ND | 4.7 | 1.9 |
| TRANS-1,3-DICHLOROPROPENE | ND | 4.7 | 1.9 |
| TRICHLOROETHENE | ND | 4.7 | 1.9 |
| VINYL CHLORIDE | ND | 4.7 | 1.9 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 128 | 60-160 |
| 4-BROMOFLUOROBENZENE | 756* | 70-150 |
| TOLUENE-D8 | 118 | 70-140 |

M401300 8

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 19:34 |
| Sample ID: | AP13-148-S-01DL | Date Analyzed: | 12/18/07 19:34 |
| Lab Samp ID: | L053-12T | Dilution Factor: | 43 |
| Lab File ID: | RLB393 | Matrix : | SOIL |
| Ext Btch ID: | V003L34 | % Moisture : | 9.9 |
| Calib. Ref.: | RLB369 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND R | 240 | 95 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 240 | 95 |
| 1,1,2-TRICHLOROETHANE | ND | 240 | 95 |
| 1,1-DICHLOROETHANE | ND | 240 | 95 |
| 1,1-DICHLOROETHENE | ND | 240 | 95 |
| 1,2-DICHLOROETHANE | ND | 240 | 95 |
| 1,2-DICHLOROPROPANE | ND | 240 | 95 |
| 2-BUTANONE | ND | 480 | 240 |
| 2-HEXANONE | ND | 480 | 240 |
| 4-METHYL-2-PENTANONE | ND | 480 | 240 |
| ACETONE | ND | 480 | 240 |
| BENZENE | 1900 J | 240 | 95 |
| BROMODICHLOROMETHANE | ND R | 240 | 95 |
| BROMOFORM | ND | 240 | 95 |
| BROMOMETHANE | ND | 480 | 95 |
| CARBON DISULFIDE | ND | 240 | 95 |
| CARBON TETRACHLORIDE | ND | 240 | 95 |
| CHLOROBENZENE | ND | 240 | 95 |
| CHLOROETHANE | ND | 240 | 95 |
| CHLOROFORM | ND | 240 | 95 |
| CHLOROMETHANE | ND | 480 | 95 |
| CIS-1,2-DICHLOROETHENE | ND | 240 | 95 |
| 1,3-DICHLOROPROPENE | ND | 240 | 95 |
| OMOCHLOROMETHANE | ND | 240 | 95 |
| YLBENZENE | 6400 J | 240 | 95 |
| M/P-XYLENES | 4700 R | 480 | 95 |
| MTBE | ND | 240 | 95 |
| METHYLENE CHLORIDE | ND | 480 | 95 |
| O-XYLENE | 380 | 240 | 95 |
| STYRENE | ND | 240 | 95 |
| TETRACHLOROETHENE | ND | 240 | 95 |
| TOLUENE | ND | 240 | 95 |
| TRANS-1,2-DICHLOROETHENE | ND | 240 | 95 |
| TRANS-1,3-DICHLOROPROPENE | ND | 240 | 95 |
| TRICHLOROETHENE | ND | 240 | 95 |
| VINYL CHLORIDE | ND | 240 | 95 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 111 | 60-160 |
| 4-BROMOFLUOROBENZENE | 154* | 70-150 |
| TOLUENE-D8 | 120 | 70-140 |

Methanol Extraction Date: 12/18/07 14:35

M40/308
2102

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 21:29 |
| Sample ID: | AP13-148-S-02 | Date Analyzed: | 12/18/07 21:29 |
| Lab Samp ID: | L053-13T | Dilution Factor: | 40 |
| Lab File ID: | RLB396 | Matrix | : SOIL |
| Ext Btch ID: | V003L34 | % Moisture | : 17.5 |
| Calib. Ref.: | RLB369 | Instrument ID | : T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 240 | 97 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 240 | 97 |
| 1,1,2-TRICHLOROETHANE | ND | 240 | 97 |
| 1,1-DICHLOROETHANE | ND | 240 | 97 |
| 1,1-DICHLOROETHENE | ND | 240 | 97 |
| 1,2-DICHLOROETHANE | ND | 240 | 97 |
| 1,2-DICHLOROPROPANE | ND | 240 | 97 |
| 2-BUTANONE | ND | 480 | 240 |
| 2-HEXANONE | ND | 480 | 240 |
| 4-METHYL-2-PENTANONE | ND | 480 | 240 |
| ACETONE | ND | 480 | 240 |
| BENZENE | 14000 J | 240 | 97 |
| BROMODICHLOROMETHANE | ND | 240 | 97 |
| BROMOFORM | ND | 240 | 97 |
| BROMOMETHANE | ND | 480 | 97 |
| CARBON DISULFIDE | ND | 240 | 97 |
| CARBON TETRACHLORIDE | ND | 240 | 97 |
| CHLOROBENZENE | ND | 240 | 97 |
| CHLOROETHANE | ND | 240 | 97 |
| CHLOROFORM | ND | 240 | 97 |
| CHLOROMETHANE | ND | 480 | 97 |
| CIS-1,2-DICHLOROETHENE | ND | 240 | 97 |
| CIS-1,3-DICHLOROPROPENE | ND | 240 | 97 |
| DIBROMOCHLOROMETHANE | ND | 240 | 97 |
| ETHYLBENZENE | 13000 J | 240 | 97 |
| M/P-XYLENES | ND | 480 | 97 |
| MTBE | ND | 240 | 97 |
| METHYLENE CHLORIDE | ND | 480 | 97 |
| O-XYLENE | 270 J | 240 | 97 |
| STYRENE | ND | 240 | 97 |
| TETRACHLOROETHENE | ND | 240 | 97 |
| TOLUENE | ND | 240 | 97 |
| TRANS-1,2-DICHLOROETHENE | ND | 240 | 97 |
| TRANS-1,3-DICHLOROPROPENE | ND | 240 | 97 |
| TRICHLOROETHENE | ND | 240 | 97 |
| VINYL CHLORIDE | ND | 240 | 97 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 162* | 60-160 |
| 4-BROMOFLUOROBENZENE | 179* | 70-150 |
| TOLUENE-D8 | 157* | 70-140 |

Methanol Extraction Date: 12/18/07 14:35

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METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 20:12 |
| Sample ID: | AP13-148-S-02DL | Date Analyzed: | 12/18/07 20:12 |
| Lab Samp ID: | L053-131 | Dilution Factor: | 400 |
| Lab File ID: | RLB394 | Matrix : | SOIL |
| Ext Btch ID: | V003L34 | % Moisture : | 17.5 |
| Calib. Ref.: | RLB369 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 2400 | 970 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 2400 | 970 |
| 1,1,2-TRICHLOROETHANE | ND | 2400 | 970 |
| 1,1-DICHLOROETHANE | ND | 2400 | 970 |
| 1,1-DICHLOROETHENE | ND | 2400 | 970 |
| 1,2-DICHLOROETHANE | ND | 2400 | 970 |
| 1,2-DICHLOROPROPANE | ND | 2400 | 970 |
| 2-BUTANONE | ND | 4800 | 2400 |
| 2-HEXANONE | ND | 4800 | 2400 |
| 4-METHYL-2-PENTANONE | ND | 4800 | 2400 |
| ACETONE | ND | 4800 | 2400 |
| BENZENE | 14000 | 2400 | 970 |
| BROMODICHLOROMETHANE | ND | 2400 | 970 |
| BROMOFORM | ND | 2400 | 970 |
| BROMOMETHANE | ND | 4800 | 970 |
| CARBON DISULFIDE | ND | 2400 | 970 |
| CARBON TETRACHLORIDE | ND | 2400 | 970 |
| CHLOROBENZENE | ND | 2400 | 970 |
| CHLOROETHANE | ND | 2400 | 970 |
| CHLOROFORM | ND | 2400 | 970 |
| CHLOROMETHANE | ND | 4800 | 970 |
| CIS-1,2-DICHLOROETHENE | ND | 2400 | 970 |
| CIS-1,3-DICHLOROPROPENE | ND | 2400 | 970 |
| DIBROMOCHLOROMETHANE | ND | 2400 | 970 |
| ETHYLBENZENE | 14000 | 2400 | 970 |
| M/P-XYLENES | ND | 4800 | 970 |
| MTBE | ND | 2400 | 970 |
| METHYLENE CHLORIDE | ND | 4800 | 970 |
| O-XYLENE | ND | 2400 | 970 |
| STYRENE | ND | 2400 | 970 |
| TETRACHLOROETHENE | ND | 2400 | 970 |
| TOLUENE | ND | 2400 | 970 |
| TRANS-1,2-DICHLOROETHENE | ND | 2400 | 970 |
| TRANS-1,3-DICHLOROPROPENE | ND | 2400 | 970 |
| TRICHLOROETHENE | ND | 2400 | 970 |
| VINYL CHLORIDE | ND | 2400 | 970 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 184* | 60-160 |
| 4-BROMOFLUOROBENZENE | 223* | 70-150 |
| TOLUENE-D8 | 156* | 70-140 |

Methanol Extraction Date: 12/18/07 14:35

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METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 13:56 |
| Sample ID: | AP13-007-W-01 | Date Analyzed: | 12/18/07 13:56 |
| Lab Samp ID: | L053-03 | Dilution Factor: | 1 |
| Lab File ID: | RLE512 | Matrix : | WATER |
| Ext Btch ID: | V0D3L45 | % Moisture : | NA |
| Calib. Ref.: | RLE270 | Instrument ID : | T-0D3 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHENE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROPROPANE | ND | 5.0 | 1.0 |
| 2-BUTANONE | ND | 10 | 5.0 |
| 2-HEXANONE | ND | 10 | 5.0 |
| 4-METHYL-2-PENTANONE | ND | 10 | 5.0 |
| ACETONE | ND | 10 | 5.0 |
| BENZENE | ND | 5.0 | 1.0 |
| BROMODICHLOROMETHANE | ND | 5.0 | 1.0 |
| BROMOFORM | ND | 5.0 | 1.0 |
| BROMOMETHANE | ND | 10 | 1.0 |
| CARBON DISULFIDE | ND | 5.0 | 1.0 |
| CARBON TETRACHLORIDE | ND | 5.0 | 1.0 |
| CHLOROBENZENE | ND | 5.0 | 1.0 |
| CHLOROETHANE | ND | 5.0 | 1.0 |
| CHLOROFORM | ND | 5.0 | 1.0 |
| CHLOROMETHANE | ND | 5.0 | 1.0 |
| CIS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| DIBROMOCHLOROMETHANE | ND | 5.0 | 1.0 |
| ETHYLBENZENE | ND | 5.0 | 1.0 |
| M/P-XYLENES | ND | 10 | 2.0 |
| MTBE | ND | 5.0 | 1.0 |
| METHYLENE CHLORIDE | ND | 10 | 1.0 |
| O-XYLENE | ND | 5.0 | 1.0 |
| STYRENE | ND | 5.0 | 1.0 |
| TETRACHLOROETHENE | ND | 5.0 | 1.0 |
| TOLUENE | ND | 5.0 | 1.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| TRICHLOROETHENE | ND | 5.0 | 1.0 |
| VINYL CHLORIDE | ND | 5.0 | 1.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 90 | 70-140 |
| 4-BROMOFLUOROBENZENE | 100 | 70-130 |
| TOLUENE-D8 | 114 | 70-140 |

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METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/18/07 15:06 |
| Sample ID: | AP13-148-W-01 | Date Analyzed: | 12/18/07 15:06 |
| Lab Samp ID: | L053-14 | Dilution Factor: | 1 |
| Lab File ID: | RLE514 | Matrix : | WATER |
| Ext Btch ID: | V0D3L45 | % Moisture : | NA |
| Calib. Ref.: | RLE270 | Instrument ID : | T-0D3 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHENE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROPROPANE | ND | 5.0 | 1.0 |
| 2-BUTANONE | ND | 10 | 5.0 |
| 2-HEXANONE | ND | 10 | 5.0 |
| 4-METHYL-2-PENTANONE | ND | 10 | 5.0 |
| ACETONE | ND | 10 | 5.0 |
| BENZENE | ND | 5.0 | 1.0 |
| BROMODICHLOROMETHANE | ND | 5.0 | 1.0 |
| BROMOFORM | ND | 5.0 | 1.0 |
| BROMOMETHANE | ND | 10 | 1.0 |
| CARBON DISULFIDE | 15 | 5.0 | 1.0 |
| CARBON TETRACHLORIDE | ND | 5.0 | 1.0 |
| CHLOROBENZENE | ND | 5.0 | 1.0 |
| CHLOROETHANE | ND | 5.0 | 1.0 |
| CHLOROFORM | ND | 5.0 | 1.0 |
| CHLOROMETHANE | ND | 5.0 | 1.0 |
| CIS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| DIBROMOCHLOROMETHANE | ND | 5.0 | 1.0 |
| ETHYLBENZENE | ND | 5.0 | 1.0 |
| M/P-XYLENES | ND | 10 | 2.0 |
| MTBE | ND | 5.0 | 1.0 |
| METHYLENE CHLORIDE | ND | 10 | 1.0 |
| O-XYLENE | ND | 5.0 | 1.0 |
| STYRENE | ND | 5.0 | 1.0 |
| TETRACHLOROETHENE | ND | 5.0 | 1.0 |
| TOLUENE | ND | 5.0 | 1.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| TRICHLOROETHENE | ND | 5.0 | 1.0 |
| VINYL CHLORIDE | ND | 5.0 | 1.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 104 | 70-140 |
| 4-BROMOFLUOROBENZENE | 102 | 70-130 |
| TOLUENE-D8 | 113 | 70-140 |

MH01300 8

LDC #: 18116A1
SDG #: 07L053
Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 1/25/08
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/4/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | % RSD, $r^2 \geq 0.990$ |
| IV. | Continuing calibration/ICV | SW | ICV ≤ 25 |
| V. | Blanks | A | |
| VI. | Surrogate spikes | SW | |
| VII. | Matrix spike/Matrix spike duplicates | A | |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | SW | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | SW | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | SW | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | SW | TB = 3 EB = 17 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:
Soil + water

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| T 1 | AP13-008-S-01 | + 11 3 | AP13-169-S-02RE L053-10N | 21 1 | * MBLK1S ✓ | 31 | |
| 2 1 | AP13-007-S-01 | → 12 5 | AP13-147-S-01 ✓ | 22 2 | * MBLK2S | 32 | |
| 3 | AP13-007-W-01 W | + 13 5 | AP13-148-S-01 ✓ | 23 2 | * MBLK3S | 33 | |
| + 4 1 | AP13-007-S-02 ✓ | 14 2 | AP13-148-S-01DL ✓ | 24 3 | * MBLK4S ✓ | 34 | |
| 5 5 | AP13-044-S-01 | 15 2 | AP13-148-S-02 ✓ | 25 4 | * MBLK5S. | 35 | |
| + 6 1 | AP13-043-S-01 | 16 2 | AP13-148-S-02DL ✓ | 26 4 | * MBLK6S | 36 | |
| + 7 5 | AP13-043-S-02 ✓ | + 17 6 | AP13-148-W-01 W | 27 5 | MBLK7S ✓ | 37 | |
| + 8 4 | AP13-041-S-01 ✓ | 18 5 | AP13-044-S-01MS | 28 6 | MBLK1W | 38 | |
| + 9 5 | AP13-169-S-01 | 19 5 | AP13-044-S-01MSD | 29 | | 39 | |
| + 10 5 | AP13-169-S-02* L053-10R | 20 | | 30 | | 40 | |

# TARGET COMPOUND WORKSHEET

CBZ

2 DCB

METHOD: VOA (EPA SW 846 Method 8260B)

| | | | | |
|---|---|---|---|---|
| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 181161

SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 12/17/07 | RLP585 | Z | 26.1 | | MBLK7S, 5, 7, 9, 10, 12, 13, 18, 19 | J/UJ/A |
| | 12/18/07 | RLE505 | A | 32.2 | | MBLK1W, All water | ↓ |
| | | | O | 29.6 | | ↓ | ↓ |
| | | | L | 25.5 | | ↓ | ↓ |

LDC #: 18111-A1
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: [illegible]
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

**Blank units:** ug/L **Associated sample units:** ug/kg
**Field blank type:** (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All soils (ND)

| Compound | Blank ID 17 | Blank ID | Sample Identification | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | 12/14/07 | | | | | | | | | |
| ~~Methylene chloride~~ G | 15 | | | | | | | | | |
| Acetone | | | | | | | | | | |
| ~~Chloroform~~ | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| CRQL | | | | | | | | | | |

**Blank units:** _____ **Associated sample units:** _____
**Field blank type:** (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

| Compound | Blank ID | Blank ID | Sample Identification | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | | |
| Methylene chloride | | | | | | | | | | |
| Acetone | | | | | | | | | | |
| Chloroform | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| CRQL | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 18116A1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Spikes

Page: 1 of 1
Reviewer: A
2nd Reviewer: R

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all surrogate %R within QC limits?

Y N N/A If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R out of outside of criteria?

| # | Date | Sample ID | Surrogate | %Recovery (Limits) | Qualifications |
|---|---|---|---|---|---|
| | | 4 | BFB | 95 ( 70-150 ) | J/A dit |
| | | | | ( ) | |
| | | | | ( ) | |
| | | 7 | BFB | 3439 ( 70-150 ) | J/A dit |
| | | | TOL | 242 ( 70-140 ) | ↓ |
| | | | | ( ) | |
| | | 8 | BFB | 168 ( 70-150 ) | J/A dit |
| | | | | ( ) | |
| | | 12 | ↓ | 877 ( 70-150 ) | J/A dit |
| | | | | ( ) | |
| | | 13 | ↓ | 756 ( ↓ ) | ↓ |
| | | | | ( ) | |
| | | 14 | ↓ | 154 ( ↓ ) | ↓ |
| | | | | ( ) | |
| | | 15 | DCE | 162 ( 60-160 ) | J/A dit |
| | | | BFB | 179 ( 70-150 ) | ↓ |
| | | | TOL | 157 ( 70-140 ) | ↓ |
| | | | | ( ) | |
| | | 16 | ↓ | 184 ( ↓ ) | ↓ |
| | | | | 223 ( ↓ ) | ↓ |
| | | | ↓ | 156 ( ↓ ) | ↓ |

| | QC Limits (Soil) | QC Limits (Water) |
|---|---|---|
| SMC1 (TOL) = Toluene-d8 | 81-117 | 88-110 |
| SMC2 (BFB) = Bromofluorobenzene | 74-121 | 86-115 |
| SMC3 (DCE) = 1,2-Dichloroethane-d4 | 80-120 | 80-120 |
| SMC4 (DFM) = Dibromofluoromethane | 80-120 | 86-118 |

SU

LDC #: 181[illegible]
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | VOD3245L/C | A | 58 (60-130) | 59 (60-130) | ( ) | MBLK1W, | J/W/P |
| | | | | ( ) | ( ) | ( ) | All water | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 18116A1
SDG #: per cover

# VALIDATION FINDINGS WORKSHEET
## Internal Standards

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

Y N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

| # | Date | Sample ID | Internal Standard | Area (Limits) | RT (Limits) | Qualifications |
|---|---|---|---|---|---|---|
| | | 11 | CBZ | 935504 (1088714 - 4354854) | | J/UJ/A |
| | | | 2DCB | 263909 (494271 - 1977084) | | ↓ |
| | | 10 | 2DCB | 219956 (353242 - 1412966) | | ↓ |

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 15[illegible]A1
SDG #: [illegible]

# VALIDATION FIN[illegible]GS WORKSHEET
## Compound Quantitation and CRQLs

Pag[illegible] 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

| # | Date | ~~Sample ID~~ Compound | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | V, EE | Exceeded cal Range | 13 | J/A dit |
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Comments: See sample calculation verification worksheet for recalculations

COMQUA.1SB

LDC #: 18116A-1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Overall Assessment of Data

Page: 1 of 1
Reviewer: B
2nd Reviewer: V

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

| # | Date | ~~Sample ID~~ compound | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | All | 2 IS out | 11 | R/A |
| | | | | | |
| | | All | higher DL | 16 | R/A |
| | | | | | |
| | | | | | |
| | | V, EE | exceeded cal range | 13 | R/A |
| | | | | | |
| | | All except V, EE | Diluted | 14 | R/A |
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Comments:

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 5, 2007

**LDC Report Date:** January 25, 2008

**Matrix:** Soil/Water

**Parameters:** Volatiles

**Validation Level:** NFESC Level III & IV

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L082

**Sample Identification**

AP13-170-W-01
AP13-170-W-02
AP13-170-S-01**
AP13-094-S-01**
AP13-093-S-01**
AP13-093-S-02
AP13-093-W-01

**Indicates sample underwent NFESC Level IV review

## Introduction

This data review covers 4 soil samples and 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8260B for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination ($r^2$) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all volatile target compounds and system performance check compounds (SPCCs) were within method and validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 12/14/07 | Methylene chloride | 30.6 | All soil samples in SDG 07L082 | J (all detects)<br>UJ (all non-detects) | A |

All of the continuing calibration RRF values were within method and validation criteria.

## V. Blanks

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

Sample AP13-170-W-01 was identified as a trip blank. No volatile contaminants were found in this blank with the following exceptions:

| Trip Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-170-W-01 | 12/5/07 | Carbon disulfide | 5.2 ug/L | AP13-170-W-02<br>AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01**<br>AP13-093-S-02<br>AP13-093-W-01 |

Sample AP13-093-W-01 was identified as an equipment blank. No volatile contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Compound | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-093-W-01 | 12/5/07 | Carbon disulfide | 4.8 ug/L | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01**<br>AP13-093-S-02 |

Sample AP13-170-W-02 was identified as a field blank. No volatile contaminants were found in this blank.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-093-W-01 | Carbon disulfide | 4.8 ug/L | 5.0U ug/L |

| Sample | Compound | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-170-S-01** | Carbon disulfide | 2.3 ug/Kg | 5.8U ug/Kg |
| AP13-094-S-01** | Carbon disulfide | 4.9 ug/Kg | 11U ug/Kg |
| AP13-093-S-02 | Carbon disulfide | 6.2 ug/Kg | 6.2U ug/Kg |

## VI. Surrogate Spikes

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

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were not within QC limits. Since there were no associated samples, no data were qualified.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| VO03L29L/C (All soil samples in SDG 07L082) | Methylene chloride | - | 133 (70-130) | - | J (all detects) | P |
| VO03L45L/C (All water samples in SDG 07L082) | Chloromethane | 58 (60-130) | 59 (70-130) | - | J (all detects)<br>UJ (all non-detects) | P |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-170-S-01** | 1,2-Dichlorobenzene-d4 | 651822 (672798-2691190) | 1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A |

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XV. Overall Assessment of Data

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Volatiles - Data Qualification Summary - SDG 07L082

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01**<br>AP13-093-S-02 | Methylene chloride | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (%D) |
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01**<br>AP13-093-S-02 | Methylene chloride | J (all detects) | P | Laboratory control samples (%R) |
| 07L082 | AP13-170-W-01<br>AP13-170-W-02<br>AP13-093-W-01 | Chloromethane | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (%R) |
| 07L082 | AP13-170-S-01** | 1,1,2,2-Tetrachloroethane | J (all detects)<br>UJ (all non-detects) | A | Internal standards (area) |

## NAS Alameda Point, IR Site 13
## Volatiles - Laboratory Blank Data Qualification Summary - SDG 07L082

No Sample Data Qualified in this SDG

## NAS Alameda Point, IR Site 13
## Volatiles - Field Blank Data Qualification Summary - SDG 07L082

| SDG | Sample | Compound | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L082 | AP13-093-W-01 | Carbon disulfide | 5.0U ug/L | A |
| 07L082 | AP13-170-S-01** | Carbon disulfide | 5.8U ug/Kg | A |
| 07L082 | AP13-094-S-01** | Carbon disulfide | 11U ug/Kg | A |
| 07L082 | AP13-093-S-02 | Carbon disulfide | 6.2U ug/Kg | A |

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/15/07 06:37 |
| Sample ID: | AP13-170-S-01 | Date Analyzed: | 12/15/07 06:37 |
| Lab Samp ID: | L082-03 | Dilution Factor: | .96 |
| Lab File ID: | RLB337 | Matrix : | SOIL |
| Ext Btch ID: | V003L29 | % Moisture : | 16.8 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 5.8 | 2.3 |
| 1,1,2,2-TETRACHLOROETHANE | ND UJ | 5.8 | 2.3 |
| 1,1,2-TRICHLOROETHANE | ND U | 5.8 | 2.3 |
| 1,1-DICHLOROETHANE | ND | 5.8 | 2.3 |
| 1,1-DICHLOROETHENE | ND | 5.8 | 2.3 |
| 1,2-DICHLOROETHANE | ND | 5.8 | 2.3 |
| 1,2-DICHLOROPROPANE | ND | 5.8 | 2.3 |
| 2-BUTANONE | 8.3J J | 12 | 5.8 |
| 2-HEXANONE | ND U | 12 | 5.8 |
| 4-METHYL-2-PENTANONE | ND | 12 | 5.8 |
| ACETONE | 12 | 12 | 5.8 |
| BENZENE | ND U | 5.8 | 2.3 |
| BROMODICHLOROMETHANE | ND | 5.8 | 2.3 |
| BROMOFORM | ND | 5.8 | 2.3 |
| BROMOMETHANE | ND | 12 | 2.3 |
| CARBON DISULFIDE | 2.3J 5.8U | 5.8 | 2.3 |
| CARBON TETRACHLORIDE | ND U | 5.8 | 2.3 |
| CHLOROBENZENE | ND | 5.8 | 2.3 |
| CHLOROETHANE | ND | 5.8 | 2.3 |
| CHLOROFORM | ND | 5.8 | 2.3 |
| CHLOROMETHANE | ND | 12 | 2.3 |
| CIS-1,2-DICHLOROETHENE | ND | 5.8 | 2.3 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.8 | 2.3 |
| DIBROMOCHLOROMETHANE | ND | 5.8 | 2.3 |
| ETHYLBENZENE | ND | 5.8 | 2.3 |
| M/P-XYLENES | ND | 12 | 2.3 |
| MTBE | ND | 5.8 | 2.3 |
| METHYLENE CHLORIDE | 4.1J J | 12 | 2.3 |
| O-XYLENE | ND U | 5.8 | 2.3 |
| STYRENE | ND | 5.8 | 2.3 |
| TETRACHLOROETHENE | ND | 5.8 | 2.3 |
| TOLUENE | ND | 5.8 | 2.3 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.8 | 2.3 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.8 | 2.3 |
| TRICHLOROETHENE | ND | 5.8 | 2.3 |
| VINYL CHLORIDE | ND | 5.8 | 2.3 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 127 | 60-160 |
| 4-BROMOFLUOROBENZENE | 122 | 70-150 |
| TOLUENE-D8 | 113 | 70-140 |

M40/3008

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/15/07 07:14 |
| Sample ID: | AP13-094-S-01 | Date Analyzed: | 12/15/07 07:14 |
| Lab Samp ID: | L082-04 | Dilution Factor: | 1.2 |
| Lab File ID: | RLB338 | Matrix : | SOIL |
| Ext Btch ID: | V003L29 | % Moisture : | 46.3 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 11 | 4.5 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 11 | 4.5 |
| 1,1,2-TRICHLOROETHANE | ND | 11 | 4.5 |
| 1,1-DICHLOROETHANE | ND | 11 | 4.5 |
| 1,1-DICHLOROETHENE | ND | 11 | 4.5 |
| 1,2-DICHLOROETHANE | ND | 11 | 4.5 |
| 1,2-DICHLOROPROPANE | ND | 11 | 4.5 |
| 2-BUTANONE | ND | 22 | 11 |
| 2-HEXANONE | ND | 22 | 11 |
| 4-METHYL-2-PENTANONE | ND | 22 | 11 |
| ACETONE | ND | 22 | 11 |
| BENZENE | ND | 11 | 4.5 |
| BROMODICHLOROMETHANE | ND | 11 | 4.5 |
| BROMOFORM | ND | 11 | 4.5 |
| BROMOMETHANE | ND | 22 | 4.5 |
| CARBON DISULFIDE | 4.9J 11 U | 11 | 4.5 |
| CARBON TETRACHLORIDE | ND U | 11 | 4.5 |
| CHLOROBENZENE | ND | 11 | 4.5 |
| CHLOROETHANE | ND | 11 | 4.5 |
| CHLOROFORM | ND | 11 | 4.5 |
| CHLOROMETHANE | ND | 22 | 4.5 |
| CIS-1,2-DICHLOROETHENE | ND | 11 | 4.5 |
| CIS-1,3-DICHLOROPROPENE | ND | 11 | 4.5 |
| [illegible]OMOCHLOROMETHANE | ND | 11 | 4.5 |
| [illegible]LBENZENE | ND | 11 | 4.5 |
| M/P-XYLENES | ND | 22 | 4.5 |
| MTBE | ND | 11 | 4.5 |
| METHYLENE CHLORIDE | 4.6J J | 22 | 4.5 |
| O-XYLENE | ND U | 11 | 4.5 |
| STYRENE | ND | 11 | 4.5 |
| TETRACHLOROETHENE | ND | 11 | 4.5 |
| TOLUENE | ND | 11 | 4.5 |
| TRANS-1,2-DICHLOROETHENE | ND | 11 | 4.5 |
| TRANS-1,3-DICHLOROPROPENE | ND | 11 | 4.5 |
| TRICHLOROETHENE | ND | 11 | 4.5 |
| VINYL CHLORIDE | ND | 11 | 4.5 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 127 | 60-160 |
| 4-BROMOFLUOROBENZENE | 118 | 70-150 |
| TOLUENE-D8 | 109 | 70-140 |

1440/3008

2009

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/15/07 07:52 |
| Sample ID: | AP13-093-S-01 | Date Analyzed: | 12/15/07 07:52 |
| Lab Samp ID: | L082-05 | Dilution Factor: | 1.1 |
| Lab File ID: | RLB339 | Matrix : | SOIL |
| Ext Btch ID: | V003L29 | % Moisture : | 13.9 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND U | 6.4 | 2.6 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 6.4 | 2.6 |
| 1,1,2-TRICHLOROETHANE | ND | 6.4 | 2.6 |
| 1,1-DICHLOROETHANE | ND | 6.4 | 2.6 |
| 1,1-DICHLOROETHENE | ND | 6.4 | 2.6 |
| 1,2-DICHLOROETHANE | ND | 6.4 | 2.6 |
| 1,2-DICHLOROPROPANE | ND | 6.4 | 2.6 |
| 2-BUTANONE | ND | 13 | 6.4 |
| 2-HEXANONE | ND | 13 | 6.4 |
| 4-METHYL-2-PENTANONE | ND | 13 | 6.4 |
| ACETONE | ND | 13 | 6.4 |
| BENZENE | ND | 6.4 | 2.6 |
| BROMODICHLOROMETHANE | ND | 6.4 | 2.6 |
| BROMOFORM | ND | 6.4 | 2.6 |
| BROMOMETHANE | ND | 13 | 2.6 |
| CARBON DISULFIDE | ND | 6.4 | 2.6 |
| CARBON TETRACHLORIDE | ND | 6.4 | 2.6 |
| CHLOROBENZENE | ND | 6.4 | 2.6 |
| CHLOROETHANE | ND | 6.4 | 2.6 |
| CHLOROFORM | ND | 6.4 | 2.6 |
| CHLOROMETHANE | ND | 13 | 2.6 |
| CIS-1,2-DICHLOROETHENE | ND | 6.4 | 2.6 |
| CIS-1,3-DICHLOROPROPENE | ND | 6.4 | 2.6 |
| DIBROMOCHLOROMETHANE | ND | 6.4 | 2.6 |
| ETHYLBENZENE | ND | 6.4 | 2.6 |
| M/P-XYLENES | ND | 13 | 2.6 |
| MTBE | ND | 6.4 | 2.6 |
| METHYLENE CHLORIDE | 3.2J J | 13 | 2.6 |
| O-XYLENE | ND U | 6.4 | 2.6 |
| STYRENE | ND | 6.4 | 2.6 |
| TETRACHLOROETHENE | ND | 6.4 | 2.6 |
| TOLUENE | ND | 6.4 | 2.6 |
| TRANS-1,2-DICHLOROETHENE | ND | 6.4 | 2.6 |
| TRANS-1,3-DICHLOROPROPENE | ND | 6.4 | 2.6 |
| TRICHLOROETHENE | ND | 6.4 | 2.6 |
| VINYL CHLORIDE | ND | 6.4 | 2.6 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 124 | 60-160 |
| 4-BROMOFLUOROBENZENE | 109 | 70-150 |
| TOLUENE-D8 | 106 | 70-140 |

1440/3008

METHOD 5035/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/15/07 08:29 |
| Sample ID: | AP13-093-S-02 | Date Analyzed: | 12/15/07 08:29 |
| Lab Samp ID: | L082-06 | Dilution Factor: | .96 |
| Lab File ID: | RLB340 | Matrix : | SOIL |
| Ext Btch ID: | V003L29 | % Moisture : | 21.3 |
| Calib. Ref.: | RLB091 | Instrument ID : | T-003 |

| PARAMETERS | RESULTS (ug/kg) | | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | U | 6.1 | 2.4 |
| 1,1,2,2-TETRACHLOROETHANE | ND | | 6.1 | 2.4 |
| 1,1,2-TRICHLOROETHANE | ND | | 6.1 | 2.4 |
| 1,1-DICHLOROETHANE | ND | | 6.1 | 2.4 |
| 1,1-DICHLOROETHENE | ND | | 6.1 | 2.4 |
| 1,2-DICHLOROETHANE | ND | | 6.1 | 2.4 |
| 1,2-DICHLOROPROPANE | ND | | 6.1 | 2.4 |
| 2-BUTANONE | ND | | 12 | 6.1 |
| 2-HEXANONE | ND | | 12 | 6.1 |
| 4-METHYL-2-PENTANONE | ND | | 12 | 6.1 |
| ACETONE | ND | | 12 | 6.1 |
| BENZENE | ND | | 6.1 | 2.4 |
| BROMODICHLOROMETHANE | ND | | 6.1 | 2.4 |
| BROMOFORM | ND | | 6.1 | 2.4 |
| BROMOMETHANE | ND | | 12 | 2.4 |
| CARBON DISULFIDE | 6.2 | U | 6.1 | 2.4 |
| CARBON TETRACHLORIDE | ND | U | 6.1 | 2.4 |
| CHLOROBENZENE | ND | | 6.1 | 2.4 |
| CHLOROETHANE | ND | | 6.1 | 2.4 |
| CHLOROFORM | ND | | 6.1 | 2.4 |
| CHLOROMETHANE | ND | | 12 | 2.4 |
| CIS-1,2-DICHLOROETHENE | ND | | 6.1 | 2.4 |
| CIS-1,3-DICHLOROPROPENE | ND | | 6.1 | 2.4 |
| DIBROMOCHLOROMETHANE | ND | | 6.1 | 2.4 |
| ETHYLBENZENE | ND | | 6.1 | 2.4 |
| M/P-XYLENES | ND | | 12 | 2.4 |
| MTBE | ND | | 6.1 | 2.4 |
| METHYLENE CHLORIDE | ND | UJ | 12 | 2.4 |
| O-XYLENE | ND | U | 6.1 | 2.4 |
| STYRENE | ND | | 6.1 | 2.4 |
| TETRACHLOROETHENE | ND | | 6.1 | 2.4 |
| TOLUENE | ND | | 6.1 | 2.4 |
| TRANS-1,2-DICHLOROETHENE | ND | | 6.1 | 2.4 |
| TRANS-1,3-DICHLOROPROPENE | ND | | 6.1 | 2.4 |
| TRICHLOROETHENE | ND | | 6.1 | 2.4 |
| VINYL CHLORIDE | ND | | 6.1 | 2.4 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 124 | 60-160 |
| 4-BROMOFLUOROBENZENE | 109 | 70-150 |
| TOLUENE-D8 | 108 | 70-140 |

MH0/3008

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/18/07 14:31 |
| Sample ID: | AP13-170-W-01 | Date Analyzed: | 12/18/07 14:31 |
| Lab Samp ID: | L082-01 | Dilution Factor: | 1 |
| Lab File ID: | RLE513 | Matrix | : WATER |
| Ext Btch ID: | V003L45 | % Moisture | : NA |
| Calib. Ref.: | RLE270 | Instrument ID | : T-003 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHENE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROPROPANE | ND | 5.0 | 1.0 |
| 2-BUTANONE | ND | 10 | 5.0 |
| 2-HEXANONE | ND | 10 | 5.0 |
| 4-METHYL-2-PENTANONE | ND | 10 | 5.0 |
| ACETONE | ND | 10 | 5.0 |
| BENZENE | ND | 5.0 | 1.0 |
| BROMODICHLOROMETHANE | ND | 5.0 | 1.0 |
| BROMOFORM | ND | 5.0 | 1.0 |
| BROMOMETHANE | ND | 10 | 1.0 |
| CARBON DISULFIDE | 5.2 | 5.0 | 1.0 |
| CARBON TETRACHLORIDE | ND | 5.0 | 1.0 |
| CHLOROBENZENE | ND | 5.0 | 1.0 |
| CHLOROETHANE | ND | 5.0 | 1.0 |
| CHLOROFORM | ND | 5.0 | 1.0 |
| CHLOROMETHANE | ND UJ | 5.0 | 1.0 |
| CIS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| DIBROMOCHLOROMETHANE | ND | 5.0 | 1.0 |
| ETHYLBENZENE | ND | 5.0 | 1.0 |
| M/P-XYLENES | ND | 10 | 2.0 |
| MTBE | ND | 5.0 | 1.0 |
| METHYLENE CHLORIDE | ND | 10 | 1.0 |
| O-XYLENE | ND | 5.0 | 1.0 |
| STYRENE | ND | 5.0 | 1.0 |
| TETRACHLOROETHENE | ND | 5.0 | 1.0 |
| TOLUENE | ND | 5.0 | 1.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| TRICHLOROETHENE | ND | 5.0 | 1.0 |
| VINYL CHLORIDE | ND | 5.0 | 1.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 100 | 70-140 |
| 4-BROMOFLUOROBENZENE | 97 | 70-130 |
| TOLUENE-D8 | 109 | 70-140 |

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/18/07 15:40 |
| Sample ID: | AP13-170-W-02 | Date Analyzed: | 12/18/07 15:40 |
| Lab Samp ID: | L082-02 | Dilution Factor: | 1 |
| Lab File ID: | RLE515 | Matrix | : WATER |
| Ext Btch ID: | VOD3L45 | % Moisture | : NA |
| Calib. Ref.: | RLE270 | Instrument ID | : T-OD3 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHENE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROPROPANE | ND | 5.0 | 1.0 |
| 2-BUTANONE | ND | 10 | 5.0 |
| 2-HEXANONE | ND | 10 | 5.0 |
| 4-METHYL-2-PENTANONE | ND | 10 | 5.0 |
| ACETONE | ND | 10 | 5.0 |
| BENZENE | ND | 5.0 | 1.0 |
| BROMODICHLOROMETHANE | ND | 5.0 | 1.0 |
| BROMOFORM | ND | 5.0 | 1.0 |
| BROMOMETHANE | ND | 10 | 1.0 |
| CARBON DISULFIDE | ND | 5.0 | 1.0 |
| CARBON TETRACHLORIDE | ND | 5.0 | 1.0 |
| CHLOROBENZENE | ND | 5.0 | 1.0 |
| CHLOROETHANE | ND | 5.0 | 1.0 |
| CHLOROFORM | ND | 5.0 | 1.0 |
| CHLOROMETHANE | ND | 5.0 | 1.0 |
| CIS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| DIBROMOCHLOROMETHANE | ND | 5.0 | 1.0 |
| ETHYLBENZENE | ND | 5.0 | 1.0 |
| M/P-XYLENES | ND | 10 | 2.0 |
| MTBE | ND | 5.0 | 1.0 |
| METHYLENE CHLORIDE | ND | 10 | 1.0 |
| O-XYLENE | ND | 5.0 | 1.0 |
| STYRENE | ND | 5.0 | 1.0 |
| TETRACHLOROETHENE | ND | 5.0 | 1.0 |
| TOLUENE | ND | 5.0 | 1.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| TRICHLOROETHENE | ND | 5.0 | 1.0 |
| VINYL CHLORIDE | ND | 5.0 | 1.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 105 | 70-140 |
| 4-BROMOFLUOROBENZENE | 99 | 70-130 |
| TOLUENE-D8 | 110 | 70-140 |

METHOD 5030B/8260B
VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/18/07 16:16 |
| Sample ID: | AP13-093-W-01 | Date Analyzed: | 12/18/07 16:16 |
| Lab Samp ID: | L082-07 | Dilution Factor: | 1 |
| Lab File ID: | RLE516 | Matrix | : WATER |
| Ext Btch ID: | V003L45 | % Moisture | : NA |
| Calib. Ref.: | RLE270 | Instrument ID | : T-003 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,1,1-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2,2-TETRACHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1,2-TRICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,1-DICHLOROETHENE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROETHANE | ND | 5.0 | 1.0 |
| 1,2-DICHLOROPROPANE | ND | 5.0 | 1.0 |
| 2-BUTANONE | ND | 10 | 5.0 |
| 2-HEXANONE | ND | 10 | 5.0 |
| 4-METHYL-2-PENTANONE | ND | 10 | 5.0 |
| ACETONE | ND | 10 | 5.0 |
| BENZENE | ND | 5.0 | 1.0 |
| BROMODICHLOROMETHANE | ND | 5.0 | 1.0 |
| BROMOFORM | ND | 5.0 | 1.0 |
| BROMOMETHANE | ND | 10 | 1.0 |
| CARBON DISULFIDE | 4.8J 5.0U | 5.0 | 1.0 |
| CARBON TETRACHLORIDE | ND | 5.0 | 1.0 |
| CHLOROBENZENE | ND | 5.0 | 1.0 |
| CHLOROETHANE | ND | 5.0 | 1.0 |
| CHLOROFORM | ND | 5.0 | 1.0 |
| CHLOROMETHANE | ND | 5.0 | 1.0 |
| CIS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| CIS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| DIBROMOCHLOROMETHANE | ND | 5.0 | 1.0 |
| ETHYLBENZENE | ND | 5.0 | 1.0 |
| M/P-XYLENES | ND | 10 | 2.0 |
| MTBE | ND | 5.0 | 1.0 |
| METHYLENE CHLORIDE | ND | 10 | 1.0 |
| O-XYLENE | ND | 5.0 | 1.0 |
| STYRENE | ND | 5.0 | 1.0 |
| TETRACHLOROETHENE | ND | 5.0 | 1.0 |
| TOLUENE | ND | 5.0 | 1.0 |
| TRANS-1,2-DICHLOROETHENE | ND | 5.0 | 1.0 |
| TRANS-1,3-DICHLOROPROPENE | ND | 5.0 | 1.0 |
| TRICHLOROETHENE | ND | 5.0 | 1.0 |
| VINYL CHLORIDE | ND | 5.0 | 1.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 1,2-DICHLOROETHANE-D4 | 104 | 70-140 |
| 4-BROMOFLUOROBENZENE | 102 | 70-130 |
| TOLUENE-D8 | 113 | 70-140 |

LDC #: 18116B1
SDG #: 07L082
Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 1/25/08
Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** GC/MS Volatiles (EPA SW 846 Method 8260B)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/5/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | % RSD, $r^2 \geq 0.990$ |
| IV. | Continuing calibration/ICV | SW | ICV ≤ 25 |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | client specified |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | SW | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/CRQLs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | SW | TB = 1 FB = 2* EB = 7 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | AP13-170-W-01 TB W | 11 | MBLK15 | 21 | | 31 | |
| 2 | AP13-170-W-02 FB W | 12 | MBLK18W | 22 | | 32 | |
| 3 | AP13-170-S-01** S | 13 | | 23 | | 33 | |
| 4 | AP13-094-S-01** | 14 | | 24 | | 34 | |
| 5 | AP13-093-S-01** | 15 | | 25 | | 35 | |
| 6 | AP13-093-S-02 | 16 | | 26 | | 36 | |
| 7 | AP13-093-W-01 EB W | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 18116B1
SDG #: see cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: FT
2nd Reviewer: [illegible]

**Method:** Volatiles (EPA SW 846 Method 8260B)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| [illegible] | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| [illegible] | | | | |
| Were the BFB performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| [illegible] | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Was a curve fit used for evaluation? | ✓ | | | |
| Did the initial calibration meet the curve fit acceptance criteria of > 0.990? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05? | ✓ | | | |
| [illegible] | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05? | | ✓ | | |
| [illegible] | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed at least once every 12 hours for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| [illegible] | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria? | | | ✓ | |
| [illegible] | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | | ✓ | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| [illegible] | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |

LDC #: 18116B1
SDG #: all cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| Was an LCS analyzed per analytical batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | ✓ | | |
| [illegible] | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| [illegible] | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | | ✓ | | |
| Were retention times within + 30 seconds of the associated calibration standard? | ✓ | | | |
| [illegible] | | | | |
| Were relative retention times (RRT's) within + 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| [illegible] | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| [illegible] | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | | ✓ | |
| [illegible] | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| [illegible] | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | ✓ | | | |

# TARGET COMPOUND WORKSHEET

## METHOD: VOA (EPA SW 846 Method 8260B)

| | | | | |
|---|---|---|---|---|
| A. Chloromethane* | U. 1,1,2-Trichloroethane | OO. 2,2-Dichloropropane | III. n-Butylbenzene | CCCC.1-Chlorohexane |
| B. Bromomethane | V. Benzene | PP. Bromochloromethane | JJJ. 1,2-Dichlorobenzene | DDDD. Isopropyl alcohol |
| C. Vinyl choride** | W. trans-1,3-Dichloropropene | QQ. 1,1-Dichloropropene | KKK. 1,2,4-Trichlorobenzene | EEEE. Acetonitrile |
| D. Chloroethane | X. Bromoform* | RR. Dibromomethane | LLL. Hexachlorobutadiene | FFFF. Acrolein |
| E. Methylene chloride | Y. 4-Methyl-2-pentanone | SS. 1,3-Dichloropropane | MMM. Naphthalene | GGGG. Acrylonitrile |
| F. Acetone | Z. 2-Hexanone | TT. 1,2-Dibromoethane | NNN. 1,2,3-Trichlorobenzene | HHHH. 1,4-Dioxane |
| G. Carbon disulfide | AA. Tetrachloroethene | UU. 1,1,1,2-Tetrachloroethane | OOO. 1,3,5-Trichlorobenzene | IIII. Isobutyl alcohol |
| H. 1,1-Dichloroethene** | BB. 1,1,2,2-Tetrachloroethane* | VV. Isopropylbenzene | PPP. trans-1,2-Dichloroethene | JJJJ. Methacrylonitrile |
| I. 1,1-Dichloroethane* | CC. Toluene** | WW. Bromobenzene | QQQ. cis-1,2-Dichloroethene | KKKK. Propionitrile |
| J. 1,2-Dichloroethene, total | DD. Chlorobenzene* | XX. 1,2,3-Trichloropropane | RRR. m,p-Xylenes | LLLL. Ethyl ether |
| K. Chloroform** | EE. Ethylbenzene** | YY. n-Propylbenzene | SSS. o-Xylene | MMMM. Benzyl chloride |
| L. 1,2-Dichloroethane | FF. Styrene | ZZ. 2-Chlorotoluene | TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane | NNNN. |
| M. 2-Butanone | GG. Xylenes, total | AAA. 1,3,5-Trimethylbenzene | UUU. 1,2-Dichlorotetrafluoroethane | OOOO. |
| N. 1,1,1-Trichloroethane | HH. Vinyl acetate | BBB. 4-Chlorotoluene | VVV. 4-Ethyltoluene | PPPP. |
| O. Carbon tetrachloride | II. 2-Chloroethylvinyl ether | CCC. tert-Butylbenzene | WWW. Ethanol | QQQQ. |
| P. Bromodichloromethane | JJ. Dichlorodifluoromethane | DDD. 1,2,4-Trimethylbenzene | XXX. Di-isopropyl ether | RRRR. |
| Q. 1,2-Dichloropropane** | KK. Trichlorofluoromethane | EEE. sec-Butylbenzene | YYY. tert-Butanol | SSSS. |
| R. cis-1,3-Dichloropropene | LL. Methyl-tert-butyl ether | FFF. 1,3-Dichlorobenzene | ZZZ. tert-Butyl alcohol | TTTT. |
| S. Trichloroethene | MM. 1,2-Dibromo-3-chloropropane | GGG. p-Isopropyltoluene | AAAA. Ethyl tert-butyl ether | UUUU. |
| T. Dibromochloromethane | NN. Methyl ethyl ketone | HHH. 1,4-Dichlorobenzene | BBBB. tert-Amyl methyl ether | VVVV. |

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 18111-B1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: <25.0%) | Finding RRF (Limit: >0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 12/14/07 | RLB326 | E | 30.6 | | MBLKIS, All SOILS | J/UJ/A |
| | | | | | | | |
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CONCAL.1SB

LDC #: 18116B1
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Y N /N/A Were field blanks identified in this SDG?
Y N N/A Were target compounds detected in the field blanks?

TB = 2 → 7
EB = 3 → 6

**Blank units:** ug/L **Associated sample units:** ug/L + ug/kg TB=1
**Field blank type:** (circle one) Field Blank / Rinsate / Trip Blank / Other: EB=7 Associated Samples:

| Compound | Blank ID 1 | Blank ID 7 | Sample Identification | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | 12/5/07 | 12/5/07 | | 7 | 3 | 4 | 6 | | | |
| ~~Methylene chloride~~ G | 5.2 | 4.8 | | 4.8 \| 5.0u | 2.3 \| 5.8u | 4.9 / 11u | 6.2 / u | | | |
| Acetone | | | | | | | | | | |
| ~~Chloroform~~ | | | | | | | | | | |
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| CRQL | | | | | | | | | | |

**Blank units:**_____ **Associated sample units:**_____
**Field blank type:** (circle one) Field Blank / Rinsate / Trip Blank / Other:_____ Associated Samples:

| Compound | Blank ID__ | Blank ID__ | Sample Identification | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | | |
| Methylene chloride | | | | | | | | | | |
| Acetone | | | | | | | | | | |
| Chloroform | | | | | | | | | | |
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| CRQL | | | | | | | | | | |

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

FBLK SB

LDC #: 18111

SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | V0D3L29L/C | E | ( ) | 133 (70-130) | ( ) | MBLKIS, | J/P det |
| | | | | ( ) | ( ) | ( ) | All soils | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | V0D3L45L/C | A | 58 (60-130) | 59 (60-130) | ( ) | MBLKIW, | J/W/P |
| | | | | ( ) | ( ) | ( ) | All water | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 181168 1
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Internal Standards


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100% of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

| # | Date | Sample ID | Internal Standard | Area (Limits) | RT (Limits) | Qualifications |
|---|---|---|---|---|---|---|
| | | 3 | 2DCB | 651822 (672798 - 2691190) | | J/UJ/A |
| | | | | | | QUAL BB only |

(BCM) = Bromochloromethane
(DFB) = 1,4-Difluorobenzene
(CBZ) = Chlorobenzene-d5
(PFB) = Pentafluorobenzene
(4DCB) = 1,4-Dichlorobenzene-d4
(2DCB) = 1,2-Dichlorobenzene-d4
(FBZ) = Fluorobenzene

LDC #: 18116B1
SDG #: all cover

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: P7
2nd Reviewer: 8

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of compound,
$C_x$ = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported RRF (50 std) | Recalculated RRF (50 std) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | V003L07 | 12/7/07 | vinyl chloride (1st internal standard) | 0.285 | 0.285 | 0.285 | 0.285 | 10.36 | 10.36 |
| | | | Benzene (2nd internal standard) | 1.264 | 1.264 | 1.246 | 1.246 | 5.05 | 5.05 |
| | | | Bromoform (3rd internal standard) | 0.504 | 0.504 | 0.521 | 0.521 | 7.72 | 7.72 |
| 2 | | | (1st internal standard) | | | | | | |
| | | | (2nd internal standard) | | | | | | |
| | | | (3rd internal standard) | | | | | | |
| 3 | | | (1st internal standard) | | | | | | |
| | | | (2nd internal standard) | | | | | | |
| | | | (3rd internal standard) | | | | | | |
| 4 | | | (1st internal standard) | | | | | | |
| | | | (2nd internal standard) | | | | | | |
| | | | (3rd internal standard) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116 B1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (Initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | RLB326 | 12/14/07 | Vinyl chloride (1st internal standard) | 0.285 | 0.280 | 0.280 | 1.8 | 1.8 |
| | | | Benzene (2nd internal standard) | 1.246 | 1.258 | 1.258 | 1.0 | 1.0 |
| | | | Bromoform (3rd internal standard) | 0.521 | 0.425 | 0.425 | 18.4 | 18.4 |
| 2 | | | (1st internal standard) | | | | | |
| | | | (2nd internal standard) | | | | | |
| | | | (3rd internal standard) | | | | | |
| 3 | | | (1st internal standard) | | | | | |
| | | | (2nd internal standard) | | | | | |
| | | | (3rd internal standard) | | | | | |
| 4 | | | (1st internal standard) | | | | | |
| | | | (2nd internal standard) | | | | | |
| | | | (3rd internal standard) | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification


Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** #5

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Toluene-d8 | 50.0 | 56.36 | 113 | 113 | 0 |
| Bromofluorobenzene | ↓ | 60.90 | 122 | 122 | ↓ |
| 1,2-Dichloroethane-d4 | ↓ | 63.66 | 127 | 127 | ↓ |
| Dibromofluoromethane | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Toluene-d8 | | | | | |
| Bromofluorobenzene | | | | | |
| 1,2-Dichloroethane-d4 | | | | | |
| Dibromofluoromethane | | | | | |

LDC #: 181161B1
SDG #: all cover

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA  Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)  LCS = Laboraotry control sample percent recovery  LCSD = Laboratory control sample duplicate percent recovery

LCS ID: LCS/D soil

| Compound | Spike Added (ug/kg) | | Spiked Sample Concentration (ug/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| 1,1-Dichloroethene | 20.0 | 20.0 | 19.2 | 19.6 | 96 | 96 | 98 | 98 | 2 | 2 |
| Trichloroethene | | | 17.2 | 18.2 | 86 | 86 | 91 | 91 | 6 | 6 |
| Benzene | | | 18.9 | 19.6 | 95 | 95 | 98 | 98 | 3 | 3 |
| Toluene | | | 17.4 | 18.3 | 87 | 87 | 92 | 92 | 5 | 5 |
| Chlorobenzene | | | 17.8 | 18.7 | 89 | 89 | 93 | 93 | 5 | 5 |
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Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 181163 1
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer:
2nd reviewer:

**METHOD:** GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| RRF | = | Relative response factor of the calibration standard. |
| $V_o$ | = | Volume or weight of sample pruged in milliliters (ml) or grams (g). |
| Df | = | Dilution factor. |
| %S | = | Percent solids, applicable to soils and solid matrices only. |

Example:

Sample I.D. #3 . carbon disulfide

Conc. = $\frac{(95827)(50)(\quad)}{(2458409)(0.966)(0.832)}$

= 2.4 ng/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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# NAS Alameda Point, IR Site 13
# Data Validation Reports
# LDC# 18116

## Semivolatiles

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 4, 2007

**LDC Report Date:** January 28, 2008

**Matrix:** Soil/Water

**Parameters:** Semivolatiles

**Validation Level:** NFESC Level III

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L053

**Sample Identification**

AP13-007-S-02
AP13-043-S-02
AP13-043-S-02DL
AP13-041-S-01
AP13-041-S-01DL
AP13-169-S-02
AP13-148-S-02
AP13-148-S-02DL
AP13-148-W-01

## Introduction

This data review covers 8 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination ($r^2$) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

## V. Blanks

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

Sample AP13-148-W-01 was identified as an equipment blank. No semivolatile contaminants were found in this blank.

## VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. Since the samples were diluted out, no data were qualified.

## VII. Matrix Spike/Matrix Spike Duplicates

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

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| SVL025WL/C (All water samples in SDG 07L053) | N-Nitroso-di-n-propylamine | - | - | 31 (≤30) | J (all detects) UJ (all non-detects) | P |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits with the following exceptions:

| Sample | Internal Standards | Area (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-041-S-01 | Phenanthrene-d10 | 265056 (336752-1347008) | N-Nitrosodiphenylamine<br>4-Bromophenyl-phenylether<br>Hexachlorobenzene<br>Pentachlorophenol<br>Phenanthrene<br>Anthracene<br>Di-n-butylphthalate<br>Fluoranthene | J (all detects)<br>UJ (all non-detects) | A |

## XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XII. Compound Quantitation and CRQLs

All compound quantitation and CRQLs were within validation criteria with the following exceptions:

| Sample | Compound | Finding | Criteria | Flag | A or P |
|---|---|---|---|---|---|
| AP13-043-S-02<br>AP13-041-S-01 | 2-Methylnaphthalene<br>Naphthalene | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects)<br>J (all detects) | A |
| AP13-148-S-02 | 2-Methylnaphthalene | Sample result exceeded calibration range. | Reported result should be within calibration range. | J (all detects) | A |

Raw data were not reviewed for this SDG.

## XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment

The overall assessment of data was acceptable. In the case where more than one result was reported for an individual sample, the least technically acceptable results were rejected as follows:

| Sample | Compound | Flag | A or P |
|---|---|---|---|
| AP13-043-S-02<br>AP13-041-S-01 | 2-Methylnaphthalene<br>Naphthalene | R<br>R | A |
| AP13-043-S-02DL<br>AP13-041-S-01DL | All TCL compounds except<br>2-Methylnaphthalene<br>Naphthalene | R | A |
| AP13-148-S-02 | 2-Methylnaphthalene | R | A |
| AP13-148-S-02DL | All TCL compounds except<br>2-Methylnaphthalene | R | A |

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Semivolatiles - Data Qualification Summary - SDG 07L053

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-148-W-01 | N-Nitroso-di-n-propylamine | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (RPD) |
| 07L053 | AP13-041-S-01 | N-Nitrosodiphenylamine<br>4-Bromophenyl-phenylether<br>Hexachlorobenzene<br>Pentachlorophenol<br>Phenanthrene<br>Anthracene<br>Di-n-butylphthalate<br>Fluoranthene | J (all detects)<br>UJ (all non-detects) | A | Internal standards (area) |
| 07L053 | AP13-043-S-02<br>AP13-041-S-01 | 2-Methylnaphthalene<br>Naphthalene | J (all detects)<br>J (all detects) | A | Compound quantitation and CRQLs |
| 07L053 | AP13-148-S-02 | 2-Methylnaphthalene | J (all detects) | A | Compound quantitation and CRQLs |
| 07L053 | AP13-043-S-02<br>AP13-041-S-01 | 2-Methylnaphthalene<br>Naphthalene | R<br>R | A | Overall assessment of data |
| 07L053 | AP13-043-S-02DL<br>AP13-041-S-01DL | All TCL compounds except<br>2-Methylnaphthalene<br>Naphthalene | R | A | Overall assessment of data |
| 07L053 | AP13-148-S-02 | 2-Methylnaphthalene | R | A | Overall assessment of data |
| 07L053 | AP13-148-S-02DL | All TCL compounds except<br>2-Methylnaphthalene | R | A | Overall assessment of data |

## NAS Alameda Point, IR Site 13
## Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 07L053

No Sample Data Qualified in this SDG

## NAS Alameda Point, IR Site 13
## Semivolatiles - Field Blank Data Qualification Summary - SDG 07L053

No Sample Data Qualified in this SDG

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID | : AP13-007-S-02 | Date Analyzed: | 12/14/07 22:27 |
| Lab Samp ID | : L053-04 | Dilution Factor: | 2 |
| Lab File ID | : RLK352 | Matrix | : SOIL |
| Ext Btch ID | : SVL027S | % Moisture | : 16.9 |
| Calib. Ref. | : RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 790 | 400 |
| 1,2-DICHLOROBENZENE | ND | 790 | 400 |
| 1,3-DICHLOROBENZENE | ND | 790 | 400 |
| 1,4-DICHLOROBENZENE | ND | 790 | 400 |
| 2,4,5-TRICHLOROPHENOL | ND | 790 | 400 |
| 2,4,6-TRICHLOROPHENOL | ND | 790 | 440 |
| 2,4-DICHLOROPHENOL | ND | 790 | 400 |
| 2,4-DIMETHYLPHENOL | ND | 790 | 400 |
| 2,4-DINITROPHENOL | ND | 1600 | 400 |
| 2,4-DINITROTOLUENE | ND | 790 | 400 |
| 2,6-DINITROTOLUENE | ND | 790 | 400 |
| 2-CHLORONAPHTHALENE | ND | 790 | 400 |
| 2-CHLOROPHENOL | ND | 790 | 400 |
| 2-METHYLNAPHTHALENE | 4200 | 790 | 400 |
| 2-METHYLPHENOL | ND | 790 | 400 |
| 2-NITROANILINE | ND | 790 | 400 |
| 2-NITROPHENOL | ND | 790 | 400 |
| 3,3'-DICHLOROBENZIDINE | ND | 790 | 400 |
| 3-NITROANILINE | ND | 790 | 400 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 1600 | 400 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 790 | 400 |
| 4-CHLORO-3-METHYLPHENOL | ND | 790 | 400 |
| 4-CHLOROANILINE | ND | 790 | 400 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 790 | 410 |
| 4-METHYLPHENOL (1) | ND | 790 | 400 |
| 4-NITROANILINE | ND | 790 | 400 |
| 4-NITROPHENOL | ND | 1600 | 400 |
| ACENAPHTHENE | ND | 790 | 400 |
| ACENAPHTHYLENE | ND | 790 | 400 |
| ANTHRACENE | ND | 790 | 400 |
| BENZO(A)ANTHRACENE | ND | 790 | 400 |
| BENZO(A)PYRENE | ND | 790 | 400 |
| BENZO(B)FLUORANTHENE | ND | 790 | 400 |
| BENZO(K)FLUORANTHENE | ND | 790 | 400 |
| BENZO(G,H,I)PERYLENE | ND | 790 | 400 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 790 | 400 |
| BIS(2-CHLOROETHYL)ETHER | ND | 790 | 400 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 790 | 400 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 790 | 400 |
| BUTYLBENZYLPHTHALATE | ND | 790 | 400 |
| CHRYSENE | ND | 790 | 400 |
| DI-N-BUTYLPHTHALATE | ND | 790 | 400 |
| DI-N-OCTYLPHTHALATE | ND | 790 | 400 |
| DIBENZO(A,H)ANTHRACENE | ND | 790 | 400 |
| DIBENZOFURAN | ND | 790 | 400 |
| DIETHYLPHTHALATE | ND | 790 | 400 |
| DIMETHYLPHTHALATE | ND | 790 | 400 |
| FLUORANTHENE | ND | 790 | 400 |
| FLUORENE | ND | 790 | 400 |
| HEXACHLOROBENZENE | ND | 790 | 400 |
| HEXACHLOROBUTADIENE | ND | 790 | 460 |
| HEXACHLOROCYCLOPENTADIENE | ND | 790 | 400 |
| HEXACHLOROETHANE | ND | 790 | 400 |
| INDENO(1,2,3-CD)PYRENE | ND | 790 | 400 |
| ISOPHORONE | ND | 790 | 400 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 790 | 400 |
| N-NITROSODIPHENYLAMINE (2) | ND | 790 | 400 |
| NAPHTHALENE | 1400 | 790 | 400 |
| NITROBENZENE | ND | 790 | 400 |
| PENTACHLOROPHENOL | ND | 1600 | 420 |
| PHENANTHRENE | 820 | 790 | 400 |
| PHENOL | ND | 790 | 400 |
| PYRENE | ND | 790 | 400 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 69 | 20-140 |
| 2-FLUOROBIPHENYL | 58 | 30-130 |
| 2-FLUOROPHENOL | 55 | 20-130 |
| NITROBENZENE-D5 | 53 | 20-130 |
| PHENOL-D5 | 52 | 20-130 |
| TERPHENYL-D14 | 72 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

M40130008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-043-S-02 | Date Analyzed: | 12/14/07 22:46 |
| Lab Samp ID: | L053-07 | Dilution Factor: | 1 |
| Lab File ID: | RLK353 | Matrix | : SOIL |
| Ext Btch ID: | SVL027S | % Moisture | : 17.0 |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 400 | 200 |
| 1,2-DICHLOROBENZENE | ND | 400 | 200 |
| 1,3-DICHLOROBENZENE | ND | 400 | 200 |
| 1,4-DICHLOROBENZENE | ND | 400 | 200 |
| 2,4,5-TRICHLOROPHENOL | ND | 400 | 200 |
| 2,4,6-TRICHLOROPHENOL | ND | 400 | 220 |
| 2,4-DICHLOROPHENOL | ND | 400 | 200 |
| 2,4-DIMETHYLPHENOL | ND | 400 | 200 |
| 2,4-DINITROPHENOL | ND | 800 | 200 |
| 2,4-DINITROTOLUENE | ND | 400 | 200 |
| 2,6-DINITROTOLUENE | ND | 400 | 200 |
| 2-CHLORONAPHTHALENE | ND | 400 | 200 |
| 2-CHLOROPHENOL | ND | 400 | 200 |
| 2-METHYLNAPHTHALENE | 13000E | 400 | 200 |
| 2-METHYLPHENOL | ND | 400 | 200 |
| 2-NITROANILINE | ND | 400 | 200 |
| 2-NITROPHENOL | ND | 400 | 200 |
| 3,3'-DICHLOROBENZIDINE | ND | 400 | 200 |
| 3-NITROANILINE | ND | 400 | 200 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 800 | 200 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 400 | 200 |
| 4-CHLORO-3-METHYLPHENOL | ND | 400 | 200 |
| 4-CHLOROANILINE | ND | 400 | 200 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 400 | 200 |
| 4-METHYLPHENOL (1) | ND | 400 | 200 |
| 4-NITROANILINE | ND | 400 | 200 |
| 4-NITROPHENOL | ND | 800 | 200 |
| ACENAPHTHENE | ND | 400 | 200 |
| ACENAPHTHYLENE | ND | 400 | 200 |
| ANTHRACENE | ND | 400 | 200 |
| BENZO(A)ANTHRACENE | ND | 400 | 200 |
| BENZO(A)PYRENE | ND | 400 | 200 |
| BENZO(B)FLUORANTHENE | ND | 400 | 200 |
| BENZO(K)FLUORANTHENE | ND | 400 | 200 |
| BENZO(G,H,I)PERYLENE | ND | 400 | 200 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 400 | 200 |
| BIS(2-CHLOROETHYL)ETHER | ND | 400 | 200 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 400 | 200 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 400 | 200 |
| BUTYLBENZYLPHTHALATE | ND | 400 | 200 |
| CHRYSENE | ND | 400 | 200 |
| DI-N-BUTYLPHTHALATE | ND | 400 | 200 |
| DI-N-OCTYLPHTHALATE | ND | 400 | 200 |
| DIBENZO(A,H)ANTHRACENE | ND | 400 | 200 |
| DIBENZOFURAN | 550 | 400 | 200 |
| DIETHYLPHTHALATE | ND | 400 | 200 |
| DIMETHYLPHTHALATE | ND | 400 | 200 |
| FLUORANTHENE | ND | 400 | 200 |
| FLUORENE | ND | 400 | 200 |
| HEXACHLOROBENZENE | ND | 400 | 200 |
| HEXACHLOROBUTADIENE | ND | 400 | 230 |
| HEXACHLOROCYCLOPENTADIENE | ND | 400 | 200 |
| HEXACHLOROETHANE | ND | 400 | 200 |
| INDENO(1,2,3-CD)PYRENE | ND | 400 | 200 |
| ISOPHORONE | ND | 400 | 200 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 400 | 200 |
| N-NITROSODIPHENYLAMINE (2) | ND | 400 | 200 |
| NAPHTHALENE | 4700E | 400 | 200 |
| NITROBENZENE | ND | 400 | 200 |
| PENTACHLOROPHENOL | ND | 800 | 210 |
| PHENANTHRENE | 1300 | 400 | 200 |
| PHENOL | ND | 400 | 200 |
| PYRENE | ND | 400 | 200 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 79 | 20-140 |
| 2-FLUOROBIPHENYL | 56 | 30-130 |
| 2-FLUOROPHENOL | 70 | 20-130 |
| NITROBENZENE-D5 | 95 | 20-130 |
| PHENOL-D5 | 62 | 20-130 |
| TERPHENYL-D14 | 77 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine
E: Exceeded Calibration Range

M40/3008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-043-S-02DL | Date Analyzed: | 12/17/07 22:59 |
| Lab Samp ID: | L053-07T | Dilution Factor: | 10 |
| Lab File ID: | RLK399 | Matrix | : SOIL |
| Ext Btch ID: | SVL027S | % Moisture | : 17.0 |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 4000 | 2000 |
| 1,2-DICHLOROBENZENE | ND | 4000 | 2000 |
| 1,3-DICHLOROBENZENE | ND | 4000 | 2000 |
| 1,4-DICHLOROBENZENE | ND | 4000 | 2000 |
| 2,4,5-TRICHLOROPHENOL | ND | 4000 | 2000 |
| 2,4,6-TRICHLOROPHENOL | ND | 4000 | 2200 |
| 2,4-DICHLOROPHENOL | ND | 4000 | 2000 |
| 2,4-DIMETHYLPHENOL | ND | 4000 | 2000 |
| 2,4-DINITROPHENOL | ND | 8000 | 2000 |
| 2,4-DINITROTOLUENE | ND | 4000 | 2000 |
| 2,6-DINITROTOLUENE | ND | 4000 | 2000 |
| 2-CHLORONAPHTHALENE | ND | 4000 | 2000 |
| 2-CHLOROPHENOL | ND | 4000 | 2000 |
| 2-METHYLNAPHTHALENE | 18000 | 4000 | 2000 |
| 2-METHYLPHENOL | ND | 4000 | 2000 |
| 2-NITROANILINE | ND | 4000 | 2000 |
| 2-NITROPHENOL | ND | 4000 | 2000 |
| 3,3'-DICHLOROBENZIDINE | ND | 4000 | 2000 |
| 3-NITROANILINE | ND | 4000 | 2000 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 8000 | 2000 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 4000 | 2000 |
| 4-CHLORO-3-METHYLPHENOL | ND | 4000 | 2000 |
| 4-CHLOROANILINE | ND | 4000 | 2000 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 4000 | 2000 |
| 4-METHYLPHENOL (1) | ND | 4000 | 2000 |
| 4-NITROANILINE | ND | 4000 | 2000 |
| 4-NITROPHENOL | ND | 8000 | 2000 |
| ACENAPHTHENE | ND | 4000 | 2000 |
| ACENAPHTHYLENE | ND | 4000 | 2000 |
| ANTHRACENE | ND | 4000 | 2000 |
| BENZO(A)ANTHRACENE | ND | 4000 | 2000 |
| BENZO(A)PYRENE | ND | 4000 | 2000 |
| BENZO(B)FLUORANTHENE | ND | 4000 | 2000 |
| BENZO(K)FLUORANTHENE | ND | 4000 | 2000 |
| BENZO(G,H,I)PERYLENE | ND | 4000 | 2000 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 4000 | 2000 |
| BIS(2-CHLOROETHYL)ETHER | ND | 4000 | 2000 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 4000 | 2000 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 4000 | 2000 |
| BUTYLBENZYLPHTHALATE | ND | 4000 | 2000 |
| CHRYSENE | ND | 4000 | 2000 |
| DI-N-BUTYLPHTHALATE | ND | 4000 | 2000 |
| DI-N-OCTYLPHTHALATE | ND | 4000 | 2000 |
| DIBENZO(A,H)ANTHRACENE | ND | 4000 | 2000 |
| DIBENZOFURAN | ND | 4000 | 2000 |
| DIETHYLPHTHALATE | ND | 4000 | 2000 |
| DIMETHYLPHTHALATE | ND | 4000 | 2000 |
| FLUORANTHENE | ND | 4000 | 2000 |
| FLUORENE | ND | 4000 | 2000 |
| HEXACHLOROBENZENE | ND | 4000 | 2000 |
| HEXACHLOROBUTADIENE | ND | 4000 | 2300 |
| HEXACHLOROCYCLOPENTADIENE | ND | 4000 | 2000 |
| HEXACHLOROETHANE | ND | 4000 | 2000 |
| INDENO(1,2,3-CD)PYRENE | ND | 4000 | 2000 |
| ISOPHORONE | ND | 4000 | 2000 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 4000 | 2000 |
| N-NITROSODIPHENYLAMINE (2) | ND | 4000 | 2000 |
| NAPHTHALENE | 6100 | 4000 | 2000 |
| NITROBENZENE | ND | 4000 | 2000 |
| PENTACHLOROPHENOL | ND | 8000 | 2100 |
| PHENANTHRENE | ND | 4000 | 2000 |
| PHENOL | ND | 4000 | 2000 |
| PYRENE | ND | 4000 | 2000 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | DO | 20-140 |
| 2-FLUOROBIPHENYL | DO | 30-130 |
| 2-FLUOROPHENOL | DO | 20-130 |
| NITROBENZENE-D5 | DO | 20-130 |
| PHENOL-D5 | DO | 20-130 |
| TERPHENYL-D14 | DO | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine
DO: Diluted Out

M40/3008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-041-S-01 | Date Analyzed: | 12/14/07 23:05 |
| Lab Samp ID: | L053-08 | Dilution Factor: | 2 |
| Lab File ID: | RLK354 | Matrix : | SOIL |
| Ext Btch ID: | SVL027S | % Moisture : | 12.2 |
| Calib. Ref.: | RKK015 | Instrument ID : | T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 750 | 380 |
| 1,2-DICHLOROBENZENE | ND | 750 | 380 |
| 1,3-DICHLOROBENZENE | ND | 750 | 380 |
| 1,4-DICHLOROBENZENE | ND | 750 | 380 |
| 2,4,5-TRICHLOROPHENOL | ND | 750 | 380 |
| 2,4,6-TRICHLOROPHENOL | ND | 750 | 420 |
| 2,4-DICHLOROPHENOL | ND | 750 | 380 |
| 2,4-DIMETHYLPHENOL | ND | 750 | 380 |
| 2,4-DINITROPHENOL | ND | 1500 | 380 |
| 2,4-DINITROTOLUENE | ND | 750 | 380 |
| 2,6-DINITROTOLUENE | ND | 750 | 380 |
| 2-CHLORONAPHTHALENE | ND | 750 | 380 |
| 2-CHLOROPHENOL | ND | 750 | 380 |
| 2-METHYLNAPHTHALENE | 39000E | 750 | 380 |
| 2-METHYLPHENOL | ND | 750 | 380 |
| 2-NITROANILINE | ND | 750 | 380 |
| 2-NITROPHENOL | ND | 750 | 380 |
| 3,3'-DICHLOROBENZIDINE | ND | 750 | 380 |
| 3-NITROANILINE | ND | 750 | 380 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 1500 | 380 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 750 | 380 |
| 4-CHLORO-3-METHYLPHENOL | ND | 750 | 380 |
| 4-CHLOROANILINE | ND | 750 | 380 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 750 | 390 |
| 4-METHYLPHENOL (1) | ND | 750 | 380 |
| 4-NITROANILINE | ND | 750 | 380 |
| 4-NITROPHENOL | ND | 1500 | 380 |
| ACENAPHTHENE | ND | 750 | 380 |
| ACENAPHTHYLENE | ND | 750 | 380 |
| ANTHRACENE | 820 | 750 | 380 |
| BENZO(A)ANTHRACENE | 520J | 750 | 380 |
| BENZO(A)PYRENE | ND | 750 | 380 |
| BENZO(B)FLUORANTHENE | ND | 750 | 380 |
| BENZO(K)FLUORANTHENE | ND | 750 | 380 |
| BENZO(G,H,I)PERYLENE | ND | 750 | 380 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 750 | 380 |
| BIS(2-CHLOROETHYL)ETHER | ND | 750 | 380 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 750 | 380 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 750 | 380 |
| BUTYLBENZYLPHTHALATE | ND | 750 | 380 |
| CHRYSENE | 830 | 750 | 380 |
| DI-N-BUTYLPHTHALATE | ND | 750 | 380 |
| DI-N-OCTYLPHTHALATE | ND | 750 | 380 |
| DIBENZO(A,H)ANTHRACENE | ND | 750 | 380 |
| DIBENZOFURAN | ND | 750 | 380 |
| DIETHYLPHTHALATE | ND | 750 | 380 |
| DIMETHYLPHTHALATE | ND | 750 | 380 |
| FLUORANTHENE | 450J | 750 | 380 |
| FLUORENE | 1900 | 750 | 380 |
| HEXACHLOROBENZENE | ND | 750 | 380 |
| HEXACHLOROBUTADIENE | ND | 750 | 430 |
| HEXACHLOROCYCLOPENTADIENE | ND | 750 | 380 |
| HEXACHLOROETHANE | ND | 750 | 380 |
| INDENO(1,2,3-CD)PYRENE | ND | 750 | 380 |
| ISOPHORONE | ND | 750 | 380 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 750 | 380 |
| N-NITROSODIPHENYLAMINE (2) | ND | 750 | 380 |
| NAPHTHALENE | 19000E | 750 | 380 |
| NITROBENZENE | ND | 750 | 380 |
| PENTACHLOROPHENOL | ND | 1500 | 400 |
| PHENANTHRENE | 6400 | 750 | 380 |
| PHENOL | ND | 750 | 380 |
| PYRENE | 720J | 750 | 380 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 51 | 20-140 |
| 2-FLUOROBIPHENYL | 58 | 30-130 |
| 2-FLUOROPHENOL | 27 | 20-130 |
| NITROBENZENE-D5 | 292* | 20-130 |
| PHENOL-D5 | 35 | 20-130 |
| TERPHENYL-D14 | 57 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine
E: Exceeded Calibration Range

14013008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-041-S-01DL | Date Analyzed: | 12/17/07 23:18 |
| Lab Samp ID: | L053-08T | Dilution Factor: | 20 |
| Lab File ID: | RLK400 | Matrix | : SOIL |
| Ext Btch ID: | SVL027S | % Moisture | : 12.2 |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | R | 7500 | 3800 |
| 1,2-DICHLOROBENZENE | ND | | 7500 | 3800 |
| 1,3-DICHLOROBENZENE | ND | | 7500 | 3800 |
| 1,4-DICHLOROBENZENE | ND | | 7500 | 3800 |
| 2,4,5-TRICHLOROPHENOL | ND | | 7500 | 3800 |
| 2,4,6-TRICHLOROPHENOL | ND | | 7500 | 4200 |
| 2,4-DICHLOROPHENOL | ND | | 7500 | 3800 |
| 2,4-DIMETHYLPHENOL | ND | | 7500 | 3800 |
| 2,4-DINITROPHENOL | ND | | 15000 | 3800 |
| 2,4-DINITROTOLUENE | ND | | 7500 | 3800 |
| 2,6-DINITROTOLUENE | ND | | 7500 | 3800 |
| 2-CHLORONAPHTHALENE | ND | | 7500 | 3800 |
| 2-CHLOROPHENOL | ND | | 7500 | 3800 |
| 2-METHYLNAPHTHALENE | 53000 | | 7500 | 3800 |
| 2-METHYLPHENOL | ND | R | 7500 | 3800 |
| 2-NITROANILINE | ND | | 7500 | 3800 |
| 2-NITROPHENOL | ND | | 7500 | 3800 |
| 3,3'-DICHLOROBENZIDINE | ND | | 7500 | 3800 |
| 3-NITROANILINE | ND | | 7500 | 3800 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | | 15000 | 3800 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | | 7500 | 3800 |
| 4-CHLORO-3-METHYLPHENOL | ND | | 7500 | 3800 |
| 4-CHLOROANILINE | ND | | 7500 | 3800 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | | 7500 | 3900 |
| 4-METHYLPHENOL (1) | ND | | 7500 | 3800 |
| 4-NITROANILINE | ND | | 7500 | 3800 |
| 4-NITROPHENOL | ND | | 15000 | 3800 |
| ACENAPHTHENE | ND | | 7500 | 3800 |
| ACENAPHTHYLENE | ND | | 7500 | 3800 |
| ANTHRACENE | ND | | 7500 | 3800 |
| BENZO(A)ANTHRACENE | ND | | 7500 | 3800 |
| BENZO(A)PYRENE | ND | | 7500 | 3800 |
| BENZO(B)FLUORANTHENE | ND | | 7500 | 3800 |
| BENZO(K)FLUORANTHENE | ND | | 7500 | 3800 |
| BENZO(G,H,I)PERYLENE | ND | | 7500 | 3800 |
| BIS(2-CHLOROETHOXY)METHANE | ND | | 7500 | 3800 |
| BIS(2-CHLOROETHYL)ETHER | ND | | 7500 | 3800 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | | 7500 | 3800 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | | 7500 | 3800 |
| BUTYLBENZYLPHTHALATE | ND | | 7500 | 3800 |
| CHRYSENE | ND | | 7500 | 3800 |
| DI-N-BUTYLPHTHALATE | ND | | 7500 | 3800 |
| DI-N-OCTYLPHTHALATE | ND | | 7500 | 3800 |
| DIBENZO(A,H)ANTHRACENE | ND | | 7500 | 3800 |
| DIBENZOFURAN | ND | | 7500 | 3800 |
| DIETHYLPHTHALATE | ND | | 7500 | 3800 |
| DIMETHYLPHTHALATE | ND | | 7500 | 3800 |
| FLUORANTHENE | ND | | 7500 | 3800 |
| FLUORENE | ND | | 7500 | 3800 |
| HEXACHLOROBENZENE | ND | | 7500 | 3800 |
| HEXACHLOROBUTADIENE | ND | | 7500 | 4300 |
| HEXACHLOROCYCLOPENTADIENE | ND | | 7500 | 3800 |
| HEXACHLOROETHANE | ND | | 7500 | 3800 |
| INDENO(1,2,3-CD)PYRENE | ND | | 7500 | 3800 |
| ISOPHORONE | ND | | 7500 | 3800 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | | 7500 | 3800 |
| N-NITROSODIPHENYLAMINE (2) | ND | | 7500 | 3800 |
| NAPHTHALENE | 25000 | | 7500 | 3800 |
| NITROBENZENE | ND | R | 7500 | 3800 |
| PENTACHLOROPHENOL | ND | | 15000 | 4000 |
| PHENANTHRENE | 6200J | | 7500 | 3800 |
| PHENOL | ND | | 7500 | 3800 |
| PYRENE | ND | | 7500 | 3800 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | DO | 20-140 |
| 2-FLUOROBIPHENYL | DO | 30-130 |
| 2-FLUOROPHENOL | DO | 20-130 |
| NITROBENZENE-D5 | DO | 20-130 |
| PHENOL-D5 | DO | 20-130 |
| TERPHENYL-D14 | DO | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine
DO: Diluted Out

1140|3008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-169-S-02 | Date Analyzed: | 12/14/07 23:23 |
| Lab Samp ID: | L053-10 | Dilution Factor: | 4 |
| Lab File ID: | RLK355 | Matrix | : SOIL |
| Ext Btch ID: | SVL027S | % Moisture | : 25.8 |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 1800 | 900 |
| 1,2-DICHLOROBENZENE | ND | 1800 | 900 |
| 1,3-DICHLOROBENZENE | ND | 1800 | 900 |
| 1,4-DICHLOROBENZENE | ND | 1800 | 900 |
| 2,4,5-TRICHLOROPHENOL | ND | 1800 | 900 |
| 2,4,6-TRICHLOROPHENOL | ND | 1800 | 990 |
| 2,4-DICHLOROPHENOL | ND | 1800 | 900 |
| 2,4-DIMETHYLPHENOL | ND | 1800 | 900 |
| 2,4-DINITROPHENOL | ND | 3600 | 900 |
| 2,4-DINITROTOLUENE | ND | 1800 | 900 |
| 2,6-DINITROTOLUENE | ND | 1800 | 900 |
| 2-CHLORONAPHTHALENE | ND | 1800 | 900 |
| 2-CHLOROPHENOL | ND | 1800 | 900 |
| 2-METHYLNAPHTHALENE | ND | 1800 | 900 |
| 2-METHYLPHENOL | ND | 1800 | 900 |
| 2-NITROANILINE | ND | 1800 | 900 |
| 2-NITROPHENOL | ND | 1800 | 900 |
| 3,3'-DICHLOROBENZIDINE | ND | 1800 | 900 |
| 3-NITROANILINE | ND | 1800 | 900 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 3600 | 900 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 1800 | 900 |
| 4-CHLORO-3-METHYLPHENOL | ND | 1800 | 900 |
| 4-CHLOROANILINE | ND | 1800 | 900 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 1800 | 920 |
| 4-METHYLPHENOL (1) | ND | 1800 | 900 |
| 4-NITROANILINE | ND | 1800 | 900 |
| 4-NITROPHENOL | ND | 3600 | 900 |
| ACENAPHTHENE | ND | 1800 | 900 |
| ACENAPHTHYLENE | ND | 1800 | 900 |
| ANTHRACENE | 1500J | 1800 | 900 |
| BENZO(A)ANTHRACENE | 3500 | 1800 | 900 |
| BENZO(A)PYRENE | 1900 | 1800 | 900 |
| BENZO(B)FLUORANTHENE | 1400J | 1800 | 900 |
| BENZO(K)FLUORANTHENE | ND | 1800 | 900 |
| BENZO(G,H,I)PERYLENE | ND | 1800 | 900 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 1800 | 900 |
| BIS(2-CHLOROETHYL)ETHER | ND | 1800 | 900 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 1800 | 900 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 1800 | 900 |
| BUTYLBENZYLPHTHALATE | ND | 1800 | 900 |
| CHRYSENE | 7100 | 1800 | 900 |
| DI-N-BUTYLPHTHALATE | ND | 1800 | 900 |
| DI-N-OCTYLPHTHALATE | ND | 1800 | 900 |
| DIBENZO(A,H)ANTHRACENE | ND | 1800 | 900 |
| DIBENZOFURAN | ND | 1800 | 900 |
| DIETHYLPHTHALATE | ND | 1800 | 900 |
| DIMETHYLPHTHALATE | ND | 1800 | 900 |
| FLUORANTHENE | 2100 | 1800 | 900 |
| FLUORENE | 1700J | 1800 | 900 |
| HEXACHLOROBENZENE | ND | 1800 | 900 |
| HEXACHLOROBUTADIENE | ND | 1800 | 1000 |
| HEXACHLOROCYCLOPENTADIENE | ND | 1800 | 900 |
| HEXACHLOROETHANE | ND | 1800 | 900 |
| INDENO(1,2,3-CD)PYRENE | ND | 1800 | 900 |
| ISOPHORONE | ND | 1800 | 900 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 1800 | 900 |
| N-NITROSODIPHENYLAMINE (2) | ND | 1800 | 900 |
| NAPHTHALENE | 940J | 1800 | 900 |
| NITROBENZENE | ND | 1800 | 900 |
| PENTACHLOROPHENOL | ND | 3600 | 940 |
| PHENANTHRENE | 2000 | 1800 | 900 |
| PHENOL | ND | 1800 | 900 |
| PYRENE | 4900 | 1800 | 900 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 66 | 20-140 |
| 2-FLUOROBIPHENYL | 76 | 30-130 |
| 2-FLUOROPHENOL | 70 | 20-130 |
| NITROBENZENE-D5 | 69 | 20-130 |
| PHENOL-D5 | 68 | 20-130 |
| TERPHENYL-D14 | 80 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

M40/3008

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-148-S-02 | Date Analyzed: | 12/14/07 23:42 |
| Lab Samp ID: | L053-13 | Dilution Factor: | 1 |
| Lab File ID: | RLK356 | Matrix : | SOIL |
| Ext Btch ID: | SVL027S | % Moisture : | 17.5 |
| Calib. Ref.: | RKK015 | Instrument ID : | T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 400 | 200 |
| 1,2-DICHLOROBENZENE | ND | 400 | 200 |
| 1,3-DICHLOROBENZENE | ND | 400 | 200 |
| 1,4-DICHLOROBENZENE | ND | 400 | 200 |
| 2,4,5-TRICHLOROPHENOL | ND | 400 | 200 |
| 2,4,6-TRICHLOROPHENOL | ND | 400 | 220 |
| 2,4-DICHLOROPHENOL | ND | 400 | 200 |
| 2,4-DIMETHYLPHENOL | ND | 400 | 200 |
| 2,4-DINITROPHENOL | ND | 800 | 200 |
| 2,4-DINITROTOLUENE | ND | 400 | 200 |
| 2,6-DINITROTOLUENE | ND | 400 | 200 |
| 2-CHLORONAPHTHALENE | ND | 400 | 200 |
| 2-CHLOROPHENOL | ND | 400 | 200 |
| 2-METHYLNAPHTHALENE | 5600E | 400 | 200 |
| 2-METHYLPHENOL | ND | 400 | 200 |
| 2-NITROANILINE | ND | 400 | 200 |
| 2-NITROPHENOL | ND | 400 | 200 |
| 3,3'-DICHLOROBENZIDINE | ND | 400 | 200 |
| 3-NITROANILINE | ND | 400 | 200 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 800 | 200 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 400 | 200 |
| 4-CHLORO-3-METHYLPHENOL | ND | 400 | 200 |
| 4-CHLOROANILINE | ND | 400 | 200 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 400 | 210 |
| 4-METHYLPHENOL (1) | ND | 400 | 200 |
| 4-NITROANILINE | ND | 400 | 200 |
| 4-NITROPHENOL | ND | 800 | 200 |
| ACENAPHTHENE | ND | 400 | 200 |
| ACENAPHTHYLENE | ND | 400 | 200 |
| ANTHRACENE | ND | 400 | 200 |
| BENZO(A)ANTHRACENE | ND | 400 | 200 |
| BENZO(A)PYRENE | ND | 400 | 200 |
| BENZO(B)FLUORANTHENE | ND | 400 | 200 |
| BENZO(K)FLUORANTHENE | ND | 400 | 200 |
| BENZO(G,H,I)PERYLENE | ND | 400 | 200 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 400 | 200 |
| BIS(2-CHLOROETHYL)ETHER | ND | 400 | 200 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 400 | 200 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 400 | 200 |
| BUTYLBENZYLPHTHALATE | ND | 400 | 200 |
| CHRYSENE | ND | 400 | 200 |
| DI-N-BUTYLPHTHALATE | ND | 400 | 200 |
| DI-N-OCTYLPHTHALATE | ND | 400 | 200 |
| DIBENZO(A,H)ANTHRACENE | ND | 400 | 200 |
| DIBENZOFURAN | ND | 400 | 200 |
| DIETHYLPHTHALATE | ND | 400 | 200 |
| DIMETHYLPHTHALATE | ND | 400 | 200 |
| FLUORANTHENE | ND | 400 | 200 |
| FLUORENE | 260J | 400 | 200 |
| HEXACHLOROBENZENE | ND | 400 | 200 |
| HEXACHLOROBUTADIENE | ND | 400 | 230 |
| HEXACHLOROCYCLOPENTADIENE | ND | 400 | 200 |
| HEXACHLOROETHANE | ND | 400 | 200 |
| INDENO(1,2,3-CD)PYRENE | ND | 400 | 200 |
| ISOPHORONE | ND | 400 | 200 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 400 | 200 |
| N-NITROSODIPHENYLAMINE (2) | ND | 400 | 200 |
| NAPHTHALENE | 2100 | 400 | 200 |
| NITROBENZENE | ND | 400 | 200 |
| PENTACHLOROPHENOL | ND | 800 | 210 |
| PHENANTHRENE | 280J | 400 | 200 |
| PHENOL | ND | 400 | 200 |
| PYRENE | ND | 400 | 200 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 79 | 20-140 |
| 2-FLUOROBIPHENYL | 56 | 30-130 |
| 2-FLUOROPHENOL | 65 | 20-130 |
| NITROBENZENE-D5 | 75 | 20-130 |
| PHENOL-D5 | 61 | 20-130 |
| TERPHENYL-D14 | 81 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine
E: Exceeded Calibration Range

M40130'8

3053

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-148-S-02DL | Date Analyzed: | 12/17/07 23:37 |
| Lab Samp ID: | L053-13T | Dilution Factor: | 3 |
| Lab File ID: | RLK401 | Matrix : | SOIL |
| Ext Btch ID: | SVL027S | % Moisture : | 17.5 |
| Calib. Ref.: | RKK015 | Instrument ID : | T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 1200 | 610 |
| 1,2-DICHLOROBENZENE | ND | 1200 | 610 |
| 1,3-DICHLOROBENZENE | ND | 1200 | 610 |
| 1,4-DICHLOROBENZENE | ND | 1200 | 610 |
| 2,4,5-TRICHLOROPHENOL | ND | 1200 | 610 |
| 2,4,6-TRICHLOROPHENOL | ND | 1200 | 670 |
| 2,4-DICHLOROPHENOL | ND | 1200 | 610 |
| 2,4-DIMETHYLPHENOL | ND | 1200 | 610 |
| 2,4-DINITROPHENOL | ND | 2400 | 610 |
| 2,4-DINITROTOLUENE | ND | 1200 | 610 |
| 2,6-DINITROTOLUENE | ND | 1200 | 610 |
| 2-CHLORONAPHTHALENE | ND | 1200 | 610 |
| 2-CHLOROPHENOL | ND | 1200 | 610 |
| 2-METHYLNAPHTHALENE | 6200 | 1200 | 610 |
| 2-METHYLPHENOL | ND | 1200 | 610 |
| 2-NITROANILINE | ND | 1200 | 610 |
| 2-NITROPHENOL | ND | 1200 | 610 |
| 3,3'-DICHLOROBENZIDINE | ND | 1200 | 610 |
| 3-NITROANILINE | ND | 1200 | 610 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 2400 | 610 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 1200 | 610 |
| 4-CHLORO-3-METHYLPHENOL | ND | 1200 | 610 |
| 4-CHLOROANILINE | ND | 1200 | 610 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 1200 | 620 |
| 4-METHYLPHENOL (1) | ND | 1200 | 610 |
| 4-NITROANILINE | ND | 1200 | 610 |
| 4-NITROPHENOL | ND | 2400 | 610 |
| ACENAPHTHENE | ND | 1200 | 610 |
| ACENAPHTHYLENE | ND | 1200 | 610 |
| ANTHRACENE | ND | 1200 | 610 |
| BENZO(A)ANTHRACENE | ND | 1200 | 610 |
| BENZO(A)PYRENE | ND | 1200 | 610 |
| BENZO(B)FLUORANTHENE | ND | 1200 | 610 |
| BENZO(K)FLUORANTHENE | ND | 1200 | 610 |
| BENZO(G,H,I)PERYLENE | ND | 1200 | 610 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 1200 | 610 |
| BIS(2-CHLOROETHYL)ETHER | ND | 1200 | 610 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 1200 | 610 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 1200 | 610 |
| BUTYLBENZYLPHTHALATE | ND | 1200 | 610 |
| CHRYSENE | ND | 1200 | 610 |
| DI-N-BUTYLPHTHALATE | ND | 1200 | 610 |
| DI-N-OCTYLPHTHALATE | ND | 1200 | 610 |
| DIBENZO(A,H)ANTHRACENE | ND | 1200 | 610 |
| DIBENZOFURAN | ND | 1200 | 610 |
| DIETHYLPHTHALATE | ND | 1200 | 610 |
| DIMETHYLPHTHALATE | ND | 1200 | 610 |
| FLUORANTHENE | ND | 1200 | 610 |
| FLUORENE | ND | 1200 | 610 |
| HEXACHLOROBENZENE | ND | 1200 | 610 |
| HEXACHLOROBUTADIENE | ND | 1200 | 690 |
| HEXACHLOROCYCLOPENTADIENE | ND | 1200 | 610 |
| HEXACHLOROETHANE | ND | 1200 | 610 |
| INDENO(1,2,3-CD)PYRENE | ND | 1200 | 610 |
| ISOPHORONE | ND | 1200 | 610 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 1200 | 610 |
| N-NITROSODIPHENYLAMINE (2) | ND | 1200 | 610 |
| NAPHTHALENE | 2300 | 1200 | 610 |
| NITROBENZENE | ND | 1200 | 610 |
| PENTACHLOROPHENOL | ND | 2400 | 640 |
| PHENANTHRENE | ND | 1200 | 610 |
| PHENOL | ND | 1200 | 610 |
| PYRENE | ND | 1200 | 610 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 79 | 20-140 |
| 2-FLUOROBIPHENYL | 65 | 30-130 |
| 2-FLUOROPHENOL | 69 | 20-130 |
| NITROBENZENE-D5 | 76 | 20-130 |
| PHENOL-D5 | 67 | 20-130 |
| TERPHENYL-D14 | 85 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

MU01300 8

3060

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| ch No. | : 07L053 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-148-W-01 | Date Analyzed: | 12/13/07 21:48 |
| Lab Samp ID: | L053-14 | Dilution Factor: | .94 |
| Lab File ID: | RLK321 | Matrix | : WATER |
| Ext Btch ID: | SVL025W | % Moisture | : NA |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,2-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,3-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,4-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 2,4,5-TRICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4,6-TRICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4-DICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4-DIMETHYLPHENOL | ND | 9.4 | 4.7 |
| 2,4-DINITROPHENOL | ND | 19 | 4.7 |
| 2,4-DINITROTOLUENE | ND | 9.4 | 4.7 |
| 2,6-DINITROTOLUENE | ND | 9.4 | 4.7 |
| 2-CHLORONAPHTHALENE | ND | 9.4 | 4.7 |
| 2-CHLOROPHENOL | ND | 9.4 | 4.7 |
| 2-METHYLNAPHTHALENE | ND | 9.4 | 4.7 |
| 2-METHYLPHENOL | ND | 9.4 | 4.7 |
| 2-NITROANILINE | ND | 9.4 | 4.7 |
| 2-NITROPHENOL | ND | 9.4 | 4.7 |
| 3,3'-DICHLOROBENZIDINE | ND | 9.4 | 4.7 |
| 3-NITROANILINE | ND | 9.4 | 4.7 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 19 | 4.7 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 9.4 | 4.7 |
| 4-CHLORO-3-METHYLPHENOL | ND | 9.4 | 4.7 |
| 4-CHLOROANILINE | ND | 9.4 | 4.7 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 9.4 | 4.7 |
| 4-METHYLPHENOL (1) | ND | 9.4 | 4.7 |
| 4-NITROANILINE | ND | 9.4 | 4.7 |
| 4-NITROPHENOL | ND | 19 | 4.7 |
| ACENAPHTHENE | ND | 9.4 | 4.7 |
| ACENAPHTHYLENE | ND | 9.4 | 4.7 |
| ANTHRACENE | ND | 9.4 | 4.7 |
| BENZO(A)ANTHRACENE | ND | 9.4 | 4.7 |
| BENZO(A)PYRENE | ND | 9.4 | 4.7 |
| BENZO(B)FLUORANTHENE | ND | 9.4 | 4.7 |
| BENZO(K)FLUORANTHENE | ND | 9.4 | 4.7 |
| BENZO(G,H,I)PERYLENE | ND | 9.4 | 4.7 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 9.4 | 4.7 |
| BIS(2-CHLOROETHYL)ETHER | ND | 9.4 | 4.7 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 9.4 | 4.7 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 9.4 | 4.7 |
| BUTYLBENZYLPHTHALATE | ND | 9.4 | 4.7 |
| CHRYSENE | ND | 9.4 | 4.7 |
| DI-N-BUTYLPHTHALATE | ND | 9.4 | 4.7 |
| DI-N-OCTYLPHTHALATE | ND | 9.4 | 4.7 |
| DIBENZO(A,H)ANTHRACENE | ND | 9.4 | 4.7 |
| DIBENZOFURAN | ND | 9.4 | 4.7 |
| DIETHYLPHTHALATE | ND | 9.4 | 4.7 |
| DIMETHYLPHTHALATE | ND | 9.4 | 4.7 |
| FLUORANTHENE | ND | 9.4 | 4.7 |
| FLUORENE | ND | 9.4 | 4.7 |
| HEXACHLOROBENZENE | ND | 9.4 | 4.7 |
| HEXACHLOROBUTADIENE | ND | 9.4 | 4.7 |
| HEXACHLOROCYCLOPENTADIENE | ND | 9.4 | 4.7 |
| HEXACHLOROETHANE | ND | 9.4 | 4.7 |
| INDENO(1,2,3-CD)PYRENE | ND | 9.4 | 4.7 |
| ISOPHORONE | ND | 9.4 | 4.7 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 9.4 | 4.7 |
| N-NITROSODIPHENYLAMINE (2) | ND | 9.4 | 4.7 |
| NAPHTHALENE | ND | 9.4 | 4.7 |
| NITROBENZENE | ND | 9.4 | 4.7 |
| PENTACHLOROPHENOL | ND | 19 | 4.7 |
| PHENANTHRENE | ND | 9.4 | 4.7 |
| PHENOL | ND | 9.4 | 4.7 |
| PYRENE | ND | 9.4 | 4.7 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 69 | 30-150 |
| 2-FLUOROBIPHENYL | 68 | 30-130 |
| 2-FLUOROPHENOL | 56 | 20-130 |
| NITROBENZENE-D5 | 64 | 30-130 |
| PHENOL-D5 | 48 | 30-130 |
| TERPHENYL-D14 | 61 | 30-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

4401300 8

3065

LDC #: 18116A2a **VALIDATION COMPLETENESS WORKSHEET** Date: 1/24/08
SDG #: 07L053 Level III Page: 1 of 1
Laboratory: EMAX Laboratories, Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/4/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | %RSD, $r^2$ ≥ 0.990 |
| IV. | Continuing calibration/ICV | A | ICV ≤ 25 |
| V. | Blanks | A | |
| VI. | Surrogate spikes | SW | |
| VII. | Matrix spike/Matrix spike duplicates | N | client specified |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | SW | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | SW | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | EB = 9 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

Soil + Water

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 + | AP13-007-S-02 | S | 11 | MBLKIS | 21 | | 31 | |
| 2 + | AP13-043-S-02 | | 12 | MBLKIW | 22 | | 32 | |
| 3 + | AP13-043-S-02DL | | 13 | | 23 | | 33 | |
| 4 | AP13-041-S-01 | | 14 | | 24 | | 34 | |
| 5 | AP13-041-S-01DL | | 15 | | 25 | | 35 | |
| 6 | AP13-169-S-02 | | 16 | | 26 | | 36 | |
| 7 + | AP13-148-S-02 | | 17 | | 27 | | 37 | |
| 8 | AP13-148-S-02DL | | 18 | | 28 | | 38 | |
| 9 | AP13-148-W-01 | W | 19 | | 29 | | 39 | |
| 10 | | | 20 | | 30 | | 40 | |

# VALIDATION FINDINGS WORKSHEET

IS = PHN

**METHOD: GC/MS BNA (EPA SW 846 Method 8270C)**

| | | | | |
|---|---|---|---|---|
| A. Phenol** | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene | TT. Pentachlorophenol** | III. Benzo(a)pyrene** |
| B. Bis (2-chloroethyl) ether | Q. 2,4-Dichlorophenol** | FF. 3-Nitroaniline | UU. Phenanthrene | JJJ. Indeno(1,2,3-cd)pyrene |
| C. 2-Chlorophenol | R. 1,2,4-Trichlorobenzene | GG. Acenaphthene** | VV. Anthracene | KKK. Dibenz(a,h)anthracene |
| D. 1,3-Dichlorobenzene | S. Naphthalene | HH. 2,4-Dinitrophenol* | WW. Carbazole | LLL. Benzo(g,h,i)perylene |
| E. 1,4-Dichlorobenzene** | T. 4-Chloroaniline | II. 4-Nitrophenol* | XX. Di-n-butylphthalate | MMM. Bis(2-Chloroisopropyl)ether |
| F. 1,2-Dichlorobenzene | U. Hexachlorobutadiene** | JJ. Dibenzofuran | YY. Fluoranthene** | NNN. Aniline |
| G. 2-Methylphenol | V. 4-Chloro-3-methylphenol** | KK. 2,4-Dinitrotoluene | ZZ. Pyrene | OOO. N-Nitrosodimethylamine |
| H. 2,2'-Oxybis(1-chloropropane) | W. 2-Methylnaphthalene | LL. Diethylphthalate | AAA. Butylbenzylphthalate | PPP. Benzoic Acid |
| I. 4-Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether | BBB. 3,3'-Dichlorobenzidine | QQQ. Benzyl alcohol |
| J. N-Nitroso-di-n-propylamine* | Y. 2,4,6-Trichlorophenol** | NN. Fluorene | CCC. Benzo(a)anthracene | RRR. Pyridine |
| K. Hexachloroethane | Z. 2,4,5-Trichlorophenol | OO. 4-Nitroaniline | DDD. Chrysene | SSS. Benzidine |
| L. Nitrobenzene | AA. 2-Chloronaphthalene | PP. 4,6-Dinitro-2-methylphenol | EEE. Bis(2-ethylhexyl)phthalate | TTT. |
| M. Isophorone | BB. 2-Nitroaniline | QQ. N-Nitrosodiphenylamine (1)** | FFF. Di-n-octylphthalate** | UUU |
| N. 2-Nitrophenol** | CC. Dimethylphthalate | RR. 4-Bromophenyl-phenylether | GGG. Benzo(b)fluoranthene | VVV. |
| O. 2,4-Dimethylphenol | DD. Acenaphthylene | SS. Hexachlorobenzene | HHH. Benzo(k)fluoranthene | WWW. |

Notes:* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

COMPNDL

LDC #: [illegible]
SDG #: Rec cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Recovery

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)

Please see qualification below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were percent recoveries (%R) for surrogates within QC limits?
Y N N/A If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?
Y N N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

| # | Date | Sample ID | Surrogate | %R (Limits) | Qualifications |
|---|---|---|---|---|---|
| | | 3 | TBP | DO ( 20-140 ) | no QUAL 10X PIL |
| | | | FBP | ( 30-130 ) | |
| | | | 2FP | ( 20-130 ) | |
| | | | NBZ | ( ↓ ) | |
| | | | PHL | ( ↓ ) | |
| | | | TPH | ( 40-130 ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | 4 | NBZ | 292 ( 20-130 ) | no QUAL |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | 5 | TBP | DO ( 20-140 ) | no QUAL 20X PIL |
| | | | FBP | ( 30-130 ) | |
| | | | 2FP | ( 20-130 ) | |
| | | | NBZ | ( ↓ ) | |
| | | | PHL | ( ↓ ) | |
| | | | TPH | ( 40-130 ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |

| * QC limits are advisory | QC Limits (Soil) | QC Limits (Water) |
|---|---|---|
| S1 (NBZ) = Nitrobenzene-d5 | 23-120 | 35-114 |
| S2 (FBP) = 2-Fluorobiphenyl | 30-115 | 43-116 |
| S3 (TPH) = Terphenyl-d14 | 18-137 | 33-141 |
| S4 (PHL) = Phenol-d5 | 24-113 | 10-94 |

| | QC Limits (Soil) | QC Limits (Water) |
|---|---|---|
| S5 (2FP) = 2-Fluorophenol | 25-121 | 21-100 |
| S6 (TBP) = 2,4,6-Tribromophenol | 19-122 | 10-123 |
| S7 (2CP) = 2-Chlorophenol-d4 | 20-130* | 33-110* |
| S8 (DCB) = 1,2-Dichlorobenzene-d4 | 20-130* | 16-110* |

LDC #: 18111-A2a
SDG #: [illegible] cover

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | SVLD25WL/C | J | ( ) | ( ) | 31 ( 30 ) | All water | J/UJ/P |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | – – – | – |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 18116A2a
SDG #: pre cover

# VALIDATION FINDINGS WORKSHEET
## Internal Standards


Reviewer: JS
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y (N) N/A Were all internal standard area counts within -50 to +100 of the associated calibration standard?

(Y) N N/A Were the retention times of the internal standards within +/- 30 seconds of the retention times of the associated calibration standard?

| # | Date | Sample ID | Internal Standard | Area (Limits) | RT (Limits) | Qualifications |
|---|---|---|---|---|---|---|
| | | 4 | PHN | 265056 (336752 - 1347008) | | J/UJ/A |

* QC limits are advisory

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10
IS4 (PHN) = Phenanthrene-d10
IS5 (CRY) = Chrysene-d12
IS6 (PRY) = Perylene-d12

.2S

LDC #: 18116A2a
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?

Y N N/A Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?

| # | Date | ~~Sample ID~~ compound | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | W, S | exceeded cal Range | 2, 4 | J/A dil |
| | | | | | |
| | | | | | |
| | | | | | |
| | | W | ↓ | 7 | ↓ |
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Comments: See sample calculation verification worksheet for recalculations

COMQUA.2S

SDG #: see cover

# Overall Assessment of Data

Page: 1 of 1
Reviewer: F
2nd Reviewer: ✓

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

| # | Date | ~~Sample ID~~ compound | Finding | Associated Samples | Qualifications |
|---|---|---|---|---|---|
| | | w, s | exceeded cal Range | 2, 4 | R/A |
| | | | | | |
| | | All except above | diluted | 3, 5 | R/A |
| | | DA | | | |
| | | | | | |
| | | W | exceeded cal Range | 7 | R/A |
| | | | | | |
| | | all except above | diluted | 8 | R/A |
| | | | | | |
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Comments:

OVR.2S

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 5, 2007

**LDC Report Date:** January 28, 2008

**Matrix:** Soil/Water

**Parameters:** Semivolatiles

**Validation Level:** NFESC Level III & IV

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L082

**Sample Identification**

AP13-170-W-02
AP13-093-S-02**
AP13-093-W-01

**Indicates sample underwent NFESC Level IV review

## Introduction

This data review covers one soil sample and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8270C for Semivolatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where %RSD was greater than 15.0%, the laboratory used a calibration curve to evaluate the compound. All coefficients of determination ($r^2$) were greater than or equal to 0.990 .

For the purposes of technical evaluation, all compounds were evaluated against the 30.0% (%RSD) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

Average relative response factors (RRF) for all semivolatile target compounds and system performance check compounds (SPCCs) were greater than or equal to 0.05 as required.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 20.0% for calibration check compounds (CCCs).

For the purposes of technical evaluation, all compounds were evaluated against the 25.0% (%D) National Functional Guideline criteria. Unless noted above, all compounds were within the validation criteria.

The percent differences (%D) of the second source calibration standard were less than or equal to 25.0% for all compounds.

All of the continuing calibration RRF values were greater than or equal to 0.05 .

## V. Blanks

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

Sample AP13-093-W-01 was identified as an equipment blank. No semivolatile contaminants were found in this blank.

Sample AP13-170-W-02 was identified as a field blank. No semivolatile contaminants were found in this blank.

## VI. Surrogate Spikes

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

## VII. Matrix Spike/Matrix Spike Duplicates

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

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| SVL025WL/C (All water samples in SDG 07L082) | N-Nitroso-di-n-propylamine | - | - | 31 (≤30) | J (all detects)<br>UJ (all non-detects) | P |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XV. Overall Assessment

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Semivolatiles - Data Qualification Summary - SDG 07L082

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-170-W-02<br>AP13-093-W-01 | N-Nitroso-di-n-propylamine | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (RPD) |

## NAS Alameda Point, IR Site 13
## Semivolatiles - Laboratory Blank Data Qualification Summary - SDG 07L082

No Sample Data Qualified in this SDG

## NAS Alameda Point, IR Site 13
## Semivolatiles - Field Blank Data Qualification Summary - SDG 07L082

No Sample Data Qualified in this SDG

METHOD 3550B/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 071082 | Date Extracted: | 12/11/07 16:00 |
| Sample ID: | AP13-093-S-02 | Date Analyzed: | 12/15/07 00:20 |
| Lab Samp ID: | L082-06 | Dilution Factor: | 2 |
| Lab File ID: | RLK358 | Matrix | : SOIL |
| Ext Btch ID: | SVL027S | % Moisture | : 21.3 |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 840 | 420 |
| 1,2-DICHLOROBENZENE | ND | 840 | 420 |
| 1,3-DICHLOROBENZENE | ND | 840 | 420 |
| 1,4-DICHLOROBENZENE | ND | 840 | 420 |
| 2,4,5-TRICHLOROPHENOL | ND | 840 | 450 |
| 2,4,6-TRICHLOROPHENOL | ND | 840 | 470 |
| 2,4-DICHLOROPHENOL | ND | 840 | 420 |
| 2,4-DIMETHYLPHENOL | ND | 840 | 420 |
| 2,4-DINITROPHENOL | ND | 1700 | 420 |
| 2,4-DINITROTOLUENE | ND | 840 | 420 |
| 2,6-DINITROTOLUENE | ND | 840 | 420 |
| 2-CHLORONAPHTHALENE | ND | 840 | 420 |
| 2-CHLOROPHENOL | ND | 840 | 420 |
| 2-METHYLNAPHTHALENE | ND | 840 | 420 |
| 2-METHYLPHENOL | ND | 840 | 420 |
| 2-NITROANILINE | ND | 840 | 420 |
| 2-NITROPHENOL | ND | 840 | 420 |
| 3,3'-DICHLOROBENZIDINE | ND | 840 | 420 |
| 3-NITROANILINE | ND | 840 | 420 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 1700 | 420 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 840 | 420 |
| 4-CHLORO-3-METHYLPHENOL | ND | 840 | 420 |
| 4-CHLOROANILINE | ND | 840 | 420 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 840 | 430 |
| 4-METHYLPHENOL (1) | ND | 840 | 420 |
| 4-NITROANILINE | ND | 840 | 420 |
| 4-NITROPHENOL | ND | 1700 | 420 |
| ACENAPHTHENE | ND | 840 | 420 |
| ACENAPHTHYLENE | ND | 840 | 420 |
| ANTHRACENE | ND | 840 | 420 |
| BENZO(A)ANTHRACENE | ND | 840 | 420 |
| BENZO(A)PYRENE | ND | 840 | 420 |
| BENZO(B)FLUORANTHENE | ND | 840 | 420 |
| BENZO(K)FLUORANTHENE | ND | 840 | 420 |
| BENZO(G,H,I)PERYLENE | ND | 840 | 420 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 840 | 420 |
| BIS(2-CHLOROETHYL)ETHER | ND | 840 | 420 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 840 | 420 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 840 | 420 |
| BUTYLBENZYLPHTHALATE | ND | 840 | 420 |
| CHRYSENE | ND | 840 | 420 |
| DI-N-BUTYLPHTHALATE | ND | 840 | 420 |
| DI-N-OCTYLPHTHALATE | ND | 840 | 420 |
| DIBENZO(A,H)ANTHRACENE | ND | 840 | 420 |
| DIBENZOFURAN | ND | 840 | 420 |
| DIETHYLPHTHALATE | ND | 840 | 420 |
| DIMETHYLPHTHALATE | ND | 840 | 420 |
| FLUORANTHENE | ND | 840 | 420 |
| FLUORENE | ND | 840 | 420 |
| HEXACHLOROBENZENE | ND | 840 | 420 |
| HEXACHLOROBUTADIENE | ND | 840 | 480 |
| HEXACHLOROCYCLOPENTADIENE | ND | 840 | 420 |
| HEXACHLOROETHANE | ND | 840 | 420 |
| INDENO(1,2,3-CD)PYRENE | ND | 840 | 420 |
| ISOPHORONE | ND | 840 | 420 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 840 | 420 |
| N-NITROSODIPHENYLAMINE (2) | ND | 840 | 420 |
| NAPHTHALENE | ND | 840 | 420 |
| NITROBENZENE | ND | 840 | 420 |
| PENTACHLOROPHENOL | ND | 1700 | 440 |
| PHENANTHRENE | ND | 840 | 420 |
| PHENOL | ND | 840 | 420 |
| PYRENE | ND | 840 | 420 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 68 | 20-140 |
| 2-FLUOROBIPHENYL | 65 | 30-130 |
| 2-FLUOROPHENOL | 52 | 20-130 |
| NITROBENZENE-D5 | 63 | 20-130 |
| PHENOL-D5 | 55 | 20-130 |
| TERPHENYL-D14 | 77 | 40-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

4403008

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-170-W-02 | Date Analyzed: | 12/13/07 22:26 |
| Lab Samp ID: | L082-02 | Dilution Factor: | .94 |
| Lab File ID: | RLK323 | Matrix : | WATER |
| Ext Btch ID: | SVL025W | % Moisture : | NA |
| Calib. Ref.: | RKK015 | Instrument ID : | T-052 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,2-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,3-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 1,4-DICHLOROBENZENE | ND | 9.4 | 4.7 |
| 2,4,5-TRICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4,6-TRICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4-DICHLOROPHENOL | ND | 9.4 | 4.7 |
| 2,4-DIMETHYLPHENOL | ND | 9.4 | 4.7 |
| 2,4-DINITROPHENOL | ND | 19 | 4.7 |
| 2,4-DINITROTOLUENE | ND | 9.4 | 4.7 |
| 2,6-DINITROTOLUENE | ND | 9.4 | 4.7 |
| 2-CHLORONAPHTHALENE | ND | 9.4 | 4.7 |
| 2-CHLOROPHENOL | ND | 9.4 | 4.7 |
| 2-METHYLNAPHTHALENE | ND | 9.4 | 4.7 |
| 2-METHYLPHENOL | ND | 9.4 | 4.7 |
| 2-NITROANILINE | ND | 9.4 | 4.7 |
| 2-NITROPHENOL | ND | 9.4 | 4.7 |
| 3,3'-DICHLOROBENZIDINE | ND | 9.4 | 4.7 |
| 3-NITROANILINE | ND | 9.4 | 4.7 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 19 | 4.7 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 9.4 | 4.7 |
| 4-CHLORO-3-METHYLPHENOL | ND | 9.4 | 4.7 |
| 4-CHLOROANILINE | ND | 9.4 | 4.7 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 9.4 | 4.7 |
| 4-METHYLPHENOL (1) | ND | 9.4 | 4.7 |
| 4-NITROANILINE | ND | 9.4 | 4.7 |
| 4-NITROPHENOL | ND | 19 | 4.7 |
| ACENAPHTHENE | ND | 9.4 | 4.7 |
| ACENAPHTHYLENE | ND | 9.4 | 4.7 |
| ANTHRACENE | ND | 9.4 | 4.7 |
| BENZO(A)ANTHRACENE | ND | 9.4 | 4.7 |
| BENZO(A)PYRENE | ND | 9.4 | 4.7 |
| BENZO(B)FLUORANTHENE | ND | 9.4 | 4.7 |
| BENZO(K)FLUORANTHENE | ND | 9.4 | 4.7 |
| BENZO(G,H,I)PERYLENE | ND | 9.4 | 4.7 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 9.4 | 4.7 |
| BIS(2-CHLOROETHYL)ETHER | ND | 9.4 | 4.7 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 9.4 | 4.7 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 9.4 | 4.7 |
| BUTYLBENZYLPHTHALATE | ND | 9.4 | 4.7 |
| CHRYSENE | ND | 9.4 | 4.7 |
| DI-N-BUTYLPHTHALATE | ND | 9.4 | 4.7 |
| DI-N-OCTYLPHTHALATE | ND | 9.4 | 4.7 |
| DIBENZO(A,H)ANTHRACENE | ND | 9.4 | 4.7 |
| DIBENZOFURAN | ND | 9.4 | 4.7 |
| DIETHYLPHTHALATE | ND | 9.4 | 4.7 |
| DIMETHYLPHTHALATE | ND | 9.4 | 4.7 |
| FLUORANTHENE | ND | 9.4 | 4.7 |
| FLUORENE | ND | 9.4 | 4.7 |
| HEXACHLOROBENZENE | ND | 9.4 | 4.7 |
| HEXACHLOROBUTADIENE | ND | 9.4 | 4.7 |
| HEXACHLOROCYCLOPENTADIENE | ND | 9.4 | 4.7 |
| HEXACHLOROETHANE | ND | 9.4 | 4.7 |
| INDENO(1,2,3-CD)PYRENE | ND | 9.4 | 4.7 |
| ISOPHORONE | ND | 9.4 | 4.7 |
| N-NITROSO-DI-N-PROPYLAMINE | ND | 9.4 | 4.7 |
| N-NITROSODIPHENYLAMINE (2) | ND | 9.4 | 4.7 |
| NAPHTHALENE | ND | 9.4 | 4.7 |
| NITROBENZENE | ND | 9.4 | 4.7 |
| PENTACHLOROPHENOL | ND | 19 | 4.7 |
| PHENANTHRENE | ND | 9.4 | 4.7 |
| PHENOL | ND | 9.4 | 4.7 |
| PYRENE | ND | 9.4 | 4.7 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 84 | 30-150 |
| 2-FLUOROBIPHENYL | 76 | 30-130 |
| 2-FLUOROPHENOL | 67 | 20-130 |
| NITROBENZENE-D5 | 74 | 30-130 |
| PHENOL-D5 | 62 | 30-130 |
| TERPHENYL-D14 | 91 | 30-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

M40130008

METHOD 3520C/8270C
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 071082 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-093-W-01 | Date Analyzed: | 12/13/07 22:45 |
| Lab Samp ID: | L082-07 | Dilution Factor: | .96 |
| Lab File ID: | RLK324 | Matrix | : WATER |
| Ext Btch ID: | SVL025W | % Moisture | : NA |
| Calib. Ref.: | RKK015 | Instrument ID | : T-052 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| 1,2,4-TRICHLOROBENZENE | ND U | 9.6 | 4.8 |
| 1,2-DICHLOROBENZENE | ND | 9.6 | 4.8 |
| 1,3-DICHLOROBENZENE | ND | 9.6 | 4.8 |
| 1,4-DICHLOROBENZENE | ND | 9.6 | 4.8 |
| 2,4,5-TRICHLOROPHENOL | ND | 9.6 | 4.8 |
| 2,4,6-TRICHLOROPHENOL | ND | 9.6 | 4.8 |
| 2,4-DICHLOROPHENOL | ND | 9.6 | 4.8 |
| 2,4-DIMETHYLPHENOL | ND | 9.6 | 4.8 |
| 2,4-DINITROPHENOL | ND | 19 | 4.8 |
| 2,4-DINITROTOLUENE | ND | 9.6 | 4.8 |
| 2,6-DINITROTOLUENE | ND | 9.6 | 4.8 |
| 2-CHLORONAPHTHALENE | ND | 9.6 | 4.8 |
| 2-CHLOROPHENOL | ND | 9.6 | 4.8 |
| 2-METHYLNAPHTHALENE | ND | 9.6 | 4.8 |
| 2-METHYLPHENOL | ND | 9.6 | 4.8 |
| 2-NITROANILINE | ND | 9.6 | 4.8 |
| 2-NITROPHENOL | ND | 9.6 | 4.8 |
| 3,3'-DICHLOROBENZIDINE | ND | 9.6 | 4.8 |
| 3-NITROANILINE | ND | 9.6 | 4.8 |
| 4,6-DINITRO-2-METHYLPHENOL | ND | 19 | 4.8 |
| 4-BROMOPHENYL-PHENYL ETHER | ND | 9.6 | 4.8 |
| 4-CHLORO-3-METHYLPHENOL | ND | 9.6 | 4.8 |
| 4-CHLOROANILINE | ND | 9.6 | 4.8 |
| 4-CHLOROPHENYL-PHENYL ETHER | ND | 9.6 | 4.8 |
| 4-METHYLPHENOL (1) | ND | 9.6 | 4.8 |
| 4-NITROANILINE | ND | 9.6 | 4.8 |
| 4-NITROPHENOL | ND | 19 | 4.8 |
| ACENAPHTHENE | ND | 9.6 | 4.8 |
| ACENAPHTHYLENE | ND | 9.6 | 4.8 |
| ANTHRACENE | ND | 9.6 | 4.8 |
| BENZO(A)ANTHRACENE | ND | 9.6 | 4.8 |
| BENZO(A)PYRENE | ND | 9.6 | 4.8 |
| BENZO(B)FLUORANTHENE | ND | 9.6 | 4.8 |
| BENZO(K)FLUORANTHENE | ND | 9.6 | 4.8 |
| BENZO(G,H,I)PERYLENE | ND | 9.6 | 4.8 |
| BIS(2-CHLOROETHOXY)METHANE | ND | 9.6 | 4.8 |
| BIS(2-CHLOROETHYL)ETHER | ND | 9.6 | 4.8 |
| BIS(2-CHLOROISOPROPYL)ETHER | ND | 9.6 | 4.8 |
| BIS(2-ETHYLHEXYL)PHTHALATE | ND | 9.6 | 4.8 |
| BUTYLBENZYLPHTHALATE | ND | 9.6 | 4.8 |
| CHRYSENE | ND | 9.6 | 4.8 |
| DI-N-BUTYLPHTHALATE | ND | 9.6 | 4.8 |
| DI-N-OCTYLPHTHALATE | ND | 9.6 | 4.8 |
| DIBENZO(A,H)ANTHRACENE | ND | 9.6 | 4.8 |
| DIBENZOFURAN | ND | 9.6 | 4.8 |
| DIETHYLPHTHALATE | ND | 9.6 | 4.8 |
| DIMETHYLPHTHALATE | ND | 9.6 | 4.8 |
| FLUORANTHENE | ND | 9.6 | 4.8 |
| FLUORENE | ND | 9.6 | 4.8 |
| HEXACHLOROBENZENE | ND | 9.6 | 4.8 |
| HEXACHLOROBUTADIENE | ND | 9.6 | 4.8 |
| HEXACHLOROCYCLOPENTADIENE | ND | 9.6 | 4.8 |
| HEXACHLOROETHANE | ND | 9.6 | 4.8 |
| INDENO(1,2,3-CD)PYRENE | ND | 9.6 | 4.8 |
| ISOPHORONE | ND | 9.6 | 4.8 |
| N-NITROSO-DI-N-PROPYLAMINE | ND U | 9.6 | 4.8 |
| N-NITROSODIPHENYLAMINE (2) | ND U | 9.6 | 4.8 |
| NAPHTHALENE | ND | 9.6 | 4.8 |
| NITROBENZENE | ND | 9.6 | 4.8 |
| PENTACHLOROPHENOL | ND | 19 | 4.8 |
| PHENANTHRENE | ND | 9.6 | 4.8 |
| PHENOL | ND | 9.6 | 4.8 |
| PYRENE | ND | 9.6 | 4.8 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| 2,4,6-TRIBROMOPHENOL | 77 | 30-150 |
| 2-FLUOROBIPHENYL | 71 | 30-130 |
| 2-FLUOROPHENOL | 60 | 20-130 |
| NITROBENZENE-D5 | 70 | 30-130 |
| PHENOL-D5 | 58 | 30-130 |
| TERPHENYL-D14 | 88 | 30-130 |

(1): Cannot be separated from 3-Methylphenol
(2): Cannot be separated from Diphenylamine

440-13008

3212

LDC #: 18116B2a

SDG #: 07L082

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/25/08

Page: 1 of 1

Reviewer:

2nd Reviewer:

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/5/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | % RSD, $r^2 \geq 0.990$ |
| IV. | Continuing calibration/ICV | A | ICV = 25 |
| V. | Blanks | A | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | client specified |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/CRQLs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | FB = 1 EB = 3 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

Soil + water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | AP13-170-W-02 FB W | 11 | MBLKIS | 21 | | 31 | |
| 2 | AP13-093-S-02** S | 12 | MBLKIW | 22 | | 32 | |
| 3 | AP13-093-W-01 EB W | 13 | | 23 | | 33 | |
| 4 | | 14 | | 24 | | 34 | |
| 5 | | 15 | | 25 | | 35 | |
| 6 | | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

LDC #: 18116B2a
SDG #: pre cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** Semivolatiles (EPA SW 846 Method 8270C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| [illegible] | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| [illegible] | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| [illegible] | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Was a curve fit used for evaluation? | ✓ | | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) > 0.05? | | ✓ | | |
| [illegible] | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| [illegible] | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| [illegible] | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| [illegible] | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | | ✓ | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences RPD) within the QC limits? | | | ✓ | |
| [illegible] | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |

LDC #: 18116B2a
SDG #: see cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | ✓ | | |
| [illegible] | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| [illegible] | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| [illegible] | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | | | ✓ | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | | | ✓ | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| [illegible] | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | | | ✓ | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| [illegible] | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | | ✓ | |
| [illegible] | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| [illegible] | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# VALIDATION FINDINGS WORKSHEET

## METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

| | | | | |
|---|---|---|---|---|
| A. Phenol** | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene | TT. Pentachlorophenol** | III. Benzo(a)pyrene** |
| B. Bis (2-chloroethyl) ether | Q. 2,4-Dichlorophenol** | FF. 3-Nitroaniline | UU. Phenanthrene | JJJ. Indeno(1,2,3-cd)pyrene |
| C. 2-Chlorophenol | R. 1,2,4-Trichlorobenzene | GG. Acenaphthene** | VV. Anthracene | KKK. Dibenz(a,h)anthracene |
| D. 1,3-Dichlorobenzene | S. Naphthalene | HH. 2,4-Dinitrophenol* | WW. Carbazole | LLL. Benzo(g,h,i)perylene |
| E. 1,4-Dichlorobenzene** | T. 4-Chloroaniline | II. 4-Nitrophenol* | XX. Di-n-butylphthalate | MMM. Bis(2-Chloroisopropyl)ether |
| F. 1,2-Dichlorobenzene | U. Hexachlorobutadiene** | JJ. Dibenzofuran | YY. Fluoranthene** | NNN. Aniline |
| G. 2-Methylphenol | V. 4-Chloro-3-methylphenol** | KK. 2,4-Dinitrotoluene | ZZ. Pyrene | OOO. N-Nitrosodimethylamine |
| H. 2,2'-Oxybis(1-chloropropane) | W. 2-Methylnaphthalene | LL. Diethylphthalate | AAA. Butylbenzylphthalate | PPP. Benzoic Acid |
| I. 4-Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether | BBB. 3,3'-Dichlorobenzidine | QQQ. Benzyl alcohol |
| J. N-Nitroso-di-n-propylamine* | Y. 2,4,6-Trichlorophenol** | NN. Fluorene | CCC. Benzo(a)anthracene | RRR. Pyridine |
| K. Hexachloroethane | Z. 2,4,5-Trichlorophenol | OO. 4-Nitroaniline | DDD. Chrysene | SSS. Benzidine |
| L. Nitrobenzene | AA. 2-Chloronaphthalene | PP. 4,6-Dinitro-2-methylphenol | EEE. Bis(2-ethylhexyl)phthalate | TTT. |
| M. Isophorone | BB. 2-Nitroaniline | QQ. N-Nitrosodiphenylamine (1)** | FFF. Di-n-octylphthalate** | UUU |
| N. 2-Nitrophenol** | CC. Dimethylphthalate | RR. 4-Bromophenyl-phenylether | GGG. Benzo(b)fluoranthene | VVV. |
| O. 2,4-Dimethylphenol | DD. Acenaphthylene | SS. Hexachlorobenzene | HHH. Benzo(k)fluoranthene | WWW. |

Notes: * = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 18116 B2a
SDG #: per cover

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: P
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | SVL025WL/C | J | ( ) | ( ) | 31 ( 30 ) | MBLKW, | J/W/P |
| | | | | ( ) | ( ) | ( ) | 1, 3 | |
| | | | | ( ) | ( ) | ( ) | — — — | — |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

LDC #: 181[illegible]32a
SDG #: per cover

# VALIDATION FIND[illegible]GS WORKSHEET
## Initial Calibration Calculation Verification

[illegible]ge: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of compound,
$C_x$ = Concentration of compound,
S = Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported RRF (40 std) | Recalculated RRF (40 std) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SV52K13 | 11/13/07 | Phenol (1st internal standard) | 1.525 | 1.525 | 1.534 | 1.534 | 7.73 | 7.73 |
| | | | Naphthalene (2nd internal standard) | 0.869 | 0.869 | 0.937 | 0.937 | 9.56 | 9.56 |
| | | | Fluorene (3rd internal standard) | 1.223 | 1.223 | 1.262 | 1.262 | 4.63 | 4.63 |
| | | | Pentachlorophenol (4th internal standard) | 0.227 | 0.227 | 0.216 | 0.216 | 6.51 | 6.51 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 1.626 | 1.626 | 1.550 | 1.550 | 9.35 | 9.35 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.134 | 1.134 | 1.118 | 1.118 | 6.03 | 6.03 |
| 2 | | | Phenol (1st internal standard) | | | | | | |
| | | | Naphthalene (2nd internal standard) | | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | | |
| 3 | | | Phenol (1st internal standard) | | | | | | |
| | | | Naphthalene (2nd internal standard) | | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B2a
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification


Reviewer:
2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | RLK298 | 12/13/07 | Phenol (1st internal standard) | 1.534 | 1.499 | 1.499 | 2 | 2 |
| | | | Naphthalene (2nd internal standard) | 0.937 | 1.033 | 1.033 | 10 | 10 |
| | | | Fluorene (3rd internal standard) | 1.262 | 1.242 | 1.242 | 2 | 2 |
| | | | Pentachlorophenol (4th internal standard) | 0.216 | 0.209 | 0.209 | 3 | 3 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | 1.550 | 1.530 | 1.530 | 1 | 1 |
| | | | Benzo(a)pyrene (6th internal standard) | 1.118 | 1.080 | 1.080 | 3 | 3 |
| 2 | RLK331 | 12/14/07 | Phenol (1st internal standard) | | 1.736 | 1.736 | 13 | 13 |
| | | | Naphthalene (2nd internal standard) | | 0.932 | 0.932 | 1 | 1 |
| | | | Fluorene (3rd internal standard) | | 1.203 | 1.203 | 5 | 5 |
| | | | Pentachlorophenol (4th internal standard) | | 0.220 | 0.220 | 2 | 2 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | 1.582 | 1.582 | 2 | 2 |
| | | | Benzo(a)pyrene (6th internal standard) | | 1.145 | 1.145 | 2 | 2 |
| 3 | | | Phenol (1st internal standard) | | | | | |
| | | | Naphthalene (2nd internal standard) | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B2a
SDG #: per cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** #2 2x DIL

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | 50 | 15.72 | 63 | 63 | 0 |
| 2-Fluorobiphenyl | ↓ | 16.28 | 65 | 65 | ↓ |
| Terphenyl-d14 | ↓ | 19.28 | 77 | 77 | ↓ |
| Phenol-d5 | 150 | 41.07 | 55 | 55 | ↓ |
| 2-Fluorophenol | ↓ | 38.73 | 52 | 52 | ↓ |
| 2,4,6-Tribromophenol | ↓ | 50.76 | 68 | 68 | ↓ |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

LDC #: 18116B2a
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification


Reviewer: 15
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA  Where: SSC = Spike concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)  LCS = Laboratory control sample percent recovery  LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS ID SOIL

| Compound | Spike Added (ug/kg) | | Spike Concentration (ug/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | 2670 | 2670 | 2560 | 2490 | 96 | 96 | 94 | 94 | 3 | 3 |
| N-Nitroso-di-n-propylamine | ↓ | ↓ | 2590 | 2630 | 97 | 97 | 99 | 99 | 1 | 1 |
| 4-Chloro-3-methylphenol | | | 2330 | 2270 | 87 | 87 | 85 | 85 | 3 | 3 |
| Acenaphthene | | | 2080 | 2140 | 78 | 78 | 80 | 80 | 3 | 3 |
| Pentachlorophenol | | | 1800 | 1930 | 68 | 68 | 72 | 72 | 7 | 7 |
| Pyrene | | | 2460 | 2330 | 92 | 92 | 87 | 87 | 6 | 6 |
| | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B2a
SDG #: See cover

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: B
2nd reviewer: V

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. _____ . _____:

Conc. = (_____)(_____)(_____)(_____)(_____) / (_____)(_____)(_____)(_____)(_____)

= ND

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
| | | | | | |
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# NAS Alameda Point, IR Site 13
# Data Validation Reports
# LDC# 18116

## PAHs

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 4, 2007

**LDC Report Date:** January 28, 2008

**Matrix:** Soil/Water

**Parameters:** Polynuclear Aromatic Hydrocarbons

**Validation Level:** NFESC Level III

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L053

**Sample Identification**

AP13-008-S-01
AP13-007-S-01
AP13-044-S-01
AP13-043-S-01
AP13-169-S-01
AP13-147-S-01
AP13-148-S-01
AP13-148-W-01
AP13-044-S-01MS
AP13-044-S-01MSD

## Introduction

This data review covers 9 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination ($r^2$) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds were within validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 12/13/07 | Benzo(b)fluoranthene | 27.0 | AP13-008-S-01<br>AP13-043-S-01<br>AP13-148-W-01<br>MBLK1W | J (all detects)<br>UJ (all non-detects) | A |

All of the continuing calibration RRF values were within validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|---|---|---|---|---|
| MBLK1S | 12/11/07 | Naphthalene | 11 ug/Kg | All soil samples in SDG 07L053 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Sample AP13-148-W-01 was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

## VI. Surrogate Spikes

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

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| SVL025WX/C (All water samples in SDG 07L053) | Acenaphthene | - | - | 41 (≤30) | J (all detects) | P |
| | Acenaphthylene | - | - | 44 (≤30) | UJ (all non-detects) | |
| | Anthracene | - | - | 34 (≤30) | | |
| | Benzo(k)fluoranthene | - | - | 37 (≤30) | | |
| | Chrysene | - | - | 34 (≤30) | | |
| | Fluoranthene | - | - | 31 (≤30) | | |
| | Fluorene | - | - | 37 (≤30) | | |
| | Naphthalene | - | - | 44 (≤30) | | |
| | Phenanthrene | - | - | 33 (≤30) | | |
| | Pyrene | - | - | 31 (≤30) | | |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

Raw data were not reviewed for this SDG.

## XII. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

## XIII. Tentatively Identified Compounds (TICs)

Raw data were not reviewed for this SDG.

## XIV. System Performance

Raw data were not reviewed for this SDG.

## XV. Overall Assessment

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 07L053

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-008-S-01<br>AP13-043-S-01<br>AP13-148-W-01 | Benzo(b)fluoranthene | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (%D) |
| 07L053 | AP13-148-W-01 | Acenaphthene<br>Acenaphthylene<br>Anthracene<br>Benzo(k)fluoranthene<br>Chrysene<br>Fluoranthene<br>Fluorene<br>Naphthalene<br>Phenanthrene<br>Pyrene | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (RPD) |

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 07L053

No Sample Data Qualified in this SDG

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 07L053

No Sample Data Qualified in this SDG

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-170-W-02 | Date Analyzed: | 12/14/07 03:24 |
| Lab Samp ID: | L082-02 | Dilution Factor: | .94 |
| Lab File ID: | RLZ351 | Matrix | : WATER |
| Ext Btch ID: | SVL025W | % Moisture | : NA |
| Calib. Ref.: | RIZ477 | Instrument ID | : T-048 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| ACENAPHTHENE | ND UJ | 0.94 | 0.19 |
| ACENAPHTHYLENE | ND | 0.94 | 0.19 |
| ANTHRACENE | ND | 0.94 | 0.19 |
| BENZO(A)ANTHRACENE | ND | 0.94 | 0.19 |
| BENZO(A)PYRENE | ND | 0.94 | 0.19 |
| BENZO(B)FLUORANTHENE | ND UJ | 0.94 | 0.19 |
| BENZO(K)FLUORANTHENE | ND | 0.94 | 0.19 |
| BENZO(G,H,I)PERYLENE | ND | 0.94 | 0.19 |
| CHRYSENE | ND UJ | 0.94 | 0.19 |
| DIBENZO(A,H)ANTHRACENE | ND | 0.94 | 0.19 |
| FLUORANTHENE | ND UJ | 0.94 | 0.19 |
| FLUORENE | ND | 0.94 | 0.19 |
| INDENO(1,2,3-CD)PYRENE | ND | 0.94 | 0.19 |
| NAPHTHALENE | ND UJ | 0.94 | 0.19 |
| PHENANTHRENE | ND | 0.94 | 0.19 |
| PYRENE | ND | 0.94 | 0.19 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 73 | 30-130 |

G740/3008

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-093-W-01 | Date Analyzed: | 12/14/07 03:43 |
| Lab Samp ID: | L082-07 | Dilution Factor: | .96 |
| Lab File ID: | RLZ352 | Matrix | : WATER |
| Ext Btch ID: | SVL025W | % Moisture | : NA |
| Calib. Ref.: | RIZ477 | Instrument ID | : T-048 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| ACENAPHTHENE | ND UJ | 0.96 | 0.19 |
| ACENAPHTHYLENE | ND | 0.96 | 0.19 |
| ANTHRACENE | ND | 0.96 | 0.19 |
| BENZO(A)ANTHRACENE | ND U | 0.96 | 0.19 |
| BENZO(A)PYRENE | ND | 0.96 | 0.19 |
| BENZO(B)FLUORANTHENE | ND UJ | 0.96 | 0.19 |
| BENZO(K)FLUORANTHENE | ND | 0.96 | 0.19 |
| BENZO(G,H,I)PERYLENE | ND U | 0.96 | 0.19 |
| CHRYSENE | ND UJ | 0.96 | 0.19 |
| DIBENZO(A,H)ANTHRACENE | ND U | 0.96 | 0.19 |
| FLUORANTHENE | ND UJ | 0.96 | 0.19 |
| FLUORENE | ND | 0.96 | 0.19 |
| INDENO(1,2,3-CD)PYRENE | ND U | 0.96 | 0.19 |
| NAPHTHALENE | ND UJ | 0.96 | 0.19 |
| PHENANTHRENE | ND | 0.96 | 0.19 |
| PYRENE | ND | 0.96 | 0.19 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 80 | 30-130 |

M40/3008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-170-S-01 | Date Analyzed: | 12/17/07 20:33 |
| Lab Samp ID: | L082-03W | Dilution Factor: | 5 |
| Lab File ID: | RLZ421 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 16.8 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND | 120 | 60 |
| ACENAPHTHYLENE | ND | 120 | 60 |
| ANTHRACENE | ND | 120 | 60 |
| BENZO(A)ANTHRACENE | 140 | 120 | 60 |
| BENZO(A)PYRENE | ND | 120 | 60 |
| BENZO(B)FLUORANTHENE | ND | 120 | 60 |
| BENZO(K)FLUORANTHENE | ND | 120 | 60 |
| BENZO(G,H,I)PERYLENE | 520 | 120 | 60 |
| CHRYSENE | 200 | 120 | 60 |
| DIBENZO(A,H)ANTHRACENE | ND | 120 | 60 |
| FLUORANTHENE | 200 | 120 | 60 |
| FLUORENE | ND | 120 | 60 |
| INDENO(1,2,3-CD)PYRENE | 220 | 120 | 60 |
| NAPHTHALENE | ND | 120 | 60 |
| PHENANTHRENE | 87J | 120 | 60 |
| PYRENE | 220 | 120 | 60 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 86 | 40-130 |

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3161

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-094-S-01 | Date Analyzed: | 12/14/07 01:30 |
| Lab Samp ID: | L082-04 | Dilution Factor: | 1 |
| Lab File ID: | RLZ345 | Matrix | : SOIL |
| Ext Btch ID: | SVL028S | % Moisture | : 46.3 |
| Calib. Ref.: | RIZ477 | Instrument ID | : T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND U | 37 | 19 |
| ACENAPHTHYLENE | ND U | 37 | 19 |
| ANTHRACENE | 26J | 37 | 19 |
| BENZO(A)ANTHRACENE | 150 | 37 | 19 |
| BENZO(A)PYRENE | 300 | 37 | 19 |
| BENZO(B)FLUORANTHENE | 290 J | 37 | 19 |
| BENZO(K)FLUORANTHENE | 83 | 37 | 19 |
| BENZO(G,H,I)PERYLENE | 290 | 37 | 19 |
| CHRYSENE | 190 | 37 | 19 |
| DIBENZO(A,H)ANTHRACENE | ND U | 37 | 19 |
| FLUORANTHENE | 300 | 37 | 19 |
| FLUORENE | ND U | 37 | 19 |
| INDENO(1,2,3-CD)PYRENE | 200 | 37 | 19 |
| NAPHTHALENE | ND U | 37 | 19 |
| PHENANTHRENE | 35J | 37 | 19 |
| PYRENE | 440 | 37 | 19 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 70 | 40-130 |

M4013008

3178

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-093-S-01 | Date Analyzed: | 12/14/07 01:49 |
| Lab Samp ID: | L082-05 | Dilution Factor: | 1 |
| Lab File ID: | RLZ346 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 13.9 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND U | 23 | 12 |
| ACENAPHTHYLENE | ND | 23 | 12 |
| ANTHRACENE | ND | 23 | 12 |
| BENZO(A)ANTHRACENE | ND | 23 | 12 |
| BENZO(A)PYRENE | ND | 23 | 12 |
| BENZO(B)FLUORANTHENE | ND UJ | 23 | 12 |
| BENZO(K)FLUORANTHENE | ND U | 23 | 12 |
| BENZO(G,H,I)PERYLENE | ND | 23 | 12 |
| CHRYSENE | ND | 23 | 12 |
| DIBENZO(A,H)ANTHRACENE | ND | 23 | 12 |
| FLUORANTHENE | ND | 23 | 12 |
| FLUORENE | ND | 23 | 12 |
| INDENO(1,2,3-CD)PYRENE | ND | 23 | 12 |
| NAPHTHALENE | ND | 23 | 12 |
| PHENANTHRENE | ND | 23 | 12 |
| PYRENE | ND | 23 | 12 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 68 | 40-130 |

14403008

LDC #: 18116A2b

SDG #: 07L053

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/24/08

Page: 1 of 1

Reviewer:

2nd Reviewer:

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/4/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | %RSD, $r^2 \geq 0.990$ RRF no spec |
| IV. | Continuing calibration/ICV | SW | |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | A | |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | N | |
| XII. | Compound quantitation/CRQLs | N | |
| XIII. | Tentatively identified compounds (TICs) | N | |
| XIV. | System performance | N | |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | EB = 8 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: soil + water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | AP13-008-S-01 | 11 | MBLKIS | 21 | | 31 | |
| 2 | AP13-007-S-01 | 12 | MBLKIW | 22 | | 32 | |
| 3 | AP13-044-S-01 | 13 | | 23 | | 33 | |
| 4 | AP13-043-S-01 | 14 | | 24 | | 34 | |
| 5 | AP13-169-S-01 | 15 | | 25 | | 35 | |
| 6 | AP13-147-S-01 | 16 | | 26 | | 36 | |
| 7 | AP13-148-S-01 | 17 | | 27 | | 37 | |
| 8 | AP13-148-W-01 | 18 | | 28 | | 38 | |
| 9 | AP13-044-S-01MS | 19 | | 29 | | 39 | |
| 10 | AP13-044-S-01MSD | 20 | | 30 | | 40 | |

# VALIDATION FINDINGS WORKSHEET

## METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

| | | | | |
|---|---|---|---|---|
| A. Phenol** | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene | TT. Pentachlorophenol** | III. Benzo(a)pyrene** |
| B. Bis (2-chloroethyl) ether | Q. 2,4-Dichlorophenol** | FF. 3-Nitroaniline | UU. Phenanthrene | JJJ. Indeno(1,2,3-cd)pyrene |
| C. 2-Chlorophenol | R. 1,2,4-Trichlorobenzene | GG. Acenaphthene** | VV. Anthracene | KKK. Dibenz(a,h)anthracene |
| D. 1,3-Dichlorobenzene | S. Naphthalene | HH. 2,4-Dinitrophenol* | WW. Carbazole | LLL. Benzo(g,h,i)perylene |
| E. 1,4-Dichlorobenzene** | T. 4-Chloroaniline | II. 4-Nitrophenol* | XX. Di-n-butylphthalate | MMM. Bis(2-Chloroisopropyl)ether |
| F. 1,2-Dichlorobenzene | U. Hexachlorobutadiene** | JJ. Dibenzofuran | YY. Fluoranthene** | NNN. Aniline |
| G. 2-Methylphenol | V. 4-Chloro-3-methylphenol** | KK. 2,4-Dinitrotoluene | ZZ. Pyrene | OOO. N-Nitrosodimethylamine |
| H. 2,2'-Oxybis(1-chloropropane) | W. 2-Methylnaphthalene | LL. Diethylphthalate | AAA. Butylbenzylphthalate | PPP. Benzoic Acid |
| I. 4-Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether | BBB. 3,3'-Dichlorobenzidine | QQQ. Benzyl alcohol |
| J. N-Nitroso-di-n-propylamine* | Y. 2,4,6-Trichlorophenol** | NN. Fluorene | CCC. Benzo(a)anthracene | RRR. Pyridine |
| K. Hexachloroethane | Z. 2,4,5-Trichlorophenol | OO. 4-Nitroaniline | DDD. Chrysene | SSS. Benzidine |
| L. Nitrobenzene | AA. 2-Chloronaphthalene | PP. 4,6-Dinitro-2-methylphenol | EEE. Bis(2-ethylhexyl)phthalate | TTT. |
| M. Isophorone | BB. 2-Nitroaniline | QQ. N-Nitrosodiphenylamine (1)** | FFF. Di-n-octylphthalate** | UUU |
| N. 2-Nitrophenol** | CC. Dimethylphthalate | RR. 4-Bromophenyl-phenylether | GGG. Benzo(b)fluoranthene | VVV. |
| O. 2,4-Dimethylphenol | DD. Acenaphthylene | SS. Hexachlorobenzene | HHH. Benzo(k)fluoranthene | WWW. |

Notes:* = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

LDC #: 181[illegible]26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours of sample analysis for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: ≤25.0%) | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 12/13/07 | RLZ334 | GGG | 27.0 | | MBLK1W, 1, 4, 8 | J/UJ/A |

CONCAL.2S

LDC #: 18116A26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

**Blank extraction date:** 12/11/07 **Blank analysis date:** 12/13/07
**Conc. units:** ug/kg Associated Samples: All soils (ND)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | UBLK15 | | | | | | | | | |
| S | 11 | | | | | | | | | |
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| | | | | | | | | | | |

**Blank extraction date:**_____ **Blank analysis date:**_____
**Conc. units:**_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | |
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 18116A2b
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?
Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | SV2625WX/C | GG. | ( ) | ( ) | 41 ( 30 ) | All water + | J/UJ/P |
| | | | DD. | ( ) | ( ) | 44 ( ) | MBLK1W | |
| | | | VV | ( ) | ( ) | 34 ( ) | — — — | — |
| | | | HHH | ( ) | ( ) | 37 ( ) | | |
| | | | DDD | ( ) | ( ) | 34 ( ) | | |
| | | | YY | ( ) | ( ) | 31 ( ) | | |
| | | | NN | ( ) | ( ) | 37 ( ) | | |
| | | | S | ( ) | ( ) | 44 ( ) | | |
| | | | UU | ( ) | ( ) | 33 ( ) | | |
| | | | ZZ | ( ) | ( ) | 31 ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 5, 2007

**LDC Report Date:** January 28, 2008

**Matrix:** Soil/Water

**Parameters:** Polynuclear Aromatic Hydrocarbons

**Validation Level:** NFESC Level III & IV

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L082

**Sample Identification**

AP13-170-W-02
AP13-170-S-01**
AP13-094-S-01**
AP13-093-S-01
AP13-093-W-01

**Indicates sample underwent NFESC Level IV review

## Introduction

This data review covers 3 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per a modification of EPA SW 846 Method 8270C using Selected Ion Monitoring (SIM) for Polynuclear Aromatic Hydrocarbons.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section V.

Field duplicates are summarized in Section XVI.

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

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals. All ion abundance requirements were met.

## III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for selected compounds.

A curve fit, based on the initial calibration, was established for quantitation for selected compounds. The coefficient of determination ($r^2$) was greater than or equal to 0.990 .

Average relative response factors (RRF) for all target compounds were within validation criteria.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 25.0% with the following exceptions:

| Date | Compound | %D | Associated Samples | Flag | A or P |
|---|---|---|---|---|---|
| 12/13/07 | Benzo(b)fluoranthene | 27.0 | AP13-170-W-02<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-W-01<br>MBLK1W | J (all detects)<br>UJ (all non-detects) | A |

All of the continuing calibration RRF values were within validation criteria.

## V. Blanks

Method blanks were reviewed for each matrix as applicable. No polynuclear aromatic hydrocarbon contaminants were found in the method blanks with the following exceptions:

| Method Blank ID | Extraction Date | Compound TIC (RT in minutes) | Concentration | Associated Samples |
|---|---|---|---|---|
| MBLK1S | 12/11/07 | Naphthalene | 11 ug/Kg | All soil samples in SDG 07L082 |

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Sample AP13-093-W-01 was identified as an equipment blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

Sample AP13-170-W-02 was identified as a field blank. No polynuclear aromatic hydrocarbon contaminants were found in this blank.

## VI. Surrogate Spikes

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

## VII. Matrix Spike/Matrix Spike Duplicates

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

## VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| LCS ID (Associated Samples) | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| SVL025WX/C (All water samples in SDG 07L082) | Acenaphthene | - | - | 41 (≤30) | J (all detects) UJ (all non-detects) | P |
| | Acenaphthylene | - | - | 44 (≤30) | | |
| | Anthracene | - | - | 34 (≤30) | | |
| | Benzo(k)fluoranthene | - | - | 37 (≤30) | | |
| | Chrysene | - | - | 34 (≤30) | | |
| | Fluoranthene | - | - | 31 (≤30) | | |
| | Fluorene | - | - | 37 (≤30) | | |
| | Naphthalene | - | - | 44 (≤30) | | |
| | Phenanthrene | - | - | 33 (≤30) | | |
| | Pyrene | - | - | 31 (≤30) | | |

## IX. Regional Quality Assurance and Quality Control

Not applicable.

## X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Target Compound Identifications

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

## XII. Compound Quantitation and CRQLs

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

## XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

## XIV. System Performance

The system performance was acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XV. Overall Assessment

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

## XVI. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 07L082

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-170-W-02<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-W-01 | Benzo(b)fluoranthene | J (all detects)<br>UJ (all non-detects) | A | Continuing calibration (%D) |
| 07L082 | AP13-170-W-02<br>AP13-093-W-01 | Acenaphthene<br>Acenaphthylene<br>Anthracene<br>Benzo(k)fluoranthene<br>Chrysene<br>Fluoranthene<br>Fluorene<br>Naphthalene<br>Phenanthrene<br>Pyrene | J (all detects)<br>UJ (all non-detects) | P | Laboratory control samples (RPD) |

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 07L082

No Sample Data Qualified in this SDG

## NAS Alameda Point, IR Site 13
## Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 07L082

No Sample Data Qualified in this SDG

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-008-S-01 | Date Analyzed: | 12/13/07 22:20 |
| Lab Samp ID: | L053-01 | Dilution Factor: | 1 |
| Lab File ID: | RLZ335 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 16.5 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND U | 24 | 12 |
| ACENAPHTHYLENE | ND | 24 | 12 |
| ANTHRACENE | ND | 24 | 12 |
| BENZO(A)ANTHRACENE | ND | 24 | 12 |
| BENZO(A)PYRENE | ND | 24 | 12 |
| BENZO(B)FLUORANTHENE | ND UJ | 24 | 12 |
| BENZO(K)FLUORANTHENE | ND U | 24 | 12 |
| BENZO(G,H,I)PERYLENE | ND | 24 | 12 |
| CHRYSENE | ND | 24 | 12 |
| DIBENZO(A,H)ANTHRACENE | ND | 24 | 12 |
| FLUORANTHENE | ND | 24 | 12 |
| FLUORENE | ND | 24 | 12 |
| INDENO(1,2,3-CD)PYRENE | ND | 24 | 12 |
| NAPHTHALENE | ND | 24 | 12 |
| PHENANTHRENE | ND | 24 | 12 |
| PYRENE | ND | 24 | 12 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 71 | 40-130 |

4/10/2008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-007-S-01 | Date Analyzed: | 12/17/07 18:20 |
| Lab Samp ID: | L053-02W | Dilution Factor: | 1 |
| Lab File ID: | RLZ414 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 16.4 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND | 24 | 12 |
| ACENAPHTHYLENE | ND | 24 | 12 |
| ANTHRACENE | ND | 24 | 12 |
| BENZO(A)ANTHRACENE | ND | 24 | 12 |
| BENZO(A)PYRENE | ND | 24 | 12 |
| BENZO(B)FLUORANTHENE | ND | 24 | 12 |
| BENZO(K)FLUORANTHENE | ND | 24 | 12 |
| BENZO(G,H,I)PERYLENE | ND | 24 | 12 |
| CHRYSENE | ND | 24 | 12 |
| DIBENZO(A,H)ANTHRACENE | ND | 24 | 12 |
| FLUORANTHENE | ND | 24 | 12 |
| FLUORENE | ND | 24 | 12 |
| INDENO(1,2,3-CD)PYRENE | ND | 24 | 12 |
| NAPHTHALENE | ND | 24 | 12 |
| PHENANTHRENE | ND | 24 | 12 |
| PYRENE | ND | 24 | 12 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 87 | 40-130 |

4mo/3008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-044-S-01 | Date Analyzed: | 12/17/07 18:39 |
| Lab Samp ID: | L053-05W | Dilution Factor: | 1 |
| Lab File ID: | RLZ415 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 19.9 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND | 25 | 12 |
| ACENAPHTHYLENE | ND | 25 | 12 |
| ANTHRACENE | ND | 25 | 12 |
| BENZO(A)ANTHRACENE | ND | 25 | 12 |
| BENZO(A)PYRENE | ND | 25 | 12 |
| BENZO(B)FLUORANTHENE | ND | 25 | 12 |
| BENZO(K)FLUORANTHENE | ND | 25 | 12 |
| BENZO(G,H,I)PERYLENE | ND | 25 | 12 |
| CHRYSENE | ND | 25 | 12 |
| DIBENZO(A,H)ANTHRACENE | ND | 25 | 12 |
| FLUORANTHENE | ND | 25 | 12 |
| FLUORENE | ND | 25 | 12 |
| INDENO(1,2,3-CD)PYRENE | ND | 25 | 12 |
| NAPHTHALENE | ND | 25 | 12 |
| PHENANTHRENE | ND | 25 | 12 |
| PYRENE | ND | 25 | 12 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 72 | 40-130 |

14013008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-043-S-01 | Date Analyzed: | 12/13/07 23:54 |
| Lab Samp ID: | L053-06 | Dilution Factor: | 1 |
| Lab File ID: | RLZ340 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 20.6 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND U | 25 | 13 |
| ACENAPHTHYLENE | ND | 25 | 13 |
| ANTHRACENE | ND | 25 | 13 |
| BENZO(A)ANTHRACENE | ND | 25 | 13 |
| BENZO(A)PYRENE | ND | 25 | 13 |
| BENZO(B)FLUORANTHENE | ND UJ | 25 | 13 |
| BENZO(K)FLUORANTHENE | ND U | 25 | 13 |
| BENZO(G,H,I)PERYLENE | ND | 25 | 13 |
| CHRYSENE | ND | 25 | 13 |
| DIBENZO(A,H)ANTHRACENE | ND | 25 | 13 |
| FLUORANTHENE | ND | 25 | 13 |
| FLUORENE | ND | 25 | 13 |
| INDENO(1,2,3-CD)PYRENE | ND | 25 | 13 |
| NAPHTHALENE | ND | 25 | 13 |
| PHENANTHRENE | ND | 25 | 13 |
| PYRENE | ND | 25 | 13 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 85 | 40-130 |

14403008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-169-S-01 | Date Analyzed: | 12/17/07 19:36 |
| Lab Samp ID: | L053-09W | Dilution Factor: | 1 |
| Lab File ID: | RLZ418 | Matrix | : SOIL |
| Ext Btch ID: | SVL028S | % Moisture | : 10.3 |
| Calib. Ref.: | RIZ477 | Instrument ID | : T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | 16J J | 22 | 11 |
| ACENAPHTHYLENE | ND U | 22 | 11 |
| ANTHRACENE | ND | 22 | 11 |
| BENZO(A)ANTHRACENE | 30 | 22 | 11 |
| BENZO(A)PYRENE | ND U | 22 | 11 |
| BENZO(B)FLUORANTHENE | ND | 22 | 11 |
| BENZO(K)FLUORANTHENE | ND | 22 | 11 |
| BENZO(G,H,I)PERYLENE | 39 | 22 | 11 |
| CHRYSENE | 49 | 22 | 11 |
| DIBENZO(A,H)ANTHRACENE | ND U | 22 | 11 |
| FLUORANTHENE | 23 | 22 | 11 |
| FLUORENE | 54 | 22 | 11 |
| INDENO(1,2,3-CD)PYRENE | ND U | 22 | 11 |
| NAPHTHALENE | ND | 22 | 11 |
| PHENANTHRENE | ND | 22 | 11 |
| PYRENE | 39 | 22 | 11 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 79 | 40-130 |

440130008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-147-S-01 | Date Analyzed: | 12/17/07 19:55 |
| Lab Samp ID: | L053-11W | Dilution Factor: | 1 |
| Lab File ID: | RLZ419 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 20.7 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND | 25 | 13 |
| ACENAPHTHYLENE | ND | 25 | 13 |
| ANTHRACENE | ND | 25 | 13 |
| BENZO(A)ANTHRACENE | ND | 25 | 13 |
| BENZO(A)PYRENE | ND | 25 | 13 |
| BENZO(B)FLUORANTHENE | ND | 25 | 13 |
| BENZO(K)FLUORANTHENE | ND | 25 | 13 |
| BENZO(G,H,I)PERYLENE | ND | 25 | 13 |
| CHRYSENE | ND | 25 | 13 |
| DIBENZO(A,H)ANTHRACENE | ND | 25 | 13 |
| FLUORANTHENE | ND | 25 | 13 |
| FLUORENE | 26 | 25 | 13 |
| INDENO(1,2,3-CD)PYRENE | ND | 25 | 13 |
| NAPHTHALENE | ND | 25 | 13 |
| PHENANTHRENE | ND | 25 | 13 |
| PYRENE | ND | 25 | 13 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 81 | 40-130 |

1440/3008

METHOD 3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/11/07 18:00 |
| Sample ID: | AP13-148-S-01 | Date Analyzed: | 12/17/07 20:14 |
| Lab Samp ID: | L053-12W | Dilution Factor: | 1 |
| Lab File ID: | RLZ420 | Matrix : | SOIL |
| Ext Btch ID: | SVL028S | % Moisture : | 9.9 |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/kg) | RL (ug/kg) | MDL (ug/kg) |
|---|---|---|---|
| ACENAPHTHENE | ND | 22 | 11 |
| ACENAPHTHYLENE | ND | 22 | 11 |
| ANTHRACENE | ND | 22 | 11 |
| BENZO(A)ANTHRACENE | ND | 22 | 11 |
| BENZO(A)PYRENE | ND | 22 | 11 |
| BENZO(B)FLUORANTHENE | ND | 22 | 11 |
| BENZO(K)FLUORANTHENE | ND | 22 | 11 |
| BENZO(G,H,I)PERYLENE | ND | 22 | 11 |
| CHRYSENE | ND | 22 | 11 |
| DIBENZO(A,H)ANTHRACENE | ND | 22 | 11 |
| FLUORANTHENE | ND | 22 | 11 |
| FLUORENE | ND | 22 | 11 |
| INDENO(1,2,3-CD)PYRENE | ND | 22 | 11 |
| NAPHTHALENE | ND | 22 | 11 |
| PHENANTHRENE | ND | 22 | 11 |
| PYRENE | ND | 22 | 11 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 88 | 40-130 |

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) Perylene-d

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) Phenol-d5
) Terphenyl-d

get Compound
) bis(2-Ethy

METHOD 3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/10/07 16:00 |
| Sample ID: | AP13-148-W-01 | Date Analyzed: | 12/14/07 03:05 |
| Lab Samp ID: | L053-14 | Dilution Factor: | .94 |
| Lab File ID: | RLZ350 | Matrix : | WATER |
| Ext Btch ID: | SVL025W | % Moisture : | NA |
| Calib. Ref.: | RIZ477 | Instrument ID : | T-048 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| ACENAPHTHENE | ND UJ | 0.94 | 0.19 |
| ACENAPHTHYLENE | ND | 0.94 | 0.19 |
| ANTHRACENE | ND | 0.94 | 0.19 |
| BENZO(A)ANTHRACENE | ND U | 0.94 | 0.19 |
| BENZO(A)PYRENE | ND | 0.94 | 0.19 |
| BENZO(B)FLUORANTHENE | ND UJ | 0.94 | 0.19 |
| BENZO(K)FLUORANTHENE | ND | 0.94 | 0.19 |
| BENZO(G,H,I)PERYLENE | ND U | 0.94 | 0.19 |
| CHRYSENE | ND UJ | 0.94 | 0.19 |
| DIBENZO(A,H)ANTHRACENE | ND U | 0.94 | 0.19 |
| FLUORANTHENE | ND UJ | 0.94 | 0.19 |
| FLUORENE | ND | 0.94 | 0.19 |
| INDENO(1,2,3-CD)PYRENE | ND U | 0.94 | 0.19 |
| NAPHTHALENE | ND UJ | 0.94 | 0.19 |
| PHENANTHRENE | ND | 0.94 | 0.19 |
| PYRENE | ND | 0.94 | 0.19 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| TERPHENYL-D14 | 47 | 30-130 |

---
= qualifier
350.D SV48I2

1440|3008

LDC #: 18116B2b

# VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/25/06

SDG #: 07L082

Page: 1 of 1

Laboratory: EMAX Laboratories, Inc.

Reviewer:

2nd Reviewer:

**METHOD:** GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/5/07 |
| II. | GC/MS Instrument performance check | A | |
| III. | Initial calibration | A | % RSD, $r^2$ ≥0.990 RRF no SPCC |
| IV. | Continuing calibration/ICV | SW | |
| V. | Blanks | SW | |
| VI. | Surrogate spikes | A | |
| VII. | Matrix spike/Matrix spike duplicates | N | client specified |
| VIII. | Laboratory control samples | SW | LCS/D |
| IX. | Regional Quality Assurance and Quality Control | N | |
| X. | Internal standards | A | |
| XI. | Target compound identification | A | Not reviewed for Level III validation. |
| XII. | Compound quantitation/CRQLs | A | Not reviewed for Level III validation. |
| XIII. | Tentitatively identified compounds (TICs) | N | Not reviewed for Level III validation. |
| XIV. | System performance | A | Not reviewed for Level III validation. |
| XV. | Overall assessment of data | A | |
| XVI. | Field duplicates | N | |
| XVII. | Field blanks | ND | FB = 1 EB = 5 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

SOIL + water

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | AP13-170-W-02 FB W | | 11 | MBLKIS | 21 | | 31 | |
| 2+ | AP13-170-S-01** S | | 12 | MBLKIW | 22 | | 32 | |
| 3+ | AP13-094-S-01** | | 13 | | 23 | | 33 | |
| 4 | AP13-093-S-01 | | 14 | | 24 | | 34 | |
| 5 | AP13-093-W-01 EB W | | 15 | | 25 | | 35 | |
| 6 | | | 16 | | 26 | | 36 | |
| 7 | | | 17 | | 27 | | 37 | |
| 8 | | | 18 | | 28 | | 38 | |
| 9 | | | 19 | | 29 | | 39 | |
| 10 | | | 20 | | 30 | | 40 | |

LDC #: 18116 2B26
SDG #: see cover

# VALIDATION FINDINGS CHECKLIST


Reviewer:
2nd Reviewer:

**Method:** Semivolatiles (EPA SW 846 Method 8270C)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| [illegible] | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| [illegible] | | | | |
| Were the DFTPP performance results reviewed and found to be within the specified criteria? | ✓ | | | |
| Were all samples analyzed within the 12 hour clock criteria? | ✓ | | | |
| [illegible] | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Was a curve fit used for evaluation? | ✓ | | | |
| Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990? | ✓ | | | |
| Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05? | ✓ | | | |
| [illegible] | | | | |
| Was a continuing calibration standard analyzed at least once every 12 hours for each instrument? | ✓ | | | |
| Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs? | ✓ | | | |
| Were all percent differences (%D) ≤ 25% and relative response factors (RRF) ≥ 0.05? | | ✓ | | |
| [illegible] | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| [illegible] | | | | |
| Were all surrogate %R within QC limits? | ✓ | | | |
| If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R? | NA | | ✓ | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| [illegible] | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | | ✓ | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| [illegible] | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |

LDC #: 18116282b
SDG #: pre cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: 
2nd Reviewer: 

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | | ✓ | | |
| [illegible] | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| [illegible] | | | | |
| Were internal standard area counts within -50% or +100% of the associated calibration standard? | ✓ | | | |
| Were retention times within ± 30 seconds from the associated calibration standard? | ✓ | | | |
| [illegible] | | | | |
| Were relative retention times (RRT's) within ± 0.06 RRT units of the standard? | ✓ | | | |
| Did compound spectra meet specified EPA "Functional Guidelines" criteria? | ✓ | | | |
| Were chromatogram peaks verified and accounted for? | ✓ | | | |
| [illegible] | | | | |
| Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound? | ✓ | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| [illegible] | | | | |
| Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum? | | | ✓ | |
| Were relative intensities of the major ions within ± 20% between the sample and the reference spectra? | | | ✓ | |
| Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)? | | | ✓ | |
| [illegible] | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| [illegible] | | | | |
| Field duplicate pairs were identified in this SDG. | NA | ✓ | | |
| Target compounds were detected in the field duplicates. | | NA | ✓ | |
| [illegible] | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

# VALIDATION FINDINGS WORKSHEET

## METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

| | | | | |
|---|---|---|---|---|
| A. Phenol** | P. Bis(2-chloroethoxy)methane | EE. 2,6-Dinitrotoluene | TT. Pentachlorophenol** | III. Benzo(a)pyrene** |
| B. Bis (2-chloroethyl) ether | Q. 2,4-Dichlorophenol** | FF. 3-Nitroaniline | UU. Phenanthrene | JJJ. Indeno(1,2,3-cd)pyrene |
| C. 2-Chlorophenol | R. 1,2,4-Trichlorobenzene | GG. Acenaphthene** | VV. Anthracene | KKK. Dibenz(a,h)anthracene |
| D. 1,3-Dichlorobenzene | S. Naphthalene | HH. 2,4-Dinitrophenol* | WW. Carbazole | LLL. Benzo(g,h,i)perylene |
| E. 1,4-Dichlorobenzene** | T. 4-Chloroaniline | II. 4-Nitrophenol* | XX. Di-n-butylphthalate | MMM. Bis(2-Chloroisopropyl)ether |
| F. 1,2-Dichlorobenzene | U. Hexachlorobutadiene** | JJ. Dibenzofuran | YY. Fluoranthene** | NNN. Aniline |
| G. 2-Methylphenol | V. 4-Chloro-3-methylphenol** | KK. 2,4-Dinitrotoluene | ZZ. Pyrene | OOO. N-Nitrosodimethylamine |
| H. 2,2'-Oxybis(1-chloropropane) | W. 2-Methylnaphthalene | LL. Diethylphthalate | AAA. Butylbenzylphthalate | PPP. Benzoic Acid |
| I. 4-Methylphenol | X. Hexachlorocyclopentadiene* | MM. 4-Chlorophenyl-phenyl ether | BBB. 3,3'-Dichlorobenzidine | QQQ. Benzyl alcohol |
| J. N-Nitroso-di-n-propylamine* | Y. 2,4,6-Trichlorophenol** | NN. Fluorene | CCC. Benzo(a)anthracene | RRR. Pyridine |
| K. Hexachloroethane | Z. 2,4,5-Trichlorophenol | OO. 4-Nitroaniline | DDD. Chrysene | SSS. Benzidine |
| L. Nitrobenzene | AA. 2-Chloronaphthalene | PP. 4,6-Dinitro-2-methylphenol | EEE. Bis(2-ethylhexyl)phthalate | TTT. |
| M. Isophorone | BB. 2-Nitroaniline | QQ. N-Nitrosodiphenylamine (1)** | FFF. Di-n-octylphthalate** | UUU |
| N. 2-Nitrophenol** | CC. Dimethylphthalate | RR. 4-Bromophenyl-phenylether | GGG. Benzo(b)fluoranthene | VVV. |
| O. 2,4-Dimethylphenol | DD. Acenaphthylene | SS. Hexachlorobenzene | HHH. Benzo(k)fluoranthene | WWW. |

Notes: * = System performance check compound (SPCC) for RRF; ** = Calibration check compound (CCC) for %RSD.

CC L

LDC #: LX11/-B26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

**METHOD:** GC/MS ~~VOA~~ SVOA (EPA SW 846 Method ~~8260B~~ 8270C)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤25 %D and ≥0.05 RRF ?

| # | Date | Standard ID | Compound | Finding %D (Limit: ≤25.0%) | Finding RRF (Limit: ≥0.05) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|
| | 12/13/07 | RLZ334 | GGG | 27.0 | | MBLKIW, 1, 3 → 5 | J/UJ/A |
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CONCAL 1SB

LDC #: 18116B2b
SDG #: [illegible]

# VALIDATION FINDINGS WORKSHEET
## Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Blank extraction date: 12/11/07 Blank analysis date: 12/13/07
Conc. units: ug/kg Associated Samples: All soils (ND)

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | MBK15 | | | | | | | | | |
| S | 11 | | | | | | | | | |
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Blank extraction date:_____ Blank analysis date:_____
Conc. units:_____ Associated Samples:_____

| Compound | Blank ID | Sample Identification | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
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CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 18111.B2b
SDG #: [illegible] cont

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

| # | Date | LCS/LCSD ID | Compound | LCS %R (Limits) | LCSD %R (Limits) | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | | SVL025WX/C | GG | ( ) | ( ) | 41 ( 30 ) | All water + | J/UJ/P |
| | | | DD | ( ) | ( ) | 44 ( ) | MBLK1W | |
| | | | YV | ( ) | ( ) | 34 ( ) | — — — | — |
| | | | HHH | ( ) | ( ) | 37 ( ) | | |
| | | | DDD | ( ) | ( ) | 34 ( ) | | |
| | | | YY | ( ) | ( ) | 31 ( ) | | |
| | | | NN | ( ) | ( ) | 37 ( ) | | |
| | | | S | ( ) | ( ) | 44 ( ) | | |
| | | | UU | ( ) | ( ) | 33 ( ) | | |
| | | | ZZ | ( ) | ( ) | 31 ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
| | | | | ( ) | ( ) | ( ) | | |
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LDC #: 14116B26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification


Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

$A_x$ = Area of compound,
$C_x$ = Concentration of compound,
S = Standard deviation of the RRFs,

$A_{is}$ = Area of associated internal standard
$C_{is}$ = Concentration of internal standard
X = Mean of the RRFs

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Reported RRF (2 std) | Recalculated RRF (2 std) | Reported Average RRF (initial) | Recalculated Average RRF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | SV48I28 | 9/28/07 | ~~Phenol (1st internal standard)~~ | | | | | | |
| | | | Naphthalene (2nd internal standard) | 3.768 | 3768 | 3.754 | 3.754 | 4.03 | 4.03 |
| | | | ~~Fluorene~~ Anthracene (3rd internal standard) | 1.349 | 1.349 | 1.340 | 1.340 | 3.81 | 3.81 |
| | | | ~~Pentachlorophenol~~ Benzo(g) pyrene (4th internal standard) | 1.133 | 1.133 | 1.142 | 1.142 | 14.09 | 14.09 |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | ~~Benzo(a)pyrene (6th internal standard)~~ | | | | | | |
| 2 | | | Phenol (1st internal standard) | | | | | | |
| | | | Naphthalene (2nd internal standard) | | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | | |
| 3 | | | Phenol (1st internal standard) | | | | | | |
| | | | Naphthalene (2nd internal standard) | | | | | | |
| | | | Fluorene (3rd internal standard) | | | | | | |
| | | | Pentachlorophenol (4th internal standard) | | | | | | |
| | | | Bis(2-ethylhexyl)phthalate (5th internal standard) | | | | | | |
| | | | Benzo(a)pyrene (6th internal standard) | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18 B26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
$A_x$ = Area of compound, $A_{is}$ = Area of associated internal standard
$C_x$ = Concentration of compound, $C_{is}$ = Concentration of internal standard

| # | Standard ID | Calibration Date | Compound (Reference Internal Standard) | Average RRF (initial) | Reported RRF (CC) | Recalculated RRF (CC) | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | RLZ301 | 12/13/07 | ~~Phenol (1st internal standard)~~ | | | | | |
| | | | Naphthalene (2nd internal standard) | 3.754 | 3.385 | 3.385 | 9.8 | 9.8 |
| | | | Anthracene ~~Fluorene~~ (3rd internal standard) | 1.340 | 1.342 | 1.342 | 0.1 | 0.1 |
| | | | Benzo(a) pyrene ~~Pentachlorophenol~~ (4th internal standard) | 1.142 | 1.290 | 1.290 | 13.0 | 13.0 |
| | | | ~~Bis(2-ethylhexyl)phthalate~~ (5th internal standard) | | | | | |
| | | | ~~Benzo(a)pyrene (6th internal standard)~~ | | | | | |
| 2 | RLZ334 | 12/13/07 | ~~Phenol (1st internal standard)~~ | | | | | |
| | | | Naphthalene (2nd internal standard) | | 3.345 | 3.345 | 10.9 | 10.9 |
| | | | Anthracene ~~Fluorene~~ (3rd internal standard) | | 1.356 | 1.356 | 1.2 | 1.2 |
| | | | Benzo(a) pyrene ~~Pentachlorophenol~~ (4th internal standard) | | 1.367 | 1.367 | 19.7 | 19.7 |
| | | | ~~Bis(2-ethylhexyl)phthalate~~ (5th internal standard) | | | | | |
| | | | ~~Benzo(a)pyrene (6th internal standard)~~ | | | | | |
| 3 | RLZ410 | 12/17/07 | ~~Phenol (1st~~ internal standard) | | | | | |
| | | | Naphthalene (2nd internal standard) | | 3.447 | 3.447 | 8.2 | 8.2 |
| | | | Anthracene ~~Fluorene~~ (3rd internal standard) | | 1.320 | 1.320 | 1.5 | 1.5 |
| | | | Benzo(a) pyrene ~~Pentachlorophenol~~ (4th internal standard) | | 1.244 | 1.244 | 8.9 | 8.9 |
| | | | ~~Bis(2-ethylhexyl)phthalate (5th internal standard)~~ | | | | | |
| | | | ~~Benzo(a)pyrene (6th internal standard)~~ | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page: 1 of
Reviewer:
2nd Reviewer:

**METHOD:** GC/MS BNA (EPA SW 846 Method 8270C)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA

Where: SSC = Spike concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: LCS/D soil

| Compound | Spike Added (ug/kg) | | Spike Concentration (ug/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | LCS | LCSD | Reported | Recalc | Reported | Recalc | Reported | Recalculated |
| Phenol | | | | | | | | | | |
| N-Nitroso-di-n-propylamine | | | | | | | | | | |
| 4-Chloro-3-methylphenol | | | | | | | | | | |
| Acenaphthene | 333 | 333 | 294 | 275 | 88 | 88 | 83 | 83 | 6 | 6 |
| Pentachlorophenol | | | | | | | | | | |
| Pyrene | ↓ | ↓ | 322 | 297 | 97 | 97 | 89 | 89 | 8 | 8 |
| | | | | | | | | | | |
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Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116 B2b
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of
Reviewer: B
2nd reviewer: ✓

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_t)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

| | | |
|---|---|---|
| $A_x$ | = | Area of the characteristic ion (EICP) for the compound to be measured |
| $A_{is}$ | = | Area of the characteristic ion (EICP) for the specific internal standard |
| $I_s$ | = | Amount of internal standard added in nanograms (ng) |
| $V_o$ | = | Volume or weight of sample extract in milliliters (ml) or grams (g). |
| $V_i$ | = | Volume of extract injected in microliters (ul) |
| $V_t$ | = | Volume of the concentrated extract in microliters (ul) |
| Df | = | Dilution Factor. |
| %S | = | Percent solids, applicable to soil and solid matrices only. |
| 2.0 | = | Factor of 2 to account for GPC cleanup |

Example:

Sample I.D. #2 . Benzo(a) anthracene

Conc. = (26280)(10)(8)(1000) / (292630)(1.306)(0.864)(6.03)(0.832)

= 137.5 ug/kg

| # | Sample ID | Compound | Reported Concentration ( ) | Calculated Concentration ( ) | Qualification |
|---|---|---|---|---|---|
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LDC #: 18116B26
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification

Page: 1 of 1
Reviewer: B
2nd reviewer: ✓

**METHOD:** GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

**Sample ID:** 2 5X

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | 25 | 4.32 | 86 | 86 | 0 |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

**Sample ID:**

| | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|
| Nitrobenzene-d5 | | | | | |
| 2-Fluorobiphenyl | | | | | |
| Terphenyl-d14 | | | | | |
| Phenol-d5 | | | | | |
| 2-Fluorophenol | | | | | |
| 2,4,6-Tribromophenol | | | | | |
| 2-Chlorophenol-d4 | | | | | |
| 1,2-Dichlorobenzene-d4 | | | | | |

# NAS Alameda Point, IR Site 13
# Data Validation Reports
# LDC# 18116

## Metals

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 4, 2007

**LDC Report Date:** January 24, 2008

**Matrix:** Soil/Water

**Parameters:** Metals

**Validation Level:** NFESC Level III

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L053

**Sample Identification**

AP13-008-S-01
AP13-007-S-01
AP13-007-S-02
AP13-044-S-01
AP13-043-S-01
AP13-043-S-02
AP13-041-S-01
AP13-169-S-01
AP13-169-S-02
AP13-147-S-01
AP13-148-S-01
AP13-148-S-02
AP13-148-W-01
AP13-044-S-01MS
AP13-044-S-01MSD

## Introduction

This data review covers 14 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020A and 7000 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples |
|---|---|---|---|
| ICB/CCB | Antimony<br>Thallium<br>Molybdenum | 0.285 ug/L<br>0.121 ug/L<br>0.126 ug/L | All soil samples in SDG 07L053 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-008-S-01 | Thallium | 0.163 mg/Kg | 0.163U mg/Kg |
| AP13-007-S-02 | Molybdenum | 0.140 mg/Kg | 0.140U mg/Kg |
| AP13-044-S-01 | Molybdenum | 0.279 mg/Kg | 0.279U mg/Kg |
| AP13-043-S-01 | Molybdenum | 0.351 mg/Kg | 0.351U mg/Kg |
| AP13-043-S-02 | Molybdenum | 0.194 mg/Kg | 0.194U mg/Kg |

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-041-S-01 | Molybdenum | 0.239 mg/Kg | 0.239U mg/Kg |
| AP13-169-S-01 | Molybdenum | 0.220 mg/Kg | 0.220U mg/Kg |
| AP13-169-S-02 | Antimony<br>Molybdenum | 0.186 mg/Kg<br>0.241 mg/Kg | 0.186U mg/Kg<br>0.241U mg/Kg |
| AP13-147-S-01 | Molybdenum | 0.371 mg/Kg | 0.371U mg/Kg |
| AP13-148-S-01 | Molybdenum | 0.190 mg/Kg | 0.190U mg/Kg |
| AP13-148-S-02 | Thallium<br>Molybdenum | 0.135 mg/Kg<br>0.190 mg/Kg | 0.135U mg/Kg<br>0.190U mg/Kg |

Sample AP13-148-W-01 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-148-W-01 | 12/4/07 | Chromium<br>Copper<br>Zinc | 0.511 ug/L<br>1.92 ug/L<br>11.2 ug/L | All soil samples in SDG 07L053 |

Sample AP13-170-W-02 (from SDG 07L082) was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-170-W-02 | 12/5/07 | Barium<br>Chromium<br>Copper<br>Nickel<br>Zinc | 1.20 ug/L<br>0.533 ug/L<br>0.548 ug/L<br>0.668 ug/L<br>14.0 ug/L | All soil samples in SDG 07L053 |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks.

## IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID (Associated Samples) | Analyte | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| AP13-044-S-01MS/MSD (All soil samples in SDG 07L053) | Antimony | 27 (75-125) | 24 (75-125) | - | J (all detects)<br>UJ (all non-detects) | A |
| AP13-044-S-01MS/MSD (All soil samples in SDG 07L053) | Barium | 135 (75-125) | 156 (75-125) | - | J (all detects) | A |

## VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VII. Laboratory Control Samples (LCS)

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

## VIII. Internal Standards

Raw data were not reviewed for this SDG.

## IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XI. Sample Result Verification

Raw data were not reviewed for this SDG.

## XII. Overall Assessment of Data

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

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Metals - Data Qualification Summary - SDG 07L053

| SDG | Sample | Analyte | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-008-S-01<br>AP13-007-S-01<br>AP13-007-S-02<br>AP13-044-S-01<br>AP13-043-S-01<br>AP13-043-S-02<br>AP13-041-S-01<br>AP13-169-S-01<br>AP13-169-S-02<br>AP13-147-S-01<br>AP13-148-S-01<br>AP13-148-S-02 | Antimony | J (all detects)<br>UJ (all non-detects) | A | Matrix spike/Matrix spike duplicates (%R) |
| 07L053 | AP13-008-S-01<br>AP13-007-S-01<br>AP13-007-S-02<br>AP13-044-S-01<br>AP13-043-S-01<br>AP13-043-S-02<br>AP13-041-S-01<br>AP13-169-S-01<br>AP13-169-S-02<br>AP13-147-S-01<br>AP13-148-S-01<br>AP13-148-S-02 | Barium | J (all detects) | A | Matrix spike/Matrix spike duplicates (%R) |

## NAS Alameda Point, IR Site 13
## Metals - Laboratory Blank Data Qualification Summary - SDG 07L053

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L053 | AP13-008-S-01 | Thallium | 0.163U mg/Kg | A |
| 07L053 | AP13-007-S-02 | Molybdenum | 0.140U mg/Kg | A |
| 07L053 | AP13-044-S-01 | Molybdenum | 0.279U mg/Kg | A |
| 07L053 | AP13-043-S-01 | Molybdenum | 0.351U mg/Kg | A |
| 07L053 | AP13-043-S-02 | Molybdenum | 0.194U mg/Kg | A |
| 07L053 | AP13-041-S-01 | Molybdenum | 0.239U mg/Kg | A |
| 07L053 | AP13-169-S-01 | Molybdenum | 0.220U mg/Kg | A |

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L053 | AP13-169-S-02 | Antimony<br>Molybdenum | 0.186U mg/Kg<br>0.241U mg/Kg | A |
| 07L053 | AP13-147-S-01 | Molybdenum | 0.371U mg/Kg | A |
| 07L053 | AP13-148-S-01 | Molybdenum | 0.190U mg/Kg | A |
| 07L053 | AP13-148-S-02 | Thallium<br>Molybdenum | 0.135U mg/Kg<br>0.190U mg/Kg | A |

**NAS Alameda Point, IR Site 13**
**Metals - Field Blank Data Qualification Summary - SDG 07L053**

No Sample Data Qualified in this SDG

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-008-S-01 | Date Analyzed: | 12/14/07 22:11 |
| Lab Samp ID: | L053-01 | Dilution Factor: | 1 |
| Lab File ID: | 98L10068 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 16.5 |
| Calib. Ref.: | 98L10058 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.599 | 0.120 |
| Arsenic | 1.34 | 0.599 | 0.120 |
| Barium | 90.9 J | 0.599 | 0.120 |
| Beryllium | 0.211J J | 0.599 | 0.120 |
| Cadmium | ND U | 0.599 | 0.120 |
| Chromium | 49.2 | 0.599 | 0.120 |
| Cobalt | 5.04 | 0.599 | 0.120 |
| Copper | 16.8 | 1.20 | 0.240 |
| Lead | 3.00 | 0.599 | 0.120 |
| Molybdenum | ND U | 0.599 | 0.120 |
| Nickel | 39.8 | 0.599 | 0.120 |
| Selenium | ND U | 1.20 | 0.120 |
| Silver | ND U | 0.599 | 0.120 |
| Thallium | 0.163J U | 1.20 | 0.120 |
| Vanadium | 20.9 | 0.599 | 0.120 |
| Zinc | 34.1 | 1.20 | 0.599 |

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METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-007-S-01 | Date Analyzed: | 12/14/07 22:33 |
| Lab Samp ID: | L053-02 | Dilution Factor: | 1 |
| Lab File ID: | 98L10072 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 16.4 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND U J | 0.598 | 0.120 |
| Arsenic | 1.23 | 0.598 | 0.120 |
| Barium | 24.2 J | 0.598 | 0.120 |
| Beryllium | 0.141J J | 0.598 | 0.120 |
| Cadmium | ND U | 0.598 | 0.120 |
| Chromium | 24.6 | 0.598 | 0.120 |
| Cobalt | 3.98 | 0.598 | 0.120 |
| Copper | 9.41 | 1.20 | 0.239 |
| Lead | 1.74 | 0.598 | 0.120 |
| Molybdenum | ND U | 0.598 | 0.120 |
| Nickel | 24.6 | 0.598 | 0.120 |
| Selenium | ND U | 1.20 | 0.120 |
| Silver | ND | 0.598 | 0.120 |
| Thallium | ND | 1.20 | 0.120 |
| Vanadium | 16.4 | 0.598 | 0.120 |
| Zinc | 22.5 | 1.20 | 0.598 |

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METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-007-S-02 | Date Analyzed: | 12/14/07 22:38 |
| Lab Samp ID: | L053-04 | Dilution Factor: | 1 |
| Lab File ID: | 98L10073 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 16.9 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.602 | 0.120 |
| Arsenic | 2.69 | 0.602 | 0.120 |
| Barium | 82.0 J | 0.602 | 0.120 |
| Beryllium | 0.292J | 0.602 | 0.120 |
| Cadmium | 0.165J | 0.602 | 0.120 |
| Chromium | 47.0 | 0.602 | 0.120 |
| Cobalt | 7.42 | 0.602 | 0.120 |
| Copper | 16.2 | 1.20 | 0.241 |
| Lead | 3.89 | 0.602 | 0.120 |
| Molybdenum | 0.140J U | 0.602 | 0.120 |
| Nickel | 53.8 | 0.602 | 0.120 |
| Selenium | ND | 1.20 | 0.120 |
| Silver | ND | 0.602 | 0.120 |
| Thallium | ND | 1.20 | 0.120 |
| Vanadium | 28.4 | 0.602 | 0.120 |
| Zinc | 37.5 | 1.20 | 0.602 |

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METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-044-S-01 | Date Analyzed: | 12/14/07 22:01 |
| Lab Samp ID: | L053-05 | Dilution Factor: | 1 |
| Lab File ID: | 98L10066 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 19.9 |
| Calib. Ref.: | 98L10058 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND | 0.624 | 0.125 |
| Arsenic | 5.26 | 0.624 | 0.125 |
| Barium | 99.2 | 0.624 | 0.125 |
| Beryllium | 0.383J | 0.624 | 0.125 |
| Cadmium | ND | 0.624 | 0.125 |
| Chromium | 56.3 | 0.624 | 0.125 |
| Cobalt | 6.85 | 0.624 | 0.125 |
| Copper | 14.1 | 1.25 | 0.250 |
| Lead | 3.82 | 0.624 | 0.125 |
| Molybdenum | 0.279J | 0.624 | 0.125 |
| Nickel | 60.0 | 0.624 | 0.125 |
| Selenium | ND | 1.25 | 0.125 |
| Silver | ND | 0.624 | 0.125 |
| Thallium | 0.607J | 1.25 | 0.125 |
| Vanadium | 33.5 | 0.624 | 0.125 |
| Zinc | 32.3 | 1.25 | 0.624 |

6440/3108

7005

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-043-S-01 | Date Analyzed: | 12/14/07 22:44 |
| Lab Samp ID: | L053-06 | Dilution Factor: | 1 |
| Lab File ID: | 98L10074 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 20.6 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.630 | 0.126 |
| Arsenic | 2.82 | 0.630 | 0.126 |
| Barium | 36.2 J | 0.630 | 0.126 |
| Beryllium | ND U | 0.630 | 0.126 |
| Cadmium | ND U | 0.630 | 0.126 |
| Chromium | 27.2 | 0.630 | 0.126 |
| Cobalt | 3.04 | 0.630 | 0.126 |
| Copper | 6.22 | 1.26 | 0.252 |
| Lead | 4.26 | 0.630 | 0.126 |
| Molybdenum | 0.351J U | 0.630 | 0.126 |
| Nickel | 22.6 | 0.630 | 0.126 |
| Selenium | ND U | 1.26 | 0.126 |
| Silver | ND U | 0.630 | 0.126 |
| Thallium | ND U | 1.26 | 0.126 |
| Vanadium | 19.0 | 0.630 | 0.126 |
| Zinc | 19.1 | 1.26 | 0.630 |

14401300 8

7007

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-043-S-02 | Date Analyzed: | 12/14/07 22:49 |
| Lab Samp ID: | L053-07 | Dilution Factor: | 1 |
| Lab File ID: | 98L10075 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 17.0 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.602 | 0.120 |
| Arsenic | 4.13 | 0.602 | 0.120 |
| Barium | 114 J | 0.602 | 0.120 |
| Beryllium | 0.480J | 0.602 | 0.120 |
| Cadmium | 0.162J | 0.602 | 0.120 |
| Chromium | 67.7 | 0.602 | 0.120 |
| Cobalt | 10.5 | 0.602 | 0.120 |
| Copper | 15.4 | 1.20 | 0.241 |
| Lead | 4.29 | 0.602 | 0.120 |
| Molybdenum | 0.194J U | 0.602 | 0.120 |
| Nickel | 72.7 | 0.602 | 0.120 |
| Selenium | ND | 1.20 | 0.120 |
| Silver | ND | 0.602 | 0.120 |
| Thallium | ND | 1.20 | 0.120 |
| Vanadium | 36.4 | 0.602 | 0.120 |
| Zinc | 40.9 | 1.20 | 0.602 |

L4401300 8

7888

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-041-S-01 | Date Analyzed: | 12/14/07 22:55 |
| Lab Samp ID: | L053-08 | Dilution Factor: | 1 |
| Lab File ID: | 98L10076 | Matrix | : SOIL |
| Ext Btch ID: | IML011S | % Moisture | : 12.2 |
| Calib. Ref.: | 98L10070 | Instrument ID | : EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.569 | 0.114 |
| Arsenic | 4.76 | 0.569 | 0.114 |
| Barium | 85.6 J | 0.569 | 0.114 |
| Beryllium | 0.370J | 0.569 | 0.114 |
| Cadmium | 0.137J | 0.569 | 0.114 |
| Chromium | 71.1 | 0.569 | 0.114 |
| Cobalt | 4.17 | 0.569 | 0.114 |
| Copper | 14.0 | 1.14 | 0.228 |
| Lead | 4.67 | 0.569 | 0.114 |
| Molybdenum | 0.239J U | 0.569 | 0.114 |
| Nickel | 54.9 | 0.569 | 0.114 |
| Selenium | ND U | 1.14 | 0.114 |
| Silver | ND | 0.569 | 0.114 |
| Thallium | ND | 1.14 | 0.114 |
| Vanadium | 48.2 | 0.569 | 0.114 |
| Zinc | 40.8 | 1.14 | 0.569 |

1440/3008

7009

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-169-S-01 | Date Analyzed: | 12/14/07 23:00 |
| Lab Samp ID: | L053-09 | Dilution Factor: | 1 |
| Lab File ID: | 98L10077 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 10.3 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.557 | 0.111 |
| Arsenic | 1.94 | 0.557 | 0.111 |
| Barium | 67.3 J | 0.557 | 0.111 |
| Beryllium | 0.157J J | 0.557 | 0.111 |
| Cadmium | ND U | 0.557 | 0.111 |
| Chromium | 23.3 | 0.557 | 0.111 |
| Cobalt | 2.95 | 0.557 | 0.111 |
| Copper | 24.8 | 1.11 | 0.223 |
| Lead | 23.6 | 0.557 | 0.111 |
| Molybdenum | 0.220J U | 0.557 | 0.111 |
| Nickel | 15.0 | 0.557 | 0.111 |
| Selenium | ND U | 1.11 | 0.111 |
| Silver | ND | 0.557 | 0.111 |
| Thallium | ND | 1.11 | 0.111 |
| Vanadium | 16.9 | 0.557 | 0.111 |
| Zinc | 39.6 | 1.11 | 0.557 |

MW013108

7818

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-169-S-02 | Date Analyzed: | 12/14/07 23:05 |
| Lab Samp ID: | L053-10 | Dilution Factor: | 1 |
| Lab File ID: | 98L10078 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 25.8 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | 0.186J UJ | 0.674 | 0.135 |
| Arsenic | 8.29 | 0.674 | 0.135 |
| Barium | 70.9 J | 0.674 | 0.135 |
| Beryllium | ND U | 0.674 | 0.135 |
| Cadmium | ND | 0.674 | 0.135 |
| Chromium | 13.2 | 0.674 | 0.135 |
| Cobalt | 0.506J J | 0.674 | 0.135 |
| Copper | 317 | 1.35 | 0.270 |
| Lead | 124 | 0.674 | 0.135 |
| Molybdenum | 0.241J U | 0.674 | 0.135 |
| Nickel | 4.36 | 0.674 | 0.135 |
| Selenium | 0.290J J | 1.35 | 0.135 |
| Silver | ND U | 0.674 | 0.135 |
| Thallium | ND | 1.35 | 0.135 |
| Vanadium | 9.42 | 0.674 | 0.135 |
| Zinc | 195 | 1.35 | 0.674 |

14401308

7211

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-147-S-01 | Date Analyzed: | 12/14/07 23:11 |
| Lab Samp ID: | L053-11 | Dilution Factor: | 1 |
| Lab File ID: | 98L10079 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 20.7 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.631 | 0.126 |
| Arsenic | 2.64 J | 0.631 | 0.126 |
| Barium | 74.8 J | 0.631 | 0.126 |
| Beryllium | 0.447J J | 0.631 | 0.126 |
| Cadmium | 0.207J J | 0.631 | 0.126 |
| Chromium | 48.3 | 0.631 | 0.126 |
| Cobalt | 37.6 | 0.631 | 0.126 |
| Copper | 29.6 | 1.26 | 0.252 |
| Lead | 4.92 | 0.631 | 0.126 |
| Molybdenum | 0.371J U | 0.631 | 0.126 |
| Nickel | 83.0 | 0.631 | 0.126 |
| Selenium | 0.128J J | 1.26 | 0.126 |
| Silver | ND U | 0.631 | 0.126 |
| Thallium | ND J | 1.26 | 0.126 |
| Vanadium | 37.9 | 0.631 | 0.126 |
| Zinc | 49.1 | 1.26 | 0.631 |

1440/3108

7812

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-148-S-01 | Date Analyzed: | 12/14/07 23:16 |
| Lab Samp ID: | L053-12 | Dilution Factor: | 1 |
| Lab File ID: | 98L10080 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 9.9 |
| Calib. Ref.: | 98L10070 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.555 | 0.111 |
| Arsenic | 1.17 | 0.555 | 0.111 |
| Barium | 40.3 J | 0.555 | 0.111 |
| Beryllium | 0.153J | 0.555 | 0.111 |
| Cadmium | ND U | 0.555 | 0.111 |
| Chromium | 24.1 | 0.555 | 0.111 |
| Cobalt | 4.15 | 0.555 | 0.111 |
| Copper | 12.9 | 1.11 | 0.222 |
| Lead | 2.19 | 0.555 | 0.111 |
| Molybdenum | 0.190J U | 0.555 | 0.111 |
| Nickel | 17.4 | 0.555 | 0.111 |
| Selenium | ND U | 1.11 | 0.111 |
| Silver | ND | 0.555 | 0.111 |
| Thallium | ND | 1.11 | 0.111 |
| Vanadium | 19.3 | 0.555 | 0.111 |
| Zinc | 27.7 | 1.11 | 0.555 |

MU013008

7913

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| ...ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| ...ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-148-S-02 | Date Analyzed: | 12/14/07 23:38 |
| Lab Samp ID: | L053-13 | Dilution Factor: | 1 |
| Lab File ID: | 98L10084 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 17.5 |
| Calib. Ref.: | 98L10082 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.606 | 0.121 |
| Arsenic | 3.79 | 0.606 | 0.121 |
| Barium | 122 J | 0.606 | 0.121 |
| Beryllium | 0.423J J | 0.606 | 0.121 |
| Cadmium | ND U | 0.606 | 0.121 |
| Chromium | 79.5 | 0.606 | 0.121 |
| Cobalt | 3.84 | 0.606 | 0.121 |
| Copper | 19.0 | 1.21 | 0.242 |
| Lead | 5.88 | 0.606 | 0.121 |
| Molybdenum | 0.190J UA | 0.606 | 0.121 |
| Nickel | 47.4 | 0.606 | 0.121 |
| Selenium | 0.276J J | 1.21 | 0.121 |
| Silver | ND U | 0.606 | 0.121 |
| Thallium | 0.135J UA | 1.21 | 0.121 |
| Vanadium | 48.1 | 0.606 | 0.121 |
| Zinc | 40.5 | 1.21 | 0.606 |

1440/3008

7014

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| SDG NO. | : 07L053 | Date Extracted: | 12/12/07 14:00 |
| Sample ID: | AP13-148-W-01 | Date Analyzed: | 12/14/07 03:25 |
| Lab Samp ID: | L053-14 | Dilution Factor: | 1 |
| Lab File ID: | 98L09067 | Matrix : | WATER |
| Ext Btch ID: | IML012W | % Moisture : | NA |
| Calib. Ref.: | 98L09059 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| Antimony | ND U | 1.00 | 0.500 |
| Arsenic | ND | 1.00 | 0.500 |
| Barium | ND | 1.00 | 0.500 |
| Beryllium | ND | 1.00 | 0.500 |
| Cadmium | ND | 1.00 | 0.500 |
| Chromium | 0.511J J | 1.00 | 0.500 |
| Cobalt | ND U | 1.00 | 0.500 |
| Copper | 1.92 | 1.00 | 0.500 |
| Lead | ND U | 1.00 | 0.500 |
| Molybdenum | ND | 2.00 | 1.00 |
| Nickel | ND | 1.00 | 0.500 |
| Selenium | ND | 1.00 | 0.500 |
| Silver | ND | 1.00 | 0.500 |
| Thallium | ND | 1.00 | 0.500 |
| Vanadium | ND | 1.00 | 0.500 |
| Zinc | 11.2 | 10.0 | 5.00 |

H40130.08

METHOD 7470A
MERCURY BY COLD VAPOR

Client : RICHARD BRADY & ASSOCIATES
Project : ALAMEDA POINT, IR SITE 13
Batch No. : 07L053

Matrix : WATER
Instrument ID : TI047

| SAMPLE ID | EMAX SAMPLE ID | RESULTS (ug/L) | DLF | MOIST | RL (ug/L) | MDL (ug/L) | Analysis DATETIME | Extraction DATETIME | LFID | CAL REF | PREP BATCH | Collection DATETIME | Received DATETIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~MBLK1W~~ | ~~HGL027WB~~ | ~~ND~~ | 1 | NA | 0.500 | 0.100 | 12/21/0712:33 | 12/20/0715:00 | M47L021010 | M47L021008 | HGL027W | NA | 12/20/07 |
| LCS1W | HGL027WL | 4.86 | 1 | NA | 0.500 | 0.100 | 12/21/0712:35 | 12/20/0715:00 | M47L021011 | M47L021008 | HGL027W | NA | 12/20/07 |
| ~~LCD1W~~ | ~~HGL027WG~~ | ~~4.88~~ | 1 | NA | 0.500 | 0.100 | 12/21/0712:37 | 12/20/0715:00 | M47L021012 | M47L021008 | HGL027W | NA | 12/20/07 |
| AP13-148-W-01 | L053-14 | ND U | 1 | NA | 0.500 | 0.100 | 12/21/0712:50 | 12/20/0715:00 | M47L021018 | M47L021008 | HGL027W | 12/04/07 | 12/05/07 |

144-13008

METHOD 7471A
MERCURY BY COLD VAPOR

Client : RICHARD BRADY & ASSOCIATES
Project : ALAMEDA POINT, IR SITE 13
Batch No. : 07L053

Matrix : SOIL
Instrument ID : TI047

| SAMPLE ID | EMAX SAMPLE ID | RESULTS (mg/kg) | DLF | MOIST | RL (mg/kg) | MDL (mg/kg) | Analysis DATETIME | Extraction DATETIME | LFID | CAL REF | PREP BATCH | Collection DATETIME | Received DATETIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MBLK1S | HGL023SB | ND | 1 | NA | 0.100 | 0.0330 | 12/19/0713:46 | 12/18/0719:00 | M47L016073 | M47L016068 | HGL023S | NA | 12/18/07 |
| LCS1S | HGL023SL | 0.815 | 1 | NA | 0.100 | 0.0330 | 12/19/0713:48 | 12/18/0719:00 | M47L016074 | M47L016068 | HGL023S | NA | 12/18/07 |
| LCD1S | HGL023SC | 0.798 | 1 | NA | 0.100 | 0.0330 | 12/19/0713:51 | 12/18/0719:00 | M47L016075 | M47L016068 | HGL023S | NA | 12/18/07 |
| AP13-044-S-01AS | L053-05A | 0.520 | 1 | 19.9 | 0.125 | 0.0412 | 12/19/0713:53 | 12/18/0719:00 | M47L016076 | M47L016068 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-044-S-01 | L053-05 | 0.0824J J | 1 | 19.9 | 0.125 | 0.0412 | 12/19/0713:55 | 12/18/0719:00 | M47L016077 | M47L016068 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-044-S-01DL | L053-05J | ND UR | 5 | 19.9 | 0.624 | 0.206 | 12/19/0713:57 | 12/18/0719:00 | M47L016078 | M47L016068 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-043-S-01MS | L053-05M | 1.12 | 1 | 19.9 | 0.125 | 0.0412 | 12/19/0713:59 | 12/18/0719:00 | M47L016079 | M47L016068 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-043-S-01MSD | L053-05S | 1.17 | 1 | 19.9 | 0.125 | 0.0412 | 12/19/0714:05 | 12/18/0719:00 | M47L016082 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-008-S-01 | L053-01 | ND U | 1 | 16.5 | 0.120 | 0.0395 | 12/19/0714:07 | 12/18/0719:00 | M47L016083 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-007-S-01 | L053-02 | ND | 1 | 16.4 | 0.120 | 0.0395 | 12/19/0714:09 | 12/18/0719:00 | M47L016084 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-007-S-02 | L053-04 | ND | 1 | 16.9 | 0.120 | 0.0397 | 12/19/0714:13 | 12/18/0719:00 | M47L016086 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-043-S-01 | L053-06 | ND | 1 | 20.6 | 0.126 | 0.0416 | 12/19/0714:15 | 12/18/0719:00 | M47L016087 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-043-S-02 | L053-07 | ND | 1 | 17.0 | 0.120 | 0.0398 | 12/19/0714:17 | 12/18/0719:00 | M47L016088 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-041-S-01 | L053-08 | ND | 1 | 12.2 | 0.114 | 0.0376 | 12/19/0714:19 | 12/18/0719:00 | M47L016089 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-169-S-01 | L053-09 | 0.139 | 1 | 10.3 | 0.111 | 0.0368 | 12/19/0714:21 | 12/18/0719:00 | M47L016090 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-169-S-02 | L053-10 | 0.0892J J | 1 | 25.8 | 0.135 | 0.0445 | 12/19/0714:24 | 12/18/0719:00 | M47L016091 | M47L016080 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-147-S-01 | L053-11 | ND U | 1 | 20.7 | 0.126 | 0.0416 | 12/19/0714:30 | 12/18/0719:00 | M47L016094 | M47L016092 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-148-S-01 | L053-12 | ND | 1 | 9.9 | 0.111 | 0.0366 | 12/19/0714:31 | 12/18/0719:00 | M47L016095 | M47L016092 | HGL023S | 12/04/07 | 12/05/07 |
| AP13-148-S-02 | L053-13 | ND | 1 | 17.5 | 0.121 | 0.0400 | 12/19/0714:33 | 12/18/0719:00 | M47L016096 | M47L016092 | HGL023S | 12/04/07 | 12/05/07 |

MH01300 8

LDC #: 18116A4

SDG #: 07L053

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III

Date: 1/18/08

Page: 1 of 1

Reviewer: AL

2nd Reviewer: ✓

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020A/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/4/07 |
| II. | Calibration | A | |
| III. | Blanks | SW | |
| IV. | ICP Interference Check Sample (ICS) Analysis | A | |
| V. | Matrix Spike Analysis | SW | MS/MSD |
| VI. | Duplicate Sample Analysis | N | |
| VII. | Laboratory Control Samples (LCS) | A | LCS/LCSD |
| VIII. | Internal Standard (ICP-MS) | N | Not Reviewed for Level III |
| IX. | Furnace Atomic Absorption QC | N | Not Utilized |
| X. | ICP Serial Dilution | A | |
| XI. | Sample Result Verification | N | |
| XII. | Overall Assessment of Data | A | |
| XIII. | Field Duplicates | N | |
| XIV. | Field Blanks | SW | EB: 13 FB: AP13-170-W-02 (from 07L082) |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:

| | | Soil + water | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | AP13-008-S-01 | S | 11 | AP13-148-S-01 | S | 21 | | 31 | |
| 2 | AP13-007-S-01 | ↓ | 12 | AP13-148-S-02 | ↓ | 22 | | 32 | |
| 3 | AP13-007-S-02 | | 13 | AP13-148-W-01 | W | 23 | | 33 | |
| 4 | AP13-044-S-01 | | 14 | AP13-044-S-01MS | S | 24 | | 34 | |
| 5 | AP13-043-S-01 | | 15 | AP13-044-S-01MSD | ↓ | 25 | | 35 | |
| 6 | AP13-043-S-02 | | 16 | MB | | 26 | | 36 | |
| 7 | AP13-041-S-01 | | 17 | | | 27 | | 37 | |
| 8 | AP13-169-S-01 | | 18 | | | 28 | | 38 | |
| 9 | AP13-169-S-02 | | 19 | | | 29 | | 39 | |
| 10 | AP13-147-S-01 | ↓ | 20 | | | 30 | | 40 | |

Notes:

LDC #: 15116A4 VALIDATION FINDINGS WORKSHEET Page: 1 of 1

SDG #: 07L053

## VALIDATION FINDINGS WORKSHEET
### Sample Specific Element Reference

Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

| Sample ID | Matrix | Target Analyte List (TAL) |
|---|---|---|
| 1-12 | So | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| 13 | W | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| QC sample 14-15 | So | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| **Analysis Method** | | |
| ICP | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| ICP Trace | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| ICP-MS | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |
| GFAA | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, $CN^-$, ___ ___ |

Comments: Mercury by CVAA if performed

LDC #: 18116A4
SDG #: 07L053

# VALIDATION FINDINGS WORKSHEET
## PB/ICB/CCB QUALIFIED SAMPLES


Reviewer: AL
2nd Reviewer: L

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: 1000x
Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: All soil

| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Blank Action Limit | Sample Identification 1 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Al | | | | | | | | | | | | | | | Al | |
| Sb | | | 0.285 | 1.43 | | | | | | | | 0.186 | | | Sb | |
| As | | | | | | | | | | | | | | | As | |
| Ba | | | | | | | | | | | | | | | Ba | |
| Be | | | | | | | | | | | | | | | Be | |
| Cd | | | | | | | | | | | | | | | Cd | |
| Ca | | | | | | | | | | | | | | | Ca | |
| Cr | | | | | | | | | | | | | | | Cr | |
| Co | | | | | | | | | | | | | | | Co | |
| Cu | | | | | | | | | | | | | | | Cu | |
| Fe | | | | | | | | | | | | | | | Fe | |
| Pb | | | | | | | | | | | | | | | Pb | |
| Mg | | | | | | | | | | | | | | | Mg | |
| Mn | | | | | | | | | | | | | | | Mn | |
| Hg | | | | | | | | | | | | | | | Hg | |
| Ni | | | | | | | | | | | | | | | Ni | |
| K | | | | | | | | | | | | | | | K | |
| Se | | | | | | | | | | | | | | | Se | |
| Ag | | | | | | | | | | | | | | | Ag | |
| Na | | | | | | | | | | | | | | | Na | |
| Tl | | | 0.121 | 0.605 | 0.163 | | | | | | | | | | Tl | 0.135 |
| V | | | | | | | | | | | | | | | V | |
| Zn | | | | | | | | | | | | | | | Zn | |
| B | | | | | | | | | | | | | | | B | |
| Mo | | | 0.128 | 0.64 | | 0.140 | 0.279 | 0.351 | 0.194 | 0.239 | 0.220 | 0.241 | 0.371 | 0.190 | Mo | 0.190 |
| Sr | | | | | | | | | | | | | | | Sr | |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 15116A4
SDG #: 0AL053

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)
(Y) N N/A Field blanks were identified in this SDG.
(Y) N N/A Were target analytes detected in the field blanks?

Blank units: mg/L Associated sample units: mg/kg
Sampling date: 12/4/07 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / (Other): EB Associated Samples: All soil (>5x)

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13 | | | | | | | | | | | |
| Cr | 0.511 | 0.256 | | | | | | | | | | |
| Cu | 1.92 | 0.96 | | | | | | | | | | |
| Zn | 11.2 | 5.6 | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |

Blank units: Associated sample units:
Sampling date: Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples:

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
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ALL RESULTS WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

FBLKASC2.4S2

LDC #: 18116 A4
SDG #: 07L053

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 2 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/7000)

Y N N/A Field blanks were identified in this SDG.
Y N N/A Were target analytes detected in the field blanks?

**Blank units:** ug/L **Associated sample units:** mg/kg
**Sampling date:** 12/5/07 **Soil factor applied** 100x
**Field blank type:** (circle one) Field Blank / Rinsate / Other: _____ **Associated Samples:** All soil (>5x)

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AP13-170-W-02 | | | | | | | | | | | |
| Ba | 1.20 | 0.60 | | | | | | | | | | |
| Cr | 0.533 | 0.267 | | | | | | | | | | |
| Cu | 0.548 | 0.274 | | | | | | | | | | |
| Ni | 0.668 | 0.334 | | | | | | | | | | |
| Zn | 14.0 | 7.0 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

**Blank units:** _____ **Associated sample units:** _____
**Sampling date:** _____ **Soil factor applied** _____
**Field blank type:** (circle one) Field Blank / Rinsate / Other: _____ **Associated Samples:** _____

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |

ALL RESULTS WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 18116A4
SDG #: 07L053

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | MS/MSD ID | Matrix | Analyte | MS %Recovery | MSD %Recovery | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| * | 14/15 | So | Sb | 27 | 24 | | All soil | J/UJ/A |
| | | | Ba | 135 | 156 | | " | J det/A |

Comments: * Sb post-spike = 98%.

MSD.4S2

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 5, 2007

**LDC Report Date:** January 24, 2008

**Matrix:** Soil/Water

**Parameters:** Metals

**Validation Level:** NFESC Level III & IV

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L082

**Sample Identification**

AP13-170-W-02
AP13-170-S-01**
AP13-094-S-01**
AP13-093-S-01
AP13-093-S-02
AP13-093-W-01

**Indicates sample underwent NFESC Level IV review

## Introduction

This data review covers 4 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6020A and 7000 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (October 2004) as there are no current guidelines for the methods stated above.

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

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

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

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

| Method Blank ID | Analyte | Maximum Concentration | Associated Samples |
|---|---|---|---|
| ICB/CCB | Antimony<br>Thallium<br>Molybdenum | 0.285 ug/L<br>0.121 ug/L<br>0.128 ug/L | All soil samples in SDG 07L082 |

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-170-S-01** | Molybdenum | 0.145 mg/Kg | 0.145U mg/Kg |
| AP13-093-S-02 | Molybdenum | 0.142 mg/Kg | 0.142U mg/Kg |

Sample AP13-093-W-01 was identified as an equipment blank. No metal contaminants were found in this blank with the following exceptions:

| Equipment Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-093-W-01 | 12/5/07 | Barium<br>Copper<br>Zinc<br>Mercury | 0.540 ug/L<br>12.9 ug/L<br>15.9 ug/L<br>0.151 ug/L | All soil samples in SDG 07L082 |

Sample AP13-170-W-02 was identified as a field blank. No metal contaminants were found in this blank with the following exceptions:

| Field Blank ID | Sampling Date | Analyte | Concentration | Associated Samples |
|---|---|---|---|---|
| AP13-170-W-02 | 12/5/07 | Barium<br>Chromium<br>Copper<br>Nickel<br>Zinc | 1.20 ug/L<br>0.533 ug/L<br>0.548 ug/L<br>0.668 ug/L<br>14.0 ug/L | All soil samples in SDG 07L082 |

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated field blanks with the following exceptions:

| Sample | Analyte | Reported Concentration | Modified Final Concentration |
|---|---|---|---|
| AP13-093-S-02 | Copper<br>Zinc | 6.38 mg/Kg<br>3.28 mg/Kg | 6.38U mg/Kg<br>3.28U mg/Kg |

## IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met.

The criteria for analysis were met.

## V. Matrix Spike Analysis

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits with the following exceptions:

| Spike ID (Associated Samples) | Analyte | MS (%R) (Limits) | MSD (%R) (Limits) | RPD (Limits) | Flag | A or P |
|---|---|---|---|---|---|---|
| AP13-044-S-01MS/MSD (All soil samples in SDG 07L082) | Antimony | 27 (75-125) | 24 (75-125) | - | J (all detects) UJ (all non-detects) | A |
| AP13-044-S-01MS/MSD (All soil samples in SDG 07L082) | Barium | 135 (75-125) | 156 (75-125) | - | J (all detects) | A |

## VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable.

## VII. Laboratory Control Samples (LCS)

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

## VIII. Internal Standards

All internal standard percent recoveries (%R) were within QC limits for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

## X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

## XI. Sample Result Verification

All sample result verifications were acceptable for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

## XII. Overall Assessment of Data

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

## XIII. Field Duplicates

No field duplicates were identified in this SDG.

## NAS Alameda Point, IR Site 13
## Metals - Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-S-02 | Antimony | J (all detects)<br>UJ (all non-detects) | A | Matrix spike/Matrix spike duplicates (%R) |
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-S-02 | Barium | J (all detects) | A | Matrix spike/Matrix spike duplicates (%R) |

## NAS Alameda Point, IR Site 13
## Metals - Laboratory Blank Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L082 | AP13-170-S-01** | Molybdenum | 0.145U mg/Kg | A |
| 07L082 | AP13-093-S-02 | Molybdenum | 0.142U mg/Kg | A |

## NAS Alameda Point, IR Site 13
## Metals - Field Blank Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L082 | AP13-093-S-02 | Copper<br>Zinc | 6.38U mg/Kg<br>3.28U mg/Kg | A |

## NAS Alameda Point, IR Site 13
## Metals - Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-S-02 | Antimony | J (all detects)<br>UJ (all non-detects) | A | Matrix spike/Matrix spike duplicates (%R) |
| 07L082 | AP13-170-S-01**<br>AP13-094-S-01**<br>AP13-093-S-01<br>AP13-093-S-02 | Barium | J (all detects) | A | Matrix spike/Matrix spike duplicates (%R) |

## NAS Alameda Point, IR Site 13
## Metals - Laboratory Blank Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L082 | AP13-170-S-01** | Molybdenum | 0.145U mg/Kg | A |
| 07L082 | AP13-093-S-02 | Molybdenum | 0.142U mg/Kg | A |

## NAS Alameda Point, IR Site 13
## Metals - Field Blank Data Qualification Summary - SDG 07L082

| SDG | Sample | Analyte | Modified Final Concentration | A or P |
|---|---|---|---|---|
| 07L082 | AP13-093-S-02 | Copper<br>Zinc | 6.38U mg/Kg<br>3.28U mg/Kg | A |

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| SDG NO. | : 07L082 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-170-S-01 | Date Analyzed: | 12/14/07 23:43 |
| Lab Samp ID: | L082-03 | Dilution Factor: | 1 |
| Lab File ID: | 98L10085 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 16.8 |
| Calib. Ref.: | 98L10082 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.601 | 0.120 |
| Arsenic | 1.38 | 0.601 | 0.120 |
| Barium | 30.3 J | 0.601 | 0.120 |
| Beryllium | 0.124J J | 0.601 | 0.120 |
| Cadmium | ND U | 0.601 | 0.120 |
| Chromium | 19.9 | 0.601 | 0.120 |
| Cobalt | 2.49 | 0.601 | 0.120 |
| Copper | 15.7 | 1.20 | 0.240 |
| Lead | 14.1 | 0.601 | 0.120 |
| Molybdenum | 0.145J U | 0.601 | 0.120 |
| Nickel | 12.5 | 0.601 | 0.120 |
| Selenium | ND U | 1.20 | 0.120 |
| Silver | ND | 0.601 | 0.120 |
| Thallium | ND | 1.20 | 0.120 |
| Vanadium | 12.0 | 0.601 | 0.120 |
| Zinc | 40.9 | 1.20 | 0.601 |

H1013008

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| SDG NO. | : 07L082 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-094-S-01 | Date Analyzed: | 12/14/07 23:48 |
| Lab Samp ID: | L082-04 | Dilution Factor: | 1 |
| Lab File ID: | 98L10086 | Matrix | : SOIL |
| Ext Btch ID: | IML011S | % Moisture | : 46.3 |
| Calib. Ref.: | 98L10082 | Instrument ID | : EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND U J | 0.931 | 0.186 |
| Arsenic | 11.1 | 0.931 | 0.186 |
| Barium | 92.8 J | 0.931 | 0.186 |
| Beryllium | 0.863J | 0.931 | 0.186 |
| Cadmium | 0.522J | 0.931 | 0.186 |
| Chromium | 105 | 0.931 | 0.186 |
| Cobalt | 19.5 | 0.931 | 0.186 |
| Copper | 50.7 | 1.86 | 0.372 |
| Lead | 30.9 | 0.931 | 0.186 |
| Molybdenum | 0.666J J | 0.931 | 0.186 |
| Nickel | 116 | 0.931 | 0.186 |
| Selenium | 0.440J J | 1.86 | 0.186 |
| Silver | 0.301J | 0.931 | 0.186 |
| Thallium | ND U | 1.86 | 0.186 |
| Vanadium | 79.0 | 0.931 | 0.186 |
| Zinc | 138 | 1.86 | 0.931 |

M40 13008

7005

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| NO. | : 07L082 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-093-S-01 | Date Analyzed: | 12/14/07 23:54 |
| Lab Samp ID: | L082-05 | Dilution Factor: | 1 |
| Lab File ID: | 98L10087 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 13.9 |
| Calib. Ref.: | 98L10082 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.581 | 0.116 |
| Arsenic | 0.715 | 0.581 | 0.116 |
| Barium | 53.1 J | 0.581 | 0.116 |
| Beryllium | 0.141J | 0.581 | 0.116 |
| Cadmium | ND U | 0.581 | 0.116 |
| Chromium | 27.5 | 0.581 | 0.116 |
| Cobalt | 3.83 | 0.581 | 0.116 |
| Copper | 18.7 | 1.16 | 0.232 |
| Lead | 3.28 | 0.581 | 0.116 |
| Molybdenum | ND U | 0.581 | 0.116 |
| Nickel | 23.8 | 0.581 | 0.116 |
| Selenium | ND U | 1.16 | 0.116 |
| Silver | ND | 0.581 | 0.116 |
| Thallium | ND | 1.16 | 0.116 |
| Vanadium | 17.0 | 0.581 | 0.116 |
| Zinc | 25.0 | 1.16 | 0.581 |

MU013008

7005

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| SDG NO. | : 07L082 | Date Extracted: | 12/12/07 12:30 |
| Sample ID: | AP13-093-S-02 | Date Analyzed: | 12/14/07 23:59 |
| Lab Samp ID: | L082-06 | Dilution Factor: | 1 |
| Lab File ID: | 98L10088 | Matrix : | SOIL |
| Ext Btch ID: | IML011S | % Moisture : | 21.3 |
| Calib. Ref.: | 98L10082 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| Antimony | ND UJ | 0.635 | 0.127 |
| Arsenic | 2.27 | 0.635 | 0.127 |
| Barium | 63.6 J | 0.635 | 0.127 |
| Beryllium | ND U | 0.635 | 0.127 |
| Cadmium | ND | 0.635 | 0.127 |
| Chromium | 1.26 | 0.635 | 0.127 |
| Cobalt | 0.368 J J | 0.635 | 0.127 |
| Copper | 6.38 U | 1.27 | 0.254 |
| Lead | 11.9 | 0.635 | 0.127 |
| Molybdenum | 0.142 J U | 0.635 | 0.127 |
| Nickel | 1.42 | 0.635 | 0.127 |
| Selenium | ND U | 1.27 | 0.127 |
| Silver | ND | 0.635 | 0.127 |
| Thallium | ND | 1.27 | 0.127 |
| Vanadium | 0.692 | 0.635 | 0.127 |
| Zinc^ | 3.28 U | 1.27 | 0.635 |

^ Analyzed on 12/17/07 20:46 | Data File 98L12022

WHO/3008

7007

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| ient | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| ject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| JOB NO. | : 07L082 | Date Extracted: | 12/12/07 14:00 |
| Sample ID: | AP13-093-W-01 | Date Analyzed: | 12/14/07 03:14 |
| Lab Samp ID: | L082-07 | Dilution Factor: | 1 |
| Lab File ID: | 98L09065 | Matrix : | WATER |
| Ext Btch ID: | IML012W | % Moisture : | NA |
| Calib. Ref.: | 98L09059 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| Antimony | ND | 1.00 | 0.500 |
| Arsenic | ND | 1.00 | 0.500 |
| Barium | 0.540J | 1.00 | 0.500 |
| Beryllium | ND | 1.00 | 0.500 |
| Cadmium | ND | 1.00 | 0.500 |
| Chromium | ND | 1.00 | 0.500 |
| Cobalt | ND | 1.00 | 0.500 |
| Copper | 12.9 | 1.00 | 0.500 |
| Lead | ND | 1.00 | 0.500 |
| Molybdenum | ND | 2.00 | 1.00 |
| Nickel | ND | 1.00 | 0.500 |
| Selenium | ND | 1.00 | 0.500 |
| Silver | ND | 1.00 | 0.500 |
| Thallium | ND | 1.00 | 0.500 |
| Vanadium | ND | 1.00 | 0.500 |
| Zinc | 15.9 | 10.0 | 5.00 |

1440/3008

7888

METHOD 6020A
METALS BY ICP-MS

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| SDG NO. | : 07L082 | Date Extracted: | 12/12/07 14:00 |
| Sample ID: | AP13-170-W-02 | Date Analyzed: | 12/14/07 03:09 |
| Lab Samp ID: | L082-02 | Dilution Factor: | 1 |
| Lab File ID: | 98L09064 | Matrix : | WATER |
| Ext Btch ID: | IML012W | % Moisture : | NA |
| Calib. Ref.: | 98L09059 | Instrument ID : | EMAXTI98 |

| PARAMETERS | RESULTS (ug/L) | RL (ug/L) | MDL (ug/L) |
|---|---|---|---|
| Antimony | ND U | 1.00 | 0.500 |
| Arsenic | ND | 1.00 | 0.500 |
| Barium | 1.20 | 1.00 | 0.500 |
| Beryllium | ND U | 1.00 | 0.500 |
| Cadmium | ND | 1.00 | 0.500 |
| Chromium | 0.533J J | 1.00 | 0.500 |
| Cobalt | ND U | 1.00 | 0.500 |
| Copper | 0.548J J | 1.00 | 0.500 |
| Lead | ND U | 1.00 | 0.500 |
| Molybdenum | ND | 2.00 | 1.00 |
| Nickel | 0.668J J | 1.00 | 0.500 |
| Selenium | ND U | 1.00 | 0.500 |
| Silver | ND | 1.00 | 0.500 |
| Thallium | ND | 1.00 | 0.500 |
| Vanadium | ND | 1.00 | 0.500 |
| Zinc | 14.0 | 10.0 | 5.00 |

M40/3008

7003

METHOD 7470A
MERCURY BY COLD VAPOR

Client : RICHARD BRADY & ASSOCIATES
Project : ALAMEDA POINT, IR SITE 13
Batch No. : 07L082

Matrix : WATER
Instrument ID : TI047

| SAMPLE ID | EMAX SAMPLE ID | RESULTS (ug/L) | DLF | MOIST | RL (ug/L) | MDL (ug/L) | Analysis DATETIME | Extraction DATETIME | LFID | CAL REF | PREP BATCH | Collection DATETIME | Received DATETIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MBLK1W | HGL027WB | ND | 1 | NA | 0.500 | 0.100 | 12/21/0712:33 | 12/20/0715:00 | M47L021010 | M47L021008 | HGL027W | NA | 12/20/07 |
| LCS1W | HGL027WL | 4.86 | 1 | NA | 0.500 | 0.100 | 12/21/0712:35 | 12/20/0715:00 | M47L021011 | M47L021008 | HGL027W | NA | 12/20/07 |
| LCD1W | HGL027WC | 4.88 | 1 | NA | 0.500 | 0.100 | 12/21/0712:37 | 12/20/0715:00 | M47L021012 | M47L021008 | HGL027W | NA | 12/20/07 |
| ~~AP13-170-W-02AS~~ | ~~L082-02A~~ | ~~2.12~~ | 1 | NA | 0.500 | 0.100 | 12/21/0712:39 | 12/20/0715:00 | M47L021013 | M47L021008 | HGL027W | 12/05/07 | 12/06/07 |
| AP13-170-W-02 | L082-02 | ND | 1 | NA | 0.500 | 0.100 | 12/21/0712:41 | 12/20/0715:00 | M47L021014 | M47L021008 | HGL027W | 12/05/07 | 12/06/07 |
| ~~AP13-170-W-02DL~~ | ~~L082-02J~~ | ~~ND~~ | 5 | NA | 2.50 | 0.500 | 12/21/0712:43 | 12/20/0715:00 | M47L021015 | M47L021008 | HGL027W | 12/05/07 | 12/06/07 |
| AP13-093-W-01 | L082-07 | 0.151J | 1 | NA | 0.500 | 0.100 | 12/21/0712:46 | 12/20/0715:00 | M47L021016 | M47L021008 | HGL027W | 12/05/07 | 12/06/07 |
| ~~AP13-WC1-W-01~~ | ~~L082-08~~ | ~~0.126J~~ | ~~1~~ | ~~NA~~ | ~~0.500~~ | ~~0.100~~ | ~~12/21/0712:48~~ | ~~12/20/0715:00~~ | ~~M47L021017~~ | ~~M47L021008~~ | ~~HGL027W~~ | ~~12/05/07~~ | ~~12/06/07~~ |

M40|3008

METHOD 7471A
MERCURY BY COLD VAPOR

Client : RICHARD BRADY & ASSOCIATES
Project : ALAMEDA POINT, IR SITE 13
Batch No. : 07L082

Matrix : SOIL
Instrument ID : TI047

| SAMPLE ID | EMAX SAMPLE ID | RESULTS (mg/kg) | DLF | MOIST | RL (mg/kg) | MDL (mg/kg) | Analysis DATETIME | Extraction DATETIME | LFID | CAL REF | PREP BATCH | Collection DATETIME | Received DATETIME |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~MBLK1S~~ | ~~HGL021SB~~ | ~~ND~~ | 1 | NA | 0.100 | 0.0330 | 12/19/0711:35 | 12/18/0718:00 | M47L016010 | M47L016008 | HGL021S | NA | 12/18/07 |
| LCS1S | HGL021SL | 0.833 | 1 | NA | 0.100 | 0.0330 | 12/19/0711:37 | 12/18/0718:00 | M47L016011 | M47L016008 | HGL021S | NA | 12/18/07 |
| ~~LCD1S~~ | ~~HGL021SC~~ | ~~0.818~~ | 1 | NA | 0.100 | 0.0330 | 12/19/0711:39 | 12/18/0718:00 | M47L016012 | M47L016008 | HGL021S | NA | 12/18/07 |
| AP13-170-S-01 | L082-03 | ND | 1 | 16.8 | 0.120 | 0.0397 | 12/19/0712:28 | 12/18/0718:00 | M47L016035 | M47L016032 | HGL021S | 12/05/07 | 12/06/07 |
| AP13-094-S-01 | L082-04 | 0.182J | 1 | 46.3 | 0.186 | 0.0615 | 12/19/0712:30 | 12/18/0718:00 | M47L016036 | M47L016032 | HGL021S | 12/05/07 | 12/06/07 |
| AP13-093-S-01 | L082-05 | ND | 1 | 13.9 | 0.116 | 0.0383 | 12/19/0712:32 | 12/18/0718:00 | M47L016037 | M47L016032 | HGL021S | 12/05/07 | 12/06/07 |
| AP13-093-S-02 | L082-06 | ND | 1 | 21.3 | 0.127 | 0.0419 | 12/19/0712:34 | 12/18/0718:00 | M47L016038 | M47L016032 | HGL021S | 12/05/07 | 12/06/07 |

MW13008

LDC #: 18116B4

SDG #: 07L082

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET
Level III/IV

Date: 1/18/08

Page: 1 of 1

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method ~~6010B~~ 6020A/7000)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/5/07 |
| II. | Calibration | A | |
| III. | Blanks | SW | |
| IV. | ICP Interference Check Sample (ICS) Analysis | A | |
| V. | Matrix Spike Analysis | SW | from 07L053 |
| VI. | Duplicate Sample Analysis | N | |
| VII. | Laboratory Control Samples (LCS) | A | LCS / LCSD |
| VIII. | Internal Standard (ICP-MS) | A | Not Reviewed for Level III |
| IX. | Furnace Atomic Absorption QC | N | Not Utilized |
| X. | ICP Serial Dilution | A | |
| XI. | Sample Result Verification | A | Not reviewed for Level III validation. |
| XII. | Overall Assessment of Data | A | |
| XIII. | Field Duplicates | N | |
| XIV. | Field Blanks | SW | FB = 1 EB = 6 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

soil + water

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | AP13-170-W-02 | W | 11 | | 21 | | 31 | |
| 2 | AP13-170-S-01** | S | 12 | | 22 | | 32 | |
| 3 | AP13-094-S-01** | ↓ | 13 | | 23 | | 33 | |
| 4 | AP13-093-S-01 | ↓ | 14 | | 24 | | 34 | |
| 5 | AP13-093-S-02 | ↓ | 15 | | 25 | | 35 | |
| 6 | AP13-093-W-01 | W | 16 | | 26 | | 36 | |
| 7 | MB | | 17 | | 27 | | 37 | |
| 8 | | | 18 | | 28 | | 38 | |
| 9 | | | 19 | | 29 | | 39 | |
| 10 | | | 20 | | 30 | | 40 | |

Notes:

LDC #: 18116B4
SDG #: 07L082

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** Metals (EPA SW 846 Method 6010/7000/6020)

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| I. Technical holding times | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| II. Calibration | | | | |
| Were all instruments calibrated daily, each set-up time? | ✓ | | | |
| Were the proper number of standards used? | ✓ | | | |
| Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits? | ✓ | | | |
| Were all initial calibration correlation coefficients ≥ 0.995? (Level IV only) | ✓ | | | |
| III. Blanks | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | ✓ | | | |
| IV. Interference Check Sample | | | | |
| Were ICP interference check samples performed daily? | ✓ | | | |
| Were the AB solution percent recoveries (%R) with the 80-120% QC limits? | ✓ | | | |
| V. Matrix spike/Matrix spike duplicates | | | | |
| Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water. | ✓ | | | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken. | | ✓ | | |
| Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were < 5X the RL. | ✓ | | | |
| VI. Laboratory control samples | | | | |
| Was an LCS anaylzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils? | ✓ | | | |
| VII. Furnace Atomic Absorption QC | | | | |
| If MSA was performed, was the correlation coefficients > 0.995? | | | ✓ | |
| Do all applicable analysies have duplicate injections? (Level IV only) | | | ✓ | |
| For sample concentrations > RL, are applicable duplicate injection RSD values < 20%? (Level IV only) | | | ✓ | |
| Were analytical spike recoveries within the 85-115% QC limits? | | | ✓ | |

LDC #: 181184
SDG #: 07L082

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| VII. ICP Serial Dilution | | | | |
| Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL? | ✓ | | | |
| Were all percent differences (%Ds) < 10%? | ✓ | | | |
| Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data. | | ✓ | | |
| VIII. Internal Standards (EPA SW-846 Method 6020) | | | | |
| Were all the percent recoveries (%R) within the 30-120% of the intensity of the internal standard in the associated initial calibration? | ✓ | | | |
| If the %Rs were outside the criteria, was a reanalysis performed? | | | ✓ | |
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | ✓ | | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Sample Result Verification | | | | |
| Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XI. Overall Assessment of Data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XII. Field Duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target analytes were detected in the field duplicates. | | | ✓ | |
| XIII. Field Blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target analytes were detected in the field blanks. | ✓ | | | |

LDC #: 18116B4
SDG #: 07L082

# VALIDATION FINDINGS WORKSHEET
## Sample Specific Element Reference

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

| Sample ID | Matrix | Target Analyte List (TAL) |
|---|---|---|
| 1, 6 | W | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| 2-5 | So | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| **Analysis Method** | | |
| ICP | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| ICP Trace | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| ICP-MS | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, ___ ___ |
| GFAA | | Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Si, CN-, |

Comments: Mercury by CVAA if performed

LDC #: 18116B4
SDG #: 07L082

# VALIDATION FINDINGS WORKSHEET
## PB/ICB/CCB QUALIFIED SAMPLES


Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: 1000x
Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: All soil

| | | | | | Sample Identification | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Maximum PB[a] (mg/Kg) | Maximum PB[a] (ug/L) | Maximum ICB/CCB[a] (ug/L) | Blank Action Limit | [illegible] | 2 | 5 | | | | | | | | |
| Al | | | | | | | | | | | | | | | Al |
| Sb | | | 0.285 | 1.43 | | | | | | | | | | | Sb |
| As | | | | | | | | | | | | | | | As |
| Ba | | | | | | | | | | | | | | | Ba |
| Be | | | | | | | | | | | | | | | Be |
| Cd | | | | | | | | | | | | | | | Cd |
| Ca | | | | | | | | | | | | | | | Ca |
| Cr | | | | | | | | | | | | | | | Cr |
| Co | | | | | | | | | | | | | | | Co |
| Cu | | | | | | | | | | | | | | | Cu |
| Fe | | | | | | | | | | | | | | | Fe |
| Pb | | | | | | | | | | | | | | | Pb |
| Mg | | | | | | | | | | | | | | | Mg |
| Mn | | | | | | | | | | | | | | | Mn |
| Hg | | | | | | | | | | | | | | | Hg |
| Ni | | | | | | | | | | | | | | | Ni |
| K | | | | | | | | | | | | | | | K |
| Se | | | | | | | | | | | | | | | Se |
| Ag | | | | | | | | | | | | | | | Ag |
| Na | | | | | | | | | | | | | | | Na |
| Tl | | | 0.121 | 0.605 | | | | | | | | | | | Tl |
| V | | | | | | | | | | | | | | | V |
| Zn | | | | | | | | | | | | | | | Zn |
| B | | | | | | | | | | | | | | | B |
| Mo | | | 0.128 | 0.64 | | 0.145 | 0.142 | | | | | | | | Mo |
| Sr | | | | | | | | | | | | | | | Sr |

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

BLNKSMP.4S2

LDC #: 18116B4
SDG #: 07L082
METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

# VALIDATION FINDINGS WORKSHEET
## Field Blanks

Page: 1 of 1
Reviewer: AL
2nd Reviewer: [illegible]

☒ N N/A Field blanks were identified in this SDG.
☒ N N/A Were target analytes detected in the field blanks?

Blank units: µg/L Associated sample units: µg/kg
Sampling date: 12/5/07 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: Associated Samples: All soil

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | 45 | | | | | | | | | |
| Ba | 1.20 | 0.60 | | | | | | | | | | |
| Cr | 0.533 | 0.267 | | | | | | | | | | |
| Cu | 0.548 | 0.274 | | | | | | | | | | |
| Ni | 0.668 | 0.334 | | | | | | | | | | |
| Zn | 14.0 | 7.0 | 3.28 | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Blank units: µg/L Associated sample units: µg/kg
Sampling date: 12/5/07 Soil factor applied 100x
Field blank type: (circle one) Field Blank / Rinsate / Other: CB Associated Samples: All soil

| Analyte | Blank ID | Blank Action Level | Sample Identification | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6 | | 45 | | | | | | | | | |
| Ba | 0.540 | 0.27 | | | | | | | | | | |
| Cu | 12.9 | 6.45 | 6.38 | | | | | | | | | |
| Zn | 15.9 | 7.95 | 3.28 | | | | | | | | | |
| Hg | 0.151 | 0.125 | | | | | | | | | | |
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ALL RESULTS WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 18116B4
SDG #: 07L082

# VALIDATION FINDINGS WORKSHEET
## Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: Ch
2nd Reviewer: [illegible]

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for water samples and ≤35% for soil samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

| # | MS/MSD ID | Matrix | Analyte | MS %Recovery | MSD %Recovery | RPD (Limits) | Associated Samples | Qualifications |
|---|---|---|---|---|---|---|---|---|
| | AP13-044-S-01MS/ | So | Sb | 27 | 24 | | all soil | J/wJ/A + |
| | /MD | | Ba | 135 | 156 | | ↓ | J dut/A |
| | | | | | | | | |
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Comments: + Post-Spike Sb: 98%.

MSD.4S2

LDC #: 18116B4
SDG #: 07L08L

# VALIDATION FINDINGS WORKSHEET
## Initial and Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: ae
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found / True x 100 Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

| Standard ID | Type of Analysis | Element | Found (ug/L) | True (ug/L) | Recalculated %R | Reported %R | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| | ICP (Initial calibration) | | | | | | |
| | GFAA (Initial calibration) | | | | | | |
| ICV | CVAA (Initial calibration) | Hg | 2.04 | 2.00 | 102 | NR | Y |
| | ICP (Continuing calibration) | | | | | | |
| | GFAA (Continuing calibration) | | | | | | |
| CCV3 | CVAA (Continuing calibration) | Hg | 4.94 | 5.00 | 98.8 | NR | Y |
| ICV | ICP/MS (Initial calibration) | Ba | 61.52 | 60.00 | 102.5 | 103 | Y |
| CCV7 | ICP/MS (Continuing calibation) | Ba | 43.25 | 45.00 | 96.1 | 96 | Y |

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 18116B4
SDG #: 07L082

# VALIDATION FINDINGS WORKSHEET
## Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: AL
2nd Reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

| Sample ID | Type of Analysis | Element | Found / S / I (units) | True / D / SDR (units) | Recalculated %R / RPD / %D | Reported %R / RPD / %D | Acceptable (Y/N) |
|---|---|---|---|---|---|---|---|
| ICSAB2 | ICP interference check | Cr | 19.32 | 20.00 | 96.6 | 97 | Y |
| IMLO11SL | Laboratory control sample | Sb | 46.31 | 50.00 | 92.6 | 93 | Y |
| | Matrix spike | | (SSR-SR) | | | | |
| IMLO11SC | Duplicate | Tl | 46.22 | 45.48 | 2 | 2 | Y |
| | ICP serial dilution | | | | | | |

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

TOTCLC.4SW

LDC #: 18116B4
SDG #: 071082

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification


Reviewer: [illegible]
2nd reviewer: [illegible]

**METHOD:** Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for _____ were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(DII)}{(In.\ Vol.)(\%S)}$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
DII = Dilution factor
%S = Decimal percent solids

Recalculation:

$$As = \frac{(1.145\ mg/L)(0.1\ L)(10)}{(1.005)(0.832)} = 1.376\ mg/g = 1.376\ mg/kg$$

| Sample ID | Analyte | Reported Concentration ( mg/kg ) | Calculated Concentration ( mg/kg ) | Acceptable (Y/N) |
|---|---|---|---|---|
| 2 | As | 1.38 | 1.376 | Y |
| | Ba | 30.3 | 30.31 | Y |
| | Be | 0.124 | 0.124 | Y |
| | Cr | 19.9 | 19.93 | Y |
| | Co | 2.49 | 2.494 | Y |
| | Cu | 15.7 | 15.71 | Y |
| | Pb | 14.1 | 14.11 | Y |
| | Mo | 0.145 | 0.1447 | Y |
| | Ni | 12.5 | 12.5 | Y |
| | V | 12.0 | 11.99 | Y |
| | Zn | 40.9 | 40.89 | Y |
| | | | | |
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# NAS Alameda Point, IR Site 13
# Data Validation Reports
# LDC# 18116

TPH-E

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 4, 2007

**LDC Report Date:** January 25, 2008

**Matrix:** Soil/Water

**Parameters:** Total Petroleum Hydrocarbons as Extractables

**Validation Level:** NFESC Level III

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L053

**Sample Identification**

AP13-008-S-01
AP13-007-S-01
AP13-007-S-02
AP13-044-S-01
AP13-043-S-01
AP13-043-S-02
AP13-041-S-01
AP13-169-S-01
AP13-169-S-02
AP13-147-S-01
AP13-148-S-01
AP13-148-S-02
AP13-148-W-01
AP13-044-S-01MS
AP13-044-S-01MSD

## Introduction

This data review covers 14 soil samples and one water sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

Raw data were not reviewed for this SDG. The review was based on QC data.

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

### b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample AP13-148-W-01 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

## IV. Accuracy and Precision Data

### a. Surrogate Recovery

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

| Sample | Surrogate | %R (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-007-S-02 | Hexacosane | 258 (70-160) | TPH as extractables | J (all detects) | P |
| AP13-148-W-01 | Hexacosane | 52 (70-140) | TPH as extractables | J (all detects)<br>UJ (all non-detects) | P |

### b. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

### c. Laboratory Control Samples

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

## V. Target Compound Identification

Raw data were not reviewed for this SDG.

## VI. Compound Quantitation and CRQLs

Raw data were not reviewed for this SDG.

## VII. System Performance

Raw data were not reviewed for this SDG.

## VIII. Overall Assessment of Data

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

## IX. Field Duplicates

No field duplicates were identified in this SDG.

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 07L053**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L053 | AP13-007-S-02 | TPH as extractables | J (all detects) | P | Surrogate recovery (%R) |
| 07L053 | AP13-148-W-01 | TPH as extractables | J (all detects)<br>UJ (all non-detects) | P | Surrogate recovery (%R) |

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 07L053**

No Sample Data Qualified in this SDG

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 07L053**

No Sample Data Qualified in this SDG

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-008-S-01 | Date Analyzed: | 12/19/07 02:29 |
| Lab Samp ID: | L053-01 | Dilution Factor: | 1 |
| Lab File ID: | LL18060A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 16.5 |
| Calib. Ref.: | LL18055A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | ND | 12 | 6.0 |
| MOTOR OIL | ND | 24 | 6.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 78 | 40-160 |
| HEXACOSANE | 84 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-007-S-01 | Date Analyzed: | 12/19/07 02:45 |
| Lab Samp ID: | L053-02 | Dilution Factor: | 1 |
| Lab File ID: | LL18061A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 16.4 |
| Calib. Ref.: | LL18055A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | ND | 12 | 6.0 |
| MOTOR OIL | ND | 24 | 6.0 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 79 | 40-160 |
| HEXACOSANE | 85 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-007-S-02 | Date Analyzed: | 12/19/07 04:08 |
| Lab Samp ID: | L053-04T | Dilution Factor: | 5 |
| Lab File ID: | LL18066A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 16.9 |
| Calib. Ref.: | LL18055A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 2900 J | 60 | 30 |
| MOTOR OIL | 1300 J | 120 | 30 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 97 | 40-160 |
| HEXACOSANE | 258* | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-044-S-01 | Date Analyzed: | 12/19/07 03:02 |
| Lab Samp ID: | L053-05 | Dilution Factor: | 1 |
| Lab File ID: | LL18062A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 19.9 |
| Calib. Ref.: | LL18055A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | ND | 12 | 6.2 |
| MOTOR OIL | ND | 25 | 6.2 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 79 | 40-160 |
| HEXACOSANE | 85 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

1440/3008

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-043-S-01 | Date Analyzed: | 12/19/07 03:51 |
| Lab Samp ID: | L053-06 | Dilution Factor: | 1 |
| Lab File ID: | LL18065A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 20.6 |
| Calib. Ref.: | LL18055A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | ND | 13 | 6.3 |
| MOTOR OIL | ND | 25 | 6.3 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 80 | 40-160 |
| HEXACOSANE | 86 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

14u013008

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-043-S-02 | Date Analyzed: | 12/19/07 19:33 |
| Lab Samp ID: | L053-07T | Dilution Factor: | 10 |
| Lab File ID: | LL19006A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 17.0 |
| Calib. Ref.: | LL19002A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 4400 | 120 | 60 |
| MOTOR OIL | ND | 240 | 60 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | DO | 40-160 |
| HEXACOSANE | DO | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

DO: DILUTED OUT

1440|3008

5015

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-041-S-01 | Date Analyzed: | 12/19/07 19:50 |
| Lab Samp ID: | L053-08T | Dilution Factor: | 10 |
| Lab File ID: | LL19007A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 12.2 |
| Calib. Ref.: | LL19002A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 4000 | 110 | 57 |
| MOTOR OIL | 230 | 230 | 57 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | DO | 40-160 |
| HEXACOSANE | DO | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

DO: DILUTED OUT

1440/3008

5018

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-169-S-01 | Date Analyzed: | 12/19/07 06:37 |
| Lab Samp ID: | L053-09T | Dilution Factor: | 100 |
| Lab File ID: | LL18075A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 10.3 |
| Calib. Ref.: | LL18068A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 1900 | 1100 | 560 |
| MOTOR OIL | 5300 | 2200 | 560 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | DO | 40-160 |
| HEXACOSANE | DO | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

DO: DILUTED OUT

MH0/3008

5021

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| oject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-169-S-02 | Date Analyzed: | 12/19/07 06:53 |
| Lab Samp ID: | L053-10T | Dilution Factor: | 100 |
| Lab File ID: | LL18076A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 25.8 |
| Calib. Ref.: | LL18068A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 17000 | 1300 | 670 |
| MOTOR OIL | 24000 | 2700 | 670 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | DO | 40-160 |
| HEXACOSANE | DO | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

DO: DILUTED OUT

1440/3008

5024

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-147-S-01 | Date Analyzed: | 12/19/07 05:31 |
| Lab Samp ID: | L053-11 | Dilution Factor: | 1 |
| Lab File ID: | LL18071A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 20.7 |
| Calib. Ref.: | LL18068A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 48 | 13 | 6.3 |
| MOTOR OIL | 8.8J | 25 | 6.3 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 75 | 40-160 |
| HEXACOSANE | 81 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

M40/3008

5827

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| ...nt | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-148-S-01 | Date Analyzed: | 12/19/07 05:47 |
| Lab Samp ID: | L053-12 | Dilution Factor: | 1 |
| Lab File ID: | LL18072A | Matrix | : SOIL |
| Ext Btch ID: | DSL043S | % Moisture | : 9.9 |
| Calib. Ref.: | LL18068A | Instrument ID | : GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 150 | 11 | 5.5 |
| MOTOR OIL | 24 | 22 | 5.5 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 76 | 40-160 |
| HEXACOSANE | 95 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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5088

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/15/07 14:00 |
| Sample ID: | AP13-148-S-02 | Date Analyzed: | 12/19/07 06:04 |
| Lab Samp ID: | L053-13 | Dilution Factor: | 1 |
| Lab File ID: | LL18073A | Matrix : | SOIL |
| Ext Btch ID: | DSL043S | % Moisture : | 17.5 |
| Calib. Ref.: | LL18068A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 1100 | 12 | 6.1 |
| MOTOR OIL | 6.6J | 24 | 6.1 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 88 | 40-160 |
| HEXACOSANE | 80 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

6440/3008

5933

METHOD 3520C/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/04/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/05/07 |
| Batch No. | : 07L053 | Date Extracted: | 12/10/07 17:30 |
| Sample ID: | AP13-148-W-01 | Date Analyzed: | 12/13/07 19:38 |
| Lab Samp ID: | L053-14 | Dilution Factor: | .94 |
| Lab File ID: | LL13027A | Matrix : | WATER |
| Ext Btch ID: | DSL028W | % Moisture : | NA |
| Calib. Ref.: | LL13024A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/L) | RL (mg/L) | MDL (mg/L) |
|---|---|---|---|
| DIESEL | ND UJ | 0.47 | 0.094 |
| MOTOR OIL | ND | 0.94 | 0.094 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 78 | 50-130 |
| HEXACOSANE | 52* | 70-140 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

6140/3008

LDC #: 18116A8

SDG #: 07L053

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level III

Date: 1/24/08

Page: 1 of 1

Reviewer:

2nd Reviewer:

**METHOD:** GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/4/07 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification/ICV | A | ICV ≤ 15 |
| III. | Blanks | A | |
| IVa. | Surrogate recovery | SW | |
| IVb. | Matrix spike/Matrix spike duplicates | A | |
| IVc. | Laboratory control samples | A | LCS/D |
| V. | Target compound identification | N | |
| VI. | Compound Quantitation and CRQLs | N | |
| VII. | System Performance | N | |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X. | Field blanks | ND | EB = 13 |

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples: SOIL + Water

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | AP13-008-S-01 | 11 | AP13-148-S-01 | 21 | MBLKIS | 31 | |
| 2 | AP13-007-S-01 | 12 | AP13-148-S-02 | 22 | MBLKIW | 32 | |
| 3 | AP13-007-S-02 | 13 | AP13-148-W-01 W | 23 | | 33 | |
| 4 | AP13-044-S-01 | 14 | AP13-044-S-01MS | 24 | | 34 | |
| 5 | AP13-043-S-01 | 15 | AP13-044-S-01MSD | 25 | | 35 | |
| 6 | AP13-043-S-02 | 16 | | 26 | | 36 | |
| 7 | AP13-041-S-01 | 17 | | 27 | | 37 | |
| 8 | AP13-169-S-01 | 18 | | 28 | | 38 | |
| 9 | AP13-169-S-02 | 19 | | 29 | | 39 | |
| 10 | AP13-147-S-01 | 20 | | 30 | | 40 | |

Notes:

LDC #: 181 A8
SDG #: 07L053

# VALIDATION FINDINGS WORKSHEET
## Surrogate Recovery

Page: 1 of 1
Reviewer: PR
2nd Reviewer:

**METHOD:** ✓ GC ___ HPLC

Are surrogates required by the method? Yes____ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

| # | Sample ID | Detector/ Column | Surrogate Compound | %R (Limits) | Qualifications |
|---|---|---|---|---|---|
| | 3 | not specified | K | 258 (70-160) | J/P dil (.5X) |
| | | | | ( ) | |
| | | | | ( ) | |
| | 6,7 | ↓ | L | DO (40-160) | no qual 10X |
| | | | K | DO (70-160) | ↓ |
| | | | | ( ) | |
| | 8,9 | ↓ | ↓ | ↓ ( ↓ ) | ↓ 100X |
| | | | | ( ) | |
| | | | | ( ) | |
| | 13 | ↓ | K | 52 (70-140) | J/UJ/P |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |

| | Surrogate Compound | | Surrogate Compound | | Surrogate Compound | | Surrogate Compound |
|---|---|---|---|---|---|---|---|
| A | Chlorobenzene (CBZ) | G | Octacosane | M | Benzo(e)Pyrene | S | 1-Chloro-3-Nitrobenzene |
| B | 4-Bromofluorobenzene (BFB) | H | Ortho-Terphenyl | N | Terphenyl-D14 | T | 3,4-Dinitrotoluene |
| C | a,a,a-Trifluorotoluene | I | Fluorobenzene (FBZ) | O | Decafluorobiphenyl (DCB) | U | Tripentyltin |
| D | Bromochlorobenene | J | n-Triacontane | P | 1-methylnaphthalene | V | Tri-n-propyltin |
| E | 1,4-Dichlorobutane | K | Hexacosane | Q | Dichlorophenyl Acetic Acid (DCAA) | W | Tributyl Phosphate |
| F | 1,4-Difluorobenzene (DFB) | L | Bromobenzene | R | 4-Nitrophenol | X | Triphenyl Phosphate |

# Laboratory Data Consultants, Inc.
# Data Validation Report

**Project/Site Name:** NAS Alameda Point, IR Site 13

**Collection Date:** December 5, 2007

**LDC Report Date:** January 25, 2008

**Matrix:** Soil/Water

**Parameters:** Total Petroleum Hydrocarbons as Extractables

**Validation Level:** NFESC Level III & IV

**Laboratory:** EMAX Laboratories, Inc.

**Sample Delivery Group (SDG):** 07L082

**Sample Identification**

AP13-170-W-02
AP13-170-S-01**
AP13-094-S-01**
AP13-093-S-01
AP13-093-S-02
AP13-093-W-01

**Indicates sample underwent NFESC Level IV review

## Introduction

This data review covers 4 soil samples and 2 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Method 8015 for Total Petroleum Hydrocarbons (TPH) as Extractables.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (October 1999) as there are no current guidelines for the method stated above.

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

Blank results are summarized in Section III.

Field duplicates are summarized in Section IX.

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

The following are definitions of the data qualifiers:

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

J Indicates an estimated value.

R Quality control indicates the data is not usable.

N Presumptive evidence of presence of the constituent.

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

A Indicates the finding is based upon technical validation criteria.

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

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

## I. Technical Holding Times

All technical holding time requirements were met.

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

## II. Calibration

### a. Initial Calibration

Initial calibration of compounds was performed as required by the method.

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

### b. Calibration Verification

Calibration verification was performed at required frequencies. The percent differences (%D) of amounts in continuing standard mixtures were within the 15.0% QC limits.

## III. Blanks

Method blanks were reviewed for each matrix as applicable. No total petroleum hydrocarbons as extractable contaminants were found in the method blanks.

Sample AP13-093-W-01 was identified as an equipment blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

Sample AP13-170-W-02 was identified as a field blank. No total petroleum hydrocarbons as extractable contaminants were found in this blank.

## IV. Accuracy and Precision Data

### a. Surrogate Recovery

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

| Sample | Surrogate | %R (Limits) | Compound | Flag | A or P |
|---|---|---|---|---|---|
| AP13-093-S-02 | Hexacosane | 338 (70-160) | TPH as extractables | J (all detects) | P |

### b. Matrix Spike/Matrix Spike Duplicates

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

### c. Laboratory Control Samples

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

## V. Target Compound Identification

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

## VI. Compound Quantitation and CRQLs

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

## VII. System Performance

The system performance was acceptable for samples on which NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by NFESC Level III criteria.

## VIII. Overall Assessment of Data

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

## IX. Field Duplicates

No field duplicates were identified in this SDG.

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 07L082**

| SDG | Sample | Compound | Flag | A or P | Reason |
|---|---|---|---|---|---|
| 07L082 | AP13-093-S-02 | TPH as extractables | J (all detects) | P | Surrogate recovery (%R) |

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 07L082**

No Sample Data Qualified in this SDG

**NAS Alameda Point, IR Site 13**
**Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 07L082**

No Sample Data Qualified in this SDG

METHOD 3520C/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/10/07 17:30 |
| Sample ID: | AP13-170-W-02 | Date Analyzed: | 12/13/07 20:11 |
| Lab Samp ID: | L082-02 | Dilution Factor: | .94 |
| Lab File ID: | LL13029A | Matrix | : WATER |
| Ext Btch ID: | DSL028W | % Moisture | : NA |
| Calib. Ref.: | LL13024A | Instrument ID | : GCT105 |

| PARAMETERS | RESULTS (mg/L) | RL (mg/L) | MDL (mg/L) |
|---|---|---|---|
| DIESEL | ND | 0.47 | 0.094 |
| MOTOR OIL | ND | 0.94 | 0.094 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 71 | 50-130 |
| HEXACOSANE | 89 | 70-140 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| ient | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| oject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/13/07 15:00 |
| Sample ID: | AP13-170-S-01 | Date Analyzed: | 12/15/07 02:46 |
| Lab Samp ID: | L082-03T | Dilution Factor: | 100 |
| Lab File ID: | LL14047A | Matrix : | SOIL |
| Ext Btch ID: | DSL035S | % Moisture : | 16.8 |
| Calib. Ref.: | LL14038A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 2100 | 1200 | 600 |
| MOTOR OIL | 6700 | 2400 | 600 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | DO | 40-160 |
| HEXACOSANE | DO | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

DO: DILUTED OUT

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METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/13/07 15:00 |
| Sample ID: | AP13-094-S-01 | Date Analyzed: | 12/15/07 03:03 |
| Lab Samp ID: | L082-04T | Dilution Factor: | 2 |
| Lab File ID: | LL14048A | Matrix : | SOIL |
| Ext Btch ID: | DSL035S | % Moisture : | 46.3 |
| Calib. Ref.: | LL14038A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 73 | 37 | 19 |
| MOTOR OIL | 170 | 74 | 19 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 84 | 40-160 |
| HEXACOSANE | 113 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

M40/3008

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| ent | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| oject | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/13/07 15:00 |
| Sample ID: | AP13-093-S-01 | Date Analyzed: | 12/15/07 03:19 |
| Lab Samp ID: | L082-05 | Dilution Factor: | 1 |
| Lab File ID: | LL14049A | Matrix : | SOIL |
| Ext Btch ID: | DSL035S | % Moisture : | 13.9 |
| Calib. Ref.: | LL14038A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | ND | 12 | 5.8 |
| MOTOR OIL | ND | 23 | 5.8 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 85 | 40-160 |
| HEXACOSANE | 100 | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

1440/3008

5011

METHOD 3550B/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/13/07 15:00 |
| Sample ID: | AP13-093-S-02 | Date Analyzed: | 12/15/07 04:26 |
| Lab Samp ID: | L082-06T | Dilution Factor: | 5 |
| Lab File ID: | LL14053A | Matrix : | SOIL |
| Ext Btch ID: | DSL035S | % Moisture : | 21.3 |
| Calib. Ref.: | LL14051A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/kg) | RL (mg/kg) | MDL (mg/kg) |
|---|---|---|---|
| DIESEL | 6000 J | 64 | 32 |
| MOTOR OIL | 1500 | 130 | 32 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 89 | 40-160 |
| HEXACOSANE | 338* | 70-160 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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METHOD 3520C/8015 Mod
PETROLEUM HYDROCARBONS BY EXTRACTION

| | | | |
|---|---|---|---|
| Client | : RICHARD BRADY & ASSOCIATES | Date Collected: | 12/05/07 |
| Project | : ALAMEDA POINT, IR SITE 13 | Date Received: | 12/06/07 |
| Batch No. | : 07L082 | Date Extracted: | 12/10/07 17:30 |
| Sample ID: | AP13-093-W-01 | Date Analyzed: | 12/13/07 20:27 |
| Lab Samp ID: | L082-07 | Dilution Factor: | .94 |
| Lab File ID: | LL13030A | Matrix : | WATER |
| Ext Btch ID: | DSL028W | % Moisture : | NA |
| Calib. Ref.: | LL13024A | Instrument ID : | GCT105 |

| PARAMETERS | RESULTS (mg/L) | RL (mg/L) | MDL (mg/L) |
|---|---|---|---|
| DIESEL | ND | 0.47 | 0.094 |
| MOTOR OIL | ND | 0.94 | 0.094 |

| SURROGATE PARAMETERS | % RECOVERY | QC LIMIT |
|---|---|---|
| BROMOBENZENE | 66 | 50-130 |
| HEXACOSANE | 85 | 70-140 |

RL : Reporting Limit

| Parameter | H-C Range |
|---|---|
| Diesel | C10-C24 |
| Motor Oil | C24-C36 |

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LDC #: 18116B8

SDG #: 07L082

Laboratory: EMAX Laboratories, Inc.

# VALIDATION COMPLETENESS WORKSHEET

Level III/IV

Date: 1/25/08

Page: 1 of 7

Reviewer:

2nd Reviewer:

**METHOD:** GC TPH as Extractables (EPA SW 846 Method 8015)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

| | Validation Area | | Comments |
|---|---|---|---|
| I. | Technical holding times | A | Sampling dates: 12/5/07 |
| IIa. | Initial calibration | A | |
| IIb. | Calibration verification | A | |
| III. | Blanks | A | ICV ≤ 15 |
| IVa. | Surrogate recovery | SW | |
| IVb. | Matrix spike/Matrix spike duplicates | N | client specified |
| IVc. | Laboratory control samples | A | LCS ID |
| V. | Target compound identification | A | Not reviewed for Level III validation. |
| VI. | Compound Quantitation and CRQLs | A | Not reviewed for Level III validation. |
| VII. | System Performance | A | Not reviewed for Level III validation. |
| VIII. | Overall assessment of data | A | |
| IX. | Field duplicates | N | |
| X. | Field blanks | NP | FB = 1 EB = 6 |

Note: A = Acceptable; ND = No compounds detected; D = Duplicate; N = Not provided/applicable; R = Rinsate; TB = Trip blank; SW = See worksheet; FB = Field blank; EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 2 | AP13-170-W-02 FB | 11 | MBLK15 | 21 | | 31 | |
| 2 1 | AP13-170-S-01** | 12 2 | MBLK1W | 22 | | 32 | |
| 3 1 | AP13-094-S-01** | 13 | | 23 | | 33 | |
| 4 1 | AP13-093-S-01 | 14 | | 24 | | 34 | |
| 5 1 | AP13-093-S-02 | 15 | | 25 | | 35 | |
| 6 2 | AP13-093-W-01 EB | 16 | | 26 | | 36 | |
| 7 | | 17 | | 27 | | 37 | |
| 8 | | 18 | | 28 | | 38 | |
| 9 | | 19 | | 29 | | 39 | |
| 10 | | 20 | | 30 | | 40 | |

Notes:

LDC #: L8116B8
SDG #: see cover

# VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: [illegible]
2nd Reviewer: [illegible]

**Method:** ____ GC ____ HPLC

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| **I. Technical holding times** | | | | |
| All technical holding times were met. | ✓ | | | |
| Cooler temperature criteria was met. | ✓ | | | |
| **II. Initial calibration** | | | | |
| Did the laboratory perform a 5 point calibration prior to sample analysis? | ✓ | | | |
| Was a linear fit used for evaluation? If yes, were all percent relative standard deviations (%RSD) ≤ 20%? | ✓ | | | |
| Was a curve fit used for evaluation? If Yes, what was the acceptance criteria used? | | ✓ | | |
| Did the initial calibration meet the curve fit acceptance criteria? | | | ✓ | |
| Were the RT windows properly established? | ✓ | | | |
| **IV. Continuing calibration** | | | | |
| What type of continuing calibration calculation was performed? ____%D or ____%R | ✓ | | | |
| Was a continuing calibration analyzed daily? | ✓ | | | |
| Were all percent differences (%D) ≤ 15%.0 or percent recoveries 85-115%? | ✓ | | | |
| Were all the retention times within the acceptance windows? | ✓ | | | |
| **V. Blanks** | | | | |
| Was a method blank associated with every sample in this SDG? | ✓ | | | |
| Was a method blank analyzed for each matrix and concentration? | ✓ | | | |
| Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet. | | ✓ | | |
| **VI. Surrogate spikes** | | | | |
| Were all surrogate %R within the QC limits? | | ✓ | | |
| If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R? | | ✓ | | |
| If any %R was less than 10 percent, was a reanalysis performed to confirm %R? | | | ✓ | |
| **VII. Matrix spike/Matrix spike duplicates** | | | | |
| Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water. | | | ✓ | |
| Was a MS/MSD analyzed every 20 samples of each matrix? | | | ✓ | |
| Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? | | | ✓ | |
| **VIII. Laboratory control samples** | | | | |
| Was an LCS analyzed for this SDG? | ✓ | | | |
| Was an LCS analyzed per extraction batch? | ✓ | | | |
| Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits? | ✓ | | | |

LDC #: 18116B8
SDG #: all cover

# VALIDATION FINDINGS CHECKLIST


Reviewer: [illegible]
2nd Reviewer: [illegible]

| Validation Area | Yes | No | NA | Findings/Comments |
|---|---|---|---|---|
| IX. Regional Quality Assurance and Quality Control | | | | |
| Were performance evaluation (PE) samples performed? | | | ✓ | |
| Were the performance evaluation (PE) samples within the acceptance limits? | | | ✓ | |
| X. Target compound identification | | | | |
| Were the retention times of reported detects within the RT windows? | ✓ | | | |
| XI. Compound quantitation/CRQLs | | | | |
| Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation? | ✓ | | | |
| XII. System performance | | | | |
| System performance was found to be acceptable. | ✓ | | | |
| XIII. Overall assessment of data | | | | |
| Overall assessment of data was found to be acceptable. | ✓ | | | |
| XIV. Field duplicates | | | | |
| Field duplicate pairs were identified in this SDG. | | ✓ | | |
| Target compounds were detected in the field duplicates. | | | ✓ | |
| XV. Field blanks | | | | |
| Field blanks were identified in this SDG. | ✓ | | | |
| Target compounds were detected in the field blanks. | | ✓ | | |

LDC #: 18 B8
SDG #: per cover

# VALIDATION FINDINGS WORKSHEET
## Surrogate Recovery

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** ✓ GC ___ HPLC

Are surrogates required by the method? Yes____ or No____.

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

| # | Sample ID | Detector/ Column | Surrogate Compound | %R (Limits) | Qualifications |
|---|---|---|---|---|---|
| | 2 | not specified | L | DO ( 40-160 ) | no qual 100 x DL |
| | | | K | DO ( 70-160 ) | ↓ |
| | | | | ( ) | |
| | 5 | ↓ | K | 338 ( 70-160 ) | J/Pdet 5x DL |
| | | | | ( ) | |
| | | | | ( ) | |
| | | | | ( ) | |
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| | | | | ( ) | |
| | | | | ( ) | |

| | Surrogate Compound | | Surrogate Compound | | Surrogate Compound | | Surrogate Compound |
|---|---|---|---|---|---|---|---|
| A | Chlorobenzene (CBZ) | G | Octacosane | M | Benzo(e)Pyrene | S | 1-Chloro-3-Nitrobenzene |
| B | 4-Bromofluorobenzene (BFB) | H | Ortho-Terphenyl | N | Terphenyl-D14 | T | 3,4-Dinitrotoluene |
| C | a,a,a-Trifluorotoluene | I | Fluorobenzene (FBZ) | O | Decafluorobiphenyl (DCB) | U | Tripentyltin |
| D | Bromochlorobenene | J | n-Triacontane | P | 1-methylnaphthalene | V | Tri-n-propyltin |
| E | 1,4-Dichlorobutane | K | Hexacosane | Q | Dichlorophenyl Acetic Acid (DCAA) | W | Tributyl Phosphate |
| F | 1,4-Difluorobenzene (DFB) | L | Bromobenzene | R | 4-Nitrophenol | X | Triphenyl Phosphate |

LDC #: 181168B
SDG #: see cover

# VALIDATION FINDINGS WORKSHEET
## Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer:
2nd Reviewer:

METHOD: GC ✓ HPLC ____

The calibration Factor (CF), average CF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

CF = A/C
average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

A = Area of compound,
C = Concentration of compound,
S = Standard deviation of the CF
X = Mean of the CFs

| # | Standard ID | Calibration Date | Compound | Reported CF (50.0 std) | Recalculated CF (50.0 std) | Reported Average CF (initial) | Recalculated Average CF (initial) | Reported %RSD | Recalculated %RSD |
|---|---|---|---|---|---|---|---|---|---|
| 1 | ICAL | 10/31/07 | Diesel | 29224 | 29224 | 26825.3 | 26825.3 | 13.4 | 13.4 |
| | | | | | | | | | |
| | | | | | | | | | |
| 2 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 3 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| 4 | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

INIC B

LDC #: 18116B6
SDG #: all cover

# VALIDATION FINDINGS WORKSHEET
## Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. CF - CF)/ave. CF
CF = A/C

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

| # | Standard ID | Calibration Date | Compound | Average CF(Ical)/ CCV Conc. | Reported CF/Conc. CCV | Recalculated CF/Conc. CCV | Reported %D | Recalculated %D |
|---|---|---|---|---|---|---|---|---|
| 1 | LL13037A | 12/13/07 | Diesel C10-C24 | 500 | 537.90 | 538.0 | 8 | 8 |
| | | | | | | | | |
| | LL13076A | 12/14/07 | ↓ | ↓ | 551.84 | 552.0 | 10 | 10 |
| 2 | | | | | | | | |
| | LL14038A | 12/15/07 | ↓ | ↓ | 561.97 | 562.0 | 12 | 12 |
| | | | | | | | | |
| 3 | LL14051A | 12/15/07 | ↓ | ↓ | 533.81 | 534.0 | 7 | 7 |
| | | | | | | | | |
| | | | | | | | | |
| 4 | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

CONCLC.1S

.DC #: 18116B8
SDG #: see cover
METHOD: GC __ HPLC

# VALIDATION FINDINGS WORKSHEET
## Surrogate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd reviewer: [illegible]

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #3 2X DIL

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| Bromobenzene | not specified | 100 | 41.814 | 84 | 84 | 0 |
| Hexacosane | ↓ | 25 | 14.083 | 113 | 113 | 0 |
| | | | | | | |
| | | | | | | |

Sample ID:

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Sample ID:

| Surrogate | Column/Detector | Surrogate Spiked | Surrogate Found | Percent Recovery Reported | Percent Recovery Recalculated | Percent Difference |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

LDC #: 18[illegible]B8
SDG #: [illegible]

# VALIDATION FIND[illegible]GS WORKSHEET

## Laboratory Control Sample/Laboratory Co[illegible]ol Sample Duplicates Results Verification

[illegible]: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

____METHOD: __ GC __HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA  Where SSC = Spiked concentration, SA = Spike added, SC = Sample concentration

RPD =(((SSCLCS - SSCLCSD) * 2) / (SSCLCS + SSCLCSD))*100  LCS = Laboratory Control Sample percent recovery  LCSD = Laboratory Control Sample duplicate percent recovery

LCS/LCSD samples: water soil

| Compound | Spike Added (mg/kg) | | Sample Conc. (mg/kg) | Spike Sample Concentration (mg/kg) | | LCS Percent Recovery | | LCSD Percent Recovery | | LCS/LCSD RPD | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | LCS | LCSD | -- | LCS | LCSD | Reported | Recalc. | Reported | Recalc. | Reported | Recalc. |
| Gasoline (8015) | | | | | | | | | | | |
| Diesel (8015) | 500 | 500 | | 544 | 540 | 109 | 109 | 108 | 108 | 1 | 1 |
| Benzene (8021B) | | | | | | | | | | | |
| Methane (RSK-175) | | | | | | | | | | | |
| 2,4-D (8151) | | | | | | | | | | | |
| Dinoseb (8151) | | | | | | | | | | | |
| Naphthalene (8310) | | | | | | | | | | | |
| Anthracene (8310) | | | | | | | | | | | |
| HMX (8330) | | | | | | | | | | | |
| 2,4,6-Trinitrotoluene (8330) | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 1811688
SDG #: All cover

# VALIDATION FINDINGS WORKSHEET
## Sample Calculation Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

**METHOD:** ✓ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound in the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. #3 Compound Name Phenol

Concentration = 525046 (10) (2) / 26825.30814 (10.02) (0.537)

73 mg/kg

| # | Sample ID | Compound | Reported Concentrations ( ) | Recalculated Results Concentrations ( ) | Qualifications |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
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| | | | | | |

Comments:

SAM ew.wpd

# APPENDIX H

SEE ATTACHED CD FOR 3-D ANIMATION FILE

AR_N00236_003182
ALAMEDA POINT
SSIC NO. 5090.3.A

APPENDIX H – THREE-DIMENSIONAL ANIMATION, IS CONTAINED ON ELECTRONIC MEDIA ONLY.

FOR ADDITIONAL INFORMATION, CONTACT:

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