

**Appendix A**  
**Interim Memorandums**

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## **Pavement Condition Memorandum**

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## Current Pavement Condition at the AMCO Facility

TO: Bruni Davila - US EPA  
COPIES: Ana Demorest - CH2M HILL  
FROM: Bill Frohlich - CH2M HILL  
DATE: December 3, 2004

The purpose of this memorandum is to document the concrete thickness throughout the site and evaluate of the condition of the concrete. The four main parcels considered include:

- 1414-3<sup>rd</sup> Street (the main facility)
- 1448-3<sup>rd</sup> Street (field office trailer location)
- 324 Center Street (small vacant lot)
- 328-348 Center Street (large vacant lot)

Figure 1 shows the type of ground cover (i.e., asphalt, concrete, or unpaved) and the surface cover thickness at coring locations. Note, an extensive photo log of all boring locations is available, but too large to include as part of this memo.

### 1414-3<sup>rd</sup> Street

Concrete Thickness: With the exception of a 2-foot edge on the western fence-line and a small area north of the warehouse (see Figure 1), this entire facility is covered with concrete. At this parcel concrete thickness varies from 4 to 40 inches. The median concrete thickness at the main facility is ~16 inches. All locations with concrete thicker than 12 inches are in the northern third of the facility.

At one location, RSB/G-16, refusal was encountered at four attempts at concrete coring within a 15 foot radius. At this location, surface cover consisted of alternating layers of 6 to 8 inches of concrete and 6 to 8 inches of debris, with a thickness of greater than 24 inches. The total thickness at this location could not be determined due to refusal during concrete coring.

Concrete Condition: In general, relatively smoothly finished concrete is present in the following locations: (1) along the eastern two thirds of the northern fence line, (2) just west of and adjacent to the warehouse, and (3) the southern third of the facility. In some areas this finished concrete shows wear, but is otherwise in relatively good condition. The surface in the central and most of the western portions of the site consist of poorly finished concrete with an irregular surface particularly where separate loads of concrete were placed at different times. In these areas with a more uneven finish, significant dirt accumulation and concrete "gravel" (from surficial damage to the uneven surface) obscure the slab.

At all concrete coring locations, the concrete was observed to be competent and uncracked. At RSB/G-16, despite alternating layers of 6 to 8 inches of concrete and debris the separate concrete slabs were intact. At locations with thicker concrete, observation of the core

showed layering, indicating numerous, separate concrete placement events. In spite of the layering observed in some concrete cores, the concrete was intact.

#### **1448-3<sup>rd</sup> Street**

Concrete Thickness: At the 5 coring locations at this site, the concrete is 4 to 6 inches thick.

Concrete Condition: A uniform, finished concrete slab is present throughout this site. No cracking or damage is apparent in the slab. In the central yard, the slab ends several inches from the warehouse, and two joints run the length of the slab. In the northern quarter of this lot, the original slab is covered with a more recent layer of concrete. This later layer is smoothly finished and grades evenly into the original slab.

#### **324 Center Street**

Concrete Thickness: At the 6 coring locations at this site, the concrete was 10 to 12 inches thick.

Concrete Condition: A uniform, finished concrete slab is present throughout this site. No cracking or damage is apparent in the slab. A joint is present in the middle of this lot that runs the width of the slab.

#### **332-346 Center Street**

Concrete Thickness: At the 17 coring locations at this site, the concrete was 6 to 14 inches thick, with an average thickness of ~11 inches.

Concrete Condition: Overall this lot has a uniform, finished concrete slab. A small portion of the southeast corner of this lot, adjacent to 1414-3<sup>rd</sup> Street, is somewhat more irregular and is contiguous with the thicker, uneven concrete present at main facility. No cracking or damage is apparent in the slab.



**Legend**

- Sampling Locations
- ▭ Former AMCO Chemical Facility Boundary
- - - Former Extraction Trench
- Asphalt
- Concrete
- Dirt

\*At RSG-16, repeated layers of concrete and debris were encountered. Unable to concrete core beyond 24 inches.

0 60 120 Feet  
 Scale 1:720  
 CA State Plane (NAD83) Zone III

**FIGURE 1**  
**SURFACE COVER THICKNESS**  
 REMEDIAL INVESTIGATION  
 AMCO CHEMICAL SUPERFUND SITE  
 OAKLAND, CALIFORNIA



**EPA Response to Technical Assistance Grant**



## **POOR LEGIBILITY**

ONE OR MORE PAGES IN THIS DOCUMENT ARE DIFFICULT TO READ  
DUE TO THE QUALITY OF THE ORIGINAL



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105

December 7, 2005

John W. Schweizer  
Remediation Services, Inc.  
1485 Bayshore Boulevard  
Suite 352  
San Francisco, CA 94124

Dear John:

This is in response to your request to sample in the Alameda formation at the AMCO Chemical Superfund site.

The available evidence strongly indicates that: 1) several yards separate the deepest extent of dense non-aqueous phase liquid (DNAPL) and the aquitard; 2) DNAPL is not present in proximity to the aquitard; and 3) the presence of a thick aquitard would preclude the vertical migration of contaminants to the lower aquifer.

Per our conversations, you have indicated that there are locations at the south bay sites where upper aquifers have been found to be "clean" while lower aquifers are contaminated. The heterogeneous geology of the south bay allows this phenomenon. The upper aquifer at a downgradient location is not contiguous with the upper aquifer in the source area, and the lower aquifer at the downgradient location is contiguous with the upper aquifer at the source area. However, the geology at the south bay sites differs very significantly from the geology at the AMCO site. The AMCO site differs in that the upper aquifer and lower aquifer are isolated from one another by a laterally continuous aquitard.

The available evidence also indicates that the deeper aquifer has not been impacted. Therefore, we believe that there is no need to install a well in the deeper aquifer. We will continue to assess data as they are collected.

mailed on 12/7/05  
B.D.

If you have any questions, we can address them at our next monthly meeting, next Wednesday, December 14, 2005 at the Alliance for West Oakland Development (AWOD) office. You can also call me at 415-972-3162.

Sincerely,



Bruni Dávila  
Remedial Project Manager  
AMCO Chemical Superfund Site

Enclosures

**EPA Response to TAG Question: Why is sampling in the Alameda formation not included in the SAP?**

**Hydrogeological Investigation; -50 Foot Oakland Harbor Navigation Improvement Project, Port of Oakland; Oakland and Alameda, California; Todd Engineers, February 1999.**

**Surficial Geology, Existing Conditions, Plate 21**

**Geologic Cross Section Locations, Plate 23**

**Hydrogeological Cross Sections A-A', B-B', Plate 24**

**A Comprehensive Groundwater Protection Evaluation for the South San Francisco Basin, SF-RWQCB, May 2003).**

**Figure 8a: Santa Clara Valley Groundwater Basin Cross Section A-A' Schematic (Source: Iwamura 1995)**

cc: Viola Cooper w/o enclosures

Why is sampling in the Alameda formation not included in the SAP?

Figure 14 of the SAP shows a conceptual model of the geology beneath the site. The model shows groundwater (in an unconfined aquifer) in a formation called the Merritt Sand directly beneath the Site from about 3-10 feet below the ground surface to 45-55 feet down, then a clay layer (aquitar) that extends from about 50 feet below the ground surface to about 90 feet below the ground surface, then a second (confined) aquifer in the Alameda formation beneath the approximately 40-foot thick clay layer. The Alameda formation extends from below the clay layer to bedrock which is at greater than 250 feet below ground surface, and contains usable groundwater. In fact, until recently, this water was used by the Red Star Yeast factory that was located nearby the Site (see Phase I & II Environmental Site Assessment: Alameda County Assessor's Parcel Number 004-69-004; Remediation Services, Inc. (September 2004).

Spilled solvents such as TCE have been shown to sink through the upper aquifer because they are heavier than water. They then penetrate their way through clay layers and contaminate the lower, usable aquifers. This has been shown to occur in similar geology and with some of the same chemicals that were spilled at the Site. (Please refer to the RI/FS and Quarterly Reports for the Middlefield-Ellis-Whisman [MEW] Superfund site in Mountain View, CA; and similar documents for the IBM site in San Jose, CA; the South San Jose Superfund site in San Jose, CA; and the COE site in Palo Alto, CA.) Data reported in the Preliminary Assessment/Site Investigation Report: AMCO Chemical Site; Ecology and Environment, Inc. (August 2001), which I reviewed in the West Oakland Branch Library, shows that groundwater in the upper aquifer (Merritt Sand) is sufficiently contaminated to suggest the presence of pure solvents, including TCE. The Sampling and Analysis Program (Section 6.0) of the SAP calls for discrete depth sampling of the upper aquifer and for sampling for DNAPL (Dense Non-aqueous Phase Liquid, i.e. pure heavier-than-water solvents) in the upper aquifer. These tests seem intended to establish whether these solvents could have penetrated the clay layer (aquitar) that separates the upper and lower aquifers. Please be aware that similar tests at the MEW site referenced above indicated that vertical variations in groundwater contamination were determined more by variations in soil properties than by the presence or absence of contaminants at depth. Also, samples with DNAPL were never found. However, direct tests of the lower aquifers indicated that substantial aquitards had in fact been penetrated by DNAPL. The conclusion drawn from these data at the MEW site was that DNAPL penetrates the soil column in very narrow preferential pathways that have a low probability of interception by soil borings. The experience of MEW and other similar sites suggests that the only way to be certain that the usable aquifer beneath the AMCO site has not been contaminated is to test it.

***USEPA Response:***

**In expressing your concerns regarding the potential for contamination of the lower aquifer, you present three factors to support your call for investigation of the lower aquifer. These included: 1) the site geology is similar to the geology found in other locations where contamination of the lower aquifer has been encountered, 2) the concentrations of volatile organic compounds (VOCs) in the groundwater suggest the presence of dense non-aqueous phase liquid (DNAPL) at the site; and 3) based**

on the information from the other sites cited, DNAPL may have penetrated the aquitard even if we do not encounter DNAPL in our samples.

**Site Geology:** You accurately characterized the geology of the AMCO site as a relatively simple layer cake system with a thin layer of fill extending from 3 to 10 ft below ground surface (bgs), underlain by a sandy aquifer from 50 to 70 ft bgs (also referred to as the Merritt Sands), which in turn is underlain by an aquitard that is 40+ feet thick, which in turn is underlain by the lower aquifer (also referred to as the Alameda Formation) which extend to bedrock at roughly 250 ft bgs. Available reports indicate that the upper aquifer, aquitard, and the lower aquifer are ALL laterally contiguous over a very broad area (i.e., from the site, miles to the west and to the south). Please see enclosed figures from *Hydrogeologic Investigation: Oakland Harbor Navigation Improvement (-50 foot) Project, Port of Oakland; Oakland and Alameda, California; Todd Engineers 1999*.

However, the geology at the south bay sites differs very significantly from the geology at the AMCO site. Unlike the AMCO site where soils were deposited over broad areas, either by large bodies of water (with possibly some wind-blown sands [i.e., Merritt Sands]), soils at the south bay sites you reference were deposited by streams coming off the surrounding hills (in alluvial fans). Due to the depositional environment, these south bay soils form an interwoven web of laterally and vertically interconnected aquifers and discontinuous aquitards (see enclosed figures from *A Comprehensive Groundwater Protection Evaluation for the South San Francisco Basin, SF-RWQCB, May 2003*).

These major differences in local geology result in significantly different potentials for contaminants to migrate vertically. In the south bay, the presence of discontinuous aquitards results in vertical interconnectedness of aquifers, which significantly increases the likelihood of vertical migration of both dissolved and DNAPL contaminants. However, at the AMCO site where laterally contiguous, thick aquitards are present, the migration of dissolve-phase contaminants is largely prevented and the potential migration of any DNAPL is reduced.

**DNAPL (i.e., Free-Phase Product):** Based on the elevated concentrations in shallow groundwater previously reported in the Ecology & Environment (E&E) document, you concluded that there is DNAPL in the subsurface. Per the field work we have conducted so far, we have confirmed the previous shallow groundwater data. We have also learned that below approximately 20 to 30 feet bgs, concentrations of compounds of concern (COCs) in groundwater diminish rapidly with depth to below screening levels. Furthermore, COCs in samples collected within 20 feet of the aquitard are not detected, almost without exception. On July 25, you and I met at the USEPA offices and talked about some of this preliminary data (September 2004 grab groundwater sampling and March 2005 groundwater sampling).

Based on these preliminary results, it is likely that DNAPL is present in near-surface soils, but is trapped as a residual DNAPL in a "smear zone" in the upper 20 feet (in the central portion of the site). The absence of a smear zone below 20 feet

bgs (which is reflected in the low groundwater concentrations) indicate that it is highly unlikely that DNAPL ever migrated below that depth.

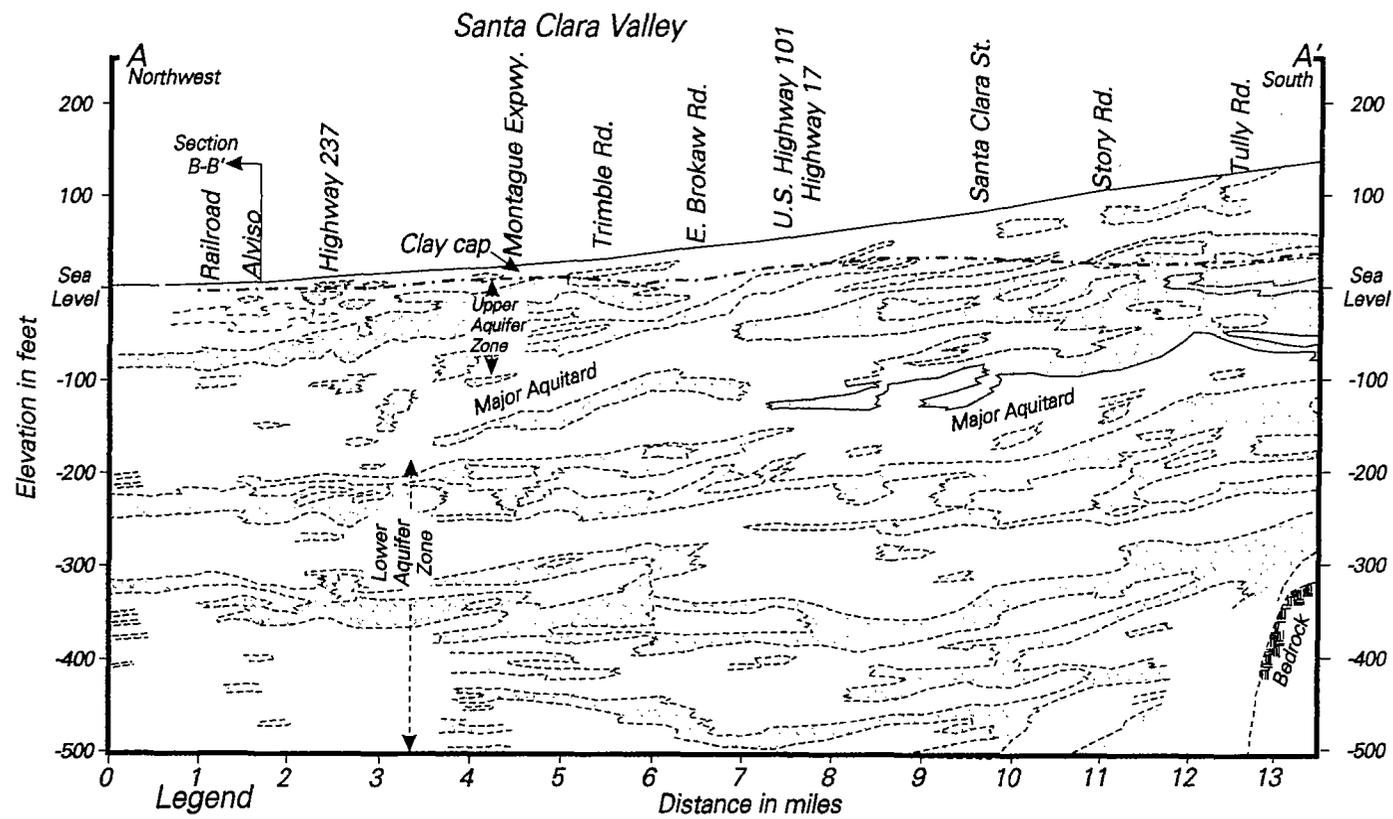
*Vertical Migration of DNAPL:* DNAPLs migrate vertically in the subsurface because these materials' densities are significantly greater than water. We agree that, in general, significant quantities of DNAPL sitting directly on aquitards would migrate vertically through these low-permeability soils due to the pressure head. There is a large body of case studies to support this. We also agree that actually locating free-phase DNAPL in the subsurface is highly improbable, and not finding DNAPL does not by itself indicate that this DNAPL is not present. However, the presence of DNAPL at depth would be supported by high dissolved phase concentrations (hundreds of parts per million (ppm), thousands of ppm, or even higher) in the vicinity; at the AMCO site, there is no such indication, as described above.

At the public meeting, you indicated that there are locations at the south bay sites where upper aquifers have been found to be "clean" while lower aquifers are contaminated. The heterogeneous geology of the south bay allows this phenomenon. The upper aquifer at a downgradient location is NOT contiguous with the upper aquifer in the source area, and the lower aquifer at the downgradient location IS contiguous with the upper aquifer at the source area. The AMCO site differs in that the upper aquifer and lower aquifer are isolated from one another by a laterally continuous aquitard.

*Summary*

The above evidence strongly indicates that: 1) several yards separate the deepest extent of DNAPL and the aquitard, 2) DNAPL is not present in proximity to the aquitard; and 3) the presence of a thick aquitard would preclude the vertical migration of contaminants to the lower aquifer.

The available evidence also indicates that the deeper aquifer has not been impacted. Therefore we believe that there is no need to install a well in the deeper aquifer. We will continue to assess data as they are collected.

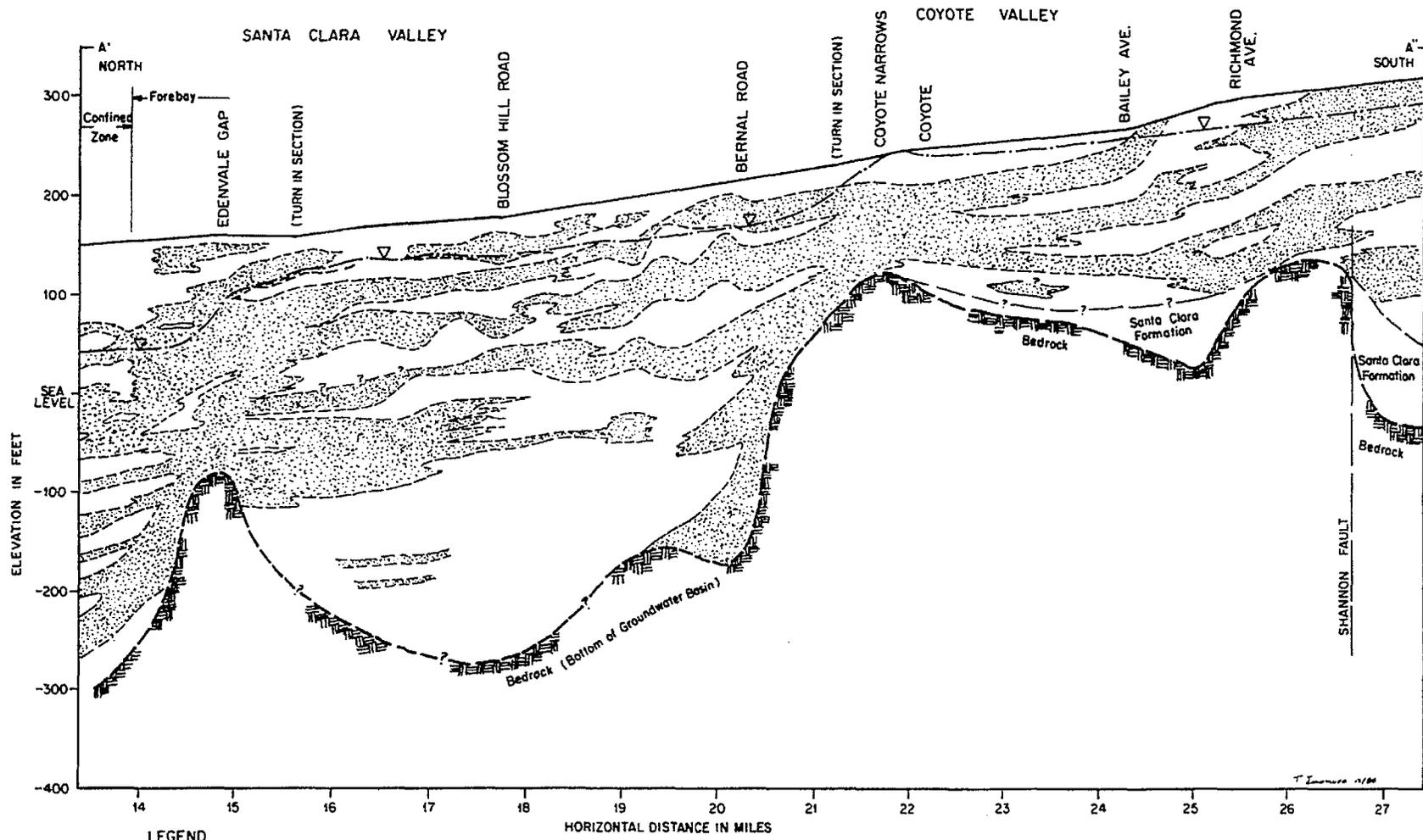


Distinguishable aquifers - mixtures of gravel and sand. Medium to high permeabilities  
 Approximate water table, 1984

Aquitard - mixtures of clay and silt, with some sand and gravel, low to very low permeabilities

- Notes:
1. Refer to Figure 2 for location of section.
  2. Interpretive section based on available well logs.
  3. Aquifers are grouped into Upper Aquifer Zone and Lower Aquifer Zone, separated by "Major" aquitard

Figure 8a: Santa Clara Valley Groundwater Basin Cross-section Schematic (Source: Iwamura 1995)



**LEGEND**

DISTINGUISHABLE AQUIFERS-- MIXTURES OF GRAVEL AND SAND, MEDIUM TO VERY HIGH PERMEABILITIES.

AQUITARD-- MIXTURES OF CLAY AND SILT, WITH SOME SAND AND GRAVEL, LOW TO VERY LOW PERMEABILITIES

APPROXIMATE WATER TABLE, 1984

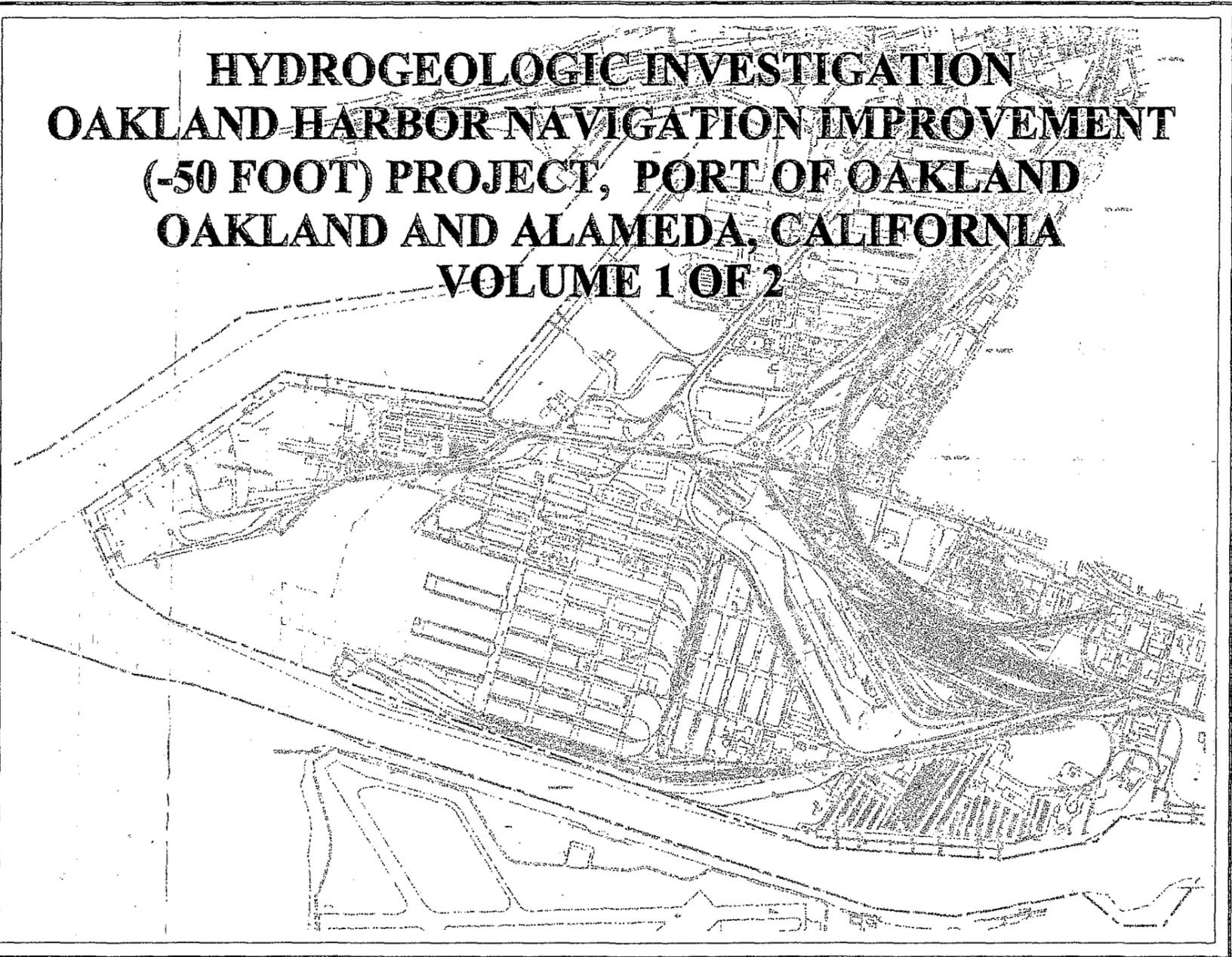
**NOTES:**

1. REFER TO FIGURE IN B FOR LOCATION OF SECTION.
2. INTERPRETIVE SECTION BASED UPON AVAILABLE WELL LOGS.
3. MOST OF SECTION A'-A'' IS FOREBAY ZONE, TO JUST PAST EDENVALE GAP.

T. L. ... 1984

# FINAL REPORT

## HYDROGEOLOGIC INVESTIGATION OAKLAND HARBOR NAVIGATION IMPROVEMENT (-50 FOOT) PROJECT, PORT OF OAKLAND OAKLAND AND ALAMEDA, CALIFORNIA VOLUME 1 OF 2



Prepared for:

**PORT OF OAKLAND**

 530 WATER STREET OAKLAND, CALIFORNIA

Prepared by:



**Subsurface Consultants, Inc.**  
Geotechnical & Environmental Engineers  
Oakland, California

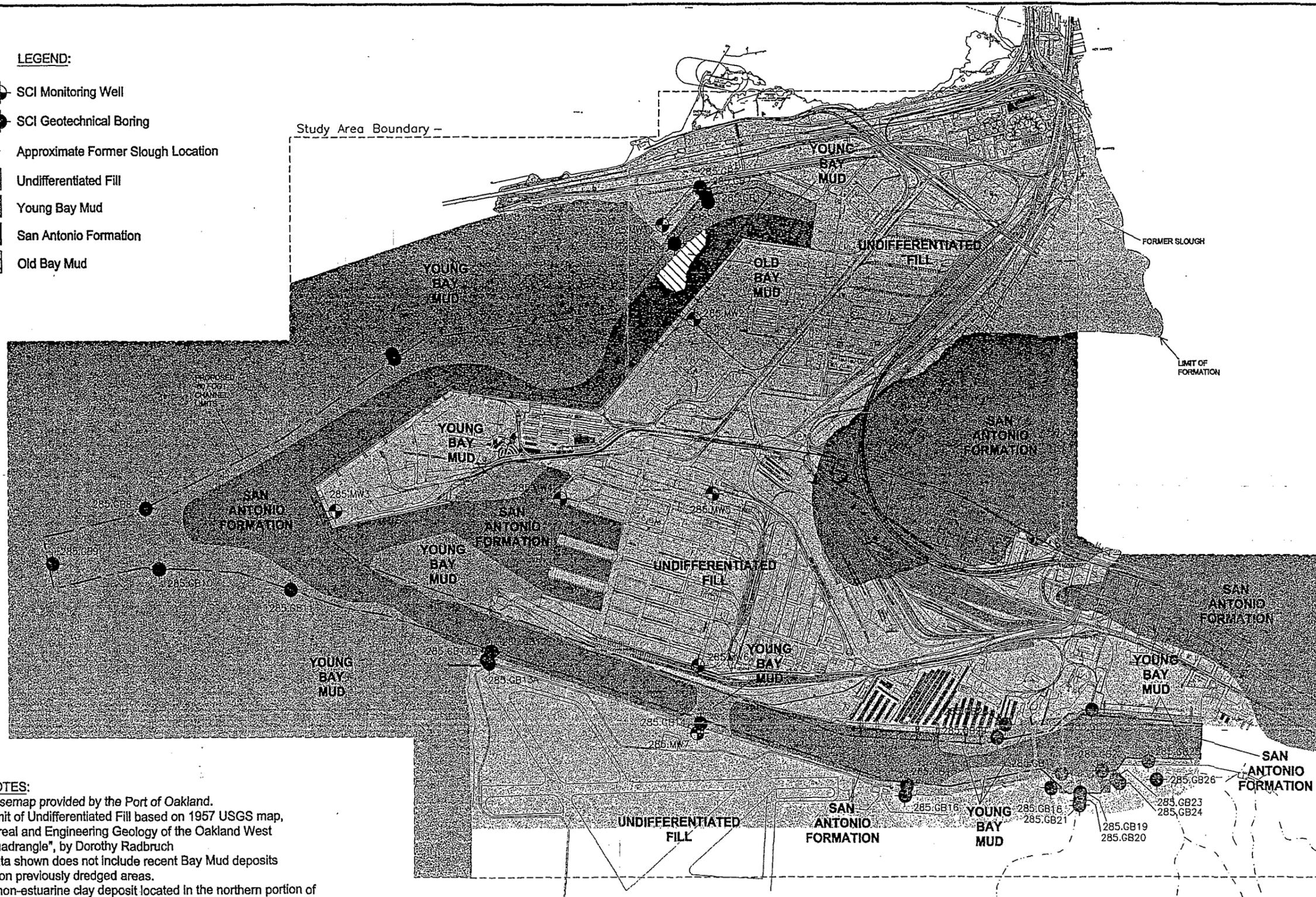
and

**Todd Engineers**  
Emeryville, California

February 12, 1999

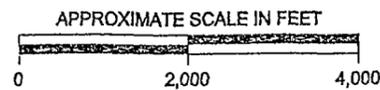
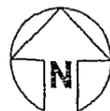
**LEGEND:**

- 285.MW4  SCI Monitoring Well
- 285.GB8  SCI Geotechnical Boring
-  Approximate Former Slough Location
-  Undifferentiated Fill
-  Young Bay Mud
-  San Antonio Formation
-  Old Bay Mud



**NOTES:**

1. Basemap provided by the Port of Oakland.
2. Limit of Undifferentiated Fill based on 1957 USGS map, "Areal and Engineering Geology of the Oakland West Quadrangle", by Dorothy Radbruch
3. Data shown does not include recent Bay Mud deposits upon previously dredged areas.
4. A non-estuarine clay deposit located in the northern portion of the outer harbor channel has been grouped with the Old Bay Mud.



Todd Engineers  
Emeryville, California

**SURFICIAL GEOLOGY,  
EXISTING CONDITIONS**



**Subsurface Consultants, Inc.**  
Geotechnical & Environmental Engineers

HYDROGEOLOGIC INVESTIGATION  
-50 FOOT NAVIGATION IMPROVEMENT PROJECT  
PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA

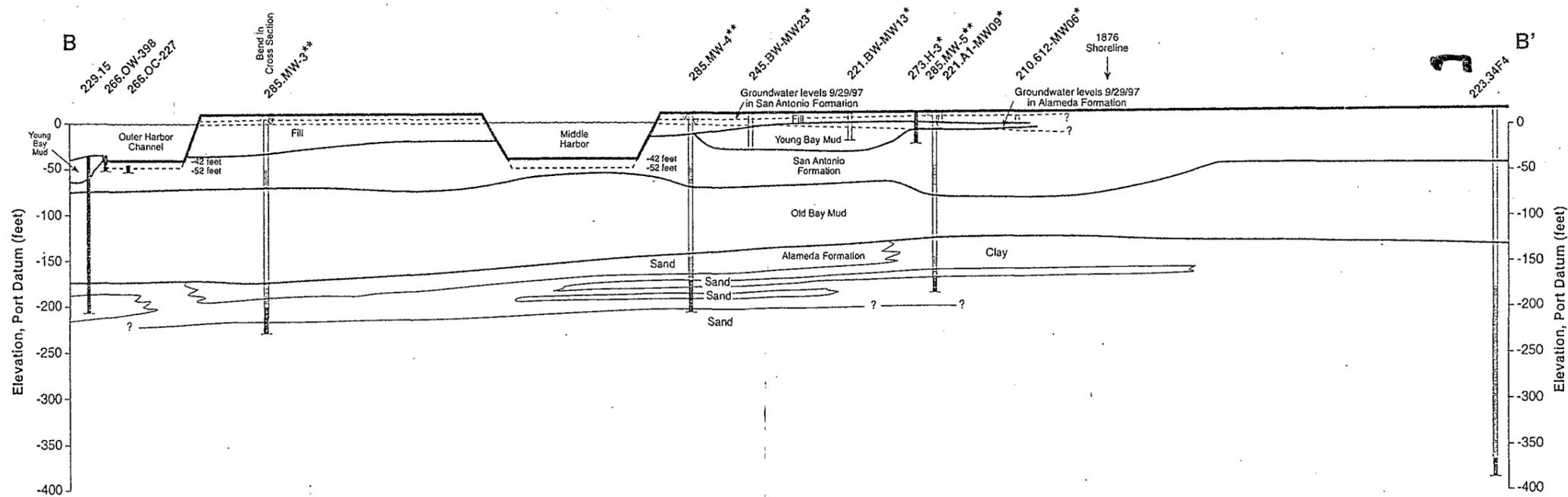
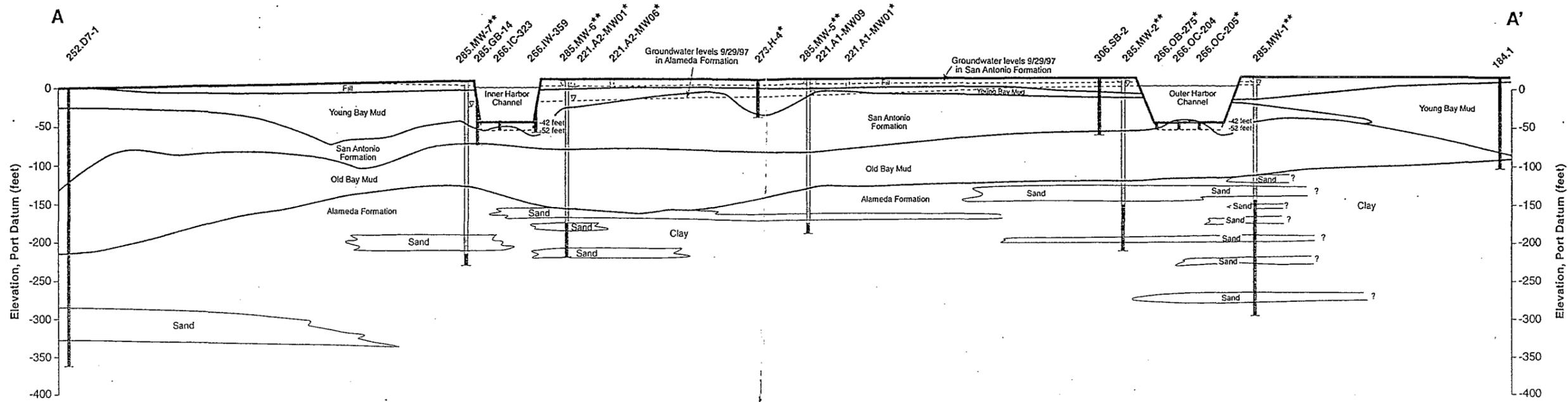
JOB NUMBER 133.008	DATE 02/99	APPROVED 
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PLATE

**21**

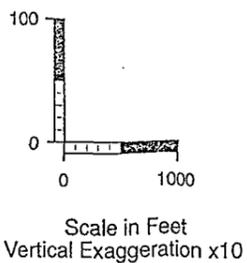
EXISTGEO.DWG





**LEGEND**

- \* Well/boring projected onto cross section (See Plate 23 for actual location)
- \*\* Screened intervals are actually separate B wells (shallower screen) and C wells (deeper screen)
- Well with screened interval
- Boring



Todd Engineers Emeryville, California		<b>HYDROGEOLOGIC CROSS SECTIONS A-A', B-B'</b>	
Subsurface Consultants, Inc. Geotechnical and Environmental Engineers		HYDROGEOLOGIC INVESTIGATION OAKLAND HARBOR NAVIGATION IMPROVEMENT (50 FOOT) PROJECT PORT OF OAKLAND, OAKLAND AND ALAMEDA, CALIFORNIA JOB NUMBER: 133,008      DATE: 1/99      APPROVED: <i>[Signature]</i>	
			<b>PLATE 24</b>

## **Stormwater Runoff Memorandum**

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## Stormwater Runoff Observations and Photo Log AMCO Facility

TO: Bruni Davila  
COPIES: Ana Demorest  
FROM: Bill Frohlich  
DATE: November 5, 2004

The purpose of the memo is to supplement the attached photograph log and briefly document observations of runoff at the AMCO facility during a rainfall event on October 19, 2004. Observations were made at the main facility (1414-3<sup>rd</sup> Street) and at our staging area where the field office trailer is located (1448-3<sup>rd</sup> Street). Most of the photographs were taken October 20, the day following the rainfall event. It should be noted that at the parcels described below there is no storm-drain system and all stormwater runoff discharges by overland flow.

Five general areas of runoff discharge were observed at the main facility (1414-3<sup>rd</sup> Street). Figure 1 shows a simplified diagram of flow and discharge. Runoff could not be observed throughout large portions of the facility due to material storage covering the ground and making some areas inaccessible. The observed points of discharge include:

- (1) *Discharge #1: The main (eastern) gate on 3<sup>rd</sup> Street.* Runoff was observed to flow south along most of the main driveway, through the eastern gate on 3<sup>rd</sup> Street, over the sidewalk, and into 3<sup>rd</sup> Street [Photo 1 and 2]. There was no visible issues with water quality at this discharge point.
- (2) *Discharge #2: Into north end of the backyards of 1428 and 1432-3<sup>rd</sup> Street.* At the center of the site, some runoff flowed west along an auxiliary driveway, and then near the western fence line changing direction south flowing under a short east-west section of fence into the yards of the north end of the backyards at 1428 and 1432-3<sup>rd</sup> Street [Photos 3, 4, 5, and 6]. Due to materials storage in the area, the full catchment of this discharge could not be determined. Some of the runoff flowing towards this discharge point was visibly turbid, however at the point of discharge runoff was observation was difficult due to high plant growth.
- (3) *Discharge #3: Mandela Parkway gate.* From center of the northern driveway, runoff flowed east, across the sidewalk, and into Mandela Parkway [Photo 7]. There was no visible issues with water quality at this discharge point.
- (4) *Discharge #4: Northwest corner of facility.* In the northwest corner of the site, runoff was observed discharging west under the fence to the large vacant lot on Center Street [Photo 8]. Although the presence of materials near this area made observation difficult, it appeared that at least in part the runoff originated from the large scrap heap

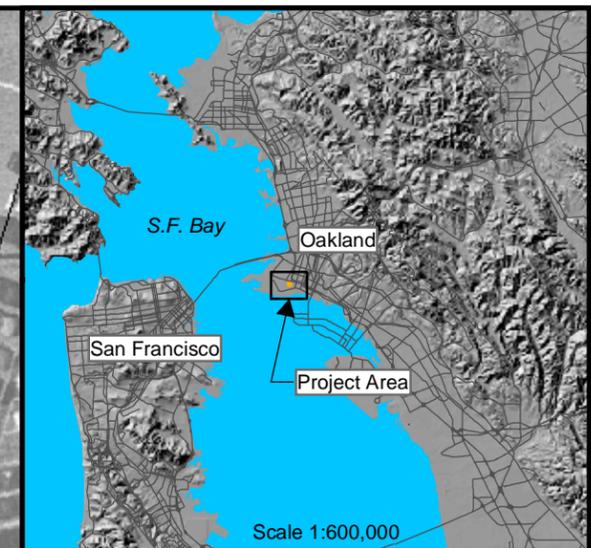
southwest of this discharge point. Runoff at this location was only slightly turbid, but was discolored, being light "coffee" colored.

- (5) *Discharge #5: The western gate on 3<sup>rd</sup> Street.* Along the secondary (western) driveway exiting to 3<sup>rd</sup> Street, runoff flow south along the driveway, over the sidewalk, and into 3<sup>rd</sup> Street [Photo 9 and 10]. Some oily sheen was observed in this stormwater discharge. Note, a leaking drum is located adjacent to this gate [Photo 11].
- (6) *Discharge #6: Southern portion of western fence.* Near the southwest corner of the site, in the vicinity of permanent soil gas probe RSP-06, runoff from the immediate vicinity was observed flowing west directly to the residence at 1428-3<sup>rd</sup> Street [Photo 12]. Because of materials covering most of the surrounding area, the full extent of discharge along this fence-line or the catchment contributing to this runoff could not be determined. There was no visible issues with water quality at this discharge point.

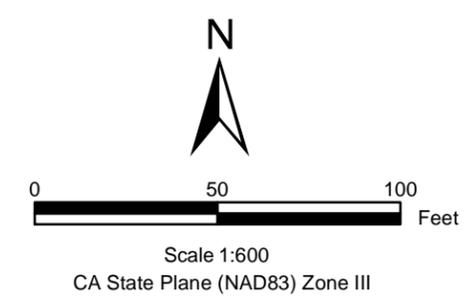
The storm drain at 3<sup>rd</sup> Street and Mandela Parkway is shown in Photo 13. The hose visible discharging into the catchbasin is from the roof drain-spout of the facility office building. Other observations at the main facility were some larger depressions that resulted in ponding, and some areas with abundant puddles resulting from rough or uneven pavement.

At 1448-3<sup>rd</sup> Street facility, runoff collected in the center line of the paved yard and flowed south across the sidewalk to 3<sup>rd</sup> Street. There was no visible issues with water quality at this discharge point.

No observations were made at the lot at 324 Center Street [Photo 15] or the large lot between 326 and 356 Center Street [Photo 16]. However, at the large lot the topography is such that runoff must flow to two parallel lows and then drain across the sidewalk to Center Street.



- Legend**
- Gates
  - Former AMCO Chemical Facility Boundary
  - Former Extraction Trench
  - Area with Small Puddles Present
  - Standing Water
  - Surface Water Runoff Direction
  - No Flow
  - Flow Inferred from Topography
  - Unable to Observe
  - Photograph Location with View Direction



**FIGURE 1**  
**STORMWATER OBSERVATIONS**  
 REMEDIAL INVESTIGATION  
 AMCO CHEMICAL SUPERFUND SITE  
 OAKLAND, CALIFORNIA





Photo 1. Looking south from the center of the yard towards 3<sup>rd</sup> Street. Ponding after rain. Water drains south to 3<sup>rd</sup> Street.



Photo 2. Looking from the north portion of the active yard south towards 3<sup>rd</sup> Street. Stormwater observations indicate that from the location of minor puddles in foreground, runoff drain to the west along "driveway". A short distance south of the puddles, runoff drains south to 3<sup>rd</sup> Street.



Photo 3. Looking west from the main driveway. Runoff was observed to flow west along this driveway and just short of the in the background fence, south (left) towards the 3<sup>rd</sup> Street residences. Note, orange spools in background are seen in Photos 4 and 5.

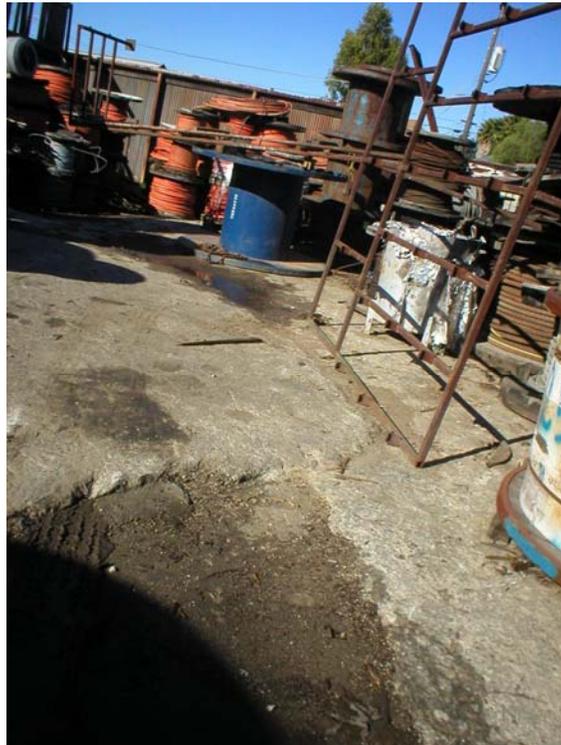


Photo 4. Looking west from the mid-point of the central auxiliary driveway. The stormwater flow path is along lows towards the western fence, and then heads south (left) towards 1428 and 1432-3<sup>rd</sup> Street residences. Note, orange cable spools seen in the background of Photo 3.



Photo 5. Looking southwest towards corner adjacent to Center Street and 3<sup>rd</sup> Street residences. Runoff observed to flow from the east to this area, and then due south to 3<sup>rd</sup> Street residences.



Photo 6. Looking east from corner adjacent to Center Street and 3<sup>rd</sup> Street residences. Runoff flows south directly to residences. Section of fence shown is adjacent to 1428 and 1432-3<sup>rd</sup> Street.



Photo 7. Looking from the north-central portion of the yard east towards Mandela Parkway. Runoff drains east to Mandela Parkway.



Photo 8. Looking west towards the northwest corner of the active facility. Stormwater was observed to drain under the fence west towards the large vacant lot on Center Street.



Photo 9. Looking west towards 1428-3<sup>rd</sup> Street. Pavement is uneven and runoff flows in various directions.



Photo 10. Looking north at the western gate on 3<sup>rd</sup> Street. Runoff flows out the gate, across the sidewalk, and to gutter on 3<sup>rd</sup> Street.



Photo 11. Looking at the west side of eastern gate on 3<sup>rd</sup> Street. Drums with a leaking drum in foreground.



Photo 12. Looking west towards RSP-06 along the western fence-line of the main site. Runoff observed flowing west towards 1428-3<sup>rd</sup> Street.



Photo 13. Storm drain on 3<sup>rd</sup> Street at the intersection of Mandela Parkway. The hose is from the roof drain of facility office.



Photo 14. Yard at 1448-3<sup>rd</sup> Street. Runoff observed to collect along center line of the yard, at the joint in concrete, and flows towards 3<sup>rd</sup> Street, across sidewalk, and into gutter.



Photo 15. 324 Center Street. Runoff not observed at this location.



Photo 16. Lot between 326 and 356 Center Street. RSP-01 in background. Runoff from northwest corner of the main facility flows under fence into this lot. Runoff from this yard flows along two shallow rills towards Center Street, across sidewalk and to gutter.

**Appendix B**  
**Boring and CPT Logs, Well and Probe Data,**  
**Aquifer Test Data, Survey Information**

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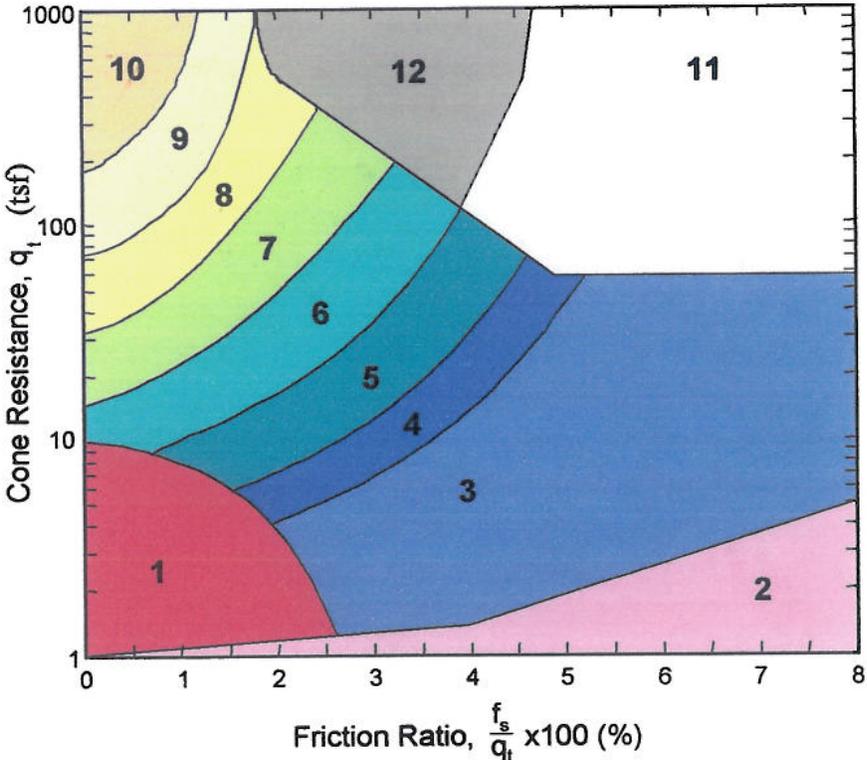


## **Boring and CPT Logs**

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# CPT Soil Behavior Type Legend (Robertson et al. 1986)



Zone	Soil Behavior Type
1	Sensitive, Fine Grained
2	Organic Material
3	Clay
4	Silty Clay to Clay
5	Clayey Silt to Silty Clay (Silt Mix)
6	Sandy Silt to Clayey Silt
7	Silty Sand to Sandy Silt (Sand Mix)
8	Sand to Silty Sand
9	Sand
10	Gravelly Sand to Sand
11	Very Stiff Fine Grained*
12	Sand to Clayey Sand*

\*Overconsolidated or cemented



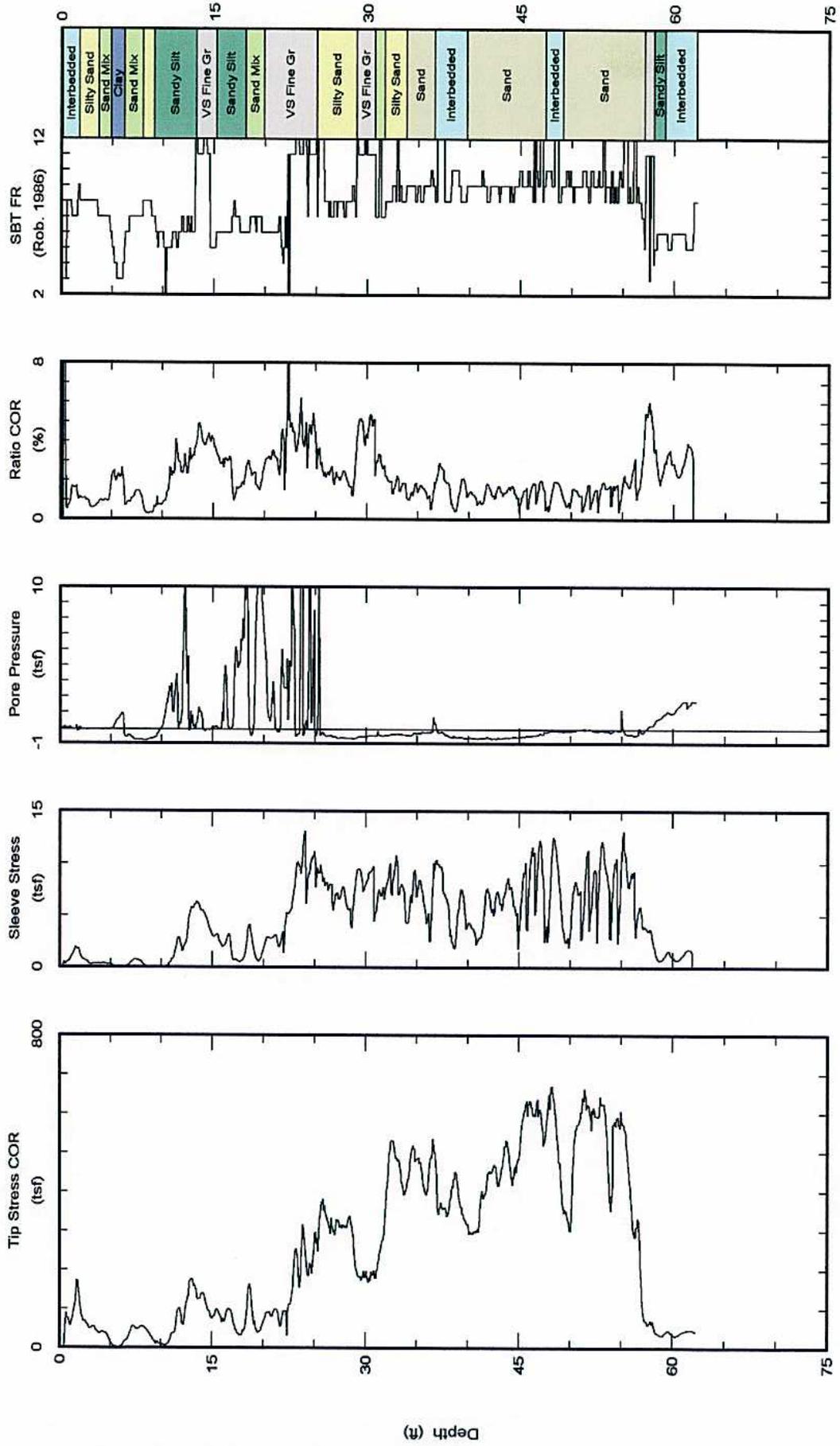


**Kehoe Testing & Engineering**  
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Fax: (714) 901-7289  
skehoe@msn.com

**CPT Data**  
30 ton rig

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.

Date: 15/Sep/2004  
Test ID: RGW-1  
Project: Oakland



Maximum depth: 62.24 (ft)

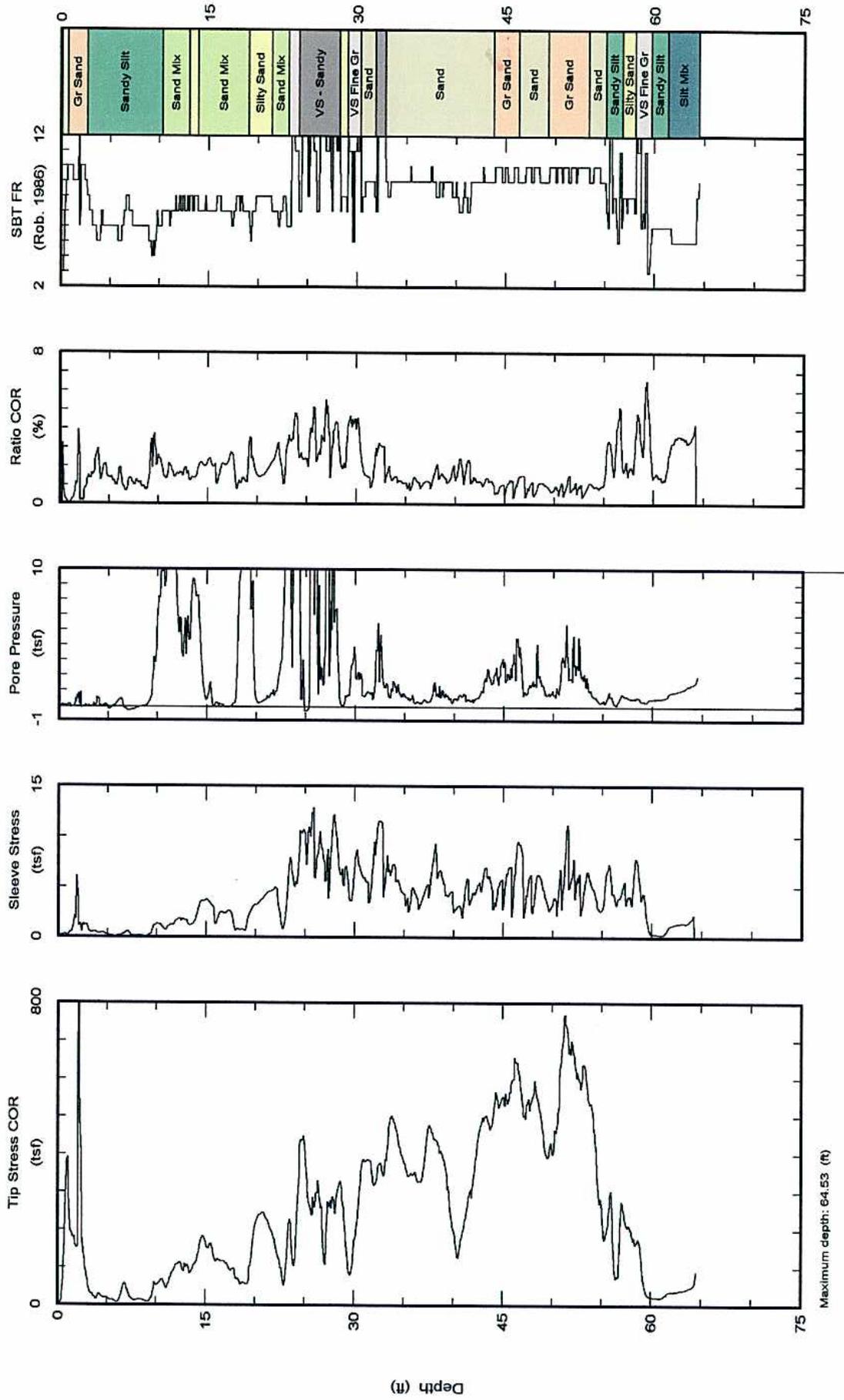


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skehoe@msn.com

**CPT Data**  
30 ton rig

**Client: Precision Sampling Inc.**  
**Job Site: 1414 3rd St.**

**Date: 17/Sep/2004**  
**Test ID: RGW-2**  
**Project: Oakland**



Maximum depth: 64.53 (ft)

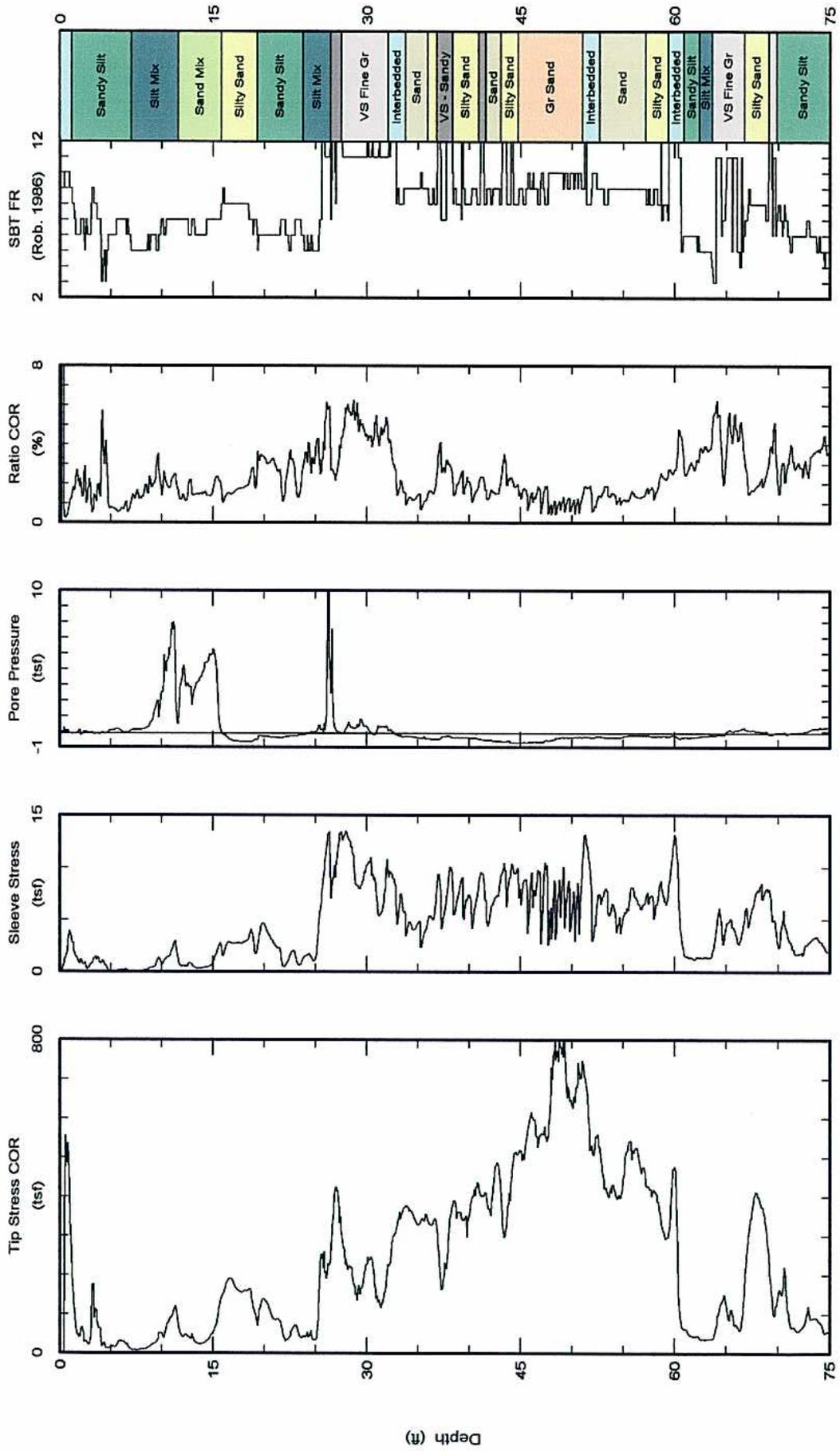


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Fax: (714) 901-7289  
skehoe@msn.com

**CPT Data**  
30 ton rig

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.

Date: 14/Sep/2004  
Test ID: RGW-3  
Project: Oakland



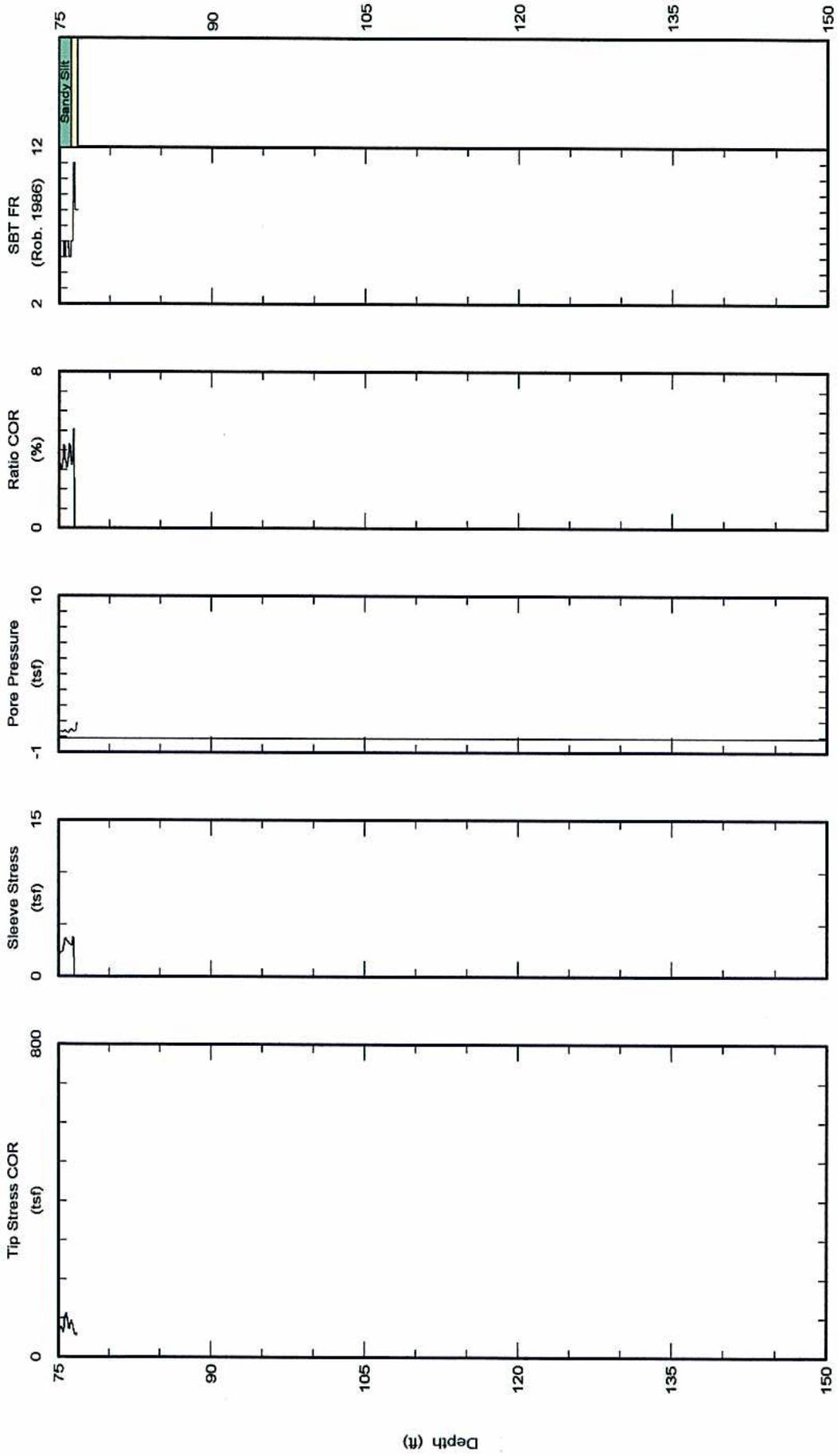


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**CPT Data**  
30 ton rig

Date: 14/Sep/2004  
Test ID: RGW-3  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



Maximum depth: 76.94 (ft)  
Page 2 of 2

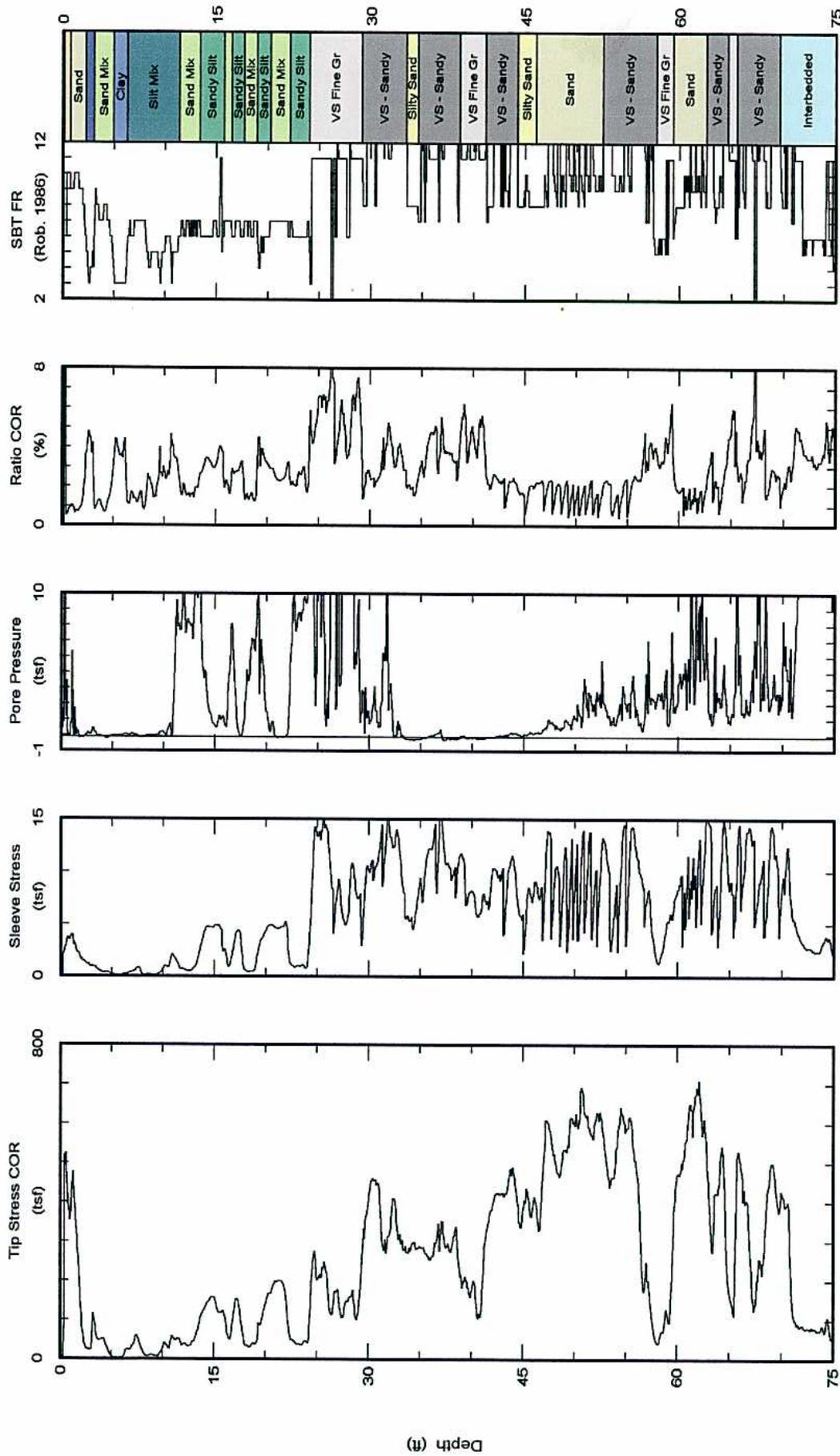


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**CPT Data**  
30 ton rig

Date: 15/Sep/2004  
Test ID: RGW-4  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



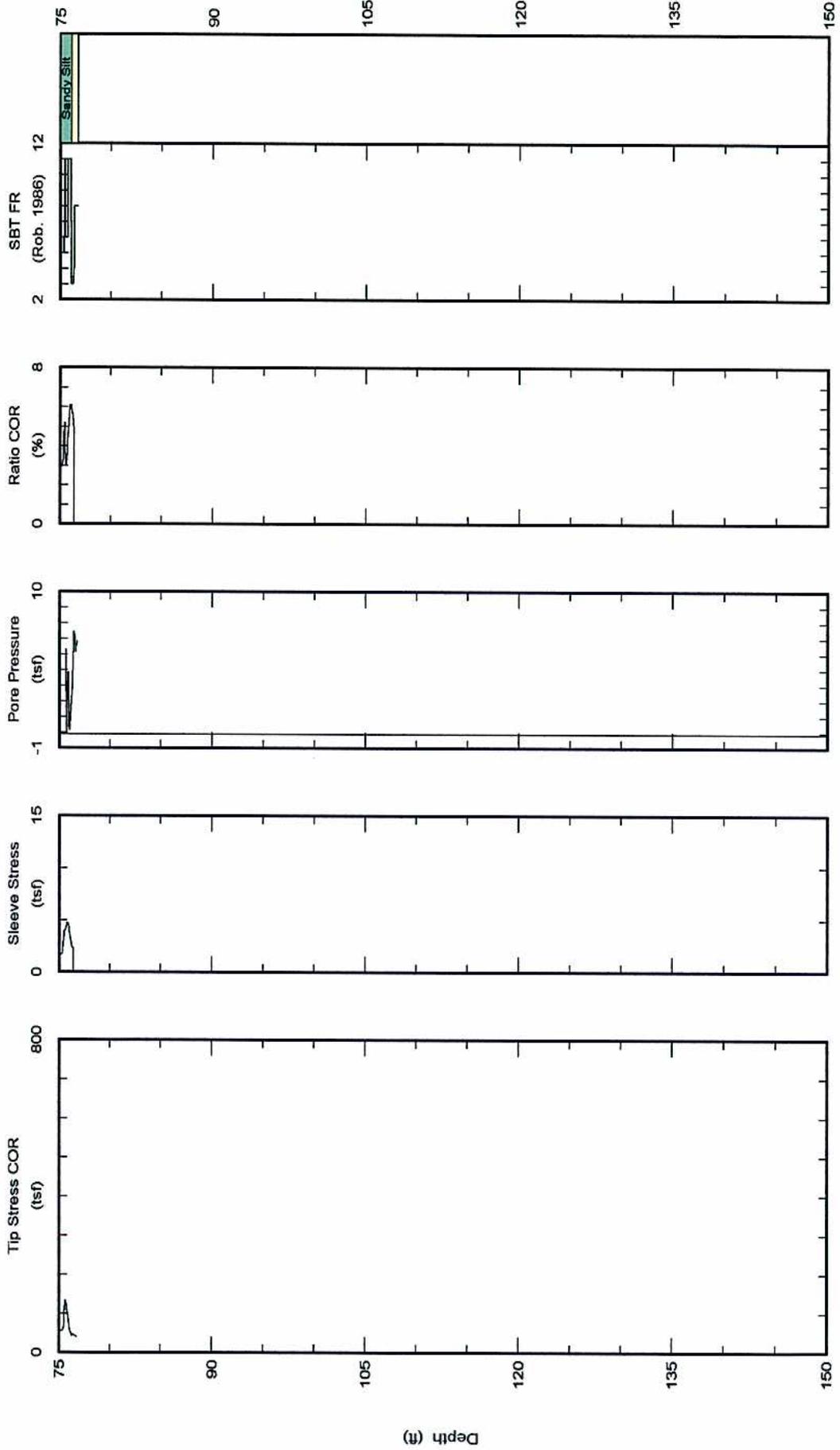


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**CPT Data**  
30 ton rig

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.

Date: 15/Sep/2004  
Test ID: RGW-4  
Project: Oakland



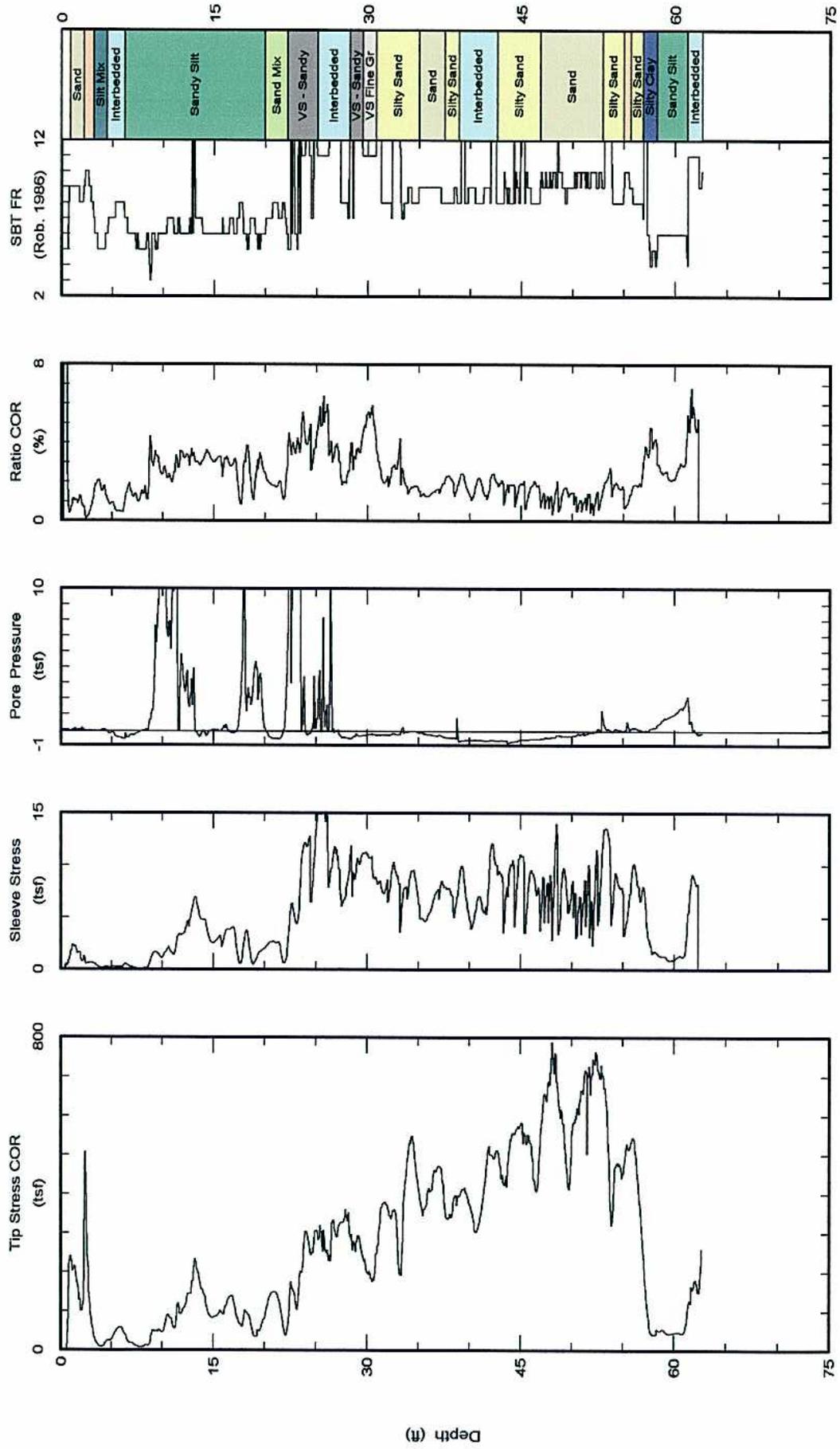


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skehoe@msn.com

**CPT Data**  
30 ton rig

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.

Date: 14/Sep/2004  
Test ID: RGW-5  
Project: Oakland



Maximum depth: 62.68 (ft)

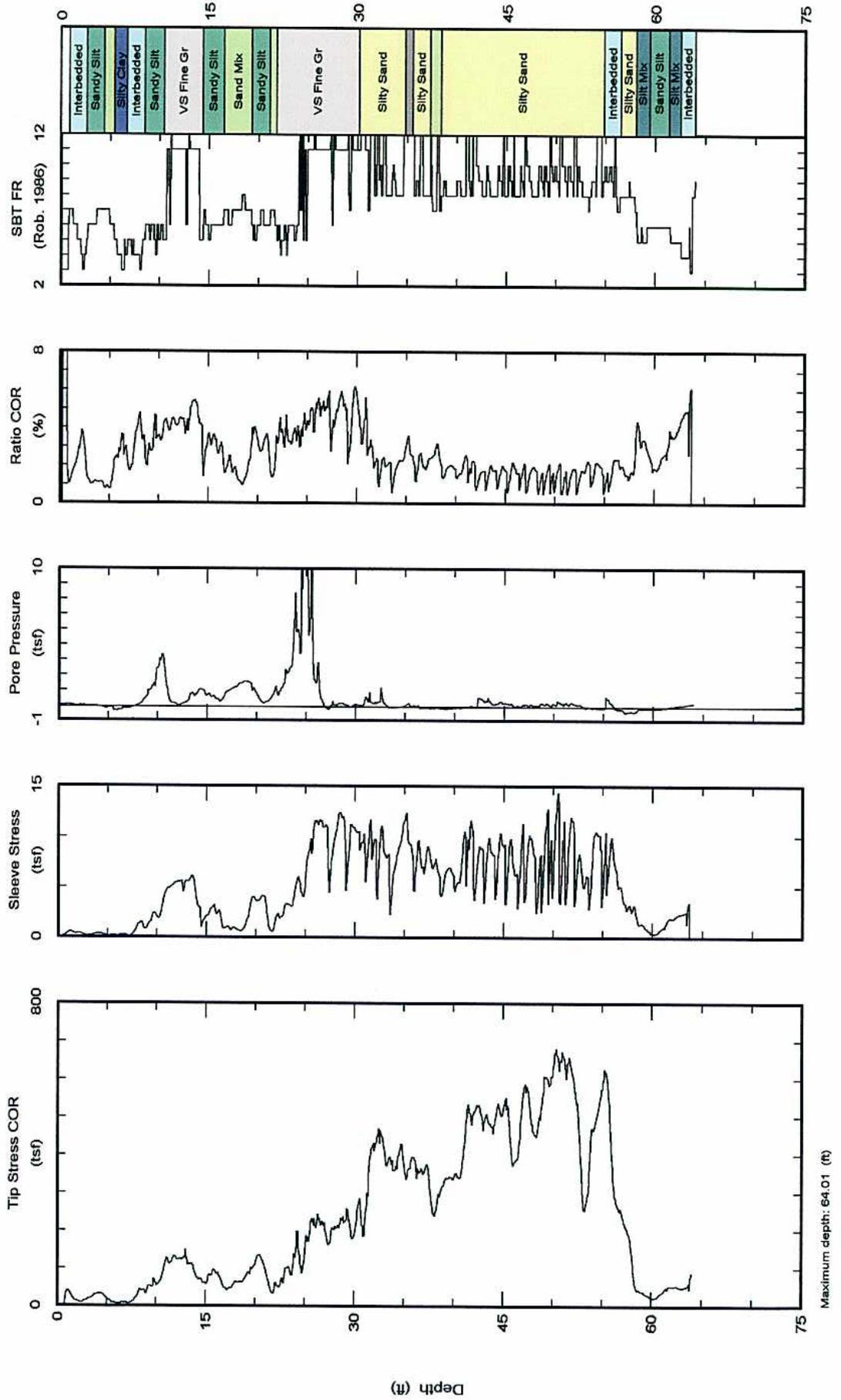


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skehoe@msn.com

**CPT Data**  
30 ton rig

Date: 16/Sep/2004  
Test ID: RGW-6  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



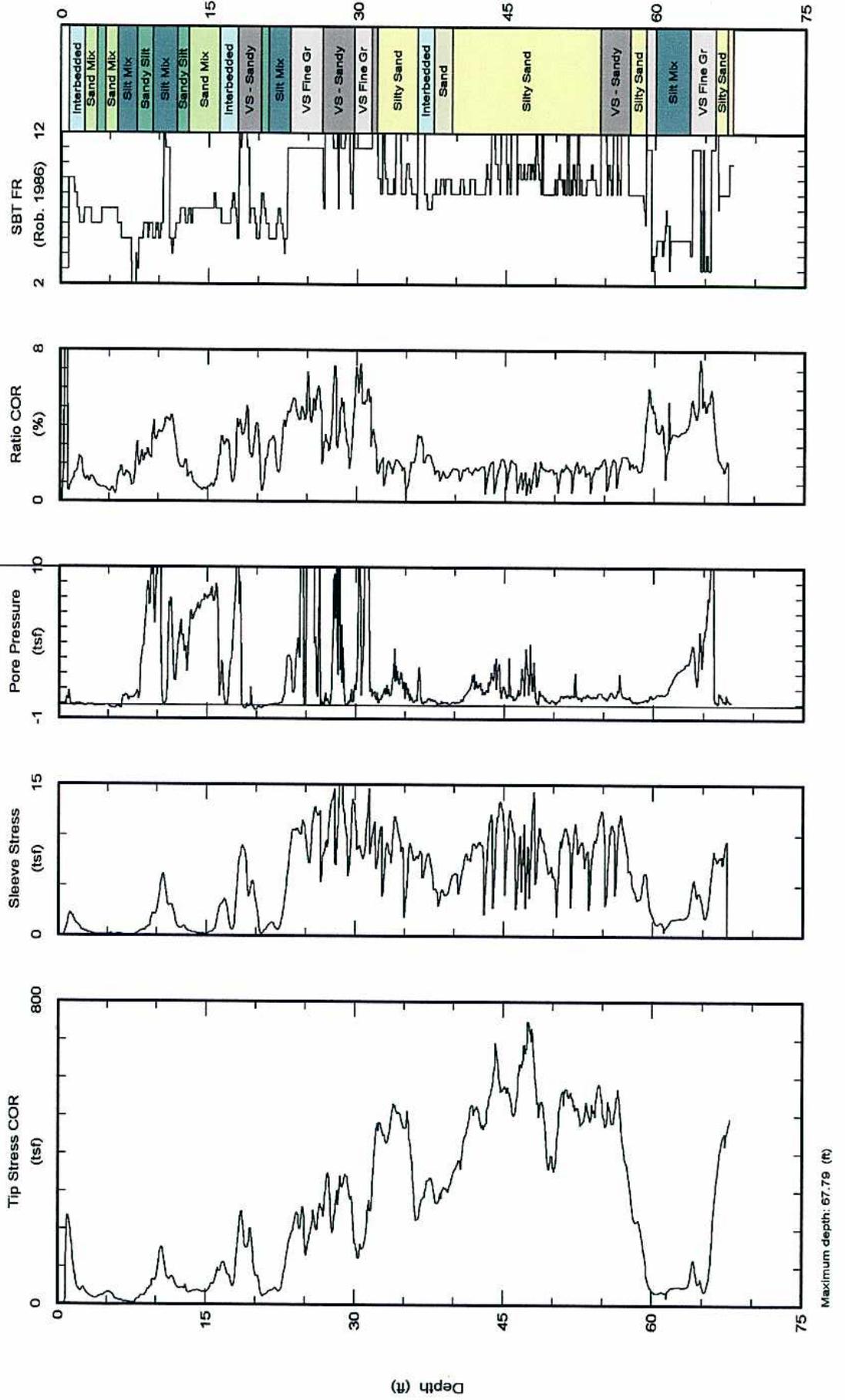


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**CPT Data**  
30 ton rig

Date: 14/Sep/2004  
Test ID: RGW-7  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



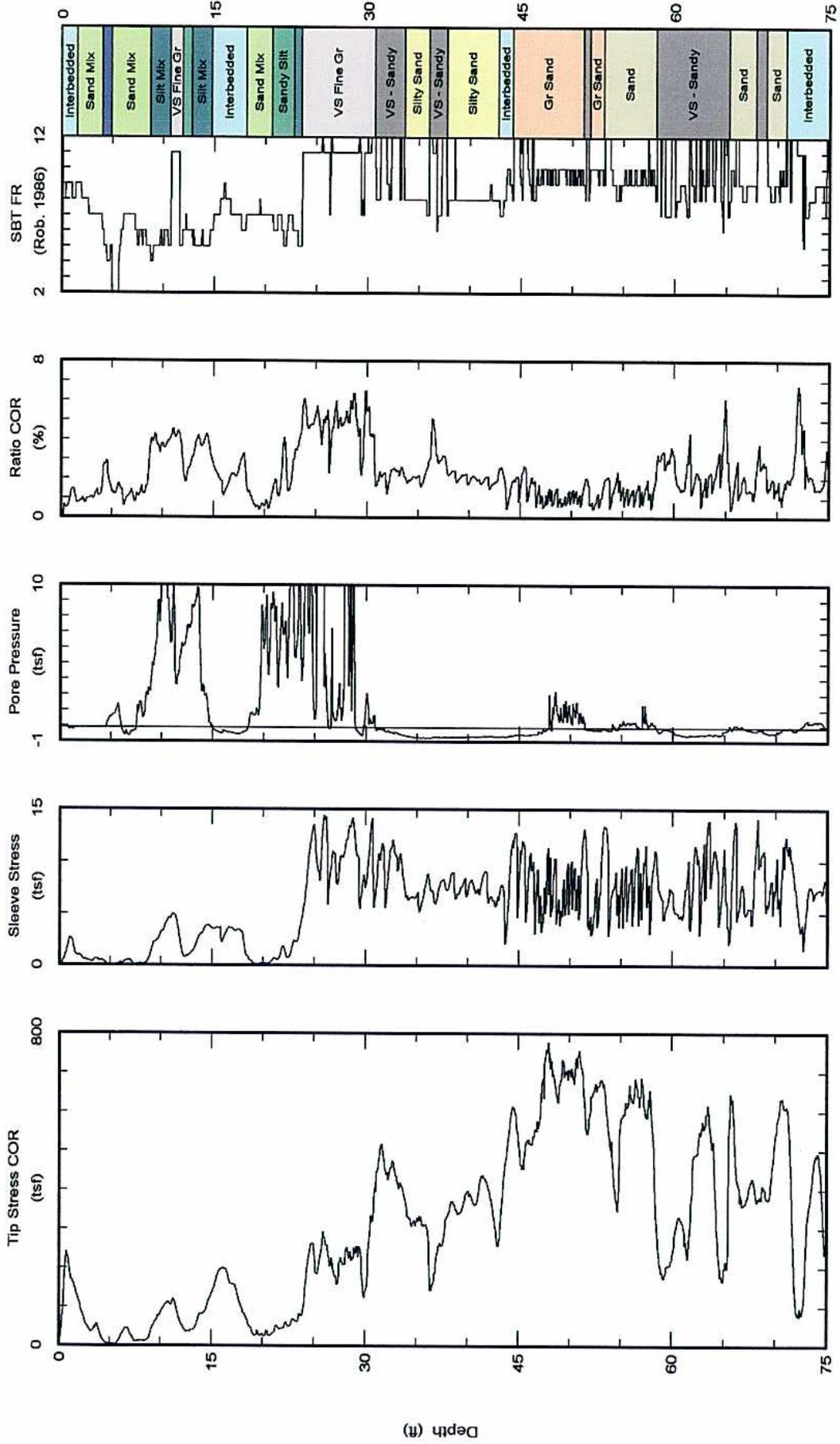


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skehoe@msn.com

**CPT Data**  
30 ton rig

Date: 16/Sep/2004  
Test ID: RGW-8  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



Maximum depth: 80.88 (ft)  
Page 1 of 2

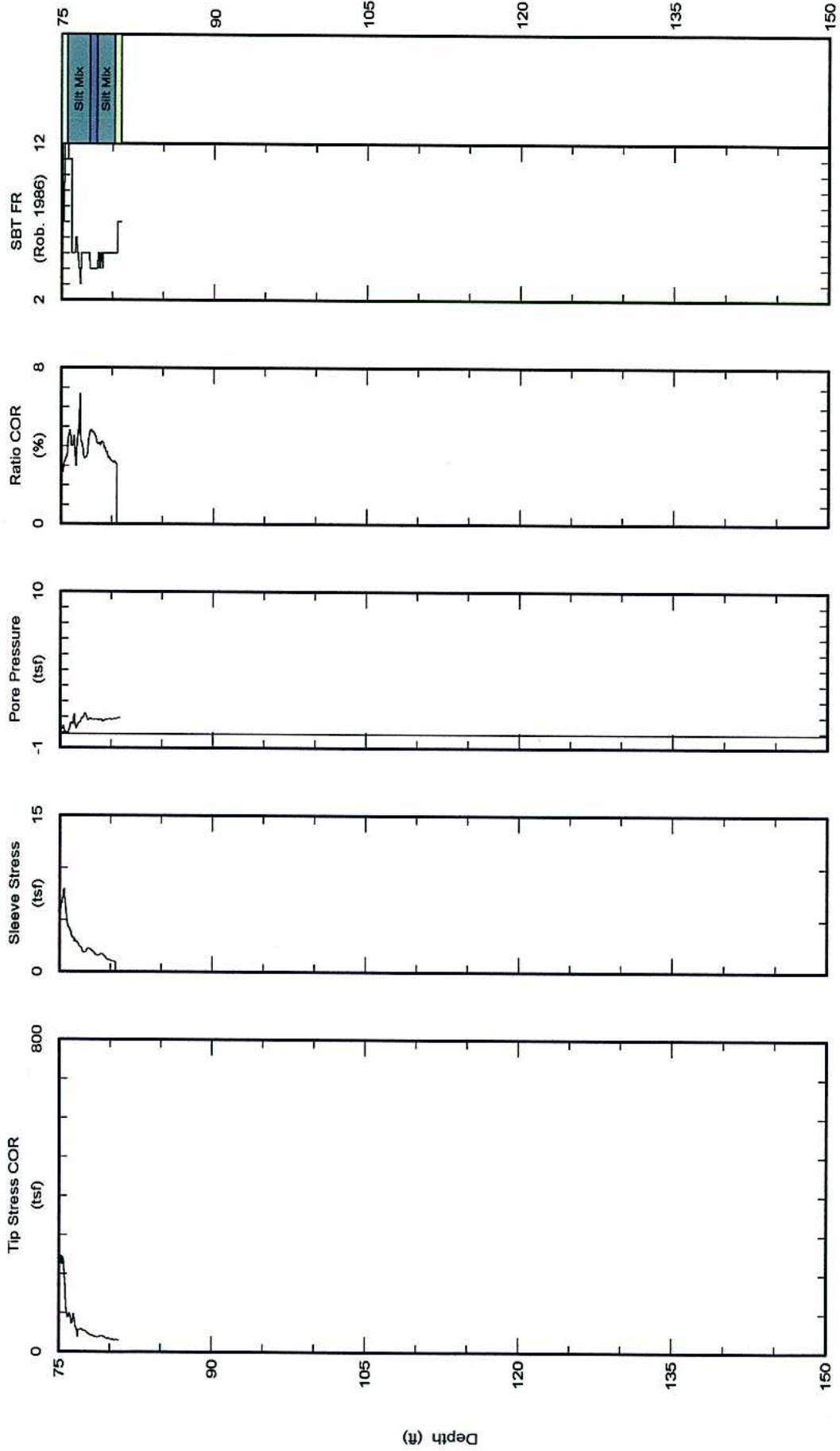


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skehoe@msn.com

**CPT Data**  
30 ton rig

Date: 16/Sep/2004  
Test ID: RGW-8  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



Maximum depth: 80.88 (ft)  
Page 2 of 2

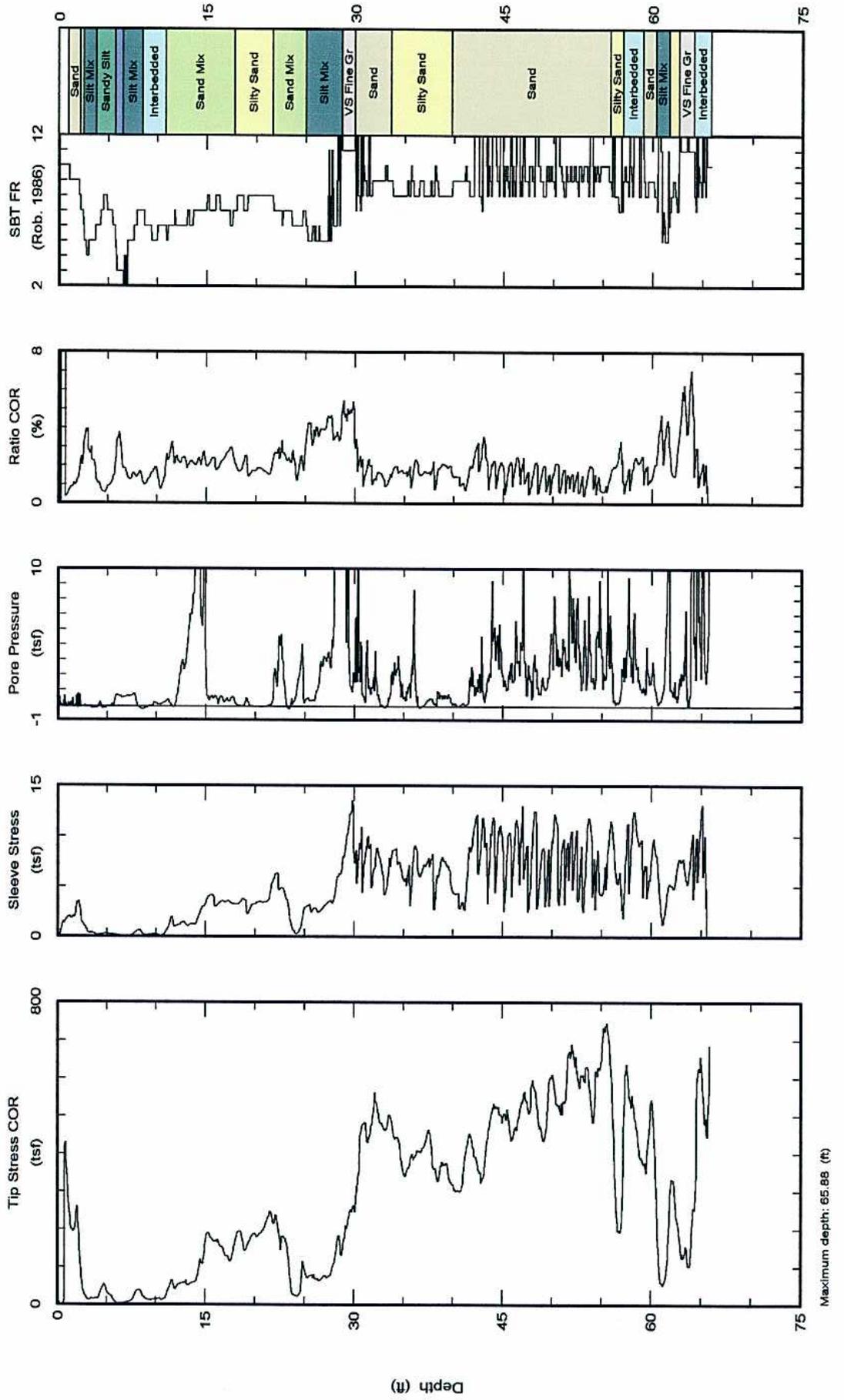


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**CPT Data**  
30 ton rig

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.

Date: 15/Sep/2004  
Test ID: RGW-9  
Project: Oakland



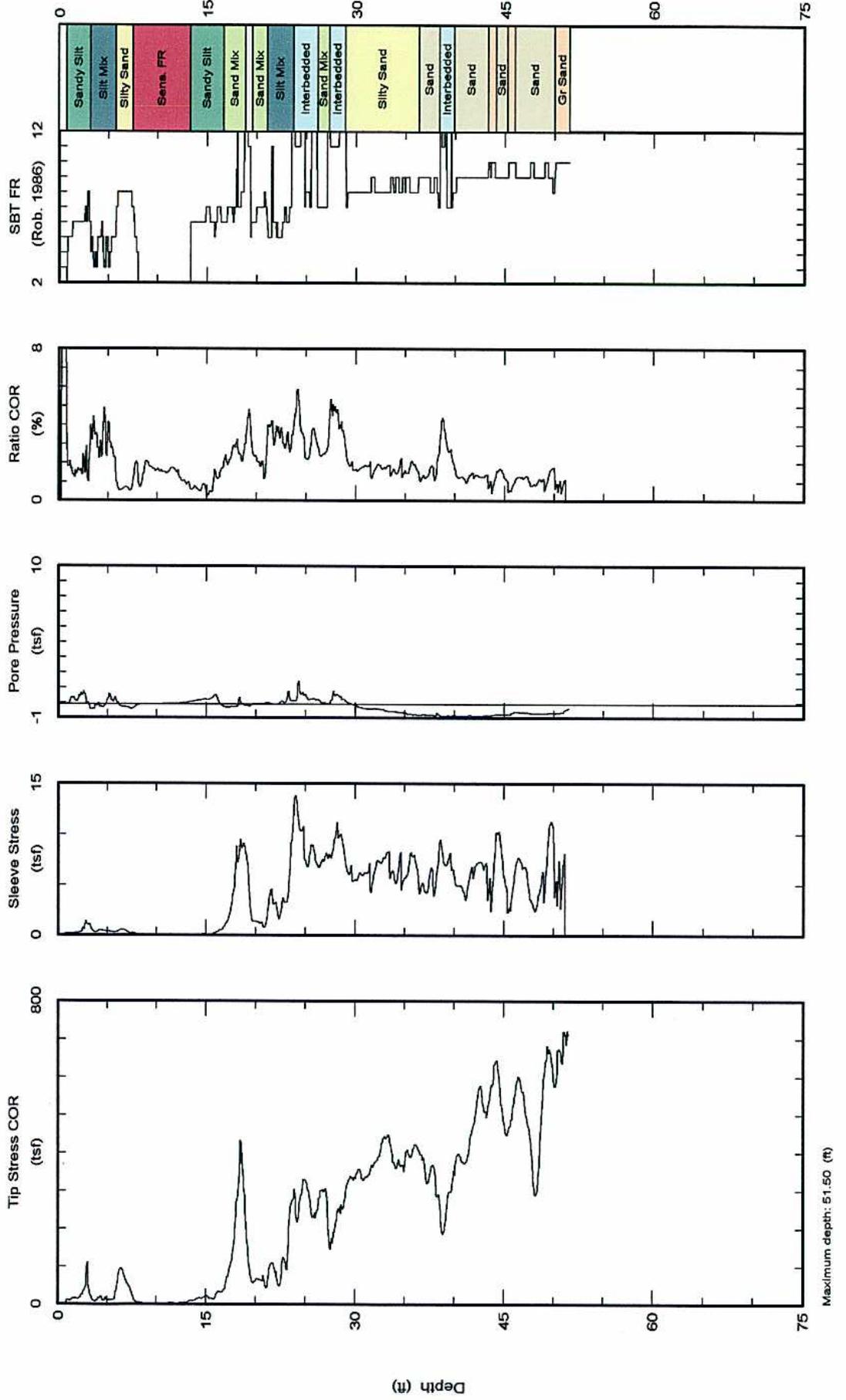


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**CPT Data**  
30 ton rig

Date: 14/Sep/2004  
Test ID: RGW-10  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



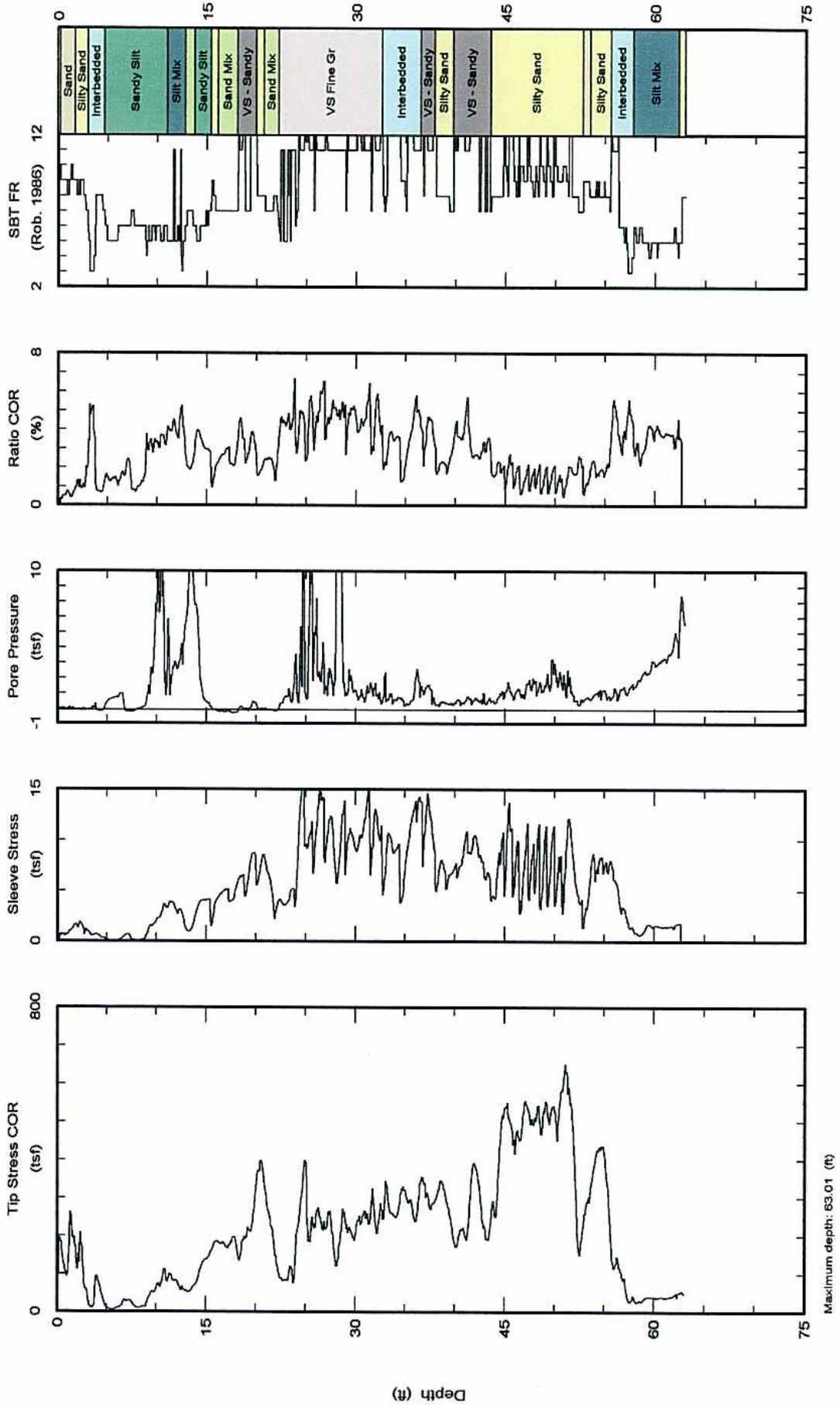


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Fax: (714) 901-7289  
skehoe@msn.com

**CPT Data**  
30 ton rig

Date: 16/Sep/2004  
Test ID: RGW-11  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.



Maximum depth: 63.01 (ft)

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 49.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/18/2004	<b>DATE COMPLETED:</b> 10/18/2004
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
---	-----------------------------------	---------------------

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PTD (PPM)	SOIL SAMPLE			
5							CONCRETE	this includes the Ray area and where cores are being opened
		1.2					- 0.5' of crushed concrete with miscellaneous debris (chips, sediments) that has washed into borehole to top of concrete base	
10						SM	<b>SILTY FINE SAND (SM)</b> - dk olive gray (5YR3/2) to black (5YR2.5/2) grading to dk greenish gray (5GY4/1), black material is wet and greenish is tighter and only moist, loose, mild petrol odor	
		1.6			0			
15						SM	<b>SILTY FINE SAND (SM)</b> - dk greenish gray as above, moist, very dense, vary concentrations of fines, 30-35% silt, <5% clay (in zones)	
		2.5			0		- SM, dark greenish gray as above (10-13'), moist	
		2.5					- wet, med dense interval from 13-13.5'	
		3				SM	- SM, dk greenish gray material as above, saturated, loose	
20						SM	<b>SILTY FINE SAND (SM)</b> - lt gray (10YR7/2) to yellowish brn (10YR5/6) mottled with oxidation, saturated, loose, no odor	
		3			0		SM as seen above, with increase fines (25-30%, some clay), wet to moist, dense, no odor	
		3				SM/SC		
25						SM	<b>SILTY FINE SAND (SM)</b> - brownish yellow (10YR6/6), saturated (flowing material), loose	
		3			0		- SM as seen from 21-22', moist to wet, med dense	
		3				SM	<b>SILTY FINE SAND (SM)</b> - SM as seen at 24.5', heavier oxidation, moist, med dense with varying concentrations of fines (~25% at top of core to ~10% at bottom)	
30						SM	- SM as seen from 27.5-28', moist, med dense, ~10-15% fines (no clay), no odor from 28-31'	
		3					- from 31-31.7, SM as directly above, moist, dense	
		3					- from 31.7 to 32.4, gap in core, full of sand/silty water	
35						SM/SP	<b>FINE SAND WITH VERY LITTLE FINES (SM/SP)</b> - grayish brn (10YR5/2), moist to wet, med dense, <10% fines	
					0		- saturated, increasing fines (~20%)	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 49.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/18/2004	<b>DATE COMPLETED:</b> 10/18/2004
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
---	-----------------------------------	---------------------

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40		3		0		SM/SP	<b>FINE SAND WITH VERY LITTLE FINES (SM/SP)</b> - grayish brn (10YR5/2), moist to wet, med dense, <10% fines	flowing material: silty/sandy water, zones of flowing material may not be representative of actual conditions, may only exist due to temporary pauses in advancement for core retrieval density cannot be determined due to core extraction from sampler  refusal at 49' due to heaving sands before pulling outer casing, water level is at 12.1' bgs and rising
		3				SM	<b>SILTY FINE SAND (SM)</b> - dry to moist, very dense, <20% fines, no odor	
	3			SM/SP	<b>FINE SAND WITH VERY LITTLE FINES (SM/SP)</b> - grayish brn (10YR5/2), moist, med dense to dense at 40'  - flowing material: silty/sandy water - SM/SP as described from 38.3-40', moist, med dense to dense at 43			
45		2.5			SM/SP	<b>FINE SAND WITH VERY LITTLE FINES (SM/SP)</b> - grayish brn (10YR5/2), moist to wet, no odor  - SM/SP as described directly above, moist to wet, med dense to loose, no odor		
		3		0				
Boring Terminated at 49 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

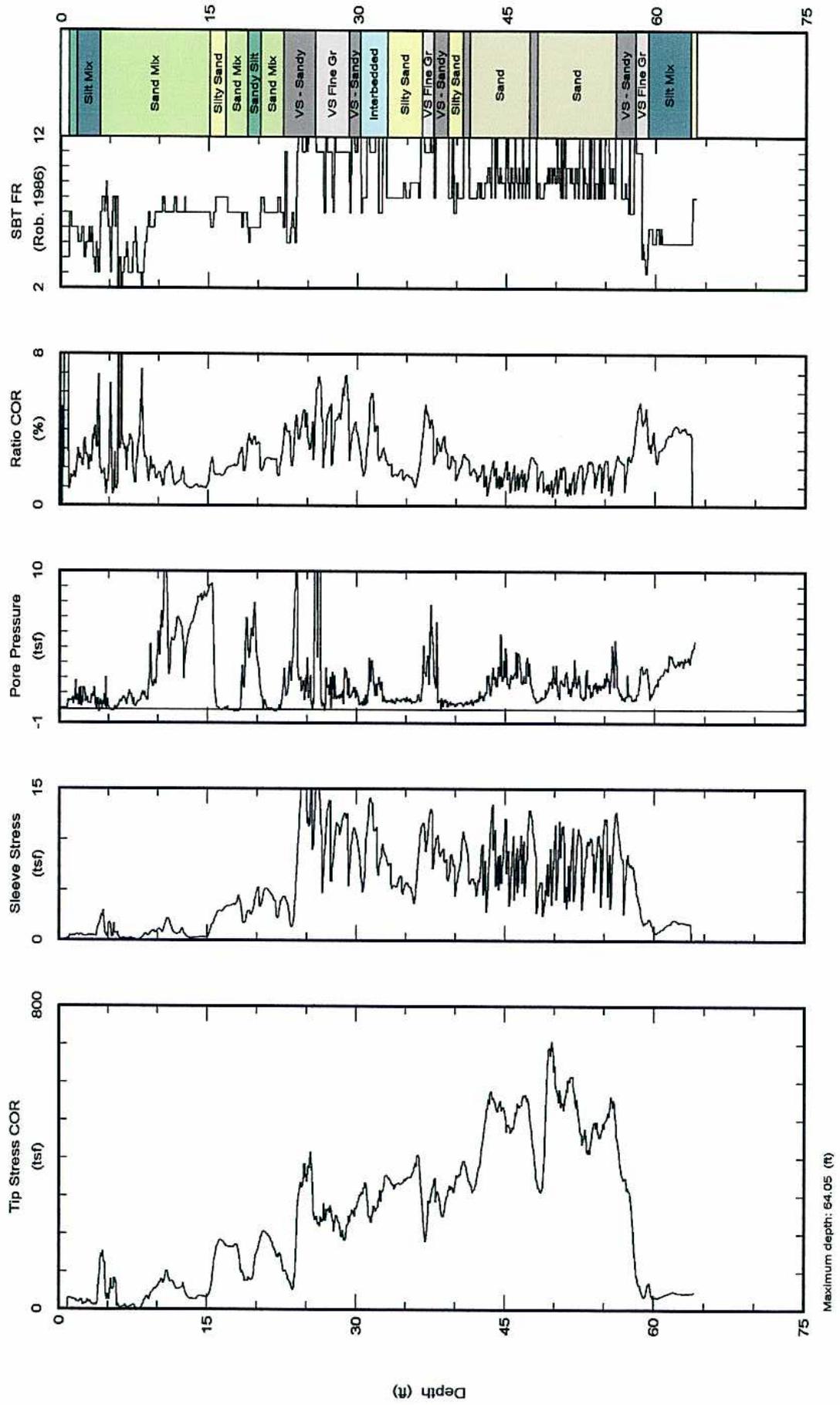


**Kehoe Testing & Engineering**  
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Fax: (714) 901-7289  
skehoe@msn.com

**CPT Data**  
30 ton rig

Date: 16/Sep/2004  
Test ID: RGW-13  
Project: Oakland

Client: Precision Sampling Inc.  
Job Site: 1414 3rd St.





**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 49.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/21/2004	<b>DATE COMPLETED:</b> 10/21/2004
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (AMTRAK - Under I-880)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
--	-----------------------------------	---------------------

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		0.5					<b>FILL</b> - silt with sand and gravel to gravel with silt and sand, virtually no recovery due to gravel	
		1.5				SM	<b>SILTY FINE SAND (SM)</b> - very dk grayish brn (2.5YR3/2) to lt olive brn (2.5YR5/4), moist to wet, loose, ~40% fines, no clay, no odor	
10		2.5				SM	<b>SILTY FINE SAND (SM)</b> - gray (2.5YR6/1) mottled with oxide, moist, med dense, cohesive, ~50% fines, no odor, contains root structures	
		1.7				SM	<b>SILTY FINE SAND (SM)</b> - yellowish brn (10YR4/6), less mottling and more thoroughly oxidized, moist, decreasing fines ~35%, no odor  - as above from 10', decreasing fines	
15		2.3						
		2.7				SM	<b>SILTY FINE SAND (SM)</b> - lt yellowish brn (2.5YR6/4), saturated, loose, 20% silt, no clay, no odor  - SM as directly above, wet, med dense, ~25% silt, no odor  - SM as described at 7.4', gray, mottled, wet to saturated	
20		3				SM/SC	<b>SILTY/CLAYEY FINE SAND (SM/SC)</b> - bluish gray (5B6/1) mottled with oxide, moist, med dense to dens, 40-50% fines, no odor	
		2.9				SM	<b>SILTY FINE SAND (SM)</b> - bluish gray (5B6/1), little to no oxidation, wet, loose, ~15% fines, no odor  - SM as directly above, oxidized throughout, moist, med dense to dense, ~20% fines  - moist to wet, loose from 25.2-26.4'	
25		2.9				SM	- wet to saturated	
		3				SM/SP	<b>SILTY FINE SAND (SM)</b> - grayish brn (10YR5/2), wet to moist, med dense to dense, <10% fines, no odor	
30		3				SM	<b>SILTY FINE SAND (SM)</b> - grayish brn (10YR5/2), saturated, med dense to dense, ~20% fines, no odor	
		3				SM/SP		
35								

## SOIL BORING LOG

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 49.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/21/2004	<b>DATE COMPLETED:</b> 10/21/2004
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (AMTRAK - Under I-880)		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40	1.5			0		SM/SP	<p><b>SILTY FINE SAND (SM)</b> - grayish brn (10YR5/2), wet to moist, saturated, med dense to dense, &lt;10% fines, no odor</p> <ul style="list-style-type: none"> <li>- SM/SP as directly above</li> <li>- cemented interval (mildly), ~30% fines, flowing material from 37.3-38.3'</li> <li>- SM/SP, saturated fine sand with ~10% fines as described from 31'</li> <li>- reddish brn (5YR4/3), oxidation stain</li> <li>- SM/SP as described at 40'</li> </ul>	<p><b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b></p>
	2.4							
45	1.9							
	3			0				
	3							
<p>Boring Terminated at 49 ft</p> <p><b>ABBREVIATIONS</b></p> <p>brn = brown            lt = light            dk = dark            vf = very fine-grained            f = fine-grained            m = medium-grained            c = coarse-grained            ang = angular            subang = subangular            subrnd = subrounded            rnd = rounded</p>								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 43.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/25/2005	<b>DATE COMPLETED:</b> 10/25/2005
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Limited Access Rig with Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Under I-880, AMTRAK, South of Park)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3		0		SM	<b>FILL: SILT WITH SAND AND GRAVEL</b> - lt yellowish brn (10YR6/4) to very dk gray (10YR3/2), dry to moist, no odor  <b>SILTY FINE SAND (SM)</b> - moist to wet from 5.2', loose, ~40% silt, <5% clay, no odor - SC/ML, as above with increased clay concentration, soft, wet, organic odor	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		2.5						
10		3		0		SM	<b>SILTY FINE SAND (SM)</b> - dk grayish brn (10YR4/2), moist, loose to med dense, ~30% silt, <5% clay, no odor  - SM as directly above, bluish gray (5B6/1) mottled with orange oxide - becomes wet	
		3						
15		3				SM	<b>SILTY FINE SAND (SM)</b> - lt olive brn (2.5YR5/6), oxidized throughout, moist, med dense, ~25% silt, no odor  <b>SILTY FINE SAND (SM)</b> - yellowish brn (10YR5/8), oxidized, moist, med dense to dense, 25-35% silt with occasional concentration of clay (14.2'), no odor	
		3						
20		3		0		SM	<b>SILTY FINE SAND (SM)</b> - lt gray (10YR7/1) with zoned oxidation, moist to wet (16-17'), med dense, no odor  - wet, less dense from 19.5-21.8'  - SM as described from 16', moist, grading more dense and with less fines	
		3						
25		3				SM	<b>SILTY FINE SAND (SM)</b> - yellowish brn (10YR5/6), moist, med dense, ~20% silt, no odor  <b>SILTY FINE SAND (SM)</b> - grayish brn (10YR5/2), moist, med dense to dense, 15-20% silt, no odor	
		2.4						
30		2.6		0		SM/SP	- SM/SP as directly above with intervals of ~,10% silt from 34-35', wet	
		2.6						
35				0				



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 43.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 10/25/2005	<b>DATE COMPLETED:</b> 10/25/2005
<b>DRILLING METHOD:</b> Vibra-Push		<b>DRILLING EQUIPMENT:</b> Limited Access Rig with Dual-Tube Coring System (3' long cores, 1.75 diameter)		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Under I-880, AMTRAK, South of Park)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

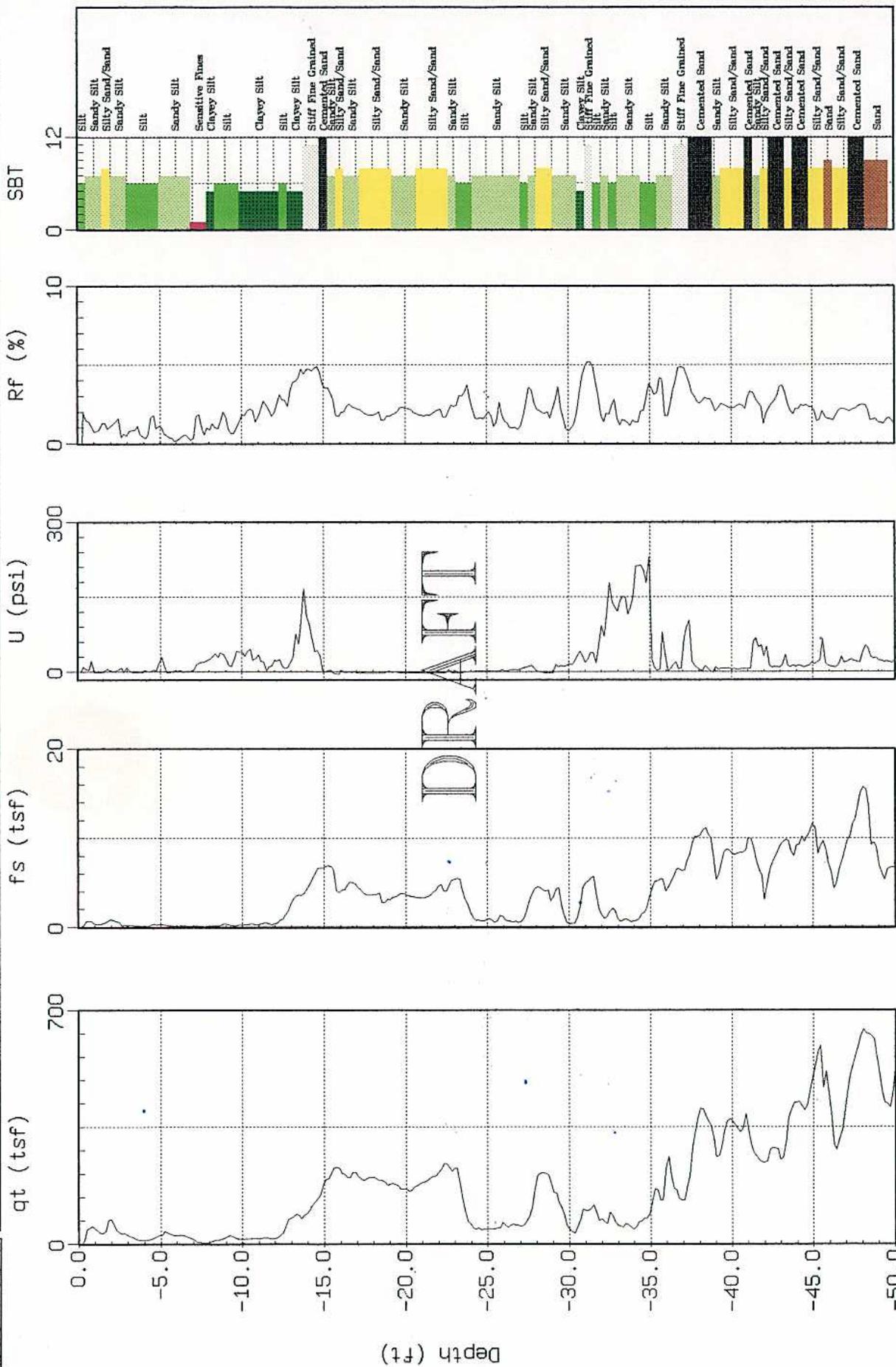
DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40		3				SM/SP	<b>SILTY FINE SAND (SM)</b> - grayish brn (10YR5/2), moist, med dense to dense, 15-20% silt, no odor	drilling rods are saturated but core isn't visibly saturated wet in core (above recovered material)  sample tube stuck in outer barrel: material shows same as above
		2.3						
		3						
Boring Terminated at 43 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								



CH2M HILL

Location : RGW-16  
Site : AMCO CHEMICAL

Geologist : B. FROHLICH  
Date : 11:30:04 09:09



SBT: Soil Behavior Type (Robertson 1990)

Max. Depth: 50.03 (ft)  
Depth Inc.: 0.164 (ft)



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 17.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.2 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,692.44	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,062.76	<b>DATE STARTED:</b> 01/12/2005 08:10	<b>DATE COMPLETED:</b> 01/12/2005 10:00
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 6.74 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Southwest Corner), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
							<b>CONCRETE</b>		
							<b>DEBRIS / FILL</b> - mottled dk gray (10YR3/1), moist, silty clayey fine sand with glass, oyster shells, and gravel, no odor		
5				0.0		SM	<b>SILTY SAND (SM)</b> - dk gray (10YR4/1) appears stained, wet to saturated, f sand, no debris or gravel, no odor  - color grades to yellowish brn (10YR5/6), moist, more dense, no odor		
10				0.0		SC	<b>CLAYEY SAND WITH SILT (SC)</b> - mottled dk yellowish brn (10YR4/6) with oxidized zones and some blue-green clay (CL), moist, f sand, no odor		
15				0.0		SM	<b>SILTY SAND (SM)</b> - dk yellowish brn (10YR4/6), wet to saturated, 70% f sand, 30% silt, no blue clay, no odor  - varying concentrations (20-40%) of silt with minor clay (=5%)		
Total Depth = 17 ft bgs  Note 1) Lithology log based on log from RMW-01-35  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded									



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 40.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.0 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,694.87	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,054.43	<b>DATE STARTED:</b> 01/11/2005 10:56	<b>DATE COMPLETED:</b> 01/11/2005 16:05
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 7.59 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Southwest Corner), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
							<b>CONCRETE</b>	Grout	
							<b>DEBRIS / FILL</b> - mottled dk gray (10YR3/1), moist, silty clayey fine sand with glass, oyster shells, and gravel, no odor		
5				0.0		SM	<b>SILTY SAND (SM)</b> - dk gray (10YR4/1) appears stained, wet to saturated, f sand, no debris or gravel, no odor  - color grades to yellowish brn (10YR5/6), moist, more dense, no odor		
10				0.0		SC	<b>CLAYEY SAND WITH SILT (SC)</b> - mottled dk yellowish brn (10YR4/6) with oxidized zones and some blue-green clay (CL), moist, f sand, no odor		
15				0.0		SM	<b>SILTY SAND (SM)</b> - dk yellowish brn (10YR4/6), wet to saturated, 70% f sand, 30% silt, no blue clay, no odor  - varying concentrations (20-40%) of silt with minor clay (=5%)		
20				0.0		SC	<b>CLAYEY SAND WITH SILT (SC)</b> - dk yellowish brn with lt gray (clayier) zones (10YR7/1), moist to wet, 80% f sand, ~20% clay, <5% silt, no odor		
25				0.0		SM	<b>SILTY SAND (SM)</b> - dk yellowish brn (10YR4/6), wet to saturated, 70% f sand, 30% silt, no blue clay, no odor  - grades to SM/SP with less silt (=10%)		
30				0.0		SM/SP	<b>SILTY SAND TO SAND (SM/SP)</b> - brn (10YR5/3), 80-90% f sand  - brown (10YR5/3), grades with very little silt (=5%)		
35								Seal	
								Pack	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 40.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.0 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,694.87	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,054.43	<b>DATE STARTED:</b> 01/11/2005 10:56	<b>DATE COMPLETED:</b> 01/11/2005 16:05
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 7.59 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Southwest Corner), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
40				0.0		SM/SP	<p><b>SILTY SAND TO SAND (SM/SP)</b> - brn (10YR5/3), 80-90% f sand</p>	
				0.0			<p>Total Depth = 40 ft bgs</p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 13.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 10.7 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,729.07	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,136.11	<b>DATE STARTED:</b> 01/12/2005 11:27	<b>DATE COMPLETED:</b> 01/12/2005 12:18
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> no core tools		<b>WATER LEVEL:</b> 3.26 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			Grout	Seal
5				465.0		SM	<p><b>CONCRETE</b></p> <p><b>DEBRIS / FILL</b> - black, silty fine sand with wood, glass, and small metal debris, strong odor, flowing separate phase product and water present, piping observed in saw cut</p> <p><b>CONCRETE</b></p> <p><b>SILTY SAND (SM)</b> - dk gray (10YR4/1), saturated, 70% f sand, 30% silt and fines with minor clay concentrations, cohesive, strong odor, interface has very oily appearance</p> <p>- color changing to greenish gray (5GY5/1)</p> <p>- cohesive, less pronounced odor</p> <p>- no PID detections in breathing zone, or perimeter</p> <p>- max of 8.6 ppm in drill casing</p>	Grout	Seal
10				12.7				Pack	
<p style="text-align: center;">Total Depth = 13 ft bgs</p> <p>Note 1) Lithology log based on log from RMW-02-50</p> <p><b>ABBREVIATIONS</b></p> <p><i>brn</i> = brown  <i>lt</i> = light  <i>dk</i> = dark  <i>vf</i> = very fine-grained  <i>f</i> = fine-grained  <i>m</i> = medium-grained  <i>c</i> = coarse-grained  <i>ang</i> = angular  <i>subang</i> = subangular  <i>subrnd</i> = subrounded  <i>rnd</i> = rounded</p>									



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 32.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.2 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,750.16	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,138.76	<b>DATE STARTED:</b> 01/13/2005 12:30	<b>DATE COMPLETED:</b> 01/13/2005 14:28
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> no sampling tools		<b>WATER LEVEL:</b> 3.88 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM		
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE					
5				465.0		SM	<p><b>CONCRETE</b></p> <p><b>DEBRIS / FILL</b> - black, silty fine sand with wood, glass, and small metal debris, strong odor, flowing separate phase product and water present, piping observed in saw cut</p> <p><b>CONCRETE</b></p> <p><b>SILTY SAND (SM)</b> - dk gray (10YR4/1), saturated, 70% f sand, 30% silt and fines with minor clay concentrations, cohesive, strong odor, interface has very oily appearance</p> <p>- color changing to greenish gray (5GY5/1)</p> <p>- cohesive, less pronounced odor</p>	Grout		
10				12.7		SM				
15				34.0			- olive gray (5Y5/2) with increasing yellow-brown oxides, saturated, 75% fine sand, 25% silt, faint odor	Seal		
20				19.6		SC	<b>CLAYEY SILTY SAND (SC)</b> - brnsh gray (10YR6/2) with bands of oxidation, moist-wet, dense, 80% f sand, 20% silt/clay, no odor			
25				34.2		SM	<b>SILTY SAND WITH CLAY (SM)</b> - yellowish brn (10YR5/4), saturated, med dense, 75% sub ang f sand, 25% silt, no odor	Pack		
30				11.3						
							Total Depth = 32 ft bgs			
							Note 1) Lithology log based on log from RMW-02-50			
							<b>ABBREVIATIONS</b>			

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 32.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.2 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,750.16	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,138.76	<b>DATE STARTED:</b> 01/13/2005 12:30	<b>DATE COMPLETED:</b> 01/13/2005 14:28
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> no sampling tools		<b>WATER LEVEL:</b> 3.88 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 50.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.1 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,738.81	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,138.41	<b>DATE STARTED:</b> 01/12/2005 14:05	<b>DATE COMPLETED:</b> 01/13/2005 11:00
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 3.65 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
							<b>CONCRETE</b>		
							<b>DEBRIS / FILL</b> - black, silty fine sand with wood, glass, and small metal debris, strong odor, flowing separate phase product and water present, piping observed in saw cut		
							<b>CONCRETE</b>		
5				465.0			<b>SILTY SAND (SM)</b> - dk gray (10YR4/1), saturated, 70% f sand, 30% silt and fines with minor clay concentrations, cohesive, strong odor, interface has very oily appearance  - color changing to greenish gray (5GY5/1)  - cohesive, less pronounced odor		
10				12.7		SM			
15				34.0			- olive gray (5Y5/2) with increasing yellow-brown oxides, saturated, 75% fine sand, 25% silt, faint odor		Grout
20				19.6		SC	<b>CLAYEY SILTY SAND (SC)</b> - brnsh gray (10YR6/2) with bands of oxidation, moist-wet, dense, 80% f sand, 20% silt/clay, no odor		
25				34.2			<b>SILTY SAND WITH CLAY (SM)</b> - yellowish brn (10YR5/4), saturated, med dense, 75% sub ang f sand, 25% silt, no odor		
30				11.3		SM			
35									

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 50.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 11.1 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,738.81	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,138.41	<b>DATE STARTED:</b> 01/12/2005 14:05	<b>DATE COMPLETED:</b> 01/13/2005 11:00
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 3.65 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
				0.0		SM	<b>SILTY SAND WITH CLAY (SM)</b> - yellowish brn (10YR5/4), saturated, med dense, 75% sub ang f sand, 25% silt, no odor	Seal	
40				0.0		SM/SP	<b>SAND WITH FINES (SM/SP)</b> - brn (10YR5/3), saturated, loose, 90% sub ang f sand slightly coarser than above, 10% fines, no odor	Pack	
45				0.0					
50				0.0					
Total Depth = 50 ft bgs									
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded									

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,832.29	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,245.05	<b>DATE STARTED:</b> 02/15/2005 12:40	<b>DATE COMPLETED:</b> 02/15/2005 14:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 2.43 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Northwest Corner), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-03-05SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		1.5	5-7-12	0.0		SM/SC	<b>CONCRETE</b>  <b>FILL - SILTY SAND / CLAYEY SAND (SM/SC)</b> - moist to wet, silty fine sand with fines and coarse brick/aggregate fragments, no odor  - sample: RMW-3-05SS-0105  - large concrete fragment  - sporadic recovery	Grout	Seal
		1.5	15-25-50	0.0					
		0.5	12-30-18	0.0					
		0.7	11-14-21	0.0					
		1	4-5	0.0					
10		0		0.0		CH	<b>FAT CLAY (CH)</b> - dk bluish gray (5B4/1), saturated, very soft, high plasticity, riddled with fibrous roots, no odor	Pack	
		1.5	2-4-5	0.0					
15		1.4	2-4-7	0.0		SC	<b>CLAYEY SAND (SC)</b> - black (N2.5), saturated, med dense, f sand, some root structures (less than above), no odor  - color becomes very dk gray (N3)  - color changes to grayish green (5G5/2) gradually		
		1.9	2-5-8-18	0.0					

Total Depth = 15 ft bgs

**ABBREVIATIONS**

- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.1 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,603.90	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,231.73	<b>DATE STARTED:</b> 02/17/2005 14:05	<b>DATE COMPLETED:</b> 02/17/2005 16:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.59 ft bgs on 03/22/2005
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		NA				SM	<b>FILL - SILTY SAND (SM)</b> - moist, silty sand with gravel/debris, brick, glass, aggregate etc, no odor	Grout	
		2	3-3-5-5	0.0		SM	<b>SILTY SAND(SM)</b> - black (2.5YR2.5/1), moist to wet, loose, cohesive, f sand, no odor - minor root structures throughout core	Seal	
		1.3	2-4-5	0.0			- color changing to lt brownish gray (2.5YR6/2)		
10		1.5	4-4-6	0.0		SM	<b>SILTY SAND (SM)</b> - bluish gray (5B6/1) mottled with orange oxide, heavily oxidized, moist to wet, medium dense, cohesive, f sand, no odor - color changing to lt blue brn (2.5YR5/4), less fines	Pack	
		1.8	4-7-13-16	0.0			- saturated		
15		1.5	4-7-12	0.0					
		1.5	5-5-9	0.0		SM	<b>SILTY SAND (SM)</b> - yellowish brn (10YR5/6) (no gray/blue gray) oxidized throughout, wet-saturated, med dense, f sand, no odor		
		2	8-12-16-18	0.0					

Total Depth = 15 ft bgs

**ABBREVIATIONS**

- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 9.3 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,502.68	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,116.85	<b>DATE STARTED:</b> 02/18/2005 12:30	<b>DATE COMPLETED:</b> 02/18/2005 14:40
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 2.8 ft bgs on 03/22/2005
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		NA		0.0		SW	<b>ASPHALT FILL - SILTY SAND WITH GRAVEL (SW)</b> - dk gray (10YR4/1), dry-moist, loose, silty sand with gravel (road-bed aggregate/asphalt chunks), no odor	Grout	
		1.7	5-10-9-8	0.0		SM	<b>SILTY SAND (SM)</b> - very dk gray (10YR3/1), moist-wet, loose, f sand, no odor  - color becoming lighter to 7.5'	Seal	
10		1.2	3-7-9	0.0		SM		Pack	
		1.3	5-5-7	0.0		SM	<b>SILTY SAND(SM)</b> - greenish gray (5GY5/1) mottled with orange oxide, wet-saturated, med dense, f sand, no odor		
		2	4-4-7-12	0.0		ML	<b>SANDY CLAYEY SILT (ML)</b> - bluish gray (5B5/1), wet, dense, 50% silt, 30% clay, 20% f sand, no odor		
15		1.1	4-8-11	0.0		SM	<b>SILTY SAND (SM)</b> - greenish gray (5GY5/1) mottled with orange oxide, wet-saturated, med dense, f sand, no odor  - increasingly oxidized		
		1.2	5-8-9	0.0					
		1.6	5-8-13-17	0.0				- yellowish brn (10YR5/6), heavily oxidized	

Total Depth = 15 ft bgs

**ABBREVIATIONS**

- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	
<b>SURFACE ELEVATION:</b> 10.7 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,932.64	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,961.31	<b>DATE STARTED:</b> 01/19/2005 09:10	<b>DATE COMPLETED:</b> 01/19/2005 15:00
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> 3 continuous core		<b>WATER LEVEL:</b> 2.24 ft bgs on 03/22/2005
<b>LOCATION:</b> 336-346 Center St. - Large Vacant Lot (Southwest Corner), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5				0.0		SM	<b>CONCRETE</b>	Grout	
							<b>FILL - SILTY SAND(SM)</b> - dk gray (10YR4/1), moist to wet, dense, loose, 60% f sand, 40% silt, no odor  - color gradually changing to brownish yellow (10YR6/6), saturated		
10				0.0		SP	<b>FILL - GRAVELLY SAND WITH SILT (SP)</b> - moist, gravelly sand with silt (chert and clasts), no odor	Seal	
							<b>SILTY SAND (SM)</b> - very dk gray (10YR3/1), loose, 60% f sand, 40% silt		
15				0.2		SM	<b>SILTY SAND (SM)</b> - yellowish brn (10YR5/8) with fine oxidation, wet, 70% f sand, 30% silt, with a blue-green clay concentration at top of interval, no odor	Pack	

Total Depth = 15 ft bgs

**ABBREVIATIONS**

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- c = coarse-grained
- ang = angular
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**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.5 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,756.28	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,936.12	<b>DATE STARTED:</b> 02/15/2005 08:50	<b>DATE COMPLETED:</b> 02/15/2005
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 3.14 ft bgs on 03/22/2005
<b>LOCATION:</b> 1448 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-07-03SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		1.5	12-15-17	0.0		SM	CONCRETE	Grout	
		1.5	5-7-7	0.0		SM	FILL - SILTY SAND (SM) - moist, silty f sand with debris/gravel, glass, brick, wood, no odor		
		0				SM	SILTY SAND (SM) - very dk gray (10YR3/1), saturated, loose, f sand - sample: RMW-7-03SS-0105  - no recovery	Seal	
10		1.5	4-5-8	0.0		SM	SILTY SAND (SM) - yellowish brn (10YR5/8), oxidized, wet to saturated, cohesive, f sand, no odor - small concentration of clay	Pack	
		1.5	6-9-11	0.0					
		1.3	5-7-7-14	0.0					
15		1.5	6-10-16	0.0		SM			
		1.5	3-8-11	0.0					
		2	10-12-13-16	0.0					

Total Depth = 15 ft bgs

**ABBREVIATIONS**

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- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,746.02	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,933.47	<b>DATE STARTED:</b> 09/07/2005 12:10	<b>DATE COMPLETED:</b> 09/08/2005 13:30
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 4.88 ft bgs on 10/07/2005
<b>LOCATION:</b> 1448 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	0.0 - 0.6	0.6		0.0		CONCRETE	Grout	
	0.6 - 3.9			0.0	SM	FILL - SILTY SAND (SM) - dk yellowish brn (10YR4/4) mottled with black, dry to moist, f-m sand with 10% clay, brick fragments and oyster shells, no odor		
	3.9 - 6.4	3.9		0.0	SC	FILL - CLAYEY SAND (SC) - grayish green (5G5/2), moist to wet, cohesive, fine sand, no odor CONCRETE - solid concrete, old building foundation?		
10	6.4 - 9.4	2.5		0.0		SILTY SAND (SM) - mottled greenish gray (5G6/1) with yellowish brn (10Y2.5/6) moderately oxidized, moist, cohesive, 60% f sand, 40% silt, no odor	Grout	
	9.4 - 14.4	3		0.0		- wet to saturated, less silt ~70% f sand, 30% silt, loose		
15	14.4 - 19.4	5		0.0	SM		Seal	
	19.4 - 24.4	5		0.0		- saturated, 75% f sand, 25% silt, no odor		
20	24.4 - 29.4	5		0.0		SAND (SP) - dk yellowish brn (10YR4/4), saturated, 80% f sand, 20% silt, no odor	Pack	
	29.4 - 34.4	5		0.0	SP	- less oxidized		
25	34.4 - 39.4	5		0.0		- dk yellowish brn (10YR4/6) oxidized, saturated, 90% f sand, 10% clay, no odor	Pack	
	39.4 - 44.4	5		0.0				

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,746.02	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,933.47	<b>DATE STARTED:</b> 09/07/2005 12:10	<b>DATE COMPLETED:</b> 09/08/2005 13:30
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 4.88 ft bgs on 10/07/2005
<b>LOCATION:</b> 1448 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							<p style="text-align: center;"><i>Total Depth = 35 ft bgs</i></p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 11.8 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,857.11	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,054.37	<b>DATE STARTED:</b> 02/24/2005 09:00	<b>DATE COMPLETED:</b> 02/24/2005 10:45
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.49 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Western Fence Line), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5							CONCRETE		
10		~1.3	2-6-9	0.0		SM	FILL-DEBRIS - dk olive brn (2.5YR3/3) to black (2.5YR2.5/1), wet-saturated, wood, metal, bricks with fine silty sandy material, no pronounced odor  SILTY SAND (SM) - greenish grey (5GY5/1) at upper 0.2' and then increasing orange oxidation (heavy) yellowish brn (10YR5/8), moist to wet, med dense, f sand, no odor - olive yellow (2.5YR6/6), loose, saturated, no odor - sample: RMW-08-10SS-0105		
15									

Total Depth = 15 ft bgs

**ABBREVIATIONS**

- brn = brown
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- vf = very fine-grained
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- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 46.5	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 11.7 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,849.49	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,052.90	<b>DATE STARTED:</b> 02/23/2005 09:32	<b>DATE COMPLETED:</b> 02/23/2005 16:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 7.12 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Western Fence Line), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-08-03SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		1.5	5-3-2	0.0		SM	<p><b>CONCRETE</b></p> <p><b>DEBRIS / FILL</b> - dk olive brn (2.5YR3/3) to black (2.5YR2.5/1), wet-saturated, wood, metal, bricks with fine silty sandy material, no pronounced odor</p> <p>- sample: RMW-08-03SS-0105</p> <p>- full recovery is a single piece of wood approximately 1.1' long, no odor</p>	Grout
		1.1	6-15-16	0.0				
10		1.3	2-3-6	0.0		SM	<p><b>SILTY SAND (SM)</b> - greenish grey (5GY5/1) at upper 0.2' and then increasing orange oxidation (heavy) yellowish brn (10YR5/8), moist to wet, med dense, f sand, no odor</p> <p><b>SILTY SAND</b> - very dk gray (10YR3/1), super saturated, f sand, no odor</p>	Seal
		0.2	32-50/4	0.0				
15		1.4	6-6-12-17	0.0		SM	<p><b>SILTY SAND (SM)</b> - lt olive brn (2.5YR5/4), saturated, loose, 60% f sand, 40% silt, no odor</p> <p><b>SILTY SAND (SM)</b> - greenish grey (5GY5/1) at upper 0.2' and then increasing orange oxidation (heavy) yellowish brn (10YR5/8), moist to wet, med dense, f sand, no odor</p>	Pack
		1.7	15-30-40-50	0.0				
20		0	9-9-18	0.0		SM	<p><b>SILTY SAND (SM)</b> - dk yellowish brn (10YR3/6), heavy oxidation (mildly generated), wet - saturated, 70% f sand, 30% silt, med dense, no odor</p> <p>- color lighter, decreasing oxidation</p> <p>- fines decreasing, saturated</p>	Pack
		0.9	8-9-11	0.0				
25		1.4	6-7-13-16	0.0		SM	<p><b>SILTY SAND (SM)</b> - dk grayish brn (10YR4/2)</p> <p>- intermittent zones of SP(85/15), sand</p>	Pack
		0.7	10-14-16	0.0				
30		1.1	11-12-12	0.0		SM	<p>- dk grayish brn (10YR4/2)</p> <p>- single iron nodule</p>	Pack
		1.6	6-12-12-16	0.0				
35		1.2	6-14-19	0.0		SM	<p>- dk grayish brn (10YR4/2)</p> <p>- intermittent zones of SP(85/15), sand</p>	Pack
		1.5	9-17-25	0.0				
35		2	12-12-16-25	0.0		SM	<p>- dk grayish brn (10YR4/2)</p> <p>- intermittent zones of SP(85/15), sand</p>	Pack
		0.9	7-15-20	0.0				
35		1.5	5-8-12	0.0		SM	<p>- dk grayish brn (10YR4/2)</p> <p>- intermittent zones of SP(85/15), sand</p>	Pack
		2	5-8-9-12	0.0				

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 46.5	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 11.7 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,849.49	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,052.90	<b>DATE STARTED:</b> 02/23/2005 09:32	<b>DATE COMPLETED:</b> 02/23/2005 16:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 7.12 ft bgs on 03/22/2005
<b>LOCATION:</b> 1414-3rd St. (Western Fence Line), Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-08-03SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40	X	1.5	8-12-13	0.0	SM	<b>SILTY SAND (SM)</b> - dk yellowish brn (10YR3/6), heavy oxidation (mildly generated), wet - saturated, 70% f sand, 30% silt, med dense, no odor	Pack	
	X	1.5	8-8-16	0.0				
	X	2	15-25-50/6	0.0				
45	X	1.4	14-17-30	0.0				
	X	1.5	7-9-17	0.0				
	X	1.5	8-30-50/3	0.0				
			18-35-76/1	0.0				
Total Depth = 46.5 ft bgs								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.3 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,597.79	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,947.48	<b>DATE STARTED:</b> 02/17/2005 09:30	<b>DATE COMPLETED:</b> 02/17/2005 11:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.69 ft bgs on 03/22/2005
<b>LOCATION:</b> 1401 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5						SM	<p><b>SILTY SAND (SM)</b> - olive brn (2.5YR4/3) mottled with oxide (orange), dry to moist, dense, 60% f sand, 40% silt, no odor</p> <p>- color changes to dk gray (2.5YR4/1), grading to black (2.5YR2.5/1)</p>	
						SM	<p><b>SILTY SAND (SM)</b> - black (2.5/1), moist, loose, 50% silt, 50% f sand, mild weathered, odor</p> <p>No Recovery</p>	
10						SM	<p><b>SILTY SAND (SM)</b> - bluish gray (5B6/1) mottled with orange oxide (dk gray staining in top 6), moist to wet, medium dense, minor clay &lt;10%, f sand, no odor</p> <p>- riddled with root structures</p>	
						SM	<p>- yellowish brn (10YR5/6), heavily oxidized, wet</p> <p>- grayish brn (2.5YR5/2), saturated, loose, 70% f sand, 30% silt, no odor</p>	
15							<p>Total Depth = 15 ft bgs</p>	

**ABBREVIATIONS**  
 brn = brown  
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 dk = dark  
 vf = very fine-grained  
 f = fine-grained  
 m = medium-grained  
 c = coarse-grained  
 ang = angular  
 subang = subangular  
 subrnd = subrounded  
 rnd = rounded



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 36.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.3 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,597.44	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,939.14	<b>DATE STARTED:</b> 02/16/2005 11:15	<b>DATE COMPLETED:</b> 02/22/2005 15:00
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.8 ft bgs on 03/22/2005
<b>LOCATION:</b> 1401 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-0-10SS-0105	

DEPTH BGS (feet)	SAMPLE				USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)			
5		1.5	9-13-22	0.0	SM	<p><b>SILTY SAND (SM)</b> - olive brn (2.5YR4/3) mottled with oxide (orange), dry to moist, dense, 60% f sand, 40% silt, no odor</p> <p>- color changes to dk gray (2.5YR4/1), grading to black (2.5YR2.5/1)</p>	Grout
		1	5-7-11	0.0			
		1	4-5	0.0			
		0	2-2-5	0.0			
		1.5	5-5-5	0.0			
10		1.6	3-4-9-15	0.0	SM	<p><b>SILTY SAND (SM)</b> - black (2.5/1), moist, loose, 50% silt, 50% f sand, mild weathered, odor</p> <p>No Recovery</p> <p><b>SILTY SAND (SM)</b> - bluish gray (5B6/1) mottled with orange oxide (dk gray staining in top 6), moist to wet, medium dense, minor clay &lt;10%, f sand, no odor</p> <p>- riddled with root structures</p>	Grout
		1	7-14-23	0.0			
		1.5	5-10-18	0.0			
15		1.8	6-10-14-25	0.0	SM	<p>- grayish brn (2.5YR5/2), saturated, loose, 70% f sand, 30% silt, no odor</p> <p>- heavily oxidized (orange), wet, dense</p> <p>- becomes increasingly saturated</p>	Seal
		1.1	7-10-15	0.0			
		1.5	5-14-15	0.0			
20		1.9	8-10-14-19	0.0	SM	<p>- moist to wet, dense</p> <p>- heavily oxidized, wet, dense</p> <p>- no oxidation, saturated</p>	Pack
		1.4	7-8-15	0.0			
		1.5	4-9-14	0.0			
25		1.8	8-15-19-24	0.0	SM	<p>- heavily oxidized, wet, dense</p> <p>- no oxidation, saturated</p>	Pack
		1.3	15-26-33	0.0			
		0.3	13-6-20	0.0			
30		0.7	25-50/6	0.0	SM	<p>- heavily oxidized, wet, dense</p> <p>- no oxidation, saturated</p>	Pack
		0	50/2	0.0			
		0.8	50/6 - 50/3	0.0			
35		0.6	40 - 50/4	0.0	SP/SM	<p><b>SILTY SAND (SM)</b> - olive brn (2.5YR4/3) saturated, loose, 80% f sand, 20% silt, no odor</p>	Pack

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 36.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 10.3 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,597.44	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,939.14	<b>DATE STARTED:</b> 02/16/2005 11:15	<b>DATE COMPLETED:</b> 02/22/2005 15:00
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.8 ft bgs on 03/22/2005
<b>LOCATION:</b> 1401 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-0-10SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
		0	75/3			SP/SM	<p style="text-align: center;"><i>Total Depth = 36 ft bgs</i></p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 15.0	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 9.7 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,513.81	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,979.03	<b>DATE STARTED:</b> 02/18/2005 09:50	<b>DATE COMPLETED:</b> 02/18/2005 00:05
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 6.71 ft bgs on 03/22/2005
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		NA	NA	0.0		SM	ASPHALT FILL- SILTY SAND WITH GRAVEL (SM) - dk gray (10YR4/1), dry to moist, loose, road bed aggregate, no odor	Grout	
		1.8	2-4-5-6	0.0		SM	SILTY SAND (SM) - dk yellowish brn (10YR4/4), wet-saturated, loose, 60% f sand, 40% silt, no odor	Seal	
10		1.2	4-4-6	0.0		SM/SC	CLAYEY SILTY SAND(SM/SC) - black (10YR2/1), wet, med dense, cohesive, 50% f sand, 40% silt, 10% clay, swampy odor - dk grayish brn (10YR3/2), saturated, less fines	Pack	
		1	5-7-8	0.0			SILTY FINE SAND (SM) - gray (10YR6/1) mottled with orange oxide, wet-saturated, med dense, 60% f sand, 40% silt, swampy odor		
		1.3	6-10-11-16	0.0			- heavily oxidized		
15		0.8	6-6-14	0.0		SM	- yellowish brn (10YR5/4)		
		1.4	5-7-10	0.0					
		1.8	6-7-13-16						

Total Depth = 15 ft bgs

**ABBREVIATIONS**

- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded



**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 46.5	<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 9.8 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,526.34	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,980.61	<b>DATE STARTED:</b> 02/21/2005 10:05	<b>DATE COMPLETED:</b> 02/21/2005 18:30
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon		<b>WATER LEVEL:</b> 7.08 ft bgs on 03/22/2005
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b> RMW-10-45SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5						SW	<b>ASPHALT</b> <b>FILL- SILTY SAND WITH GRAVEL (SM)</b> - dk gray (10YR4/1), dry to moist, loose, road bed aggregate, no odor	Grout
						SM	<b>SILTY SAND (SM)</b> - dk yellowish brn (10YR4/4), wet-saturated, loose, 60% f sand, 40% silt, no odor	
						SM/SC	<b>CLAYEY SILTY SAND(SM/SC)</b> - black (10YR2/1), wet, med dense, cohesive, 50% f sand, 40% silt, 10% clay, swampy odor	
						SM	<b>SILTY FINE SAND (SM)</b> - gray (10YR6/1) mottled with orange oxide, wet-saturated, med dense, 60% f sand, 40% silt, swampy odor  - yellowish brn (10YR5/4)	
10						SM	<b>SILTY SAND (SM)</b> - olive (5YR5/4), wet-saturated, loose, 70% f sand, 30% silt, swampy metallic odor	
						SM	<b>SILTY SAND WITH CLAY (SM)</b> - bluish gray (5B6/1) mottled with orange oxide, wet-saturated, med dense, 60% f sand, 30% silt, <10% clay, odor persists	
						SP	<b>SAND WITH SILT (SP)</b> - saturated, loose, 85% f sand, 15% silt - grades with increasing fines, oxidation  - odor persists	
15						SC	<b>CLAYEY SILTY SAND (SC)</b> - bluish gray (5B6/1) mottled with orange oxide, moist, dense, f sand, no odor	
						SM	<b>SILTY SAND (SM)</b> - olive (5YR4/4) mottled with red orange oxide, wet to saturated, med dense, f sand, grades with less fines, odor persists  - less oxidation, bluish gray zones	
20						SM	<b>SILTY SAND (SM)</b> - olive (5YR4/4), wet-saturated, loose, 70% f sand, 30% silt, faint odor	
						SM	- grades with less silt	
						SM		
25						SM		
						SM		
						SM		
30						SM		
						SM		
						SM		
35						SM		
						SM		
						SM		

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 46.5		<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	
<b>SURFACE ELEVATION:</b> 9.8 ft. MSL		<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,526.34		<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,980.61	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55		<b>DRILLING EQUIPMENT:</b> 8 Auger. CA-Mod. Split Spoon			<b>DATE STARTED:</b> 02/21/2005 10:05
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>DATE COMPLETED:</b> 02/21/2005 18:30	
					<b>WATER LEVEL:</b> 7.08 ft bgs on 03/22/2005
				<b>SAMPLE NAME:</b> RMW-10-45SS-0105	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40	1.5	12-20-25	0.0	SP	-	FINE SAND WITH SILT (SP) - olive (5YR5/4), saturated, loose, 85% f sand, 15% silt, faint odor	Pack	
	1.4	25-50/5	0.0					
	1.6	17-33-50/5	0.0					
45	1.2	26-50/5	0.0					
	1.2	24-50/6	0.0					
45	1	16-35-50/3	0.0					
	1.3	30-70-75/3	0.0	///	- sample: RMW-10-45SS-0105			
<p style="text-align: center;">Total Depth = 46.5 ft bgs</p> <p>Note 1) Top 15' of lithology log based on log from RMW-10-15</p> <p><b>ABBREVIATIONS</b></p> <p><i>brn</i> = brown  <i>lt</i> = light  <i>dk</i> = dark  <i>vf</i> = very fine-grained  <i>f</i> = fine-grained  <i>m</i> = medium-grained  <i>c</i> = coarse-grained  <i>ang</i> = angular  <i>subang</i> = subangular  <i>subrnd</i> = subrounded  <i>rnd</i> = rounded</p>								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 8.5 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,928.89	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,326.95	<b>DATE STARTED:</b> 09/20/2005 12:06	<b>DATE COMPLETED:</b> 09/21/2005 16:40
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 5.95 ft bgs on 10/07/2005
<b>LOCATION:</b> Northbound bike lane on Mandella Pkwy between 3rd and 5th St.		<b>LOGGED BY:</b> Oakland, CA M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5	5			0.0		GP	ASPHALT	Grout	
						GM	FILL - GRAVEL (GM) - vc ang gravel to cobbles (1-4), zones of silt and sand, metal slag, moist to wet, no odor		
10	5			0.0		ML	FILL - GRAVELLY SANDY SILT (ML) - wet to saturated, 35% subrnd gravel (1-3), no odor	Grout	
						SM	SILTY SAND (SM) - very dark grayish brn (10YR3/2), saturated, loose, 55% sand, 45% silt, no odor, likely top of native material - layers of clayey silt, some are rich in organic material		
15	5			0.0		OL	ORGANIC CLAYEY SILT (OL) - grayish brn (10YR5/2), rich in organic material, med stiff, low plasticity, mild sulfur odor, wet	Grout	
						OL/PT	ORGANIC SILT / PEAT (OL/PT) - dk. yellowish brn (10YR3/4) to black (10YR2/1), cohesive and soft, moist to wet, strong sulfur odor - black silt, virtually no organic debris		
25	5			0.0		SM	SILTY SAND (SM) - dk greenish gray (5FY4/1), wet, 60% f sand, 40% silt, no odor - dk yellowish brn (10YR4/4), wet to saturated, 75% sand, 25% silt, no odor	Seal	
						SM	SILTY SAND (SM) - dk greenish gray (5FY4/1), wet, 60% f sand, 40% silt, no odor - loose	Pack	
35	5			0.0		SM/SP	SILTY SAND (SM/SP) - grayish brn (10YR4/3), saturated, loose,		

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 8.5 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,928.89	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,326.95	<b>DATE STARTED:</b> 09/20/2005 12:06	<b>DATE COMPLETED:</b> 09/21/2005 16:40
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 5.95 ft bgs on 10/07/2005
<b>LOCATION:</b> Northbound bike lane on Mandella Pkwy between 3rd and 5th St.		<b>LOGGED BY:</b> Oakland, CA M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							85% f sand, 15% silt, no odor <i>Total Depth = 35 ft bgs</i>  <b>ABBREVIATIONS</b> <i>brn = brown</i> <i>lt = light</i> <i>dk = dark</i> <i>vf = very fine-grained</i> <i>f = fine-grained</i> <i>m = medium-grained</i> <i>c = coarse-grained</i> <i>ang = angular</i> <i>subang = subangular</i> <i>subrnd = subrounded</i> <i>rnd = rounded</i>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 32.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 9.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,625.72	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,111.43	<b>DATE STARTED:</b> 09/21/2005 12:43	<b>DATE COMPLETED:</b> 09/21/2005 16:40
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 3.99 ft bgs on 10/11/2005
<b>LOCATION:</b> 3rd St. gutter in front of 1414 3rd St., Oakland, CA		<b>LOGGED BY:</b> W. Frohlich / well construction M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		5		1.4		SM	Grout       Seal   Pack 	
10		5		3.2		SM		
15		5		24.9		SM		
20		5		22.7		SM		
25		0		1.4		SP		
30		2		0.0		SP		
		5		0.0		SP		
		2		0.0		SP		
Total Depth = 32 ft bgs								

**ABBREVIATIONS**

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 32.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 9.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,625.72	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,111.43	<b>DATE STARTED:</b> 09/21/2005 12:43	<b>DATE COMPLETED:</b> 09/21/2005 16:40
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 3.99 ft bgs on 10/11/2005
<b>LOCATION:</b> 3rd St. gutter in front of 1414 3rd St., Oakland, CA		<b>LOGGED BY:</b> W. Frohlich / well construction M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 53.0		<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 9.3 ft. MSL		<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,628.72		<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,101.57	
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing			<b>DATE STARTED:</b> 09/15/2005 13:00
<b>LOCATION:</b> 1414 3rd St., Oakland, CA		<b>LOGGED BY:</b> W. Frohlich		<b>DATE COMPLETED:</b> 09/19/2005 18:00	
		<b>DRILLING METHOD:</b> Rotosonic			<b>WATER LEVEL:</b> 3.85 ft bgs on 10/11/2005
		<b>LOGGED BY:</b> W. Frohlich		<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5	5				1.4	SM	CONCRETE		
						FILL - SILTY SAND (SM) - dk reddish brn (5YR3/2), some black, wet, little to no clay			
10	5				24.9	SM	SILTY SAND WITH CLAY AND GRAVEL (SM) - greyish green (5GY45/1) with black staining in veins, wet to saturated, slightly plastic, vf-f sand		
						- no more black veins, slightly more plastic			
15	5				22.7		SAND (SP) - greyish green (5GY4/1), saturated, loose, no plasticity, poorly graded f sand, no fines		
20	0				0.0			Grout	
25	2				0.0	SP	- dk greenish grey (5BG4/1)		
30	5				0.0		- f sand with 20% m sand		
35	5				0.2		- mottled dk greenish grey (5G4/1) and dk bluish grey (5B4/1), unconsolidated, f-m sand		
					0.4				

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 53.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 9.3 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,628.72	<b>EASTING (CCS NAD 83 Z 3):</b> 6,043,101.57	<b>DATE STARTED:</b> 09/15/2005 13:00	<b>DATE COMPLETED:</b> 09/19/2005 18:00
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 3.85 ft bgs on 10/11/2005
<b>LOCATION:</b> 1414 3rd St., Oakland, CA		<b>LOGGED BY:</b> W. Frohlich	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
40	X	5		8.4		SP	<b>SAND (SP)</b> - greyish green (5GY4/1), saturated, loose, no plasticity, poorly graded f sand, no fines - dk yellowish brn (10YR4/4), dense, f-m sand  - looser with some iron staining	Grout
				10.8				Seal
45	X	5		0.0		SP		Pack
				0.0				
50	X	5		0.0		SP		
				0.0				
		3		0.0				Slough
Total Depth = 53 ft bgs								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0		<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL		<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,397.02		<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,992.94	
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing			<b>DATE STARTED:</b> 09/13/2005 12:20
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>DATE COMPLETED:</b> 09/14/2005 15:50	
		<b>DRILLING METHOD:</b> Rotosonic			<b>WATER LEVEL:</b> 4.6 ft bgs on 10/07/2005
		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
5		5		0.0		SM	<p><b>ASPHALT -</b></p> <p><b>FILL - SILTY SAND WITH CLAY AND GRAVEL (SM)</b> - dk yellowish brn (10YR3/4) to black (10YR2/1), contains brick fragments, metal, and other debris, dry to moist, loose, no odor</p> <p>- bluish gray (5B5/1), mottled with oxide, m dense, low plasticity, moist, no odor</p>	Grout	
10		5		0.0	OL	<b>ORGANIC CLAYEY SILT (OL)</b> - black (N2.5), organic rich, very soft, saturated, strong sulfur odor			
15		5		0.0	OH	<b>ORGANIC SILTY CLAY (OH)</b> - greenish gray (5GY5/1), saturated, med plasticity, organic rich with organic debris, strong sulfur odor			
20		5		0.0	OL	<b>ORGANIC CLAYEY SILT (OL)</b> - dark olive brn (2.5Y3/3), wet to saturated, low plasticity, organic rich with roots and organic debris, strong sulfur odor, 10% f sand, organic rich with little to no debris, very soft, saturated			
25		5		0.0	SM	<b>SAND WITH SILT (SM)</b> - greenish gray (5GY5/1), saturated, 60% f sand, 40% silt loose, mild sulfur odor			
30		5		0.0	SM	- little to no odor - lt olive brn (2.5Y5/6), saturated, 70% sand, 30% silt, loose			
35		5		0.0	SM/SP	- brnsh yellow (10YR5/6) with concentrated orange zones of oxidation, saturated, no odor			
					SM/SP	<b>SILTY SAND (SM/SP)</b> - yellowish brn (10YR5/8), saturated, loose, 80% f sand, 20% silt, no odor	Seal		
					SP	<b>SAND WITH SILT (SP)</b> - grayish brn (10YR4/2), saturated, very loose, f sand with 10% silt, no odor			
					SM/SP	<b>SILTY SAND (SM/SP)</b> - yellowish brn (10YR5/8), saturated, loose, 80% f sand, 20% silt, no odor			

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 35.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,397.02	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,992.94	<b>DATE STARTED:</b> 09/13/2005 12:20	<b>DATE COMPLETED:</b> 09/14/2005 15:50
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 4.6 ft bgs on 10/07/2005
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							<p style="text-align: center;"><i>Total Depth = 35 ft bgs</i></p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 50.0		<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL		<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,578.17		<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,842.31	
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing			<b>DATE STARTED:</b> 09/09/2005 11:27
<b>LOCATION:</b> UPRR Property - Adjacent Prescott Park / BMW-7, Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>DATE COMPLETED:</b> 05/01/912 16:30	
		<b>WATER LEVEL:</b> 4.29 ft bgs on 10/07/2005			<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	5			2.2		SM	<b>FILL - SILTY SAND (SM)</b> - dk bluish grey (5B4/1), dry to moist, some root structures, loose, dry to moist, 60% f sand, 40% silt, no odor	
10	5			12.2		SM	<b>SILTY SAND (SM)</b> - dk brn (10YR3/4), dry to moist, no root structures, 60% f sand, 40% silt, no odor - dk greyish brn (10YR3/2), no odor - v dark grey (10YR3/1), no odor	
15	5			0.0		SM	<b>SILTY SAND (SM)</b> - greenish grey (5G5/1) mottled with oxidation light yellowish brn (2.5Y6/4), wet to saturated, finer than above, loose-cohesive, wet to saturated, 60% f sand, 40% silt, no odor  - olive yellow (2.5Y6/8), m. dense, no odor	Grout
20	5			0.0		SM	- oxidized zones are more orange in color, increased mottling, m. dense, no odor	
25	5			0.0		SM	- brn (10Yr4/3), saturated, loose, 75% sand, 25% silt, no odor	
30	5			0.0		SM	- brn (10YR4/3), saturated, no odor	
35	5			0.0		SM	- density increasing	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 50.0	<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	
<b>SURFACE ELEVATION:</b> 10.4 ft. MSL	<b>NORTHING (CCS NAD 83 Z 3):</b> 2,119,578.17	<b>EASTING (CCS NAD 83 Z 3):</b> 6,042,842.31	<b>DATE STARTED:</b> 09/09/2005 11:27	<b>DATE COMPLETED:</b> 05/01/912 16:30
<b>DRILLING METHOD:</b> Rotosonic		<b>DRILLING EQUIPMENT:</b> Limited Access Rig, 8 outer casing, 6 sample core casing		<b>WATER LEVEL:</b> 4.29 ft bgs on 10/07/2005
<b>LOCATION:</b> UPRR Property - Adjacent Prescott Park / BMW-7, Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	WELL CONSTRUCTION DIAGRAM	
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE				
40		5		0.0		SM	<p><b>SILTY SAND (SM)</b> - greenish grey (5G5/1) mottled with oxidation light yellowish brn (2.5Y6/4), wet to saturated, finer than above, loose-cohesive, wet to saturated, 60% f sand, 40% silt, no odor</p> <p>- heavily oxidized</p> <p><b>SAND (SP)</b> - brn (10YR4/3) with minor oxidation, saturated, loose, 90% f sand, 10% silt, no odor</p>	Grout	
45		5		0.0				Seal	
50		5		0.0				Pack	

Total Depth = 50 ft bgs

**ABBREVIATIONS**

- brn = brown
- lt = light
- dk = dark
- vf = very fine-grained
- f = fine-grained
- m = medium-grained
- c = coarse-grained
- ang = angular
- subang = subangular
- subrnd = subrounded
- rnd = rounded

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/16/2004	<b>DATE COMPLETED:</b> 09/16/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Large Lot on Center St.)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
5				0 1.7			<b>CONCRETE</b>  dk brn (3/3), fill like material, rock, dry, gravel, no odor	
				0			- saturated at 5', color stays dk gray (2.5YR) all the way to 8'	
							Boring Terminated at 8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 9.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/15/2004	DATE COMPLETED: 09/15/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (thin lot on Center St.)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3		3.4		SM	<p><b>CONCRETE</b></p> <p><b>SILTY SAND (SM)</b> - dk olive brn (2.5YR3/3), moist to wet, loose, no odor</p> <p>- approximate level of saturation</p> <p>- SM as described above, color is light olive brn (2.5YR5/6), saturated. Color change is gradual from ~5.5 bgs</p>	
		3.8					Boring Terminated at 9 ft	
<p><b>ABBREVIATIONS</b></p> <p>brn = brown            lt = light            dk = dark            vf = very fine-grained            f = fine-grained            m = medium-grained            c = coarse-grained            ang = angular            subang = subangular            subrnd = subrounded            rnd = rounded</p>								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/20/2004	<b>DATE COMPLETED:</b> 09/20/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (RSB-02, DC Yard)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		2.5		GM	<b>SILTY SANDY GRAVEL (GM)</b> - dry (fill), loose	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
				1.4		SM	<b>SILTY FINE SAND (SM)</b> - black (2.5YR2.5/1), moist, loose, no odor  - SM as described from 1.5'  - saturated from 5.5', color gradually changes to olive brn (2.5YR4/4)	
		3.5					Boring Terminated at 8 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 10.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/24/2004	DATE COMPLETED: 09/24/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (DC Yard)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2		10		SM	<b>CONCRETE</b>	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
					SM	<b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1), moist to wet, loose, 20% fine, faint petrol odor, wood fragments - becomes saturated from 3.5-4'		
				3.3	SM	<b>SILTY FINE SAND (SM)</b> - dk olive gray (5YR3/2), saturated, loose, 10% fine, no odor		
10		4			SM	<b>SILTY FINE SAND (SM)</b> - mottled light olive brn to gray (2.5YR5/6-6/1), moist to wet, loose to medium dense, no odor  - appears to be a zone that is perching minor amounts of groundwater. Mildly cemented by oxides due to water table fluctuation. This zone is not continuous across the site		
Boring Terminated at 10 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/24/2004	<b>DATE COMPLETED:</b> 09/24/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3		2		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - black (2.5YR2.5/1), moist (last 6 is wet), loose, no odor - mild oxidation at ~2'  - black fragments/glass	
						SM	<b>SILTY FINE SAND (SM)</b> - dk grayish brn (7.5YR6/2), wet to saturated, loose, no odor, no fill debris	
		4		2.5		SM/SC	<b>CLAYEY SILTY FINE SAND (SM/SC)</b> - mottled light olive brn (2.5YR5/6) to gray (2.5YR5/1), moist, medium stiff, no odor	
Boring Terminated at 9 ft							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/30/2005	<b>DATE COMPLETED:</b> 09/30/2005
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (DC Yard)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.8		0		CONCRETE		
						SM  - as described above with no fill, saturated		
		4				ML/SC CLAYEY FINE SAND (ML/SC) - greenish gray, wet to saturated, stiff, no odor		
Boring Terminated at 9 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 10.5	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/15/2004	<b>DATE COMPLETED:</b> 09/15/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							<b>CONCRETE</b>	
5		2.5		2.4		SM	<p><b>SILTY SAND WITH CONCRETE GRAVELS (SM)</b> - dk olive brn (2.5YR3/3), dry to moist, loose, concentrated in small zones, no odor</p> <p>- no more concrete gravels, saturated</p> <p>- SM as described above (no gravel), color gradually changes to olive gray (5YR4/2), saturated from ~6'</p>	
10		3.5					<p>Boring Terminated at 10.5 ft</p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 11.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/15/2004	<b>DATE COMPLETED:</b> 09/15/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (DC Yard)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		0.8			<p><b>CONCRETE</b></p>	<p><b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b></p>
10		4		0	SM	<p><b>SITLY SAND (SM)</b> - black (5YR2.5/1), moist to wet, med dense, ~25% silt, no odor</p> <p>- brick fragments (fill)</p> <p>- SM with high silt content as described above, moisture content varies. Gradational zones of lower silt content are obviously saturated, zones of low plasticity clay (~3) throughout the core.</p> <p>- entire core is below water table</p>		
						<p>Boring Terminated at 11 ft</p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>		

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/16/2004	<b>DATE COMPLETED:</b> 09/16/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (DC Yard)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
							CONCRETE	
5		2.8				SM	SILTY SAND (SM) - black (2.5YR2.5/1), saturated from 4', loose, sand with black fragments, no odor	
							Boring Terminated at 8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/14/2004	<b>DATE COMPLETED:</b> 09/14/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3		4.2		SM	<b>CONCRETE</b> <b>FILL: SILTY SAND (SM)</b> - black (5YR2.5/1), moist to wet, loose, minor wood content, silty fine sand with crushed concrete interlayered, slight petrol odor.  - SM as above, no wood content  - wet, saturated, no odor, poor recovery	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
		2.5		4.9				
	Boring Terminated at 8 ft							
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/15/2004	<b>DATE COMPLETED:</b>
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (DC Yard)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3.5		4.8		SM	<b>SILTY SAND (SM)</b> - dk gray (5YR4/1), dry to moist, med dense, ~25% fines, some clay zones of SC, no odor  - brick fragments - 0.3' layer of charcoal	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		3		0		SM	<b>SILTY SAND (SM)</b> - black (5YR2.5/1), saturated, loose, less fines, no odor, no brick in core - saturated	
							Boring Terminated at 8 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/20/2004	<b>DATE COMPLETED:</b> 09/20/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Mandela Pkwy)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3.2		7.1		GM	<b>SANDY SILTY GRAVEL (GM)</b> - dk gray (5YR4/1), dry to moist, loose, no odor, tile fragments	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
				1.9		SM	<b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1), moist to wet, med dense, zones of sc, no odor  - SM as above with wood, wet to saturated (~5.3')	
		2.5					Boring Terminated at 8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/16/2004	<b>DATE COMPLETED:</b> 09/16/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2		1.4		GM	<b>SILTY FINE SAND WITH ASPHALT AGGREGATE/GRAVEL (GM)</b> - olive brn (2.5YR4/4), dry, loose, no odor	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		3		2.1		SM	<b>SILTY FINE SAND (SM)</b> - black (2.5YR2.5/1), wet to saturated at ~3.5', loose - approx saturated	
Boring Terminated at 8 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b>	<b>DATE COMPLETED:</b>
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3		1.7		GM	<b>SILTY SANDY GRAVEL (GM)</b> - dk olive brn (2.5YR3/3), dry, no odor	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		4		1.3		SM	<b>SILTY FINE SAND (SM)</b> - black (2.5YR2.5/1), saturated, loose, no odor  - same as above, color changes gradually to dk grayish brn (2.5YR4/2), saturated at 7.3' Boring Terminated at 8 ft	
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 3.5	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/22/2004	DATE COMPLETED: 09/22/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (3rd St. at Mandela)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
				6.2		GM	<b>SILTY SANDY FINE GRAVEL (GM)</b> - gray (5YR5/1), dry, loose, no odor	refusal at 3.5' bgs, concrete. We believe we are encountering an unmarked utility. This area is riddled with utilities, we are aborting the remainder of the borehole and not offsetting due to potentially unsafe conditions. USA was notified twice at this location
						SM	<b>SILTY SAND (SM)</b> - very dk gray (5YR3/1), moist, loose, slight petrol odor Boring Terminated at 3.5 ft	
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 11.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/22/2004	<b>DATE COMPLETED:</b> 09/22/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3.5		606		CONCRETE		
10		4			SM	SILTY FINE SAND (SM) - black (2.5YR2.5/1), moist, loose, strong PID  - as above, saturated, color gradually changes to gray		
Boring Terminated at 11 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 10.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/27/2004	DATE COMPLETED: 09/27/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (DC Yard)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
5		2		1470		SM	<b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1), moist, loose, oily	
10		4		2373		ML	<b>FINE SANDY SILT (ML)</b> - soft black (5YR2.5/1), wet, oily  - saturated at ~7.5'	
						SM	<b>SILTY FINE SAND (SM)</b> - dk gray (5YR4/1), wet, loose	
Boring Terminated at 10 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 8.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED:	DATE COMPLETED:
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION:	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5				52		GM/SM	<b>CONCRETE</b> <b>FILL: GRAVEL MIXED WITH SILTY FINE SAND (GM/SM)</b> - black (5YR2/2), moist, loose - crushed brick	
						SM	<b>SILTY FINE SAND (SM)</b> - black (5YR2/2), moist to wet, loose, oily  - SM, silty fine sand, black, loose, oily, saturated, sweet odor	
							Boring Terminated at 8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 8.5	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/17/2004	DATE COMPLETED: 09/17/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (DC Yard near office)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	3.2			246		SM	<b>CONCRETE</b> <b>SILTY FINE SAND (SM)</b> - black (2.5YR2.5/1), moist, loose, strong odor (petrol) - black aggregate fill  - SM grades to SC	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	4					SC	<b>CLAYEY SAND (SC)</b> - grayish brn (2.5YR4/2), saturated from ~4.3', medium stiff, strong odor as above	
Boring Terminated at 8.5 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 12.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b>	<b>DATE COMPLETED:</b> 12:00:00 AM
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	3.1			1508		SM	<b>CONCRETE GRAVEL (CONCRETE FOUNDATION) WITH SILTY SAND</b>  <b>FILL: SILTY FINE SAND (SM)</b> - black (5YR2/2), moist to wet, loose, oily, fine sand with wood, brick, strong petrol/solvent odor  - SM, silty fine sand (no wood, bricks), black, oily, saturated	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
							3.7	
10	4						- as above; olive (5YR4/3), wet, med dense  Boring Terminated at 12 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/27/2004	<b>DATE COMPLETED:</b> 09/27/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (DC Yard)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		1183		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND WITH FILL (SM)</b> - black (5YR2.5/1), moist, loose, black fragments, aggregate  - SM as above with little or no fill material	
		4		1876				
Boring Terminated at 9 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.8	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/28/2004	<b>DATE COMPLETED:</b> 09/28/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.3		1867		CONCRETE		
					SM	SILTY FINE SAND WITH CONCRETE, FINE GRAVEL (SM) - pale olive, moist, loose		
		4		2485	SM	SILTY FINE SAND (SM) - black (5YR2.5/1) gradually changing to gray (5YR5/1), moist to wet to saturated at ~6', loose, no gravel		
Boring Terminated at 8.75 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 8.8	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/29/2004	DATE COMPLETED: 09/29/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (DC Yard)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		2142		SM	<b>CONCRETE</b> <b>SILTY FINE SAND WITH AGGREGATE AND GLASS (SM)</b> - black to dk greenish gray (5GY4/1), moist	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
		3.8				SM	<b>SILTY FINE SAND WITH NO AGGREGATE OR FILL (SM)</b> - black to olive (5YR5/3), saturated	
Boring Terminated at 8.8 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 8.8	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/14/2004	DATE COMPLETED: 09/14/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (Center St. Lot)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	2.8			4.2		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - very dk brn (7.5YR2.5/2) to black (7.5YR2.5/1), moist, loose, no odor  - SM as described above, color changes gradually to dk olive gray (5YR3/2) - saturated from ~6'	
	4			4.6				
Boring Terminated at 8.8 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.8	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/14/2004	<b>DATE COMPLETED:</b> 09/14/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Center St. Lot)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		4		1.7		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - very dk brn (7.5YR2.5/2), moist, loose, no odor - minor root matter	
		4		0.7			- SM as above, color becomes black (7.5YR2.5/1) - saturated from ~6'	
							Boring Terminated at 8.8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.8	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/14/2004	<b>DATE COMPLETED:</b> 09/14/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Center St. Lot)		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		3.8		2.2		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - black (10YR2/1) to strong brn (7.5YR5/6), dry to moist, loose, no odor - zone of concrete aggregate	
		4		1.6			- bentonite clay nodule in core at 5' - saturated at ~6.0'	
							Boring Terminated at 8.8 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.8	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/14/2004	<b>DATE COMPLETED:</b> 09/14/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Center St. Lot)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		4		3.2		SP	<p><b>CONCRETE</b></p> <p><b>POORLY GRADED SAND (SP)</b> - dry, loose, coarse fine, no odor (fill)</p>	<p><b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b></p>
		3.8		1.8		SM	<p><b>SILTY FINE SAND (SM)</b> - dk yellowish brn (10YR4/4) to black (10YR2/1), moist, loose, no odor</p> <p>- increased fines in darker soil (black)</p> <p>- SM (black) as above</p> <p>- saturated from 6.0'</p>	
							<p>Boring Terminated at 8.8 ft</p> <p><b>ABBREVIATIONS</b></p> <p>brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.8	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/14/2004	<b>DATE COMPLETED:</b> 09/14/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.75		0		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - very dk grayish brn (10YR3/2), moist, loose, areas of higher fines concentrations, no odor	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
				2.8			- SM, silty sand as above, color changes slightly lighter dk grayish brn (10YR4/2) - saturated from 6.0'	
			3.8		0		Boring Terminated at 8.8 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 9.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/15/2004	DATE COMPLETED:
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (thin lot on Center St.)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	3			2.8		SM	<p><b>CONCRETE</b></p> <p><b>SILTY FINE SAND (SM)</b> - dk brn (7.5YR3/3), moist to wet (last 6), loose, varying concentration of fines (silt) not exceeding 20%, some cobbles in top foot of core, no odor</p>	
	4				SM	<p><b>SILTY FINE SAND (SM)</b> - color gradually changes to yellowish brn (10YR5/6), loose to medium dense, no odor, saturated from ~5'</p> <p>- zone from 8.5' plus is slightly cemented (iron?/mottled reddish gray), not saturated, (oxides from water table fluctuation)</p>		
<p>Boring Terminated at 9 ft</p> <p><b>ABBREVIATIONS</b></p> <p>brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded</p>								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 8.8	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/17/2004	DATE COMPLETED: 09/17/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (Field office lot)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	3			0.4		SM	<b>CONCRETE</b>  <b>SILTY SAND (SM)</b> - black (2.5YR2.5/1), moist to wet (last 6), loose to med dense in last foot, no odor	
	4			0.3		SM	<b>SILTY FINE SAND (SM)</b> - lt olive brn (2.5YR5/6), med dense to dense, cohesive, saturated from ~5.5', no odor  - SC: increased clay content from 7.5-7.9'	
Boring Terminated at 8.8 ft							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/16/2004	<b>DATE COMPLETED:</b> 09/16/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
5				0.6 0 1.3			<p><b>CONCRETE</b></p> <p>- soil is gravel like and silty sandy, color is dk brn and gets dense from 2'-3'. Looks saturated at 3.5'</p> <p>- soil is saturated, color is lt brn (4/7.5), no odor</p>	
							<p>Boring Terminated at 9 ft</p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.5	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/17/2004	<b>DATE COMPLETED:</b> 09/17/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA		<b>LOGGED BY:</b> M. Cavaliere		<b>SAMPLE NAME:</b>

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5	X	4			1.2	SM	<b>CONCRETE</b> <b>SILTY SAND (SM)</b> - black (2.5YR2.5/1), dry to moist, loose, no odor	DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
						SP	<b>WELL GRADED SAND (SP)</b> - pale yellow (2.5YR7/3), dry, loose, no odor	
		4			0.5	SM	<b>SILTY FINE SAND (SM)</b> - color gradually changes from dk grayish brn (2.5YR4/2) to mottled strong brn (7.5YR5/6), saturated, med dense to dense, cohesive, no odor	
Boring Terminated at 8.5 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 9.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/28/2004	DATE COMPLETED: 09/28/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (Big lot on Center St.)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.3		858		SW	<b>WELL GRADED GRAVELLY SILTY SAND (SW)</b> - color is mottled, moist, loose, no odor - greenish hue from 1.3-1.8'	
		3				SM	<b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1) to olive yellow (5YR6/6), saturated at ~5.25', loose, no gravel, no odor	
							Boring Terminated at 9 ft	
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/28/2004	<b>DATE COMPLETED:</b> 09/28/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>
<b>LOCATION:</b> Oakland, CA (Big lot on Center St.)		<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>	

DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.7		1.8			<b>CONCRETE</b>	
						SW	<b>WELL GRADED GRAVELLY SILTY SAND (SW)</b> - light olive brn (2.5YR5/6), moist, loose, no odor, concrete base	
						SM	<b>SILTY FINE SAND (SM)</b> - color changes gradually from dk grayish brn (2.5YR4/2) to black (2.5YR2.5/1), moist to wet at 4.5', loose, no odor	
		2.8				SM	<b>SILTY FINE SAND (SM)</b> - as described above, color is dk olive gray (5YR3/2), saturated from 5.5'  - no sample collected, poor recovery, above saturation, fill from above (cave)  - color becomes olive (5YR5/4)	
							Boring Terminated at 9 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 9.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/29/2004	DATE COMPLETED: 09/29/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (Big lot on Center St.)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		0.6		SM	<b>CONCRETE</b>	
		3.7		0.5		SM	<b>SILTY FINE SAND WITH FILL (SM)</b> - mottled black to light olive brn (2.5YR3/3), moist, loose, no odor, brick, metal fragments, aggregate	
							<b>SILTY FINE SAND WITH NO FILL (SM)</b> - black to light olive brn (2.5YR5/3)-gradual, wet to saturated at 6.01', loose, no odor, core becomes more dense at depth	
Boring Terminated at 9 ft								
<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.5	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/29/2004	<b>DATE COMPLETED:</b> 09/29/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Big lot on Center St.)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		0.5		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1), moist, loose, no odor - gravel (75%) and trash material (nails, glass) from 1.5-2.5' - olive brn color (2.5YR4/4), no trash in soil, less silt from 2.5-4'  - wet at 5.8' - SM, black (2.5YR2.5/1), saturated, increase fines concentration  - SM, light olive brn (2.5YR3/3), color change is gradual, wet	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		3.6		0.3				
Boring Terminated at 9.5 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 9.0	DRILLING CONTRACTOR: Precision	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED: 09/28/2004	DATE COMPLETED: 09/28/2004
DRILLING METHOD: Geoprobe		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (Big lot on Center St.)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.8		0		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND (SM)</b> - black (5YR2.5/1) to dk olive gray (5YR3/2), moist, loose, no odor  - roots in last 6 of core	
		3.2		0			- SM as described above, no roots  - wet to saturated at 6'	
Boring Terminated at 9 ft							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.0	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/29/2004	<b>DATE COMPLETED:</b> 09/29/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Big lot on Center St.)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.3		0.9		SM	CONCRETE	
		3.4					SM	
							SILTY FINE SAND (SM) - as described above, color gradually changes to light olive brn (2.5YR3/3) at depth, saturated (entire core), med dense, no odor	
							Boring Terminated at 9 ft	
							<b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 8.5	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/29/2004	<b>DATE COMPLETED:</b> 09/29/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Big lot on Center St.)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.5		0.9		SM	<b>CONCRETE</b> <b>SILTY FINE SAND WITH AGGREGATE (SM)</b> - dk olive brn (2.5YR3/3) to black (2.5YR2.5/1), moist, loose, no odor  - no aggregate seen in last 1' of core	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		4				SM	<b>SILTY FINE SAND (SM)</b> - olive brn (2.5YR4/4) to olive yellow (2.5YR5/6) (mottled gray), saturated (entire core), loose to med dense at depth, no odor	
Boring Terminated at 8.5 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded								

**SOIL BORING LOG**

<b>PROJECT NAME:</b> AMCO Superfund		<b>HOLE DEPTH (ft):</b> 9.1	<b>DRILLING CONTRACTOR:</b> Precision	
<b>SURFACE ELEVATION:</b> --- ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> ---	<b>EASTING (CCS NAD 27 Z 5):</b> ---	<b>DATE STARTED:</b> 09/29/2004	<b>DATE COMPLETED:</b> 09/29/2004
<b>DRILLING METHOD:</b> Geoprobe		<b>DRILLING EQUIPMENT:</b>		<b>WATER LEVEL (ft):</b>

<b>LOCATION:</b> Oakland, CA (Big lot on Center St.)	<b>LOGGED BY:</b> M. Cavaliere	<b>SAMPLE NAME:</b>
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE			
5		2.8		1.2		SM	<b>CONCRETE</b>  <b>SILTY FINE SAND WITH NO FILL (SM)</b> - dk olive brn (2.5YR3/3), moist to wet (last 6), loose, no odor - top 1-1.5' of SM with fill not seen here without going through that interval. The second core went deeper stratigraphically and we are seeing the mottled interval (possibly perching) from 8.3-9.1' - saturated	<b>DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.</b>
		3.9					<b>SILTY FINE SAND (SM)</b> - mottled olive yellow/gray (2.5YR5/6), wet, med dense, less fines  Boring Terminated at 9.1 ft  <b>ABBREVIATIONS</b> brn = brown lt = light dk = dark vf = very fine-grained f = fine-grained m = medium-grained c = coarse-grained ang = angular subang = subangular subrnd = subrounded rnd = rounded	

## SOIL BORING LOG

PROJECT NAME: AMCO Superfund		HOLE DEPTH (ft): 7.0	DRILLING CONTRACTOR:	
SURFACE ELEVATION: --- ft. MSL	NORTHING (CCS NAD 27 Z 5): ---	EASTING (CCS NAD 27 Z 5): ---	DATE STARTED:	DATE COMPLETED:
DRILLING METHOD:		DRILLING EQUIPMENT:		WATER LEVEL (ft):

LOCATION: Oakland, CA (DC Yard, Central)	LOGGED BY: M. Cavaliere	SAMPLE NAME:
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DEPTH BGS (feet)	SAMPLE					USCS CODE	SOIL DESCRIPTION	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	RECOVERY (ft)	SPT RESULTS	PID (PPM)	SOIL SAMPLE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
5	X	4		589 0		SM	<p><b>CONCRETE</b></p> <hr/> <p><b>SILTY FINE SAND (SM)</b> - black to gray, wet to saturated (5.5'), loose, strong odor, oily appearance where black</p> <p>- saturated</p> <p>- color gradually changes to gray at 6.5'. The sand fraction of the gray material is slightly coarser grained yet still considered fine</p> <p style="text-align: right;">Boring Terminated at 7 ft</p> <p><b>ABBREVIATIONS</b>                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded</p>	



## **Well and Probe Data**

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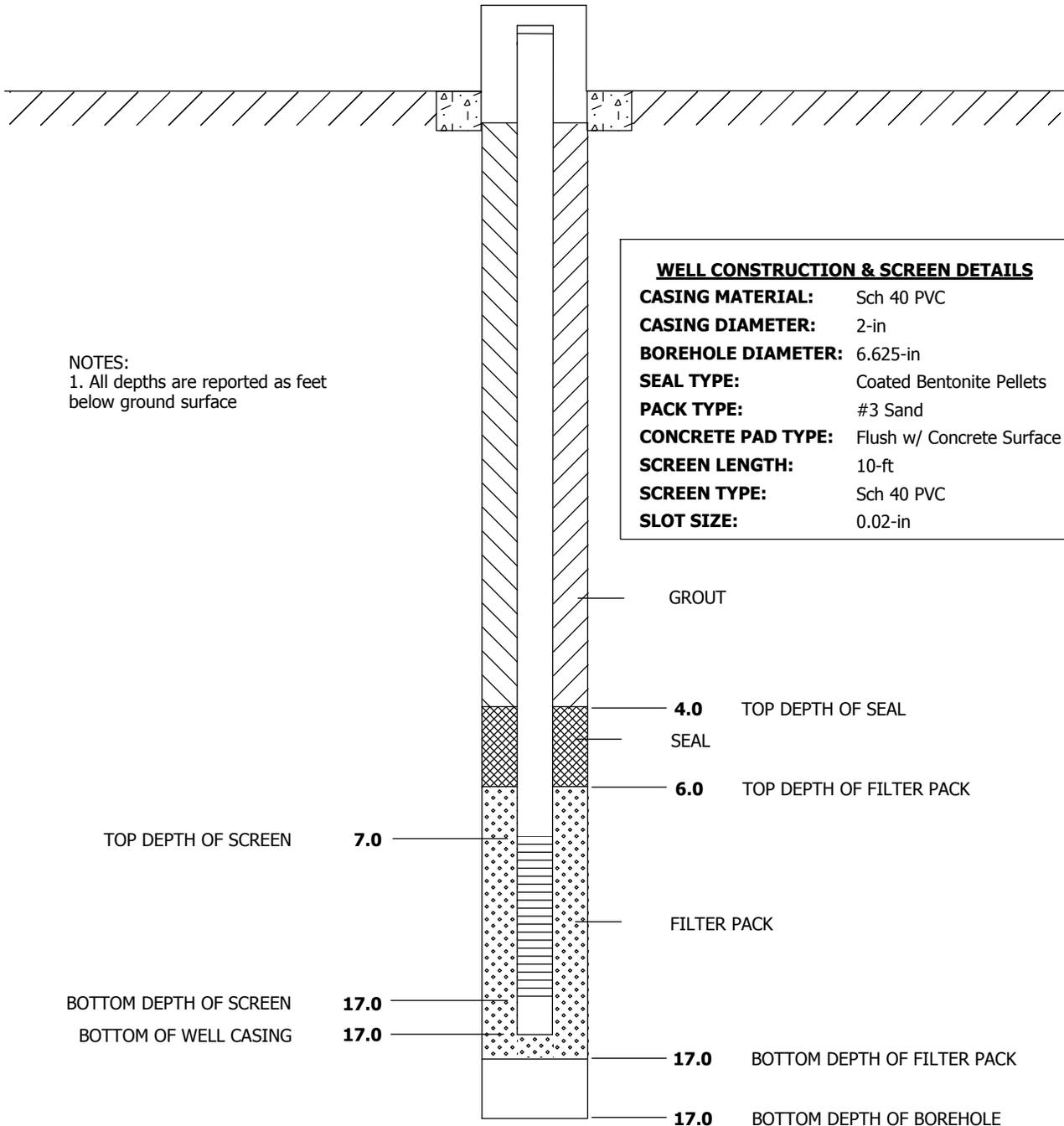
# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.RR.01	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-01-17</i>
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**LOCATION:** 1414-3rd St. (Southwest Corner), Oakland, CA

<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/12/2005 08:10
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/12/2005 10:00
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/12/2005
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.22	<b>GENERAL REMARKS:</b> ---

## LOCKING MONUMENT COMPLETION



**NOTES:**  
1. All depths are reported as feet below ground surface

<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	6.625-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	Flush w/ Concrete Surface
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

TOP DEPTH OF SCREEN

**7.0**

BOTTOM DEPTH OF SCREEN

**17.0**

BOTTOM OF WELL CASING

**17.0**

GROUT

**4.0** TOP DEPTH OF SEAL

SEAL

**6.0** TOP DEPTH OF FILTER PACK

FILTER PACK

**17.0** BOTTOM DEPTH OF FILTER PACK

**17.0** BOTTOM DEPTH OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE

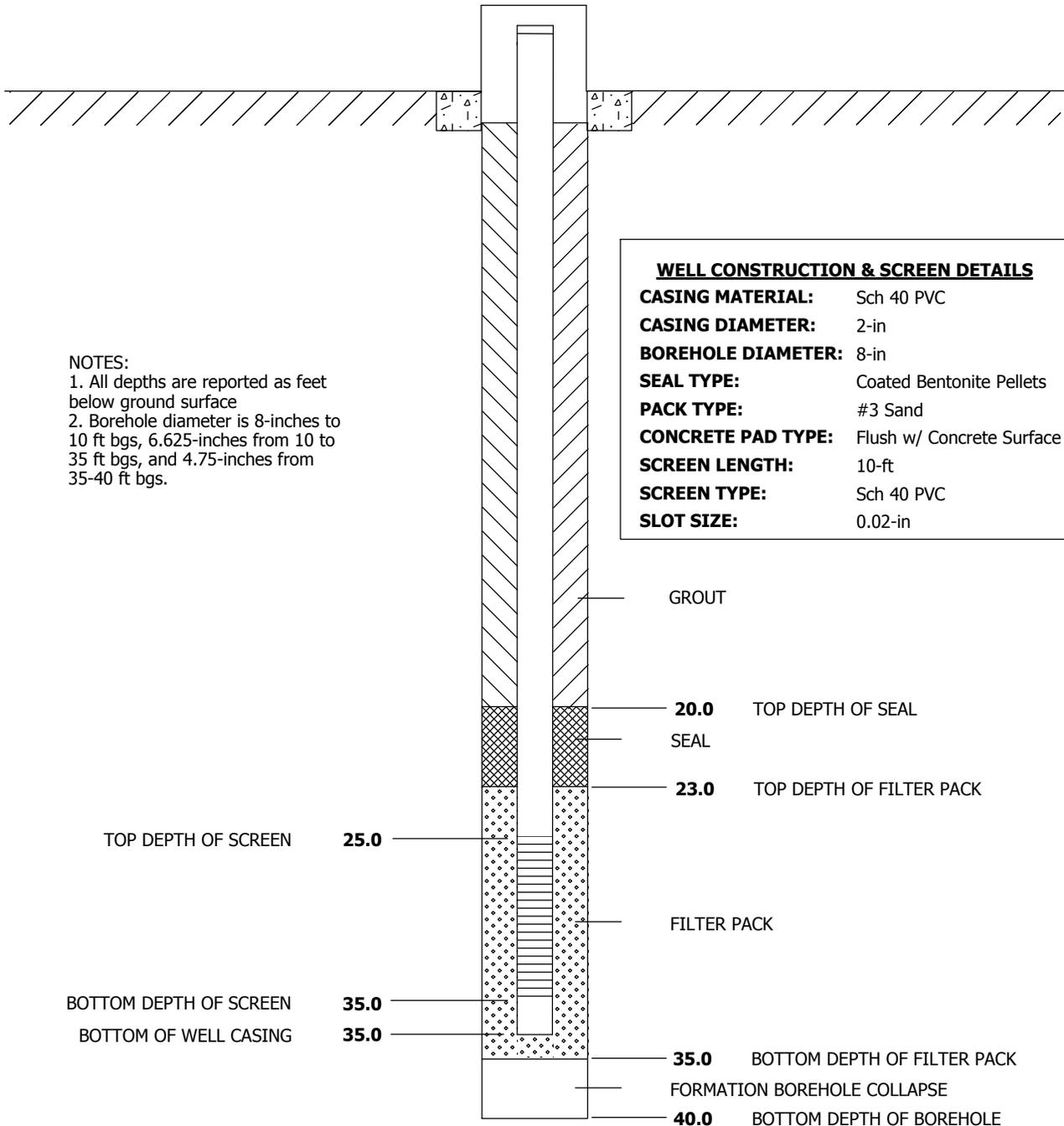
# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.RR.01	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-01-35</i>
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**LOCATION:** 1414-3rd St. (Southwest Corner), Oakland, CA

<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/11/2005 10:56
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/11/2005 16:05
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/11/2005
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.04	<b>GENERAL REMARKS:</b> ---

## LOCKING MONUMENT COMPLETION

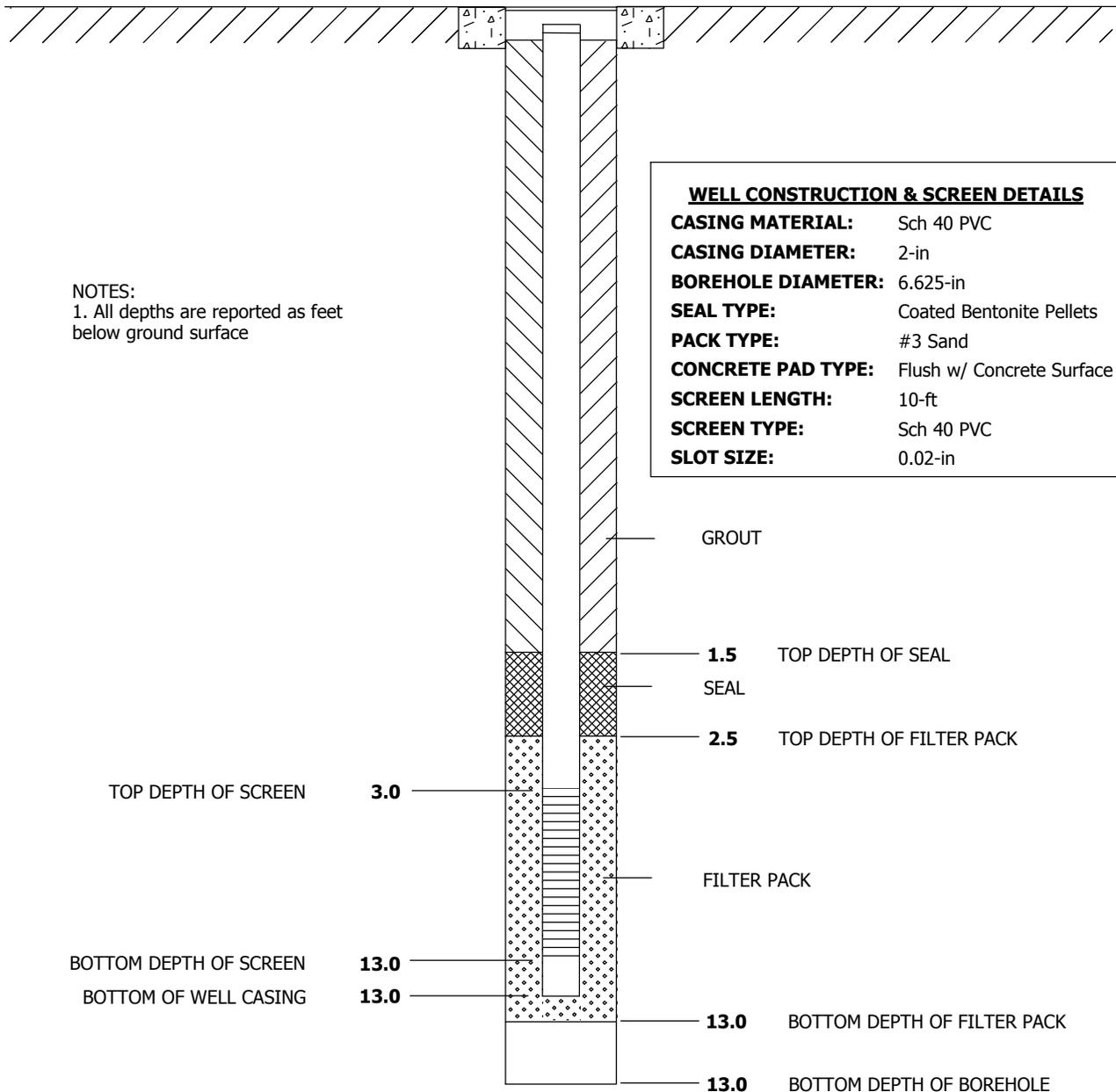


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-02-13</i>
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/12/2005 11:27	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/12/2005 12:18	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/12/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.74	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	6.625-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	Flush w/ Concrete Surface
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

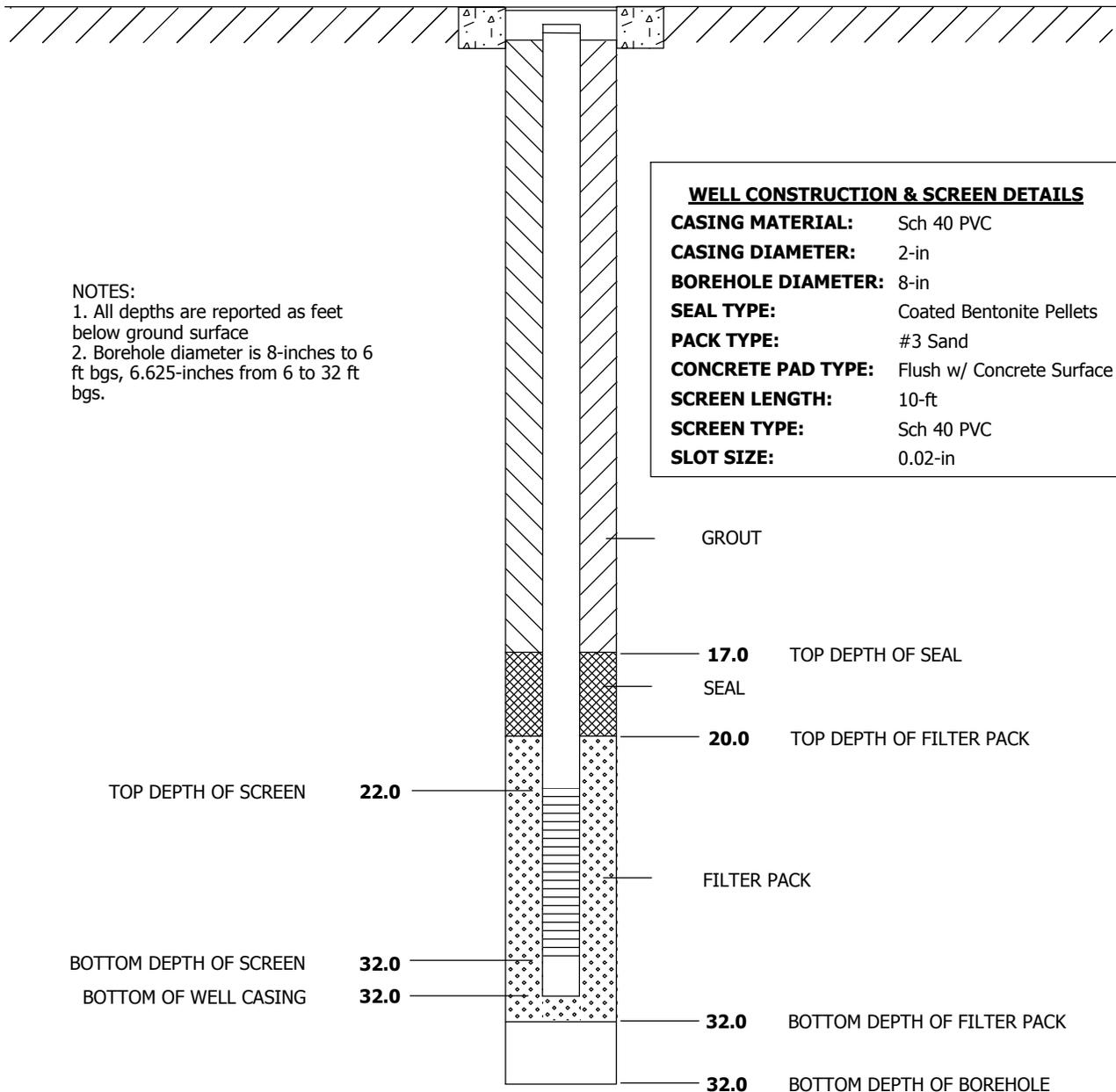
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-02-32</i>
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/13/2005 12:30	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/13/2005 14:28	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/13/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.21	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION

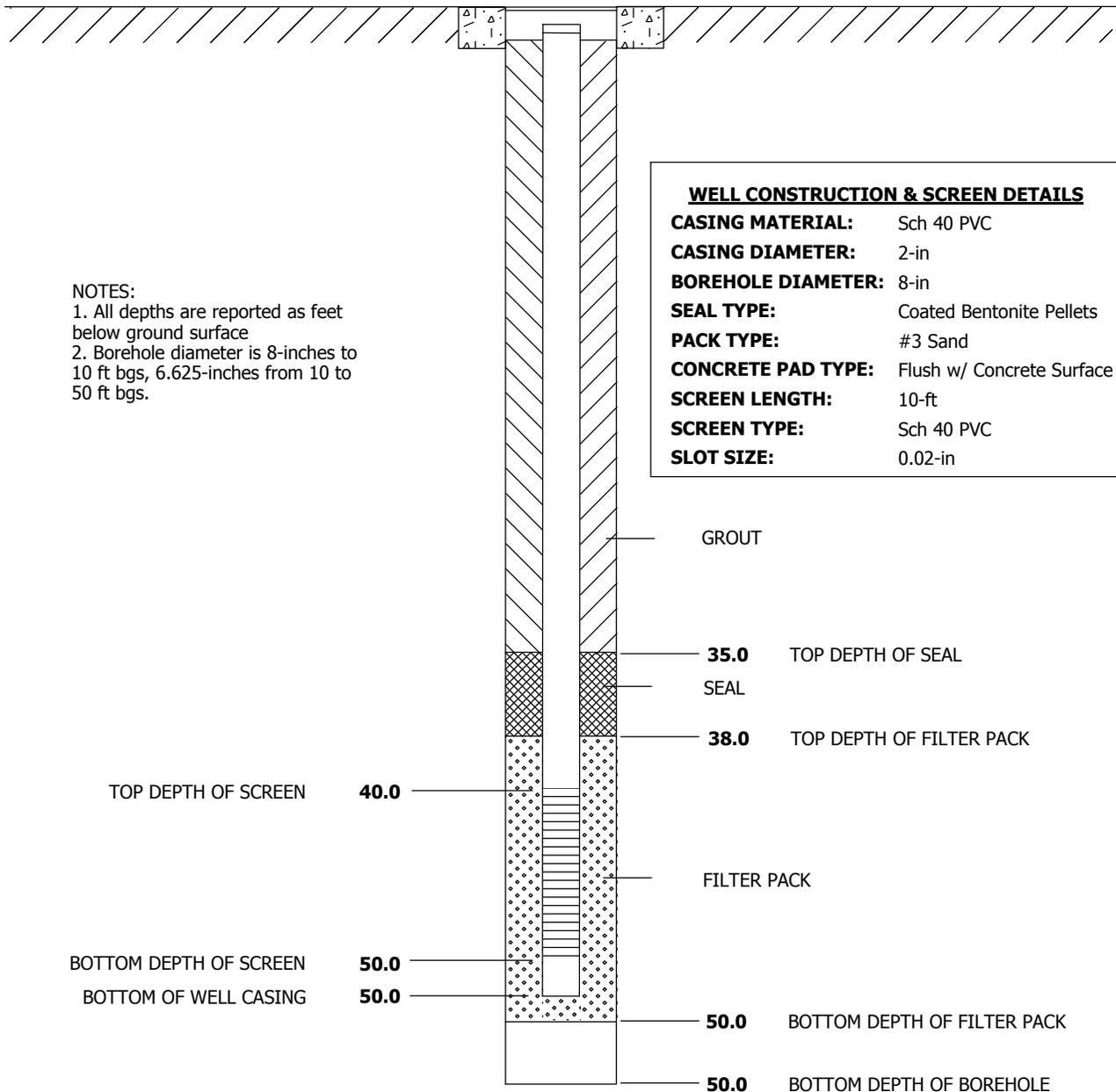


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-02-50</i>
<b>LOCATION:</b> 1414-3rd St. (Central Yard), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/12/2005 14:05	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/13/2005 11:00	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/13/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.07	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



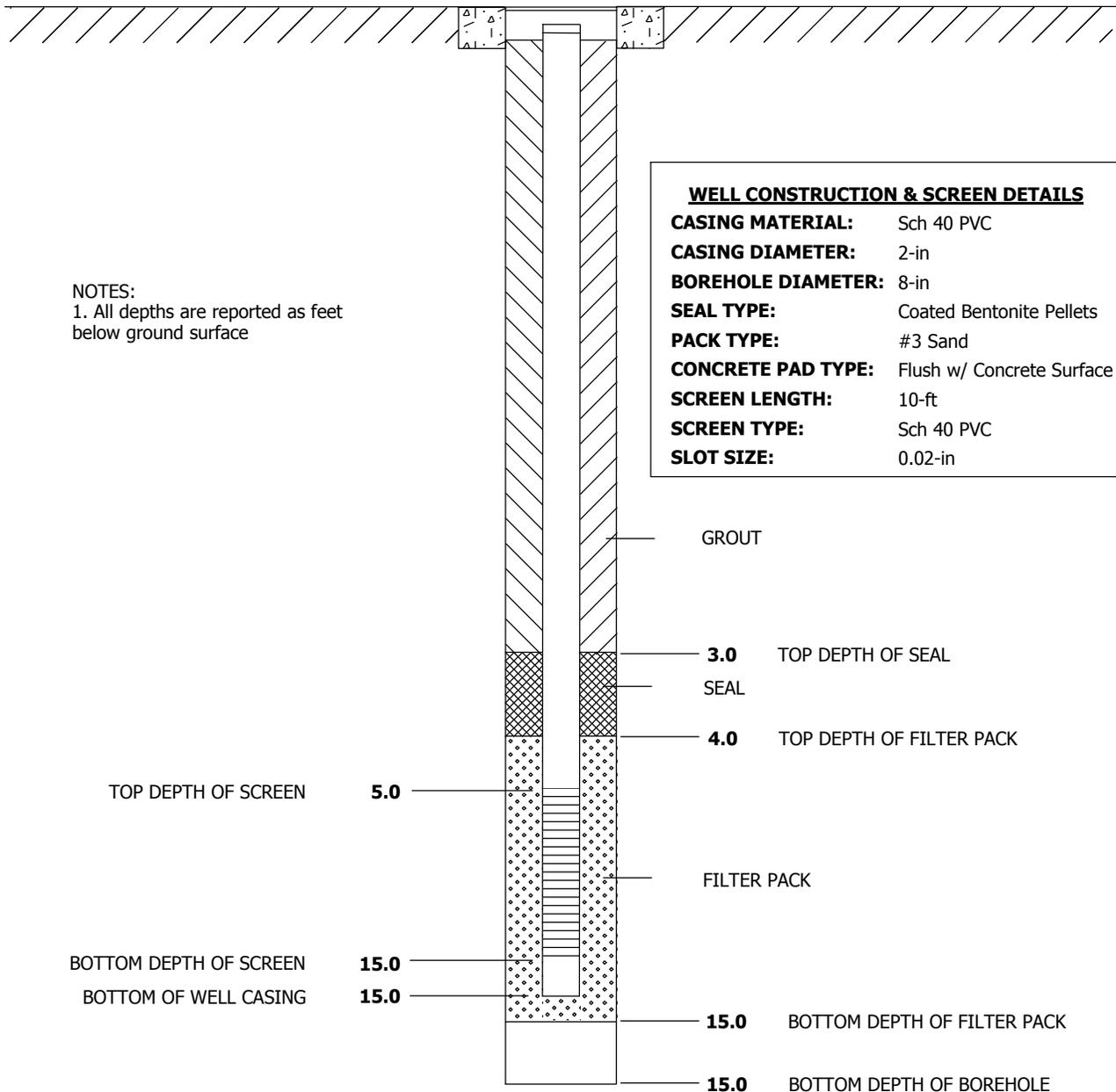
**NOTES:**  
 1. All depths are reported as feet below ground surface  
 2. Borehole diameter is 8-inches to 10 ft bgs, 6.625-inches from 10 to 50 ft bgs.

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-03-15</i>
<b>LOCATION:</b> 1414-3rd St. (Northwest Corner), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/15/2005 12:40	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/15/2005 14:30	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/15/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.43	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



**NOTES:**  
 1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

**PROJECT NO:** 175868.FI.02      **PROJECT:** AMCO Superfund      **WELL NO:** *RMW-04-15*

**LOCATION:** AMTRAK Yard - 1303 3rd St., Oakland, CA

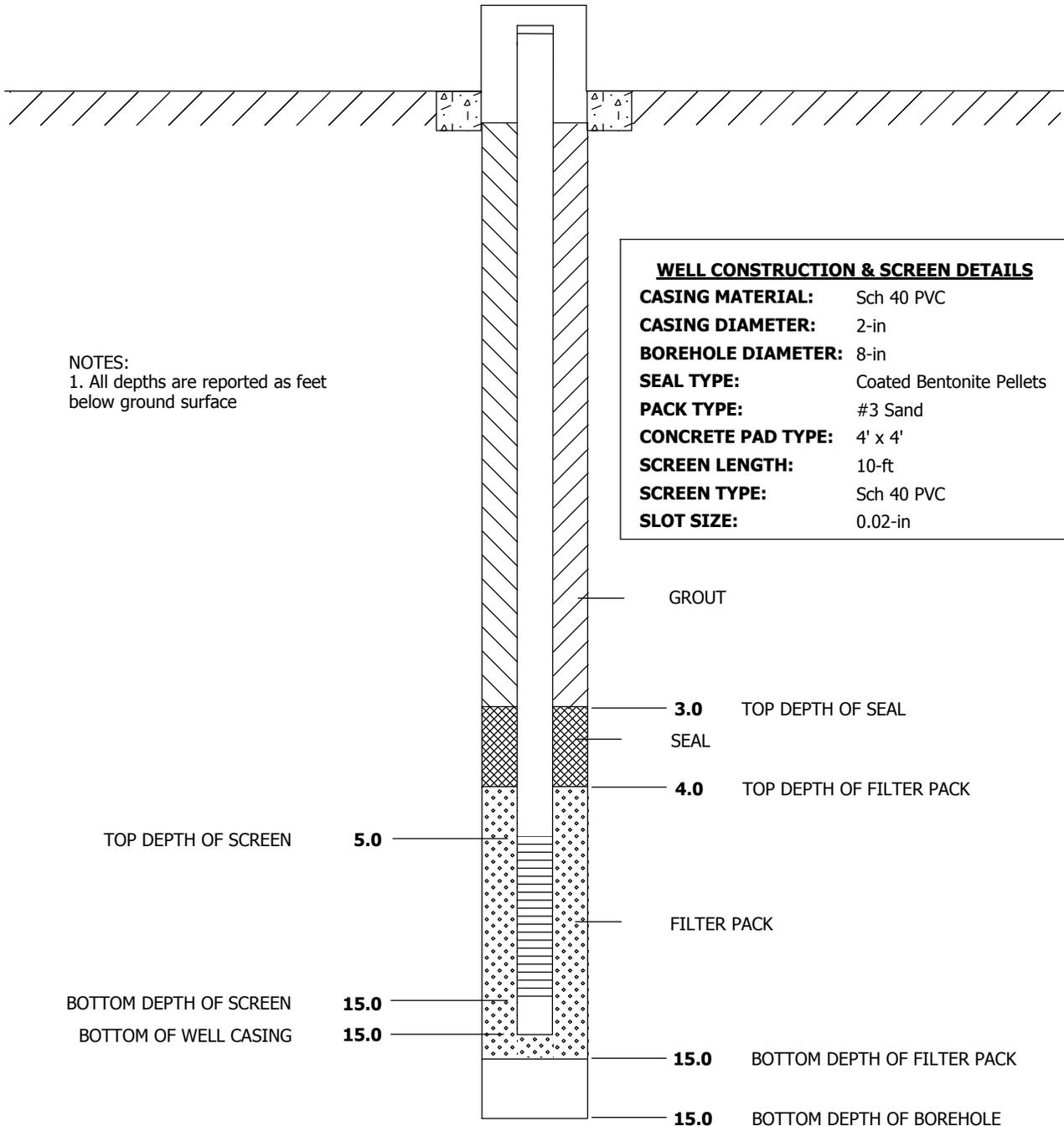
**DRILLING CONTRACTOR:** West HAZMAT, (Driller Oscar Gonzales)      **DRILLING START:** 02/17/2005 14:05

**DRILLING METHOD:** Hollow Stem Auger / CME 55      **DRILLING END:** 02/17/2005 16:30

**LOGGER:** M. Cavaliere      **WELL COMPLETION DATE:** 02/17/2005

**GROUND SURFACE ELEVATION (NAVD 88):** 10.09      **GENERAL REMARKS:** ---

## LOCKING MONUMENT COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	4' x 4'
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

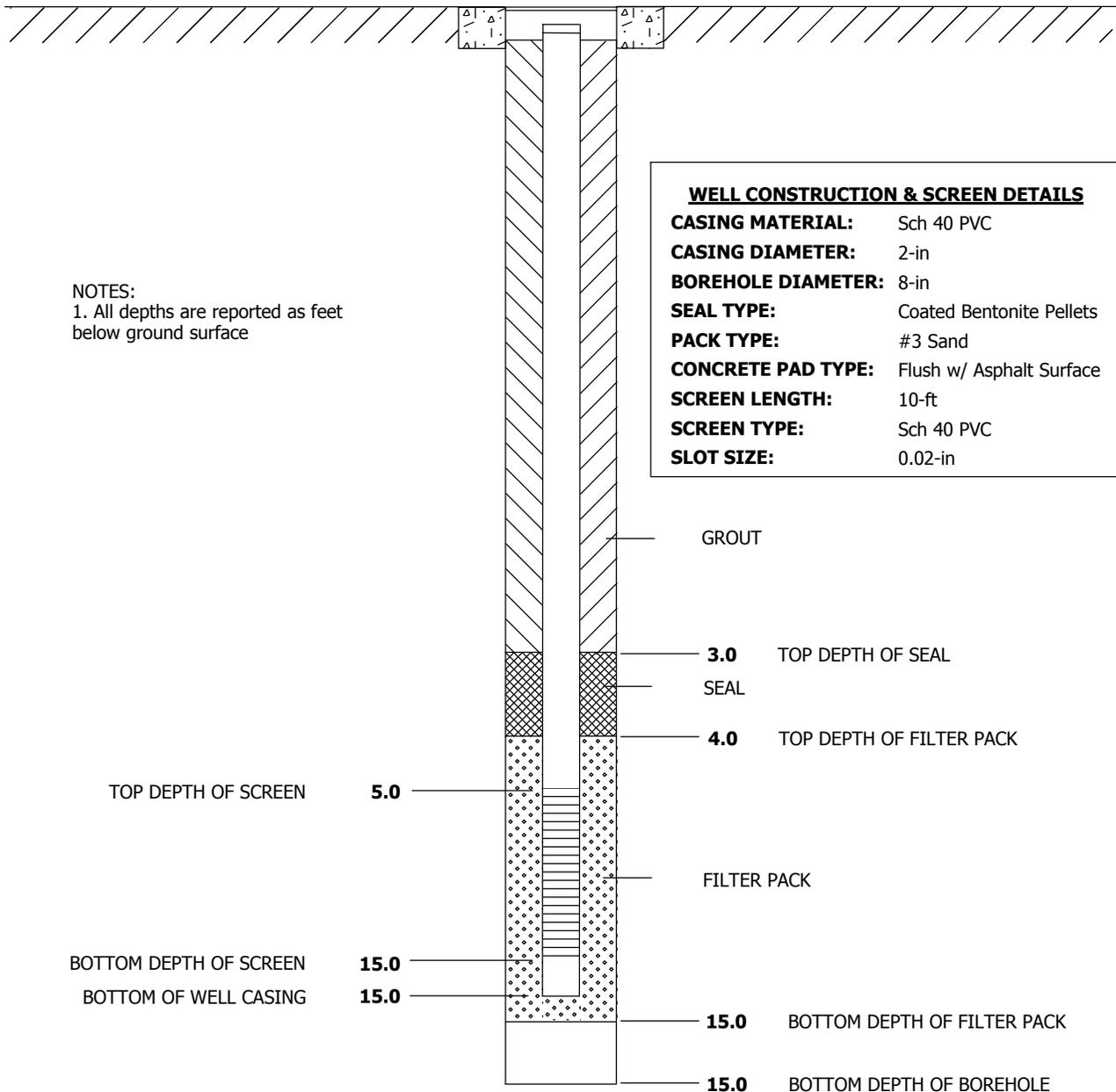
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-05-15</i>
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/18/2005 12:30	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/18/2005 14:40	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/18/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 9.27	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



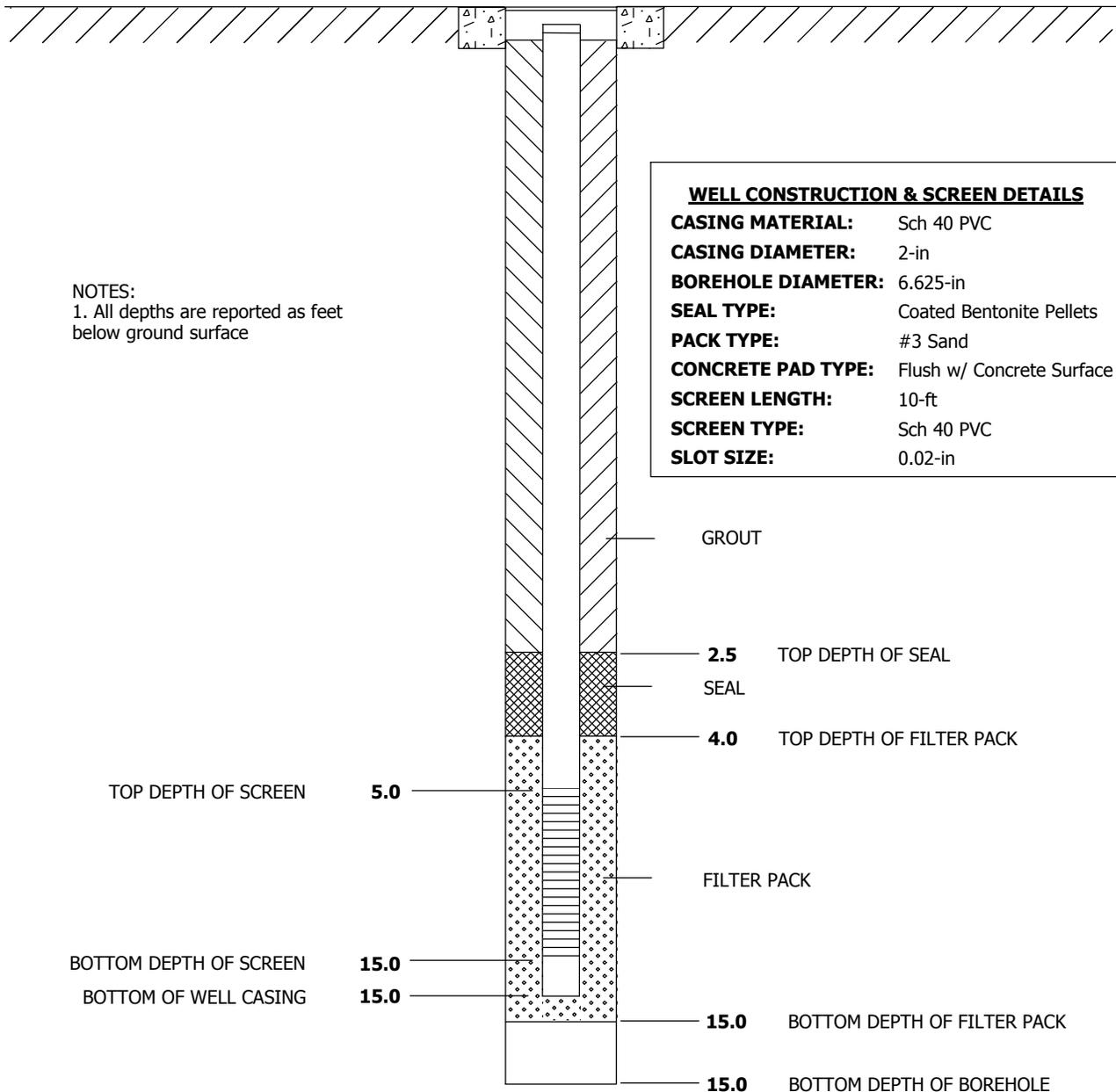
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-06-15</i>
<b>LOCATION:</b> 336-346 Center St. - Large Vacant Lot (Southwest Corner), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Resonant Sonic (Driller Val Godoy)	<b>DRILLING START:</b> 01/19/2005 09:10	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 01/19/2005 15:00	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 01/19/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.68	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



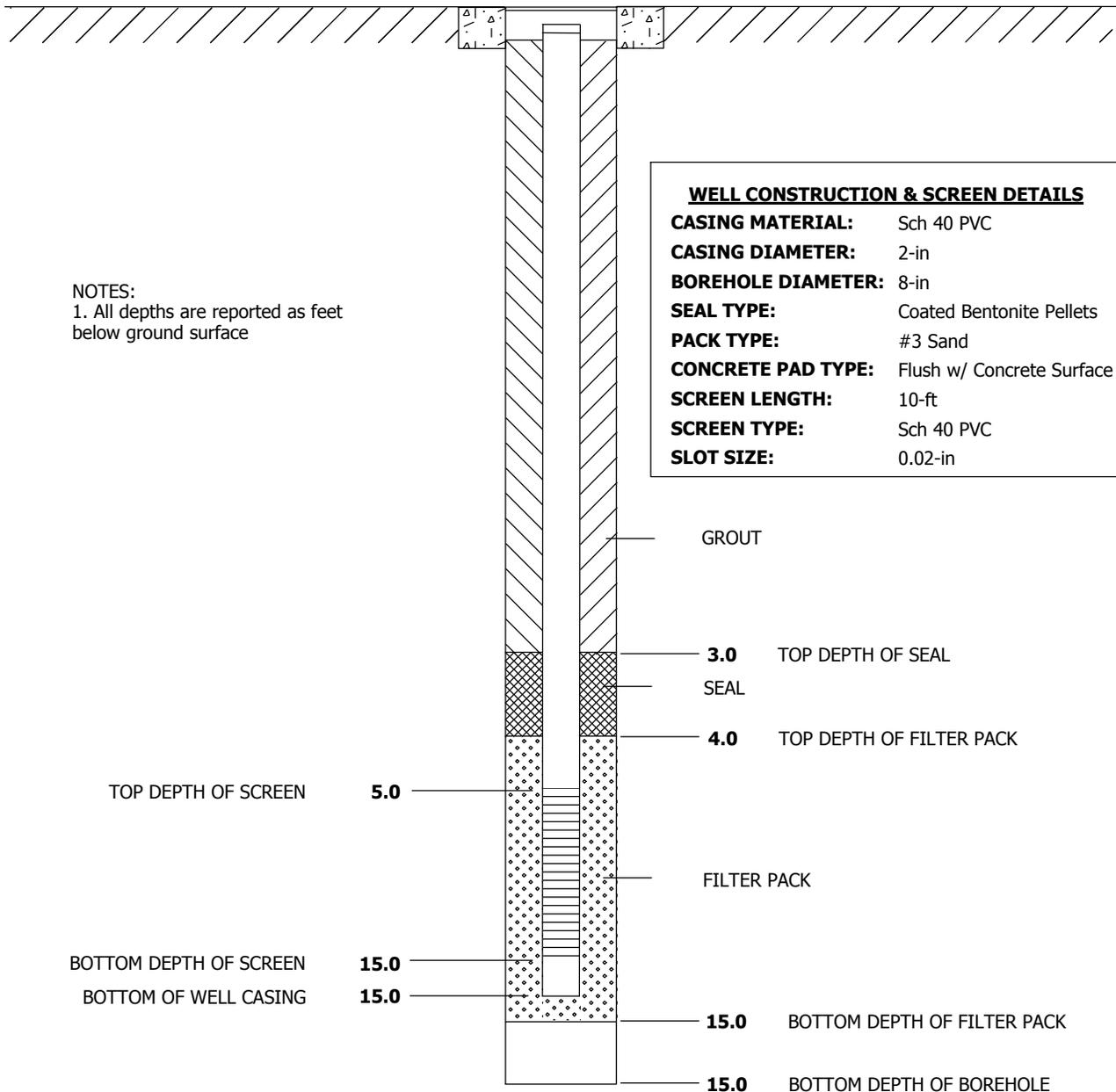
**NOTES:**  
 1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-07-15</i>
<b>LOCATION:</b> 1448 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/15/2005 08:50	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/15/2005	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/15/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.45	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION

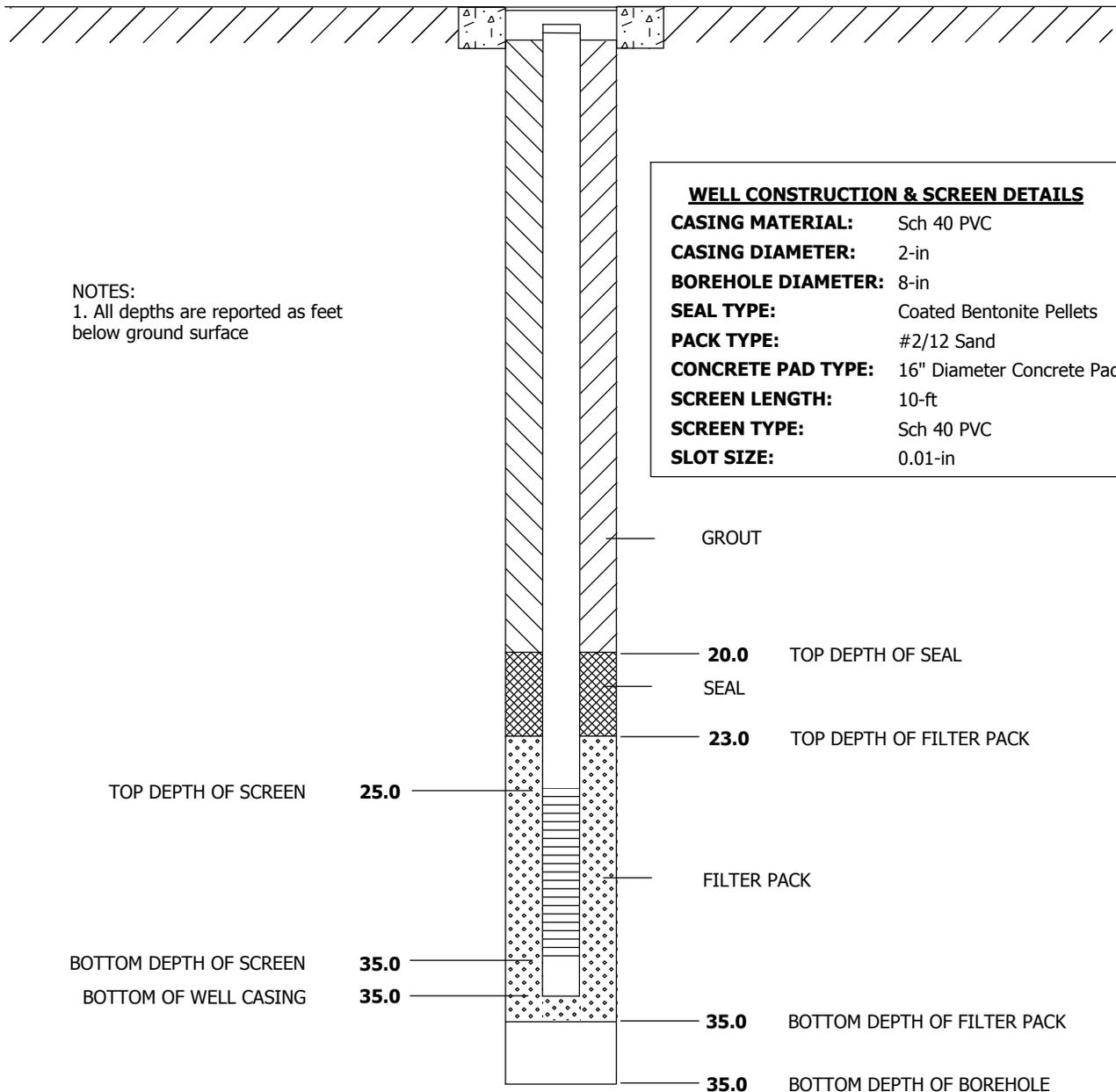


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-07-35</i>
<b>LOCATION:</b> 1448 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/07/2005 12:10	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 09/08/2005 13:30	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/07/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.42	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	16" Diameter Concrete Pad
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.01-in

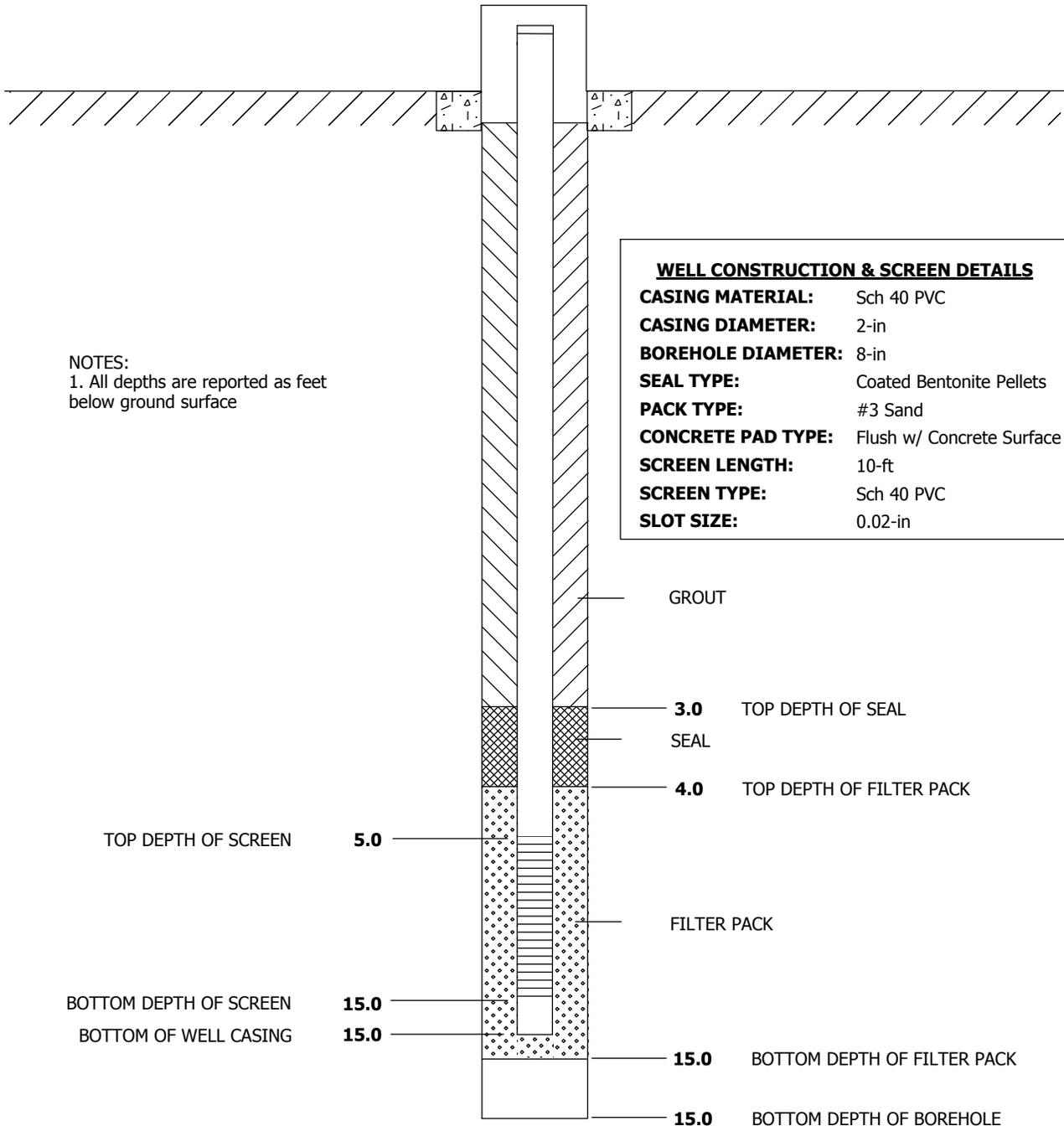
**NOTES:**  
 1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-08-15</i>
<b>LOCATION:</b> 1414-3rd St. (Western Fence Line), Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/24/2005 09:00	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/24/2005 10:45	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/24/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.76	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	Flush w/ Concrete Surface
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

**NOTES:**  
 1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

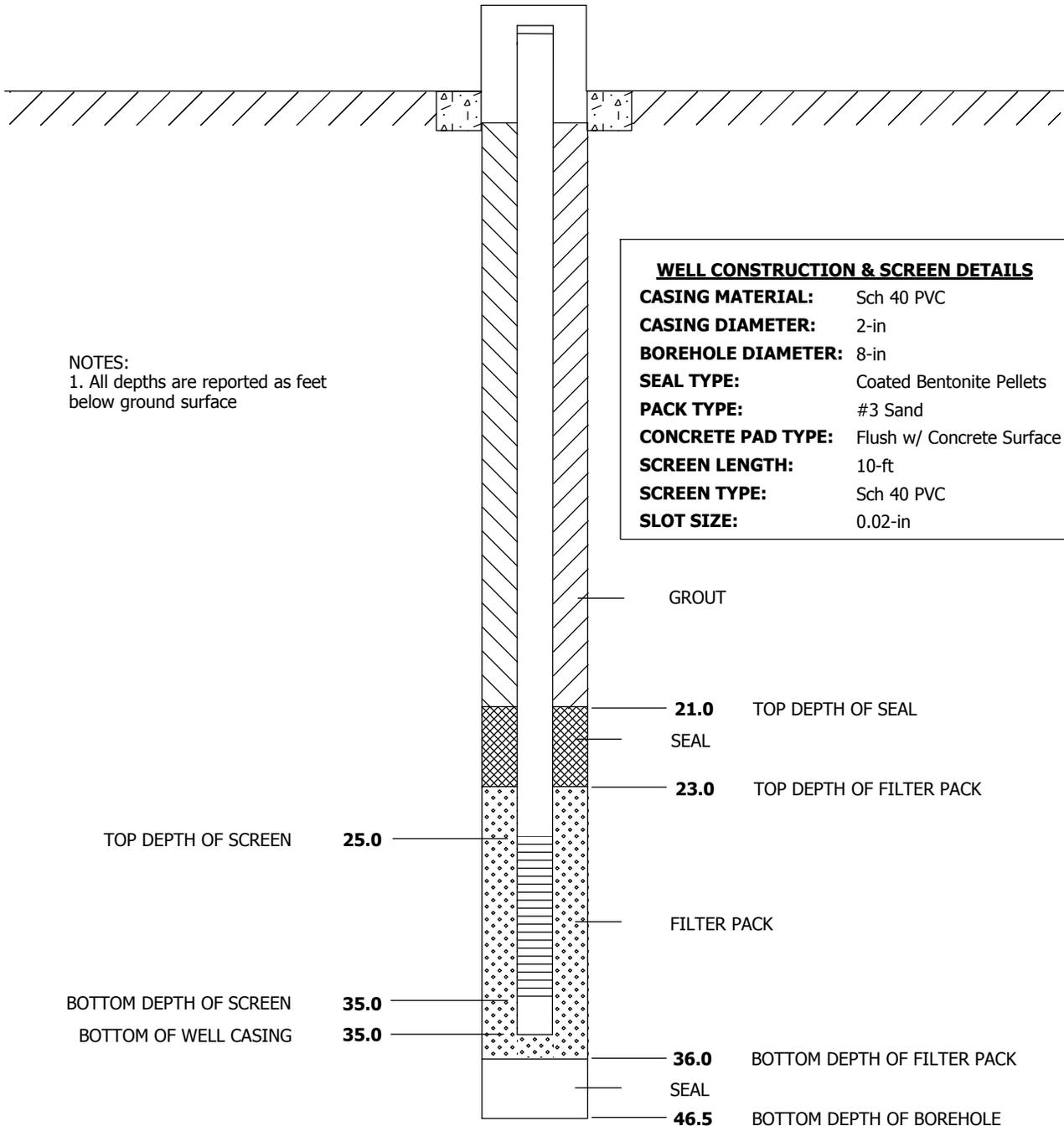
# WELL COMPLETION DIAGRAM

**PROJECT NO:** 175868.FI.02      **PROJECT:** AMCO Superfund      **WELL NO:** *RMW-08-35*

**LOCATION:** 1414-3rd St. (Western Fence Line), Oakland, CA

<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/23/2005 09:32
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/23/2005 16:30
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/23/2005
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 11.73	<b>GENERAL REMARKS:</b> ---

## LOCKING MONUMENT COMPLETION

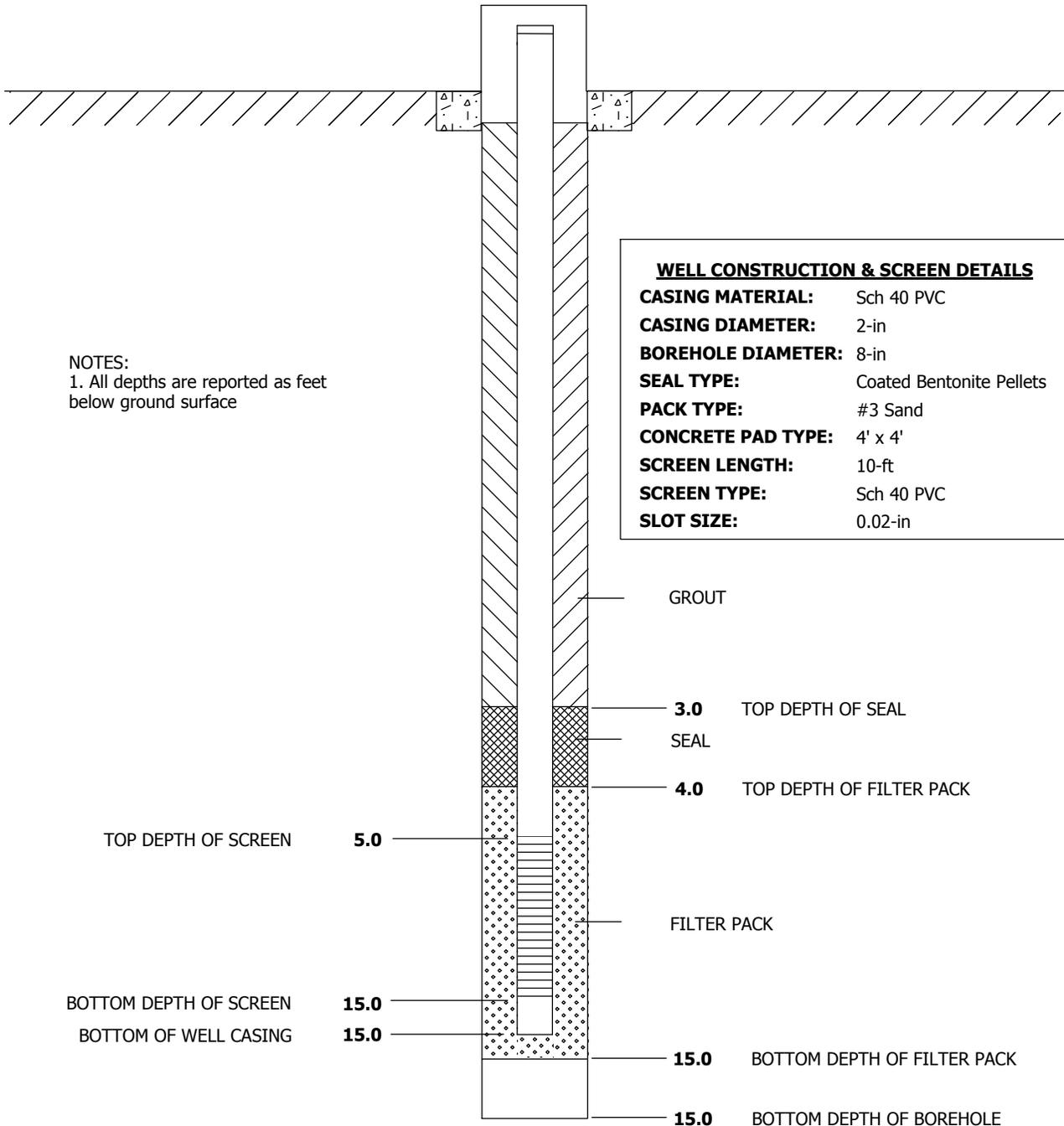


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-09-15</i>
<b>LOCATION:</b> 1401 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/17/2005 09:30	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/17/2005 11:30	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/17/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.26	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION

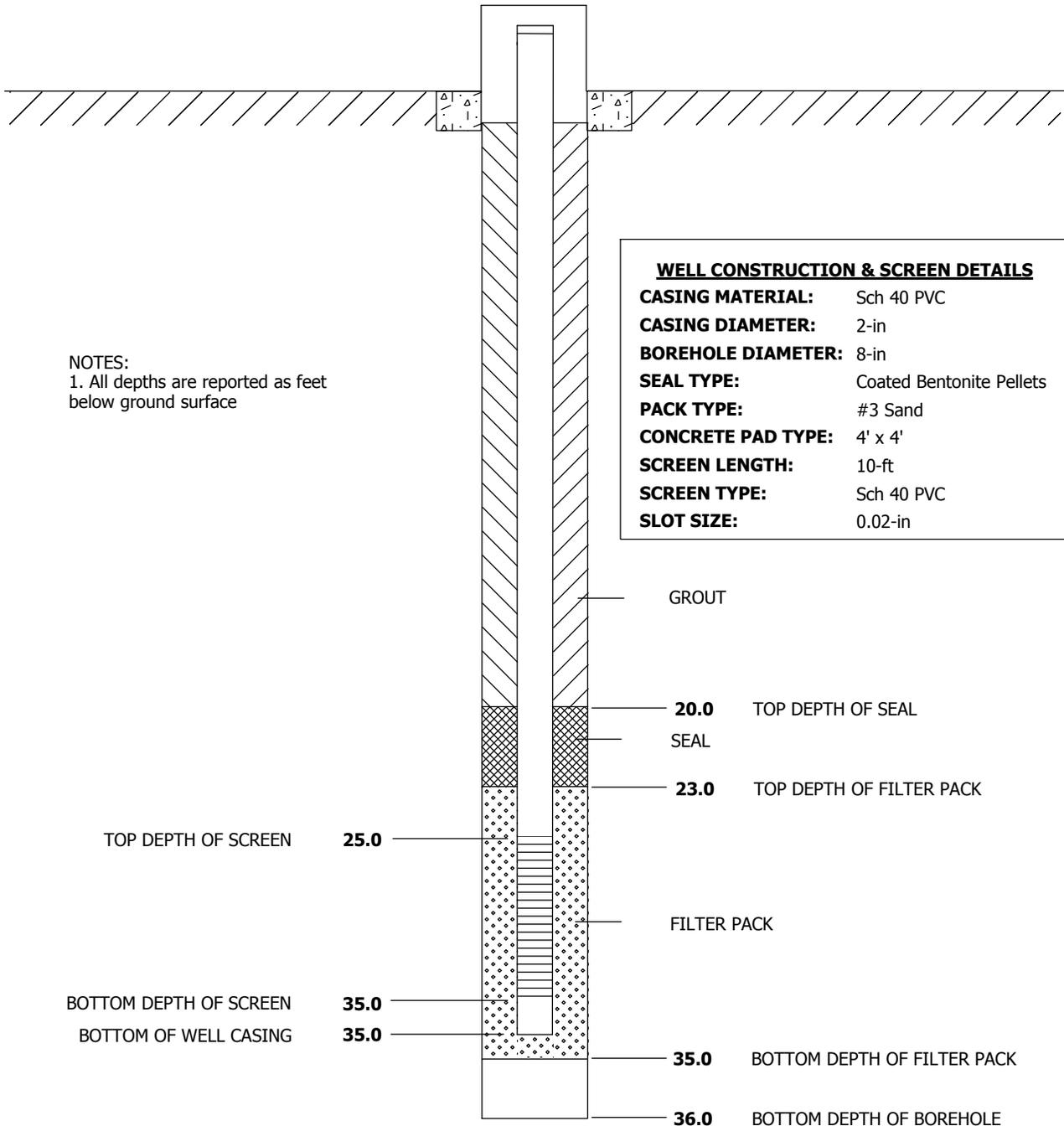


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-09-35</i>
<b>LOCATION:</b> 1401 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/16/2005 11:15	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/22/2005 15:00	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/22/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.30	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION



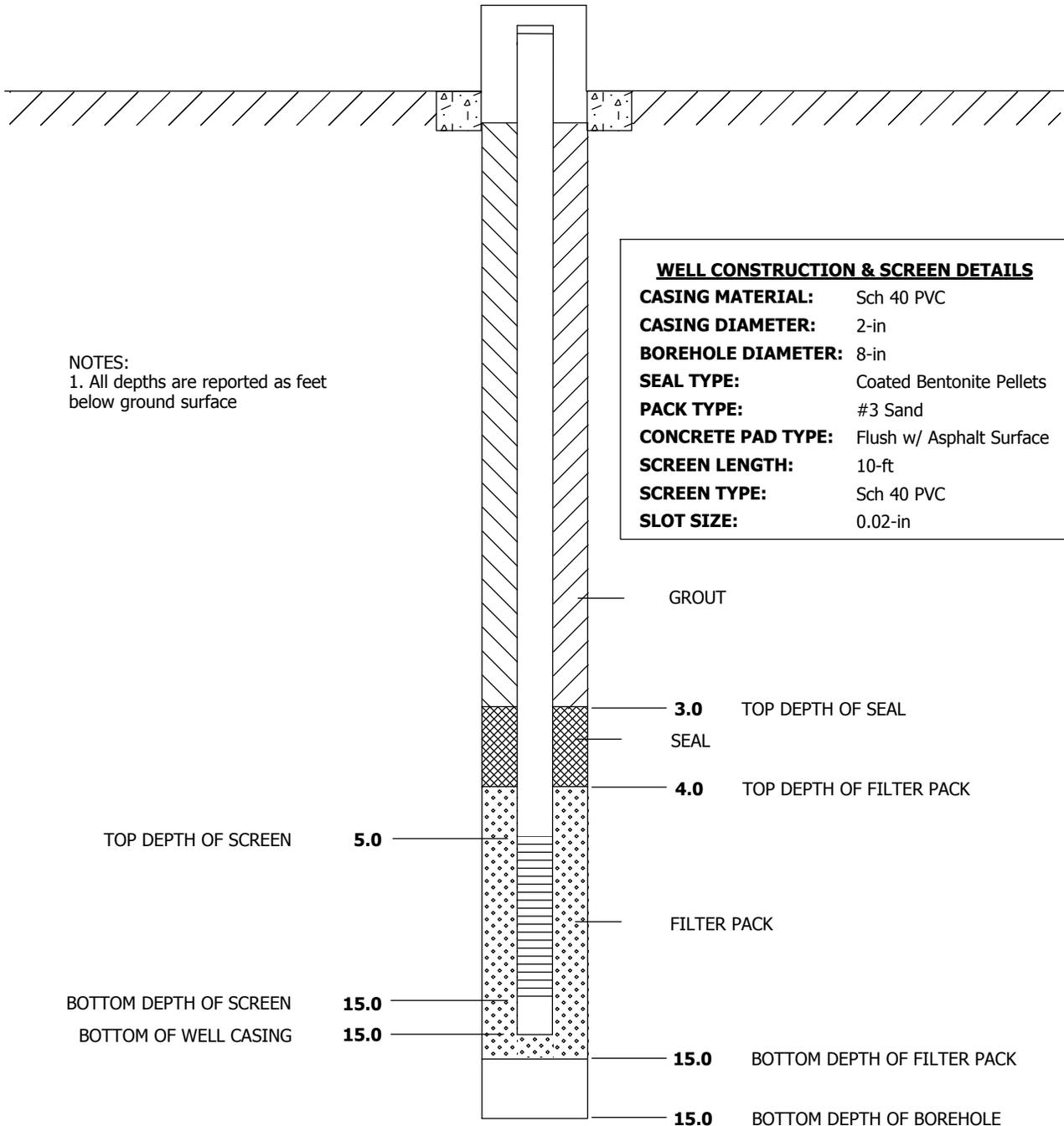
**NOTES:**  
 1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-10-15</i>
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/18/2005 09:50	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/18/2005 00:05	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/18/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 9.74	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	Flush w/ Asphalt Surface
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

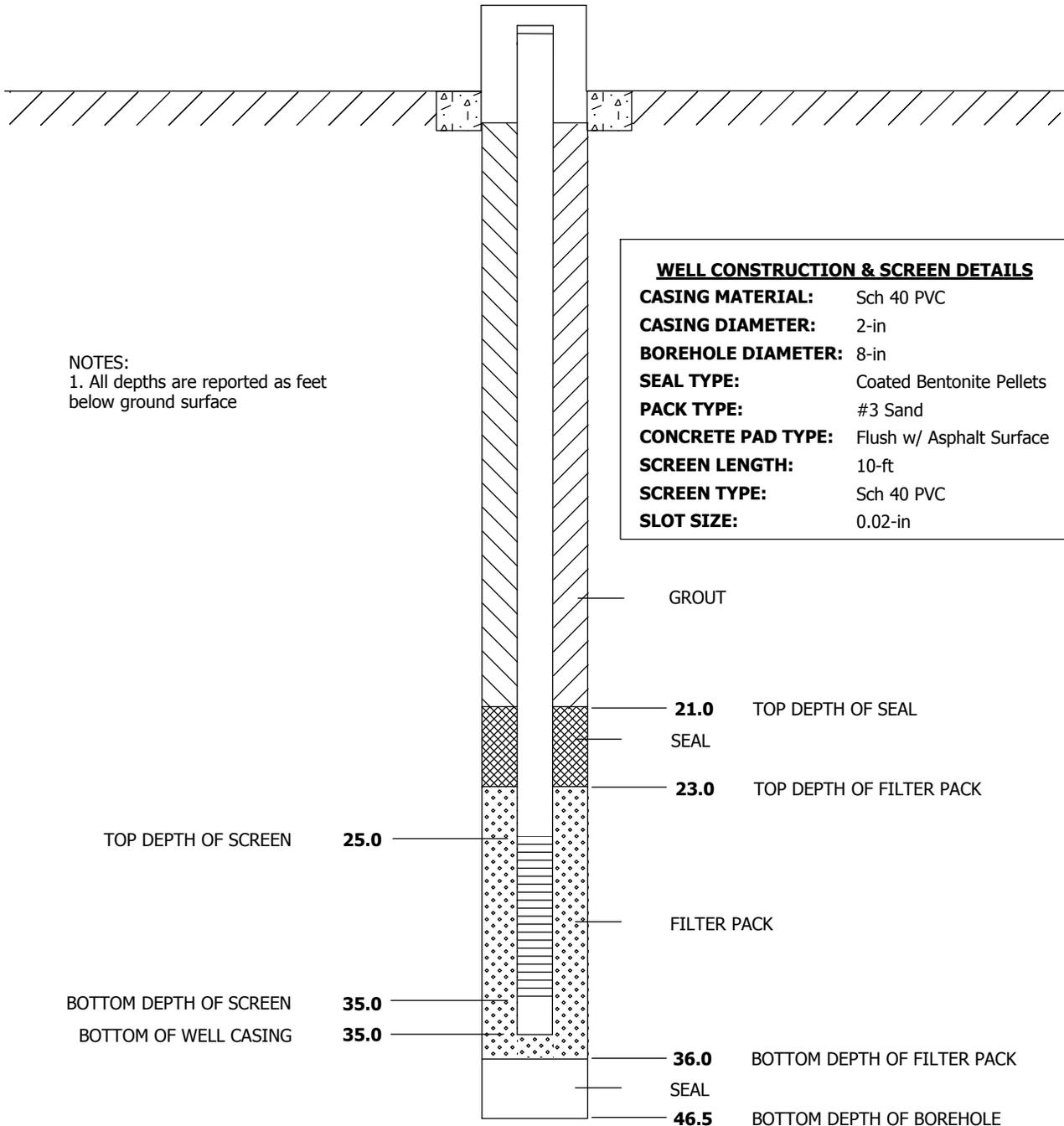
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-10-35</i>
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> West HAZMAT, (Driller Oscar Gonzales)	<b>DRILLING START:</b> 02/21/2005 10:05	
<b>DRILLING METHOD:</b> Hollow Stem Auger / CME 55	<b>DRILLING END:</b> 02/21/2005 18:30	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 02/21/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 9.77	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION



**NOTES:**  
 1. All depths are reported as feet below ground surface

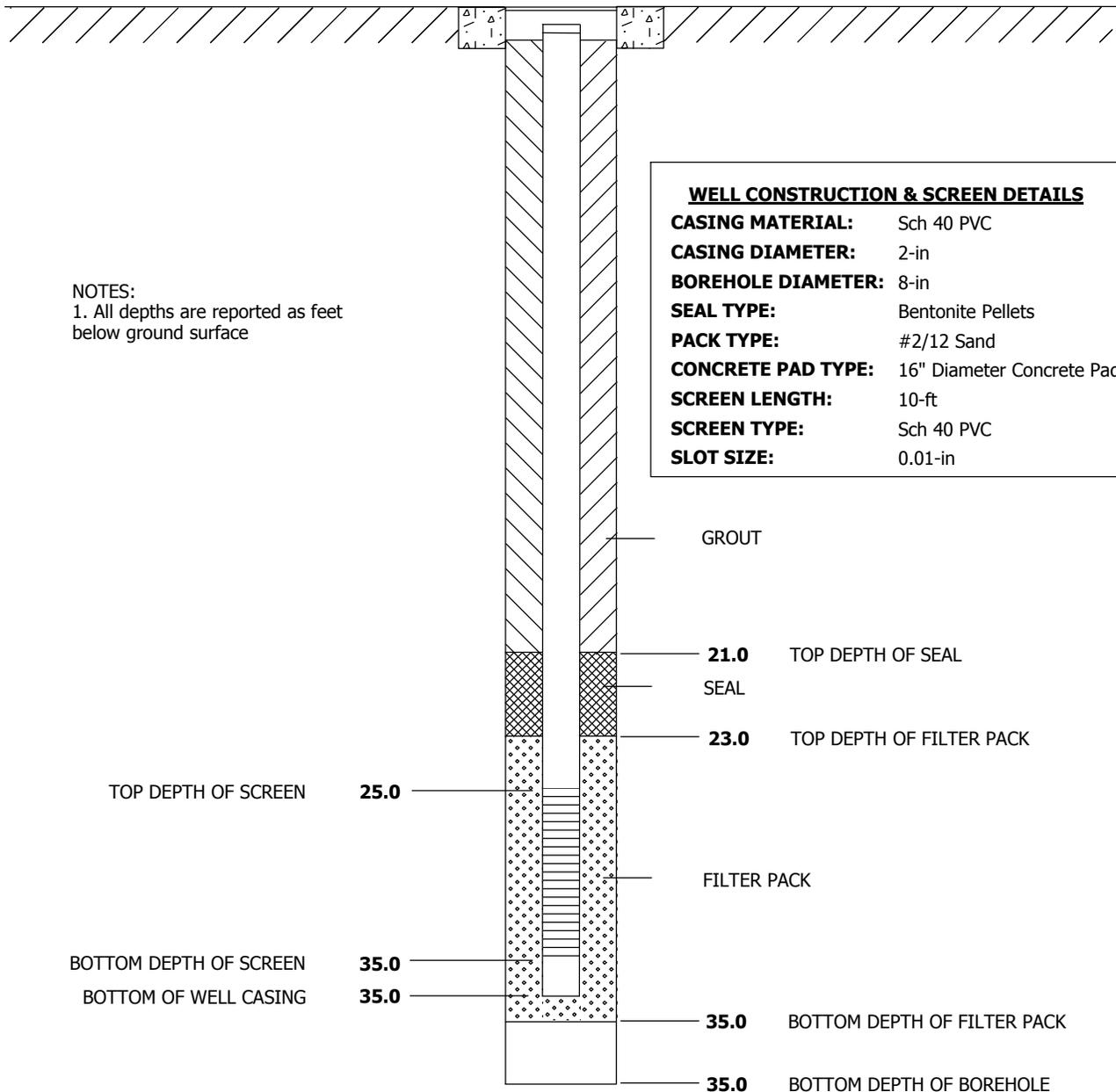
<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Coated Bentonite Pellets
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	Flush w/ Asphalt Surface
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.02-in

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-11-35</i>
<b>LOCATION:</b> Northbound bike lane on Mandella Pkwy between 3rd and 5th St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/20/2005 12:06	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 09/21/2005 16:40	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/20/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 8.52	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION

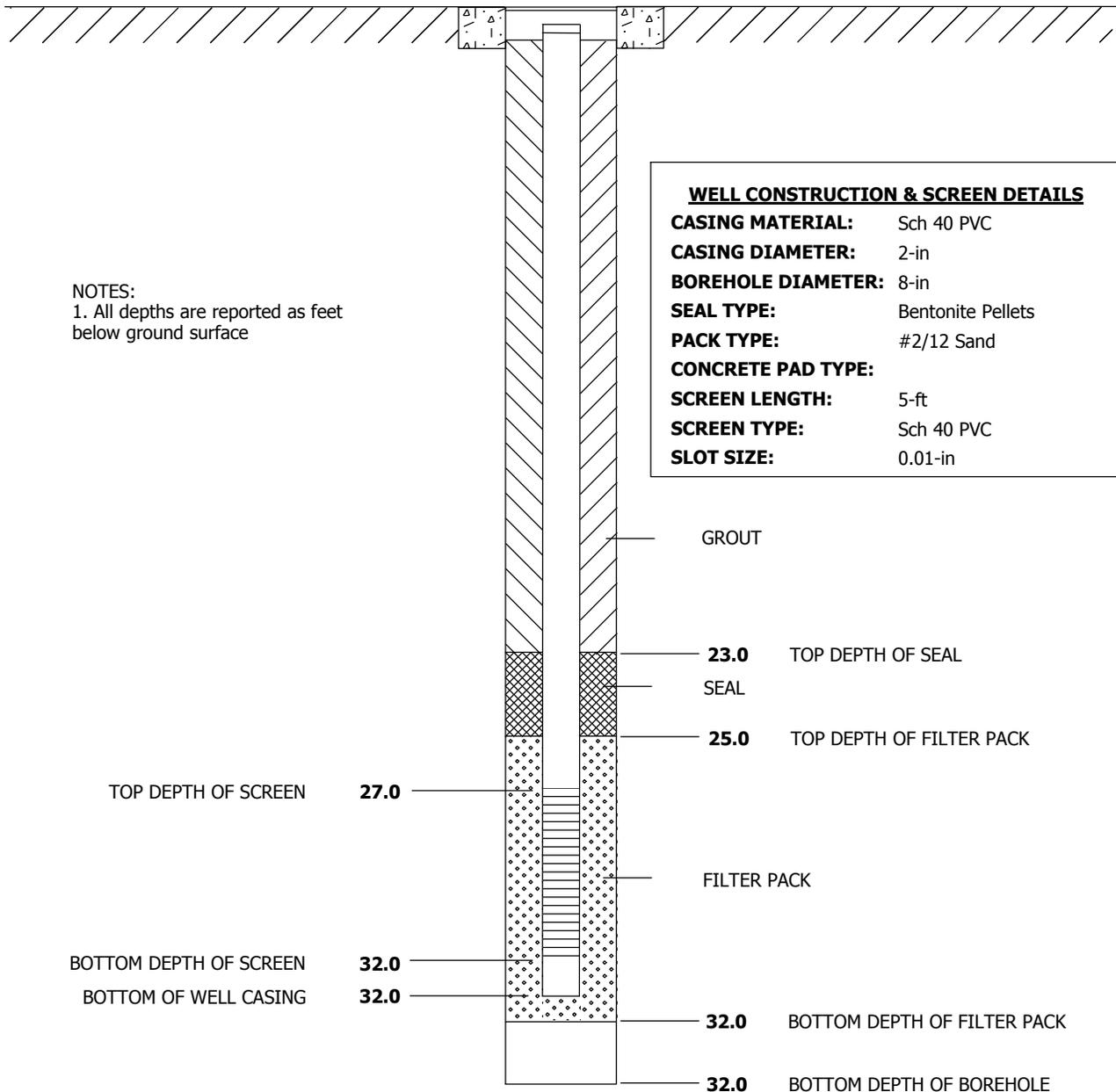


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-12-32</i>
<b>LOCATION:</b> 3rd St. gutter in front of 1414 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/21/2005 12:43	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 09/21/2005 16:40	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/21/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 9.44	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Bentonite Pellets
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	
<b>SCREEN LENGTH:</b>	5-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.01-in

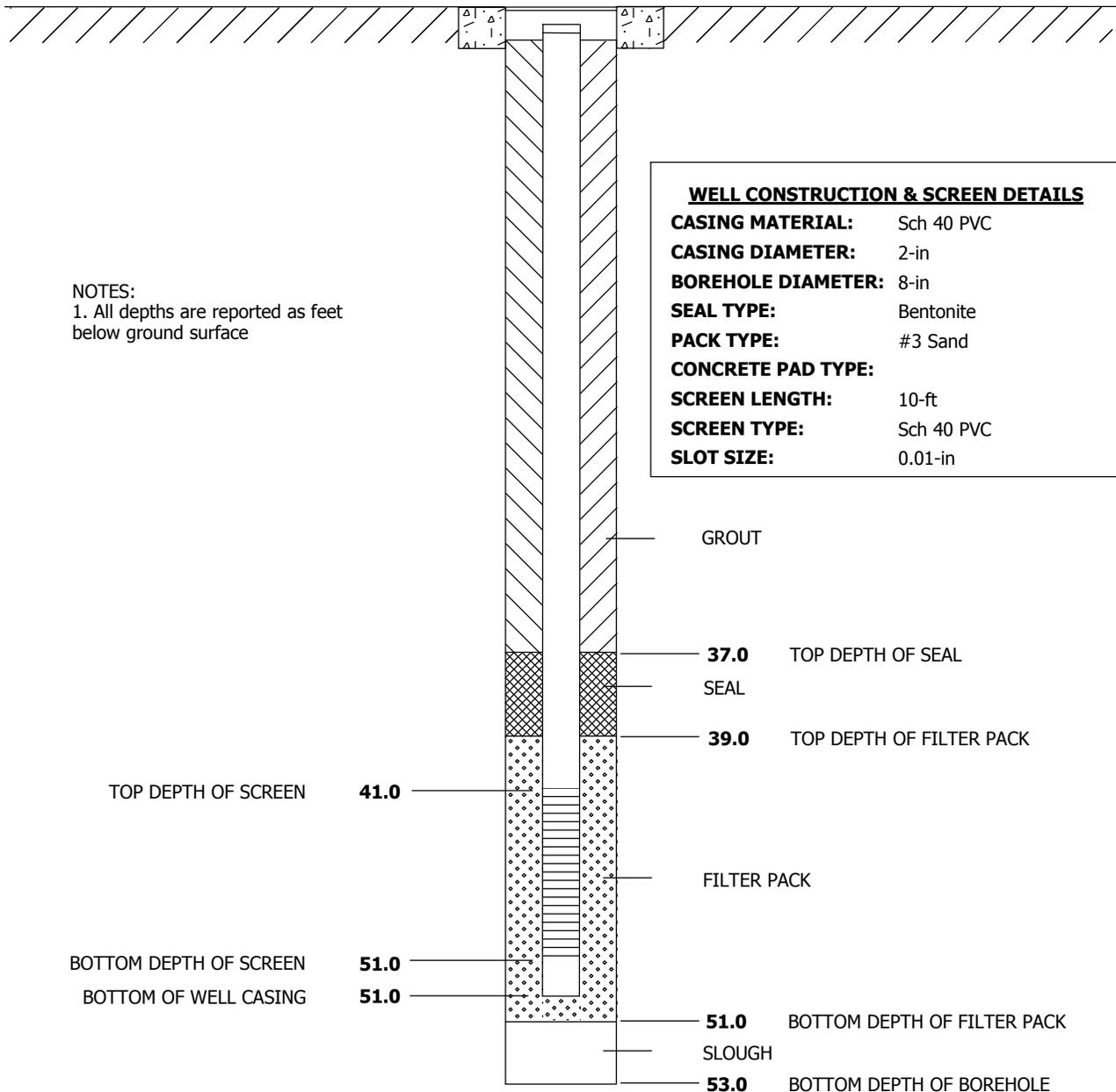
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-12-51</i>
<b>LOCATION:</b> 1414 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/15/2005 13:00	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 09/19/2005 18:00	
<b>LOGGER:</b> W. Frohlich	<b>WELL COMPLETION DATE:</b> 09/15/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 9.27	<b>GENERAL REMARKS:</b> ---	

## LOCKING FLUSH COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Bentonite
<b>PACK TYPE:</b>	#3 Sand
<b>CONCRETE PAD TYPE:</b>	
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.01-in

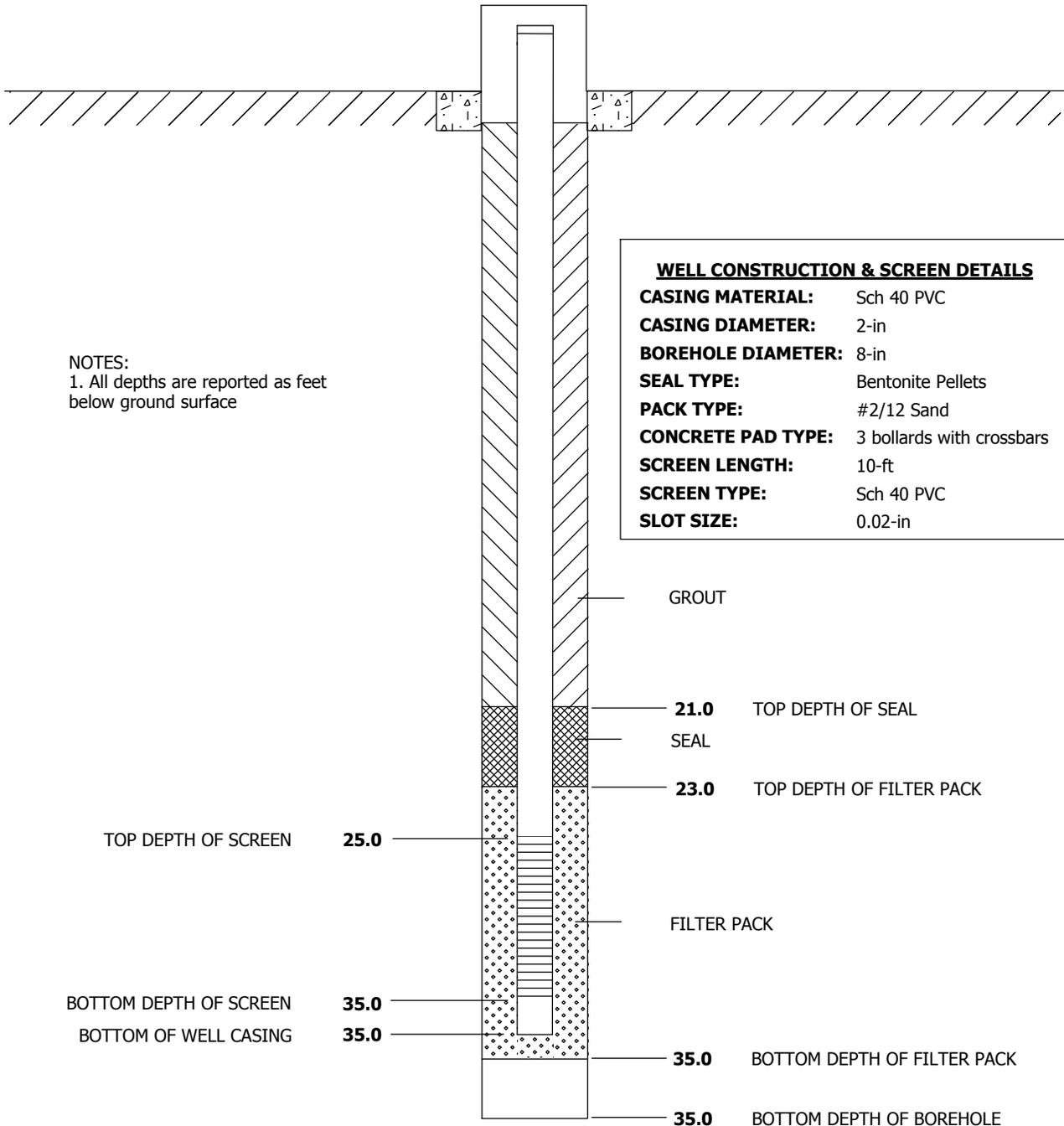
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-13-35</i>
<b>LOCATION:</b> AMTRAK Yard - 1303 3rd St., Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/13/2005 12:20	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 09/14/2005 15:50	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/13/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.38	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION

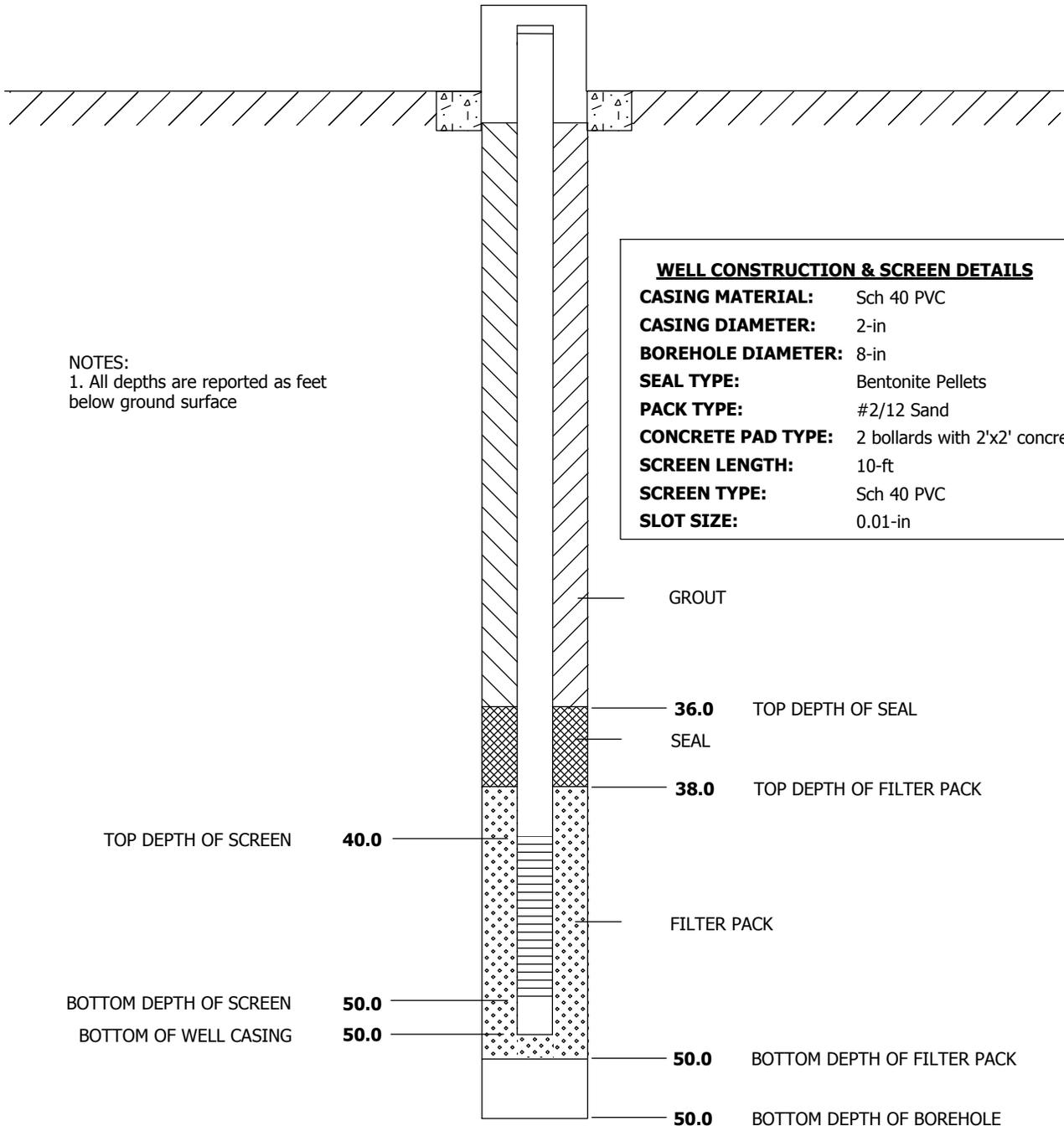


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> <i>RMW-14-50</i>
<b>LOCATION:</b> UPRR Property - Adjacent Prescott Park / BMW-7, Oakland, CA		
<b>DRILLING CONTRACTOR:</b> Boart Longyear (Shawn Martinez); Peoria, AZ	<b>DRILLING START:</b> 09/09/2005 11:27	
<b>DRILLING METHOD:</b> Rotosonic	<b>DRILLING END:</b> 05/01/912 16:30	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/09/2005	
<b>GROUND SURFACE ELEVATION (NAVD 88):</b> 10.39	<b>GENERAL REMARKS:</b> ---	

## LOCKING MONUMENT COMPLETION



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Sch 40 PVC
<b>CASING DIAMETER:</b>	2-in
<b>BOREHOLE DIAMETER:</b>	8-in
<b>SEAL TYPE:</b>	Bentonite Pellets
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	2 bollards with 2'x2' concrete pad
<b>SCREEN LENGTH:</b>	10-ft
<b>SCREEN TYPE:</b>	Sch 40 PVC
<b>SLOT SIZE:</b>	0.01-in

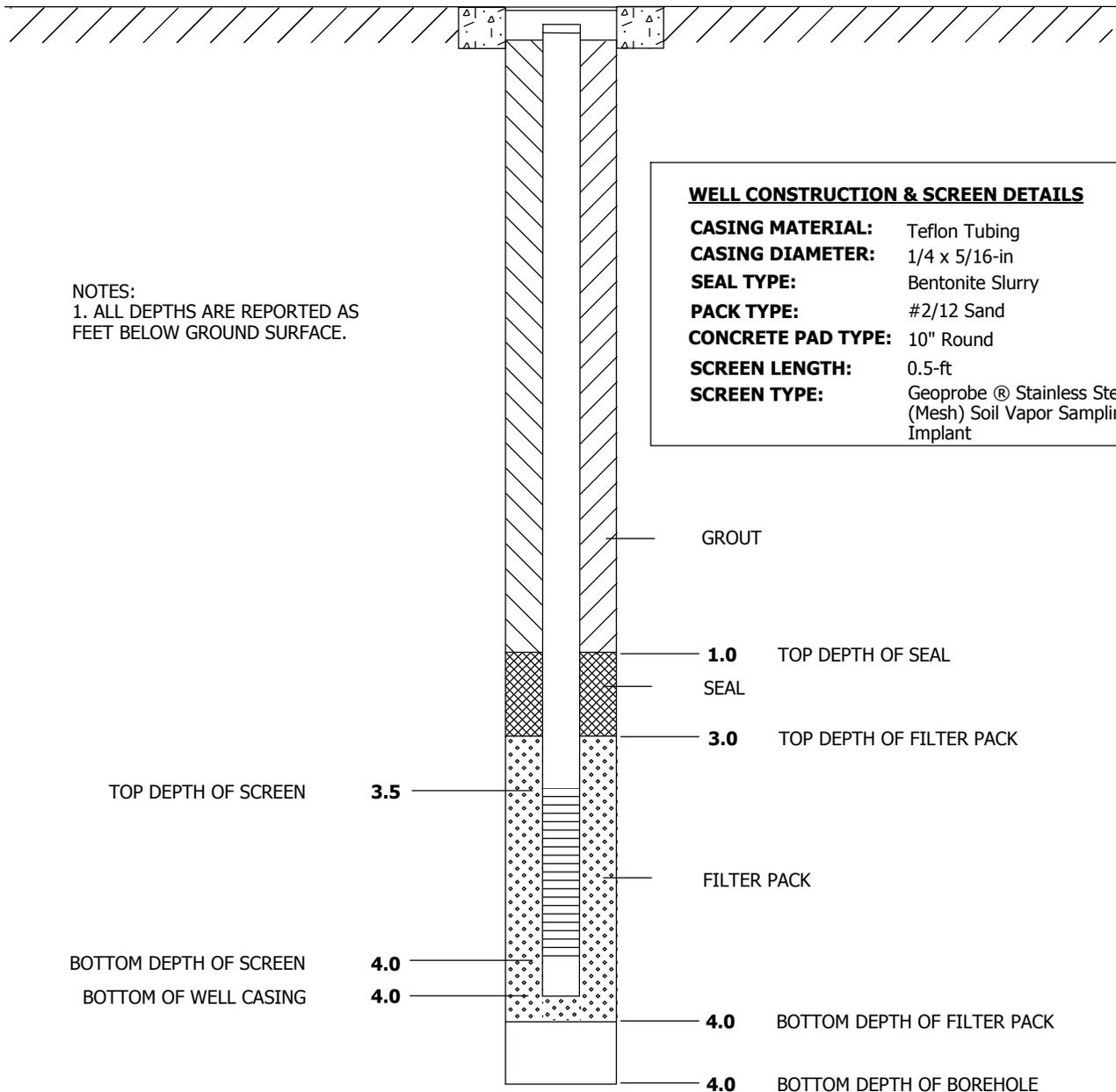
**NOTES:**  
1. All depths are reported as feet below ground surface

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-01
<b>LOCATION:</b> Oakland, CA (Center St. Lot [BRI])		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/28/2004 8:35:00 AM	
<b>DRILLING METHOD:</b> Geoprobe, Concrete Core	<b>DRILLING END:</b> 09/28/2004 9:15:00 AM	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/28/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.22	<b>GENERAL REMARKS:</b> See soil boring log for RSB-01 for lithology	

## FLUSH MOUNTED LOCKING WELL

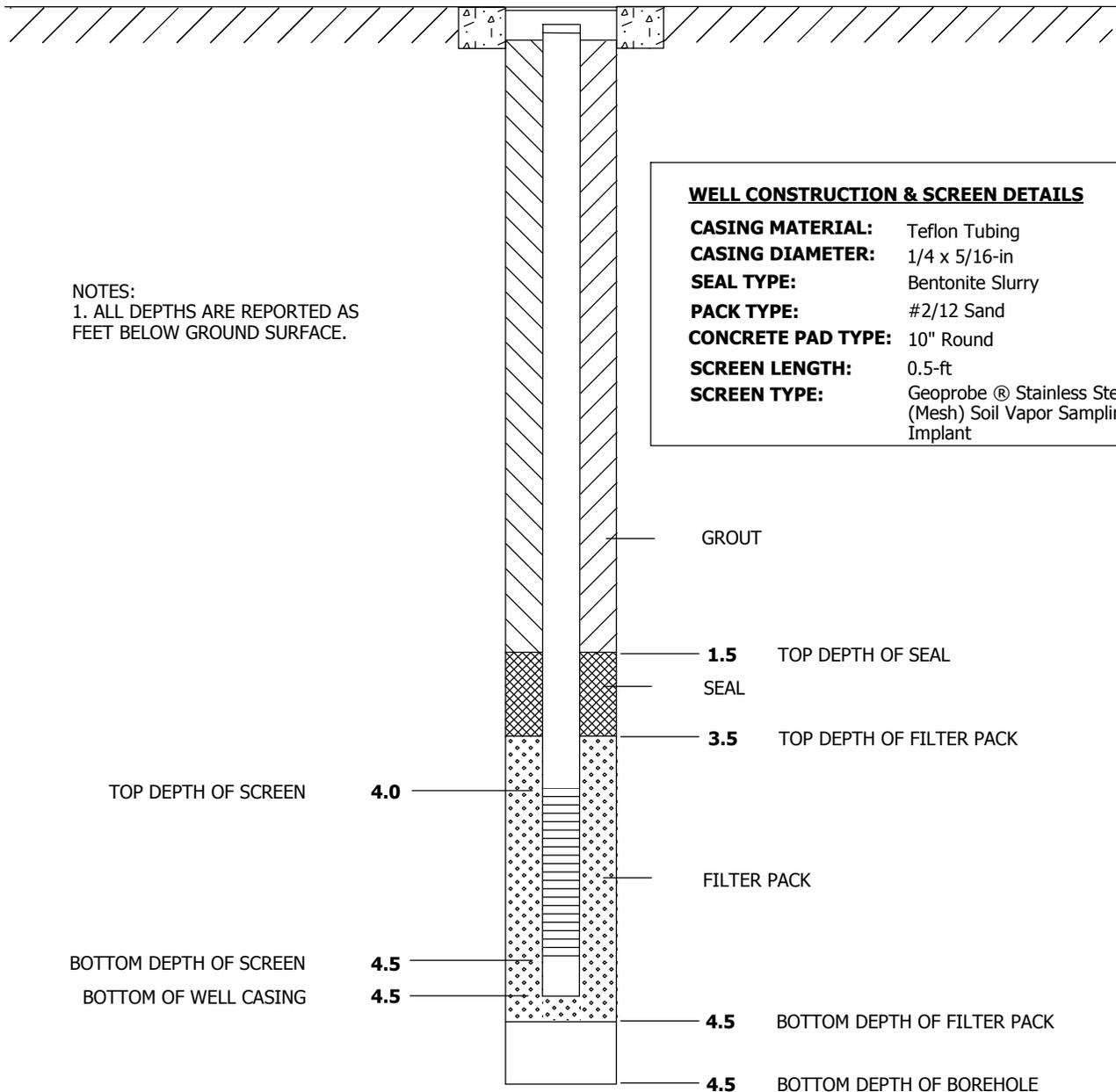


WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-02
<b>LOCATION:</b> Oakland, CA (thin lot on Center St.)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/27/2004 3:00:00 PM	
<b>DRILLING METHOD:</b> Geoprobe	<b>DRILLING END:</b> 09/27/2004 3:32:00 PM	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/27/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.02	<b>GENERAL REMARKS:</b> See soil boring log for RSB-02 for lithology	

## FLUSH MOUNTED LOCKING WELL



### WELL CONSTRUCTION & SCREEN DETAILS

- CASING MATERIAL:** Teflon Tubing
- CASING DIAMETER:** 1/4 x 5/16-in
- SEAL TYPE:** Bentonite Slurry
- PACK TYPE:** #2/12 Sand
- CONCRETE PAD TYPE:** 10" Round
- SCREEN LENGTH:** 0.5-ft
- SCREEN TYPE:** Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

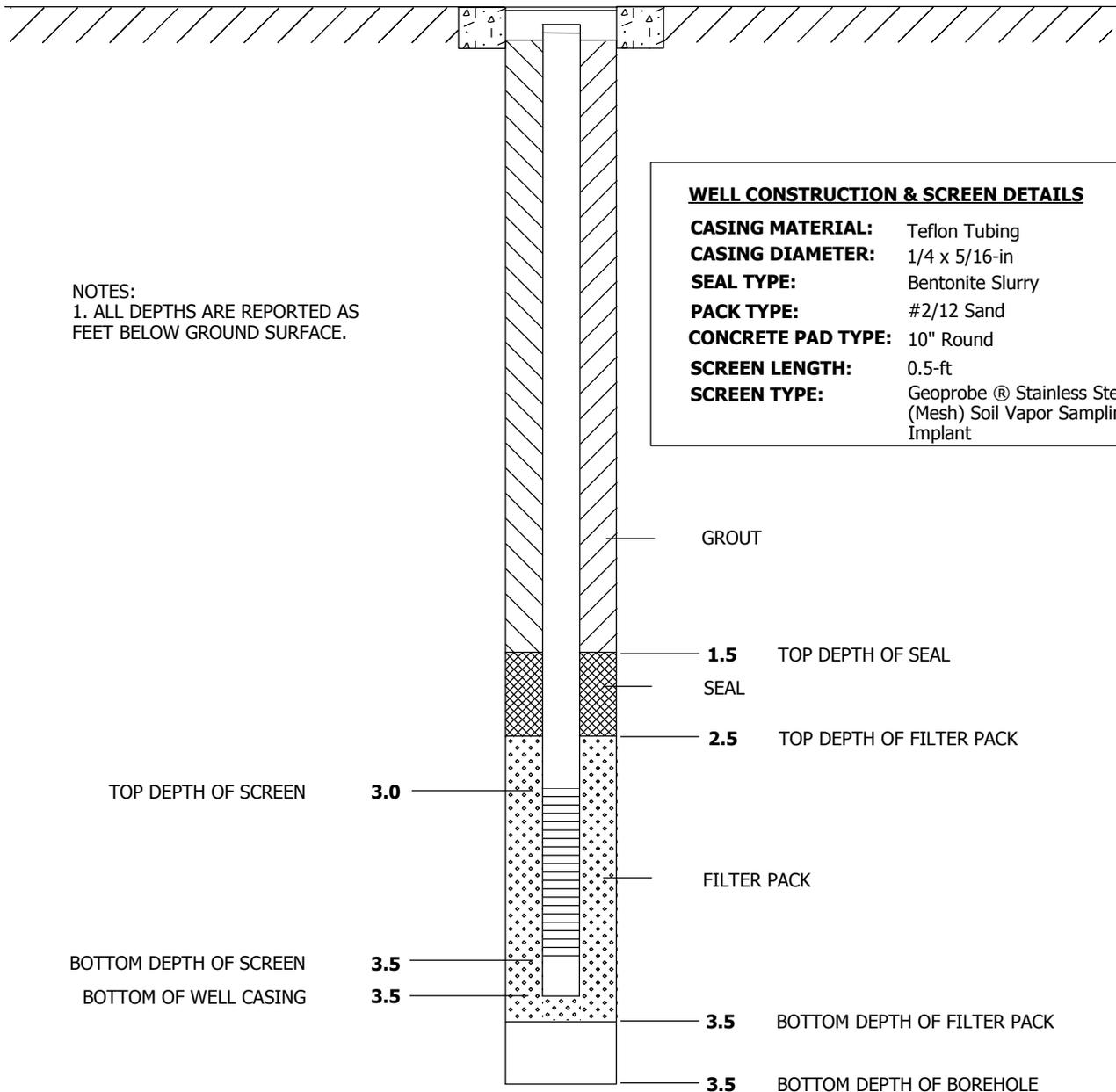
**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-03
<b>LOCATION:</b> Oakland, CA (DC Yard)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/30/2004 12:05:00 AM	
<b>DRILLING METHOD:</b> Geoprobe	<b>DRILLING END:</b> ---	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/30/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.58	<b>GENERAL REMARKS:</b> ---	

## FLUSH MOUNTED LOCKING WELL



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Bentonite Slurry
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

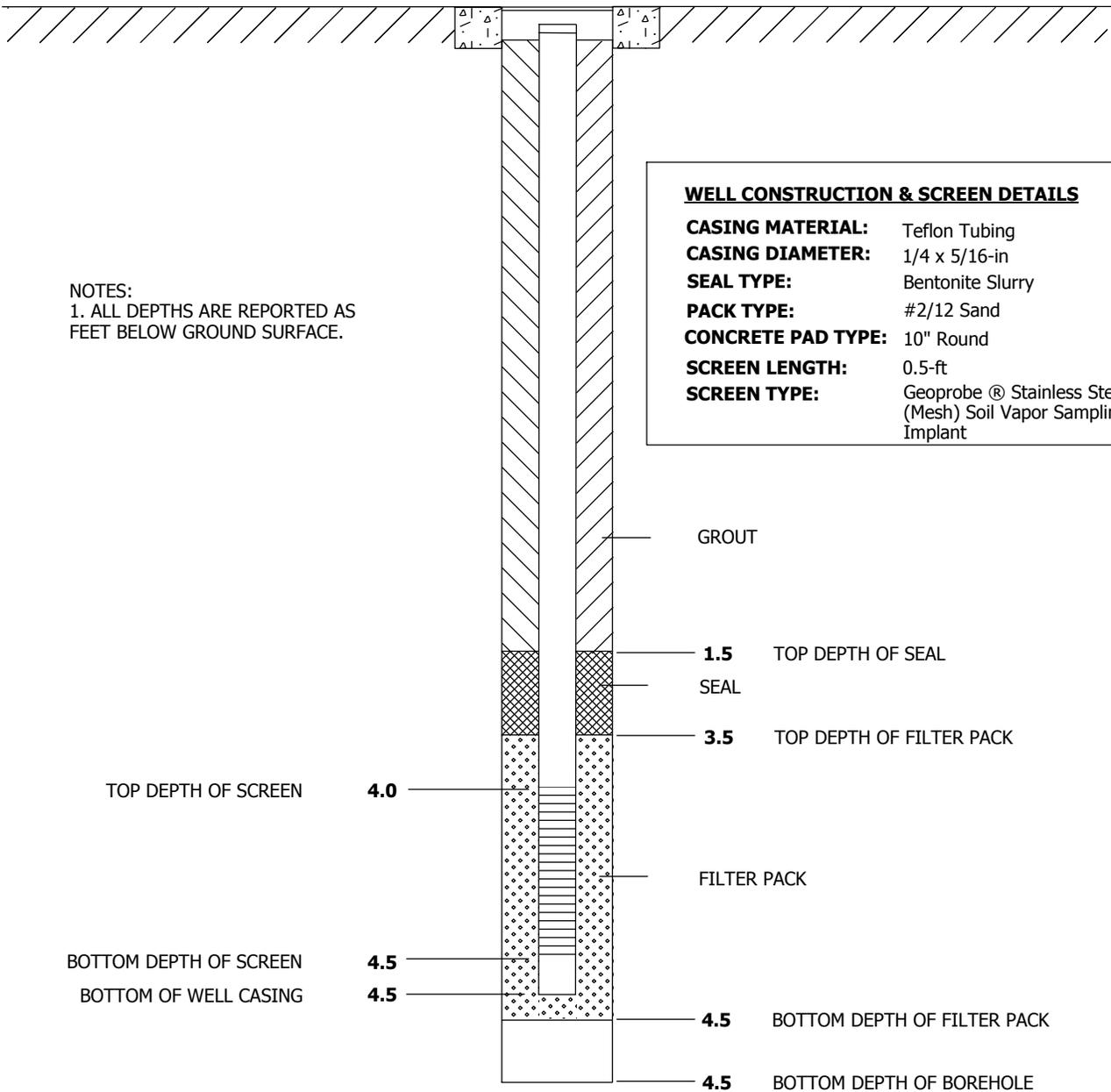
**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-04
<b>LOCATION:</b> Oakland, CA (DC Yard)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/24/2004 10:50:00 AM	
<b>DRILLING METHOD:</b> Geoprobe	<b>DRILLING END:</b> ---	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/24/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.57	<b>GENERAL REMARKS:</b> See soil boring log for RSB-04 for lithology	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

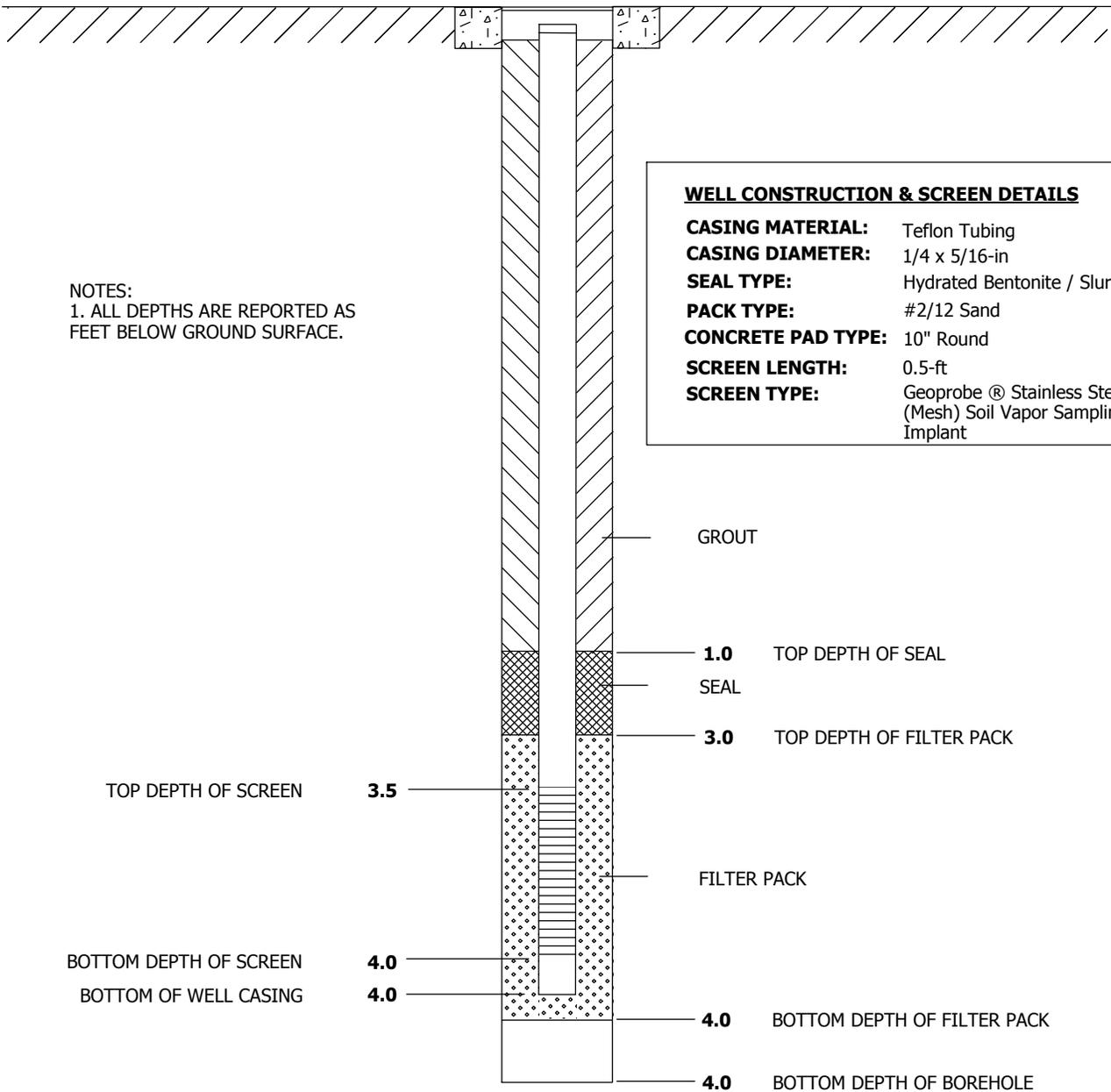
<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Bentonite Slurry
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-05
<b>LOCATION:</b> Oakland, CA (DC Yard)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/24/2004 2:05:00 PM	
<b>DRILLING METHOD:</b> Geoprobe	<b>DRILLING END:</b> 09/24/2004 2:30:00 PM	
<b>LOGGER:</b> M. Cavaliere	<b>WELL COMPLETION DATE:</b> 09/24/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.22	<b>GENERAL REMARKS:</b> See soil boring log for RSB-05 for lithology	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

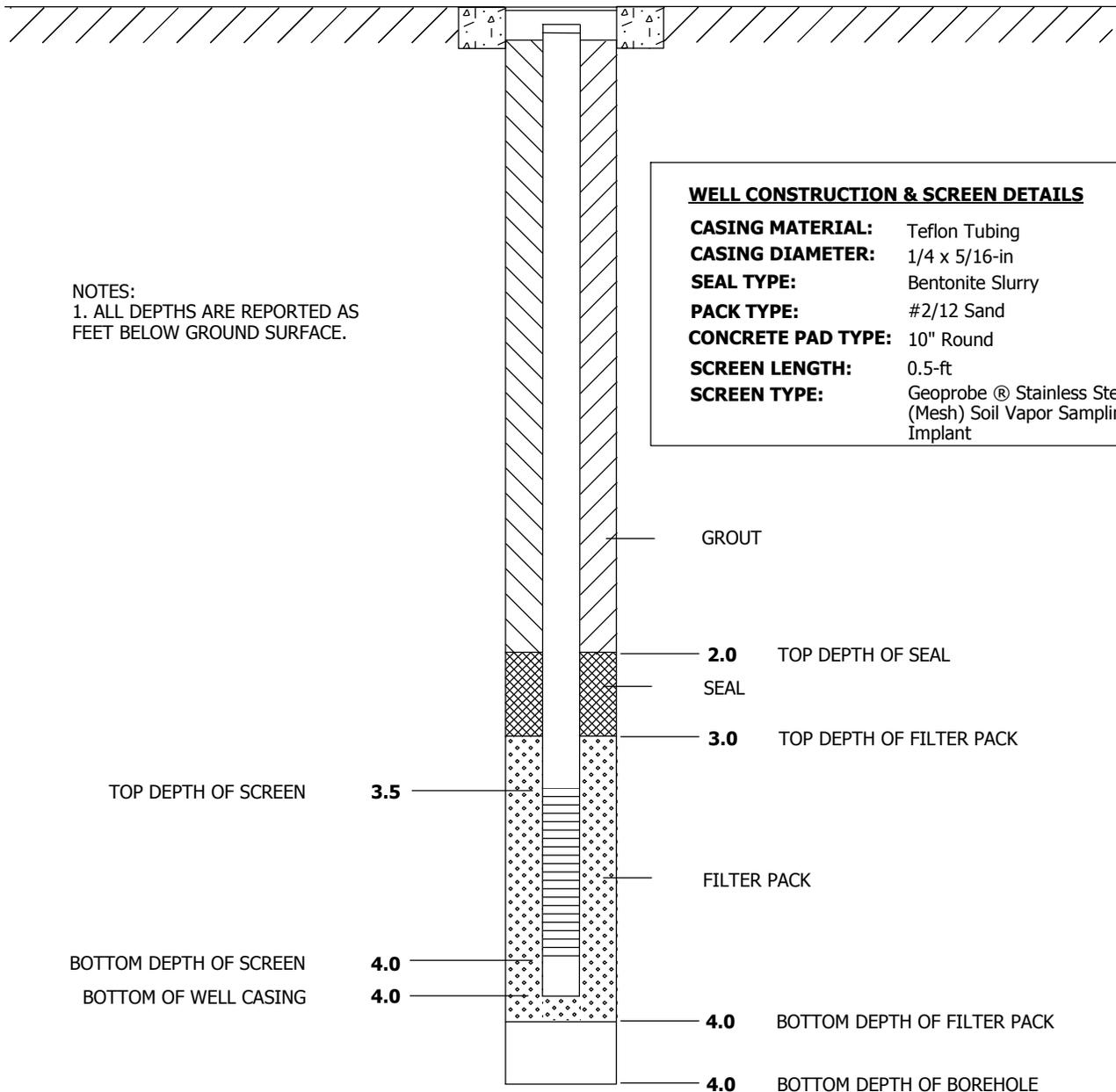
<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Hydrated Bentonite / Slurry
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-06
<b>LOCATION:</b> Oakland, CA (DC Yard)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 09/30/2004 3:34:00 PM	
<b>DRILLING METHOD:</b> Geoprobe	<b>DRILLING END:</b> ---	
<b>LOGGER:</b> K. Ebel	<b>WELL COMPLETION DATE:</b> 09/30/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 11.06	<b>GENERAL REMARKS:</b> ---	

## FLUSH MOUNTED LOCKING WELL



<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Bentonite Slurry
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

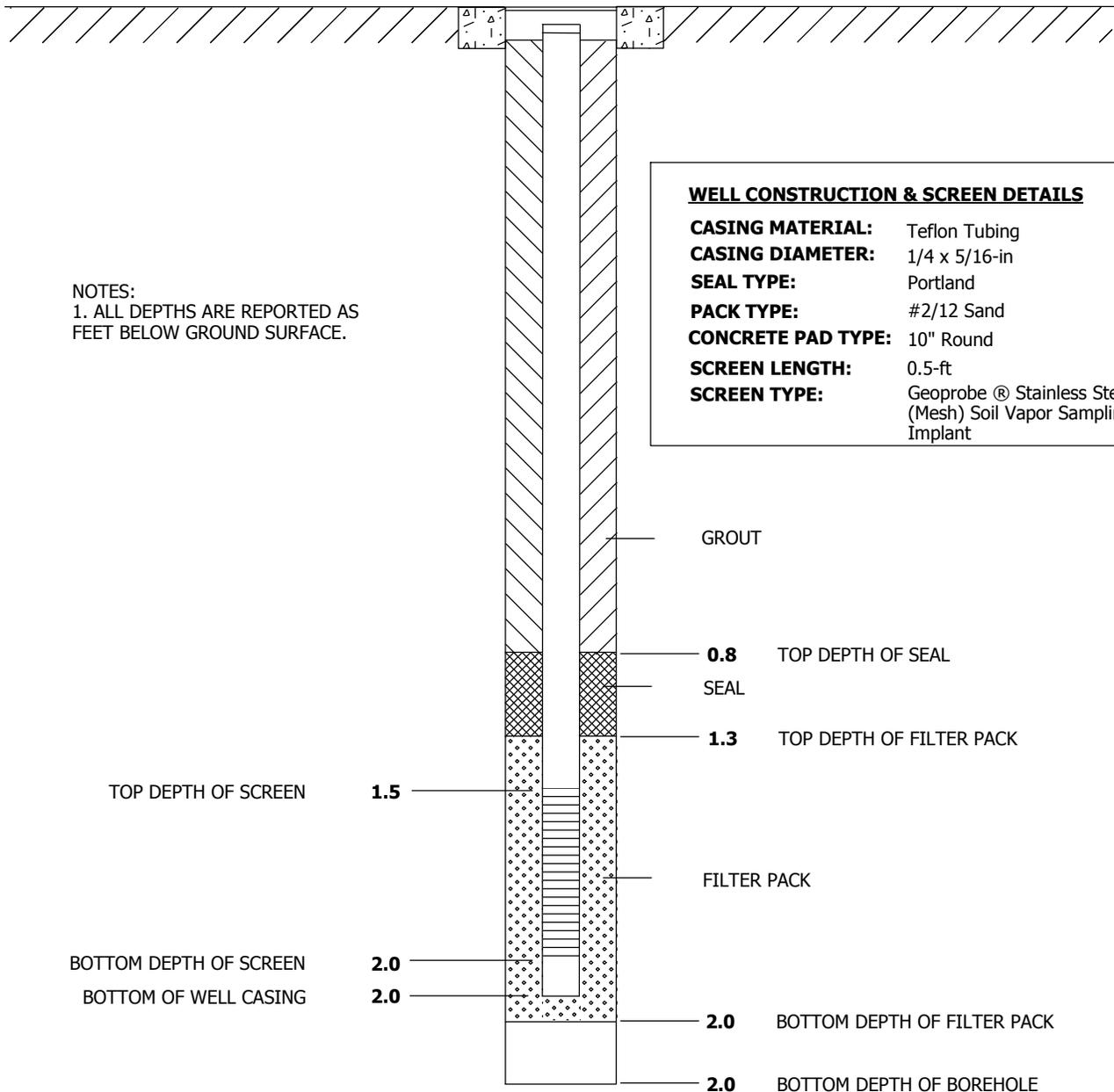
**NOTES:**  
 1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-07
<b>LOCATION:</b> Oakland, CA (Sidewalk in front of DC Metals Office)		
<b>DRILLING CONTRACTOR:</b> ---	<b>DRILLING START:</b> 10/07/2004	
<b>DRILLING METHOD:</b> ---	<b>DRILLING END:</b> 10/07/2004	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/07/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.53	<b>GENERAL REMARKS:</b> Probe installed in remediation "T" trench. 10" of concrete from sidewalk surface to 4" of coarse gravel. Below the gravel, blue-gray fill sand was encountered. 10" diameter concrete core to 10". PID in hole ~200 ppm, breathing zone ~0.3 ppm	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

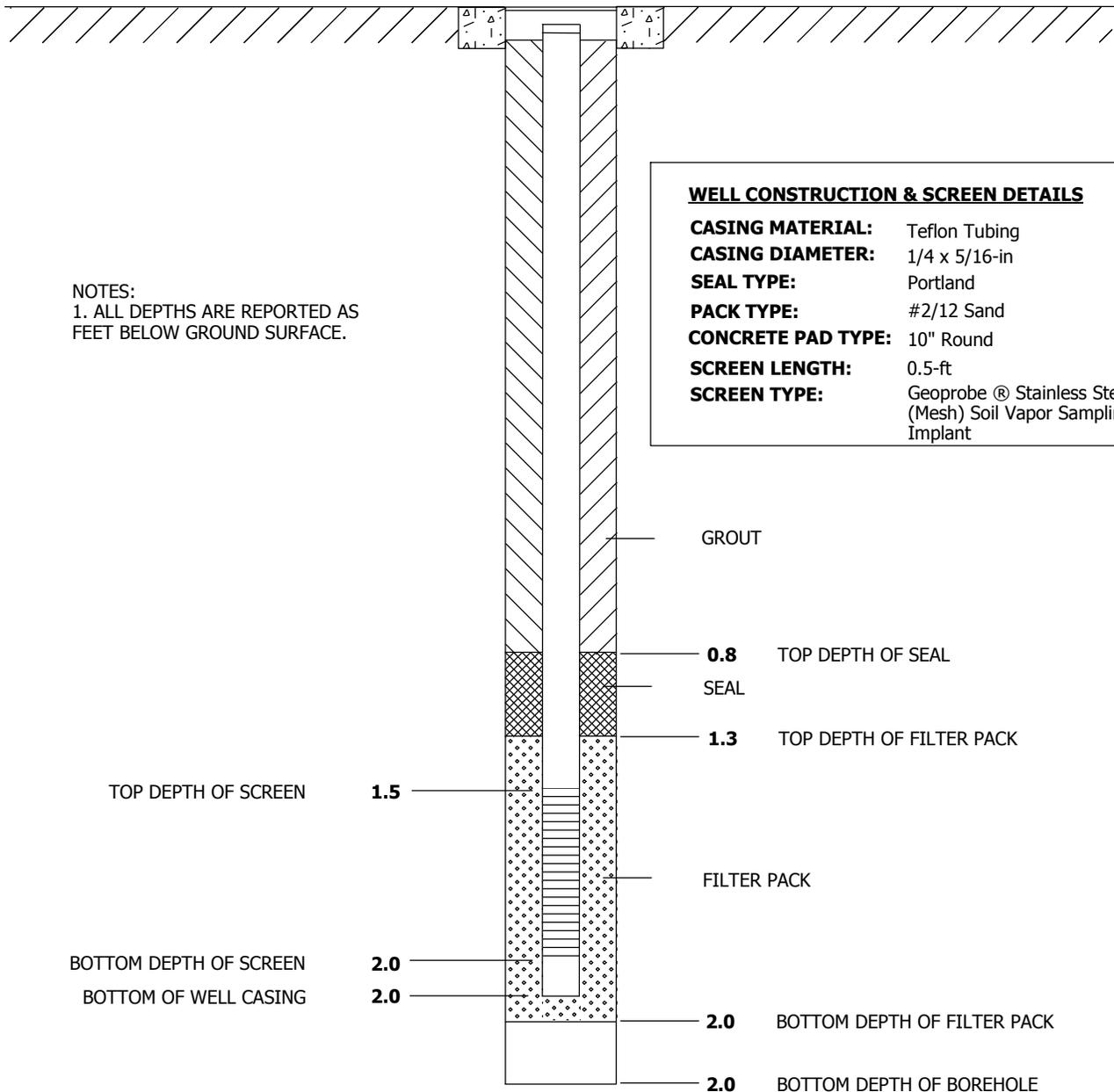
<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Portland
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-08
<b>LOCATION:</b> Oakland, CA (Sidewalk in front of 1428 3rd St.)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 10/07/2004 9:20:00 AM	
<b>DRILLING METHOD:</b> Concrete Core, Hand Auger	<b>DRILLING END:</b> 10/07/2004 11:55:00 AM	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/08/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.71	<b>GENERAL REMARKS:</b> Probe installed one foot into fine fill sand. First foot was a fine silty sand fill (sidewalk base). 10" concrete core to 4". PID 0 ppm in breathing zone.	

## FLUSH MOUNTED LOCKING WELL



### WELL CONSTRUCTION & SCREEN DETAILS

- CASING MATERIAL:** Teflon Tubing
- CASING DIAMETER:** 1/4 x 5/16-in
- SEAL TYPE:** Portland
- PACK TYPE:** #2/12 Sand
- CONCRETE PAD TYPE:** 10" Round
- SCREEN LENGTH:** 0.5-ft
- SCREEN TYPE:** Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

TOP DEPTH OF SCREEN 1.5

BOTTOM DEPTH OF SCREEN 2.0  
BOTTOM OF WELL CASING 2.0

GROUT

0.8 TOP DEPTH OF SEAL

SEAL

1.3 TOP DEPTH OF FILTER PACK

FILTER PACK

2.0 BOTTOM DEPTH OF FILTER PACK

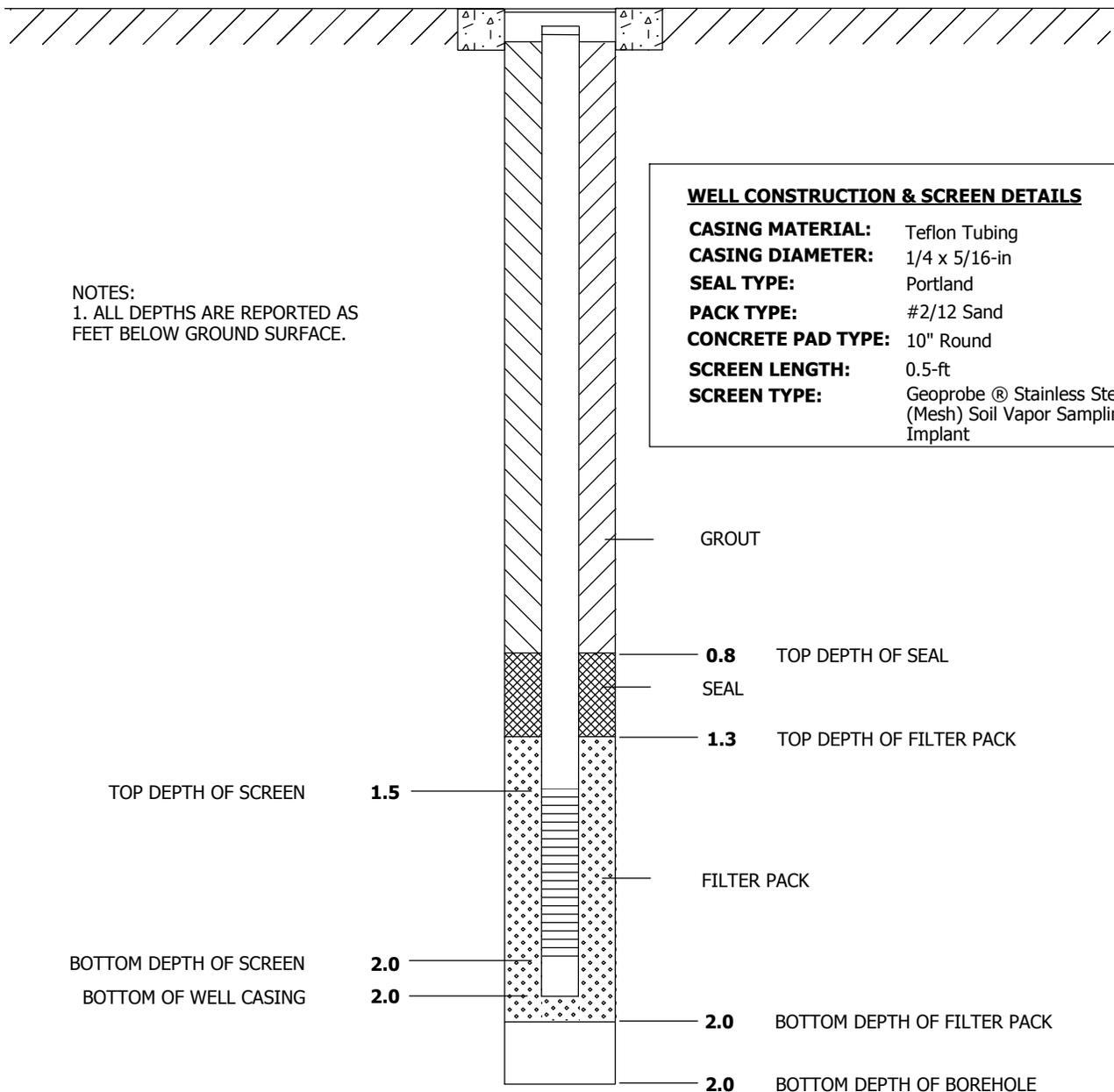
2.0 BOTTOM DEPTH OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-09
<b>LOCATION:</b> Oakland, CA (Sidewalk in front of 1436 3rd St.)		
<b>DRILLING CONTRACTOR:</b> Precision Sampling, Inc	<b>DRILLING START:</b> 10/07/2004 9:00:00 AM	
<b>DRILLING METHOD:</b> Concrete Core, Hand Auger	<b>DRILLING END:</b> 10/07/2004 11:20:00 AM	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/09/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.52	<b>GENERAL REMARKS:</b> Probe installed one foot into fine fill sand. First foot was a fine silty sand fill (sidewalk base). 10" concrete core to 4". PID 0 ppm in breathing zone.	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

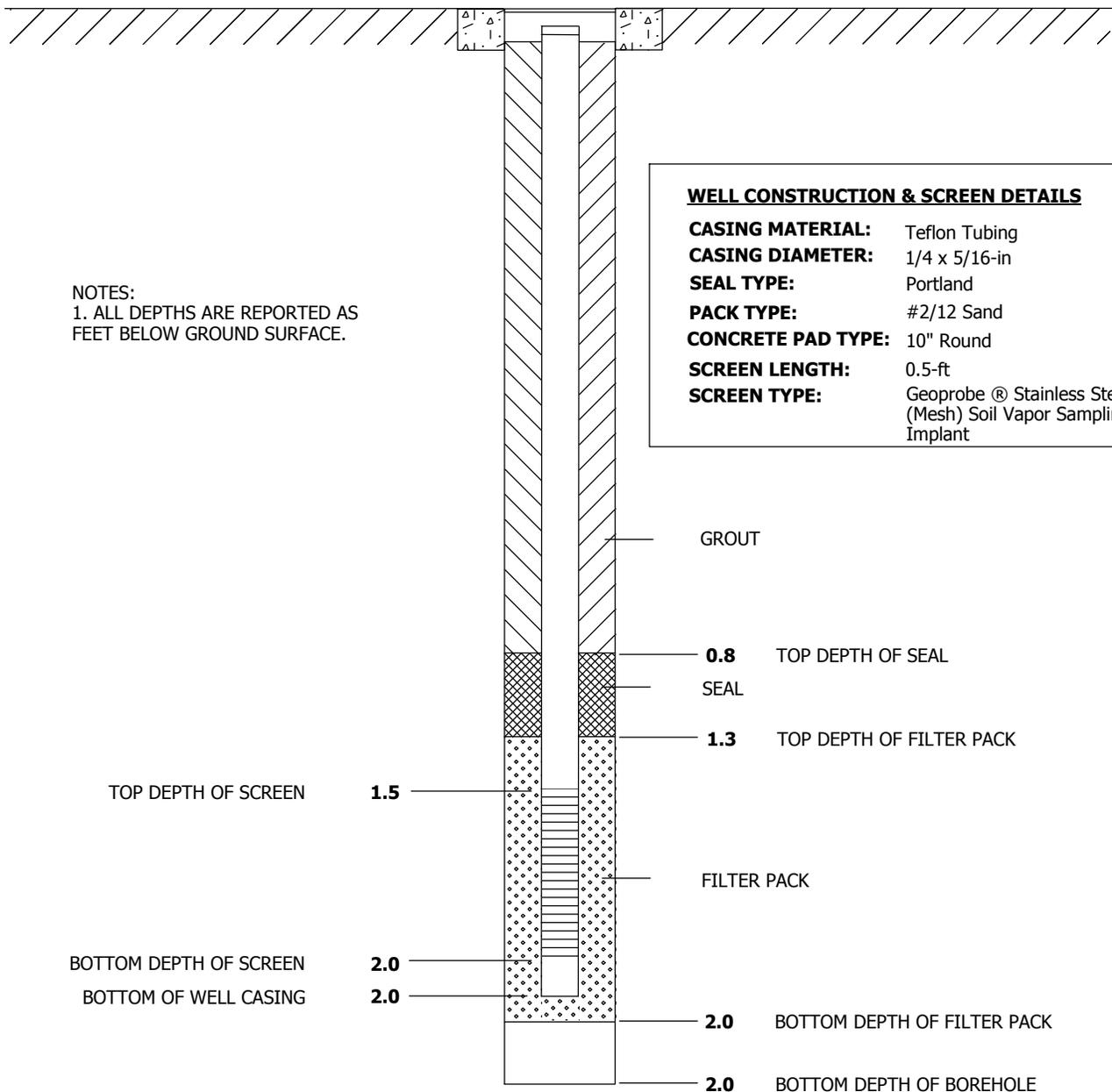
<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Portland
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-10
<b>LOCATION:</b> Oakland, CA (Corner of 3rd and Center on Sidewalk in front of 1448 3rd St.)		
<b>DRILLING CONTRACTOR:</b> Osbourne Concrete Drilling / Coring	<b>DRILLING START:</b> 10/07/2004 8:44:00 AM	
<b>DRILLING METHOD:</b> Core	<b>DRILLING END:</b> 10/07/2004 10:30:00 AM	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/10/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.50	<b>GENERAL REMARKS:</b> Probe installed one foot into fine fill sand. First foot was a fine silty sand fill (sidewalk base). 10" concrete core to 4". PID 0.2 ppm in breathing zone.	

## FLUSH MOUNTED LOCKING WELL



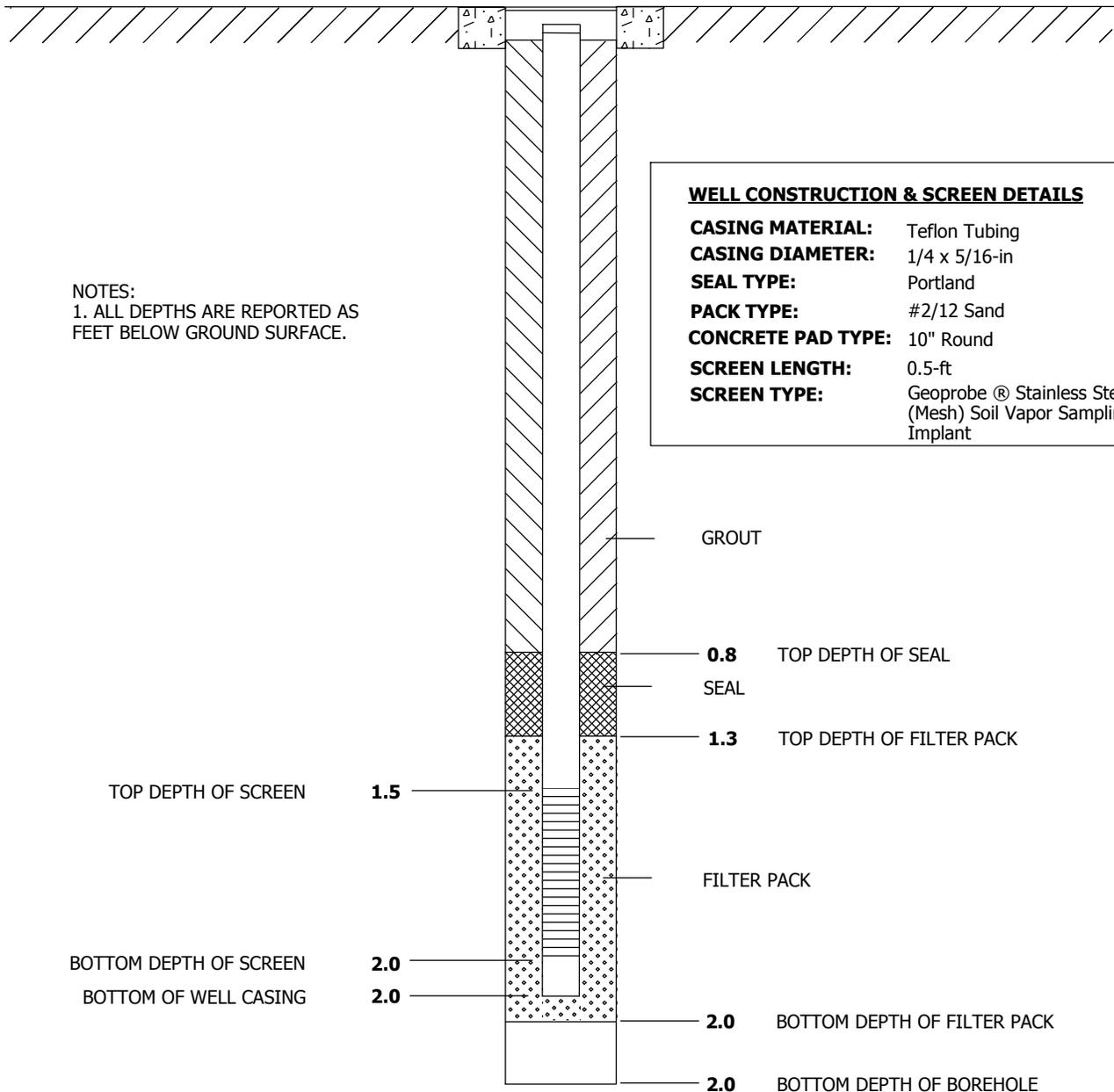
**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-11
<b>LOCATION:</b> Oakland, CA (320 Center St. over gas line)		
<b>DRILLING CONTRACTOR:</b> Osbourne Concrete Drilling / Coring	<b>DRILLING START:</b> 10/07/2004 8:27:00 AM	
<b>DRILLING METHOD:</b> Core	<b>DRILLING END:</b> 10/07/2004 9:45:00 AM	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/11/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.38	<b>GENERAL REMARKS:</b> Probe installed one foot into poorly graded fine-grained fill sand. Top foot was asphalt and road bed gravels. 10" concrete core through 5-6" of asphalt. PID reading .2-.3 ppm in breathing zone.	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

<b>WELL CONSTRUCTION &amp; SCREEN DETAILS</b>	
<b>CASING MATERIAL:</b>	Teflon Tubing
<b>CASING DIAMETER:</b>	1/4 x 5/16-in
<b>SEAL TYPE:</b>	Portland
<b>PACK TYPE:</b>	#2/12 Sand
<b>CONCRETE PAD TYPE:</b>	10" Round
<b>SCREEN LENGTH:</b>	0.5-ft
<b>SCREEN TYPE:</b>	Geoprobe® Stainless Steel (Mesh) Soil Vapor Sampling Implant

GROUT  
  
 0.8 TOP DEPTH OF SEAL  
 SEAL  
 1.3 TOP DEPTH OF FILTER PACK  
  
 FILTER PACK  
  
 2.0 BOTTOM DEPTH OF FILTER PACK  
  
 2.0 BOTTOM DEPTH OF BOREHOLE

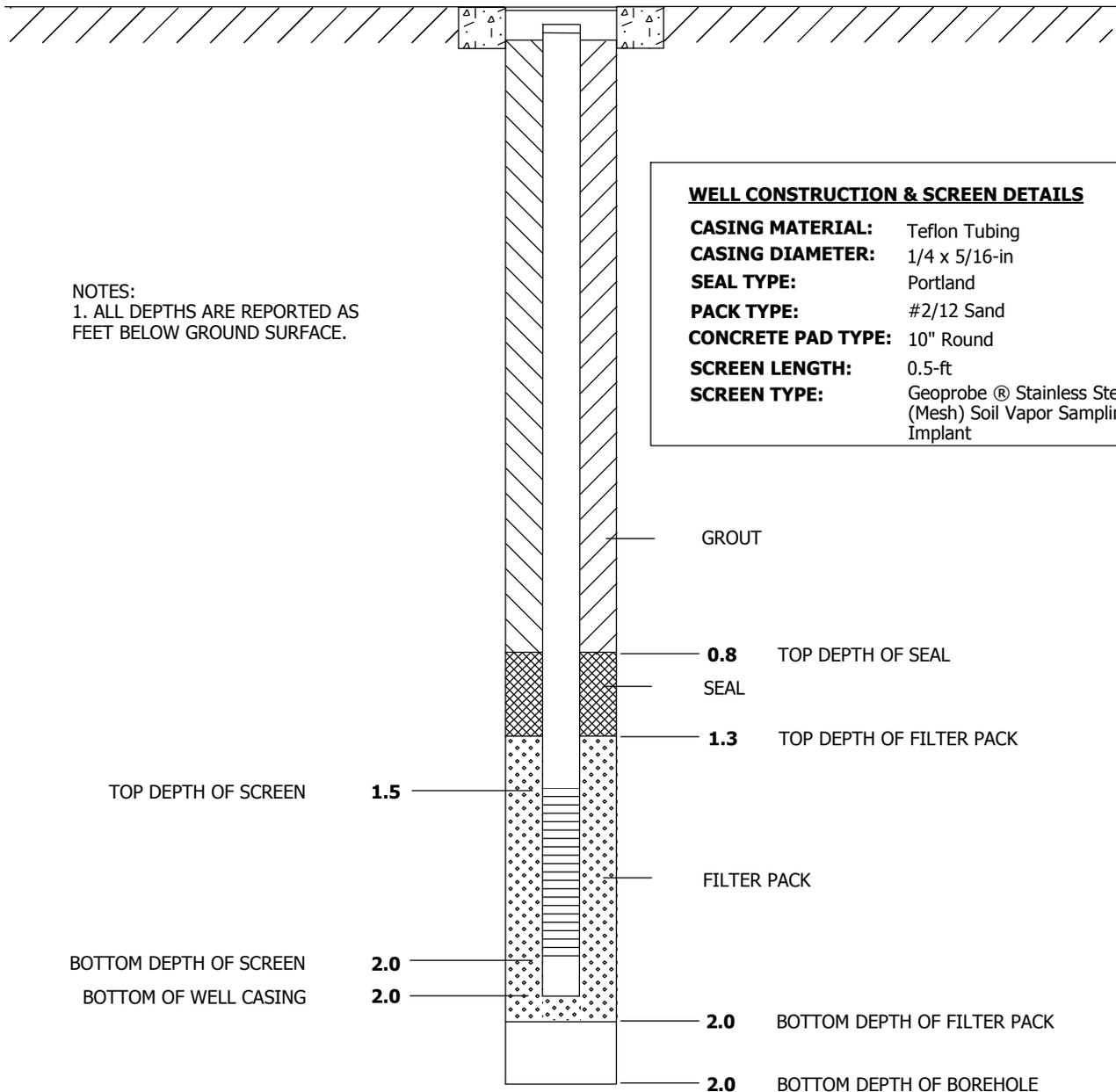
TOP DEPTH OF SCREEN 1.5  
  
 BOTTOM DEPTH OF SCREEN 2.0  
 BOTTOM OF WELL CASING 2.0

WELL DIAGRAM IS NOT TO SCALE

# WELL COMPLETION DIAGRAM

<b>PROJECT NO:</b> 175868.FI.02	<b>PROJECT:</b> AMCO Superfund	<b>WELL NO:</b> RSP-12
<b>LOCATION:</b> Oakland, CA (328 Center St. over gas line)		
<b>DRILLING CONTRACTOR:</b> Osbourne Concrete Drilling / Coring	<b>DRILLING START:</b> 10/07/2004 8:20:00 AM	
<b>DRILLING METHOD:</b> Concrete Core, Hand Auger	<b>DRILLING END:</b> 10/07/2004 9:00:00 AM	
<b>LOGGER:</b> M. Cavaliere / B. Frohlich	<b>WELL COMPLETION DATE:</b> 10/12/2004	
<b>GROUND SURFACE ELEVATION (NGVD 29):</b> 9.54	<b>GENERAL REMARKS:</b> Probe installed one foot into poorly graded, fine-grained fill sand. Top foot was asphalt and road bed gravles. 10" concrete core through 4-6" of asphalt.	

## FLUSH MOUNTED LOCKING WELL



**NOTES:**  
1. ALL DEPTHS ARE REPORTED AS FEET BELOW GROUND SURFACE.

WELL DIAGRAM IS NOT TO SCALE

**Well Construction Log**

<b>Boring Location</b> ADJACENT TANK PIT #1		<b>Boring/Well Name</b> MW-1	
<b>Drilling Company</b> HEW DRILLING		<b>Project Name</b> 5TH & KIRKHAM	
<b>Drilling Method</b> HOLLOW STEM AUGER	<b>Rig Type</b> CME 75	<b>Project Number</b> 05032	
<b>Hole Diameter</b> 10 In.	<b>Driller</b> JEFF	<b>Date</b> 10/23/90	<b>Logged By</b> W.FLOYD
<b>Ground Elevation</b>	<b>Water Elevation</b>	<b>Total Depth</b> 22'	

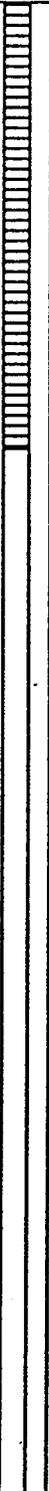
**Well Construction Specifics**

<b>Screen Placement</b> from 5 ft. to 22 ft.	<b>Slot Size</b> 0.020 inches	<b>Diameter</b> 4 inches	<b>Completion Type:</b> Above Ground <input type="checkbox"/>
<b>Blank Casing</b> from 0 ft. to 5 ft.	<b>Schedule</b> 40	<b>Diameter</b> 4 inches	
<b>Filter Pack</b> from 4 ft. to 22 ft.	<b>Size</b> #3	<b>Type</b> SAND	At Grade <input checked="" type="checkbox"/>
<b>Bentonite Pellets</b> from 3 ft. to 4 ft.	<b>Type</b> VOLCLAY	<b>Size</b> 3/8 inches	Hydrated <input checked="" type="checkbox"/> yes <input type="checkbox"/> no
<b>Cement/Bentonite</b> from 0 ft. to 3 ft.	<b>Type</b> PORTLAND	<b>Percent Bentonite</b> 3	

Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-1 5'	100%	2 1 1	1	BENTONITE/CEMENT GROUT		SM		3" ASPHALT CAP	
			2					1' OF SUBGRADE	
			3					SILTY SAND: DARK GREY TO BLACK, CONTAINS ASHES, BOTTLES, BRICKS, SHOES, ETC....., NO ODORS, SOFT.	
			4	BENTONITE PELLETS					
MW-1 8.5'	100%	4 8 10	5			SP		SAND: YELLOWISH BROWN, NO ODORS, PLANT REMAINS, MEDIUM TO FINE GRAINED, MEDIUM DENSE POORLY GRADED.	
			6						
			7						
			8	FILTER PACK					
MW-1 15'	100%	4 7 8	9					SATURATED AT 10', NO ODORS	
			10						
			11	SCREENED PVC					

Well Construction Log

SP ENVIRONMENTAL SYSTEMS, INC.

Well Number MW-1				Project Number 05032			Project Name 5TH & KIRKHAM		
Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-1 20'	100%	7	17			SP		SAME	
		12	18						
		13	19						
			20						
			21						
			22						
			23						
			24						
			25						
			26						
			27						
			28						
			29						
			30						
			31						
			32						
	33								
	34								
	35								



# Well Construction Log

**SP ENVIRONMENTAL SYSTEMS, INC.**

Well Number MW-3				Project Number 05032			Project Name 5TH & KIRKHAM		
Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-3 20'	100%	4	17			SP-SC		SAME	
		8	18						
		9	19						
			20						
			21						
			22						
			23						
			24						
			25						
			26						
			27						
			28						
			29						
			30						
			31						
			32						
			33						
	34								
	35								

**Well Construction Log**

<b>Boring Location</b> ADJACENT TO TANK PIT #4			<b>Boring/Well Name</b> MW-4		
<b>Drilling Company</b> HEW DRILLING			<b>Project Name</b> 5TH & KIRKHAM		
<b>Drilling Method</b> HOLLOW STEM AUGER		<b>Rig Type</b> CME 75		<b>Project Number</b> 05032	
<b>Hole Diameter</b> 10	<b>In. Driller</b> JEFF	<b>Date</b> 10/24/90	<b>Logged By</b> W.FLOYD		
<b>Ground Elevation</b>		<b>Water Elevation</b>		<b>Total Depth</b> 22'	

**Well Construction Specifics**

<b>Screen Placement</b> from 7 ft. to 22 ft.	<b>Slot Size</b> 0.020 inches	<b>Diameter</b> 4 inches	<b>Completion Type:</b> Above Ground _____ At Grade <u>X</u>
<b>Blank Casing</b> from 0 ft. to 7 ft.	<b>Schedule</b> 40	<b>Diameter</b> 4 inches	
<b>Filter Pack</b> from 6 ft. to 22 ft.	<b>Size</b> #3	<b>Type</b> SAND	
<b>Bentonite Pellets</b> from 5 ft. to 6 ft.	<b>Type</b> VOLCLAY	<b>Size</b> 3/8 inches	<b>Hydrated</b> <u>X</u> yes ___ no
<b>Cement/Bentonite</b> from 0 ft. to 5 ft.	<b>Type</b> PORTLAND	<b>Percent Bentonite</b> 3	

Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)	
MW4 4'	100%	1 1 3	1	<p>BENTONITE/CEMENT GROUT</p> <p>BENTONITE PELLETS</p> <p>SCREENED PVC</p> <p>FILTER PACK</p>		AF  SM  SP-SC		4" CONCRETE CAP	0	
			2					1.5' OF SILTY GRAVEL SUBGRADE		
			3					SILTY SAND; DARK GREY, NO ODORS, LOOSE, MOIST.		
			4							
MW4 8'	30%	6 8 10  8 7 6	5					SAND; BROWN, MEDIUM GRAINED, PLANT REMAINS, NO ODOR, POORLY GRADED, 10% CLAY.		
			6							
			7							
			8							
			9							YELLOWISH BROWN, MEDIUM DENSE, SOME ROOT HAIRS.
			10							
			11							
			12							
			13							
			14							
			15							

# Well Construction Log

**SP ENVIRONMENTAL SYSTEMS, INC.**

Well Number MW-4				Project Number 05032			Project Name 5TH & KIRKHAM		
Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-4 20'	100%	8	17			SP- SC		SAME	
		8	18						
		12	19						
			20						
			21						
			22						
			23						
			24						
			25						
			26						
			27						
			28						
			29						
			30						
			31						
			32						
			33						
	34								
	35								

**Well Construction Log**

<b>Boring Location</b> Eastern side of property	<b>Boring/Well Name</b> MW-6
<b>Drilling Company</b> HEW Drilling	<b>Project Name</b> 5TH & KIRKHAM
<b>Drilling Method</b> Hollow Stem Auger	<b>Rig Type</b> CME 75
<b>Hole Diameter</b> 10" In.	<b>Driller</b> Jeff
<b>Date</b> 10/23/90	<b>Logged By</b> W. FLOYD
<b>Ground Elevation</b>	<b>Water Elevation</b>
<b>Total Depth</b> 29'	

**Well Construction Specifics**

<b>Screen Placement</b> from 9 ft. to 29 ft.	<b>Slot Size</b> 0.020 inches	<b>Diameter</b> 4 inches	<b>Completion Type:</b>
<b>Blank Casing</b> from 0 ft. to 9 ft.	<b>Schedule</b> 40	<b>Diameter</b> 4 inches	Above Ground
<b>Filter Pack</b> from 8 ft. to 29 ft.	<b>Size</b> #3	<b>Type</b> SAND	At Grade <input checked="" type="checkbox"/>
<b>Bentonite Pellets</b> from 6.5 ft. to 8 ft.	<b>Type</b> VOLCLAY	<b>Size</b> 3/8 inches	Hydrated <input checked="" type="checkbox"/> yes <input type="checkbox"/> no
<b>Cement/Bentonite</b> from 0 ft. to 6.5 ft.	<b>Type</b> PORTLAND	<b>Percent Bentonite</b> 3	

Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-6 5'	100%	6 3 3	1			AF		4" ASPHALT CAP	
			2			SM		1.5' OF SILTY GRAVEL SUBGRADE	
			3			SM		SILTY SAND; DARK GREY, NO ODORS, LOOSE	
MW-6 10'	100%	0 0 0	4						
			5						
			6						
MW-6 15'	100%	1 2 1	7			CH		BAY MUD; DARK GREY, STRONG SULFIDE ODOR, VERY SOFT, HIGHLY PLASTIC, FIBROUS PLANT REMAINS	
			8			CH			
			9			CH			
			10						
			11						
			12						
			13			SP-SC		SAND; MEDIUM TO FINE GRAINED, DARK GREY, LOOSE, SOME PLANT REMAINS, POORLY GRADED, SATURATED.	
			14						
			15						

# Well Construction Log

**SP ENVIRONMENTAL SYSTEMS, INC.**

Well Number MW-6				Project Number 05032			Project Name 5TH & KIRKHAM		
Sample Number	Recov.	Blows / 6-inches	Depth Feet	Well Detail	Lithology	USCS Log	Color	Sample Description	FID/PID (ppm)
MW-6 20'	100%	2	17			SP-SC		COLOR CHANGE AT 20' TO YELLOWISH BROWN.	
		2	18						
		2	19						
MW-6 25'	100%	16	20			SC		DENSER	
		21	21						
			22						
			23						
			24						
			25						
MW-6 30'	100%	18	26						
		26	27						
			28						
			29						
			30						
			31						
	32								
	33								
	34								
	35								



ERM  
1777 Botelho Drive  
Suite 260  
Walnut Creek, California 94596  
(925) 946-0455

# BOREHOLE LOG

Site Id: MW-7  
Page 1 of 1

Project Number: 8040.14

Total Depth: 20.00'

Project Name: Bobo's

Completed Depth: 20.00'

Location: 1401 Third Street, Oakland, California

Borehole Dia.: 8.00in

Contractor: Gregg Drilling

Drilling Method: Hollow Stem Auger

Logged By: K. Fox-Dobbs, J. Tundermann

Date(s): 12/11/00

Blank Casing:			
type: Sch 40 PVC	dia: 2.00in	fm: 0.0'	to: 10.00'
Screens:			
type: Slotted	size: 0.020in	dia: 2.00in	fm: 10.00' to: 20.00'
Annular Fill:			
type: Grout		fm: 0.00'	to: 8.00'
type: Bentonite Seal		fm: 8.00'	to: 9.00'
type: Sand Filter (Lonestar #2/12)		fm: 9.00'	to: 20.00'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Recovery	PID (ppm)	Description/Soil Classification
0.0		FILL		HAND AUGER		0.0	SILTY SAND/GRAVEL (FILL): brown gray.
5.0		ML				0.0	SILT (ML): dark brown, some organics, dry.
10.0		ML			NO REC.	0.0	CLAYEY SILT (ML): brown gray, sandy, iron oxide present, slightly moist.
15.0		SP			NO REC.	0.0	SAND (SP): brown, fine grained, increasing clay with depth, moist.
20.0		ML			NO REC.	0.0	SANDY SILT (ML): brown, moist. Bottom of Boring - 20.0'



ERM  
1777 Botelho Drive  
Suite 260  
Walnut Creek, California 94596  
(925) 946-0455

# BOREHOLE LOG

Site Id: MW-8  
Page 1 of 1

Project Number: 8040.14

Total Depth: 19.50'

Project Name: Bobo's

Completed Depth: 19.50'

Location: 1401 Third Street, Oakland, California

Borehole Dia.: 8.00in

Contractor: Gregg Drilling

Drilling Method: Hollow Stem Auger

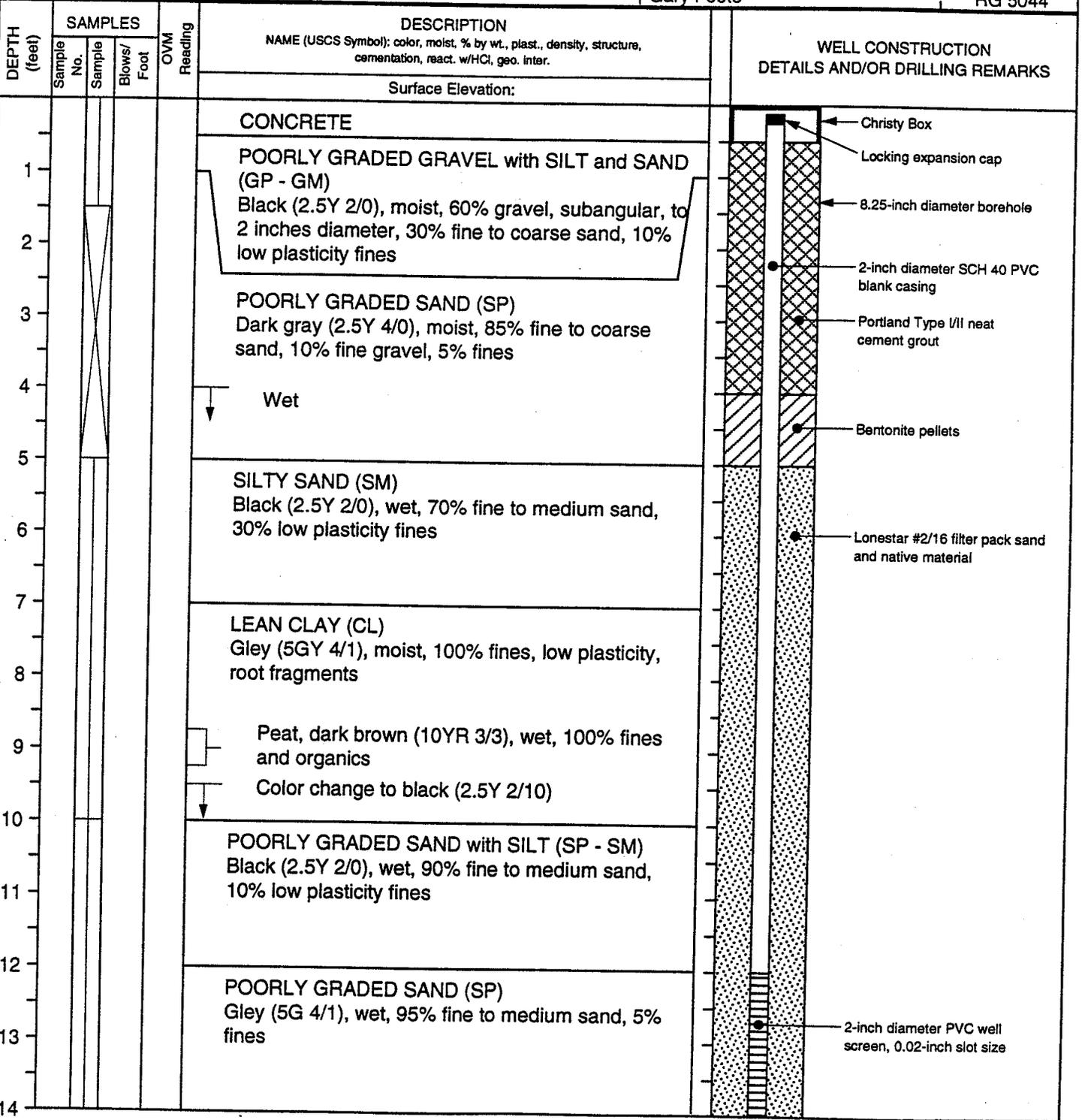
Logged By: K. Fox-Dobbs, J. Tundermann

Date(s): 12/11/00

Blank Casing:			
type: Sch 40 PVC	dia: 2.00in	fm: 0.0'	to: 9.50'
Screens:			
type: Slotted	size: 0.020in	dia: 2.00in	fm: 9.50' to: 19.50'
Annular Fill:			
type: Grout		fm: 0.00'	to: 7.50'
type: Bentonite Seal		fm: 7.50'	to: 8.50'
type: Sand Filter (Lonestar #2/12)		fm: 8.50'	to: 19.50'

Depth (ft)	Graphic Log	USCS Code	Well Construction	Sample Recovery	Recovery	PI/D (ppm)	Description/Soil Classification
0.0		FILL			NO REC.		SILTY SAND/GRAVEL (FILL): brown.
0.0					NO REC.		GRAVELLY SILT (FILL): brown, ceramic chips, wood fragments, glass chips.
7.0		PT			NO REC.		PEAT (Pt): black to blue gray, organic material, hydrogen sulfide odor.
0.0		SM			NO REC.		SILTY SAND (SM): blue gray, very fine grained, moist.
0.0					NO REC.		SILTY SAND (SM): as above.
0.0							Bottom of Boring - 19.5'

PROJECT: I-880 Oakland, California		<b>Log of Piezometer No. P-1</b>	
BORING LOCATION: Bobo's Junkyard		ELEVATION AND DATUM: N/A	
DRILLING CONTRACTOR: Gregg Drilling and Testing		DATE STARTED: 3/3/95	DATE FINISHED: 3/3/95
DRILLING METHOD: Hollow stem auger		TOTAL DEPTH: 18 feet	SCREEN INTERVAL: 12' - 17'
DRILLING EQUIPMENT: Mobile Drill B-61		DEPTH TO WATER ATD: 4 feet	CASING: 2-inch SCH 40 PVC
SAMPLING METHOD: 5-foot continuous core		LOGGED BY: C. F. Rome	
HAMMER WEIGHT: N/A	DROP: N/A	RESPONSIBLE PROFESSIONAL: Gary Foote	REG. NO. RG 5044



2686L.001

PROJECT: I-880  
Oakland, California

# Log of Piezometer No. P-1 (cont.)

DEPTH (feet)	SAMPLES					DESCRIPTION NAME (USCS Symbol): color, moist, % by wt., plast. density, structure, cementation, react. w/HCl, geo. inter.	WELL CONSTRUCTION DETAILS AND/OR DRILLING REMARKS
	Sample No.	Sample	Blows/ Foot	OVM	Reading		
15						POORLY GRADED SAND (SP) (continued)	<p>8.25-inch diameter borehole</p> <p>Lonestar #2/16 filter pack sand</p> <p>2-inch diameter PVC well screen, 0.02-inch slot size</p> <p>PVC threaded end cap</p>
16							
17							
18						Bottom of boring at 18 feet bgs	
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

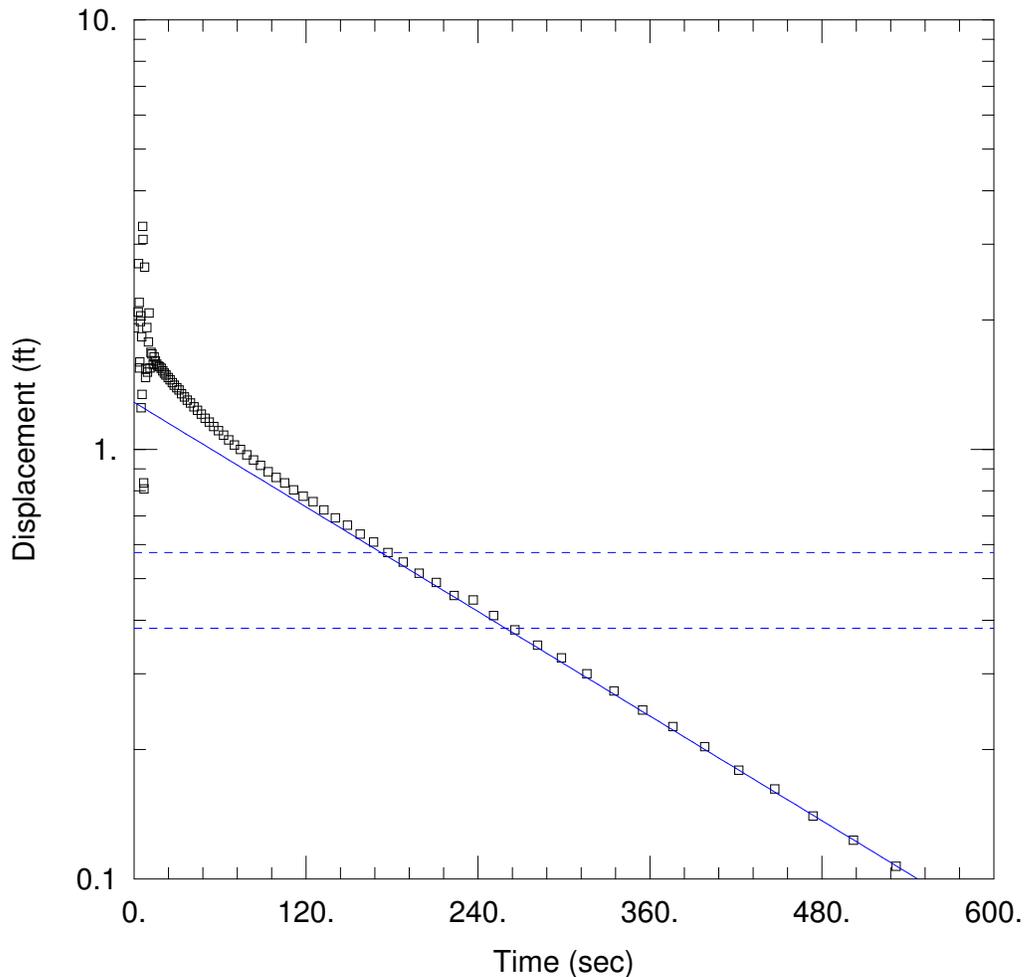
W-2 (11/92)

## **Aquifer Test Data**

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WELL TEST ANALYSIS

Data Set: \...\RMW-07-15\_in\_2.aqt  
 Date: 10/05/07

Time: 15:12:37

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO  
 Test Well: RMW-07-15-i2  
 Test Date: 4/12/05

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-07-15)

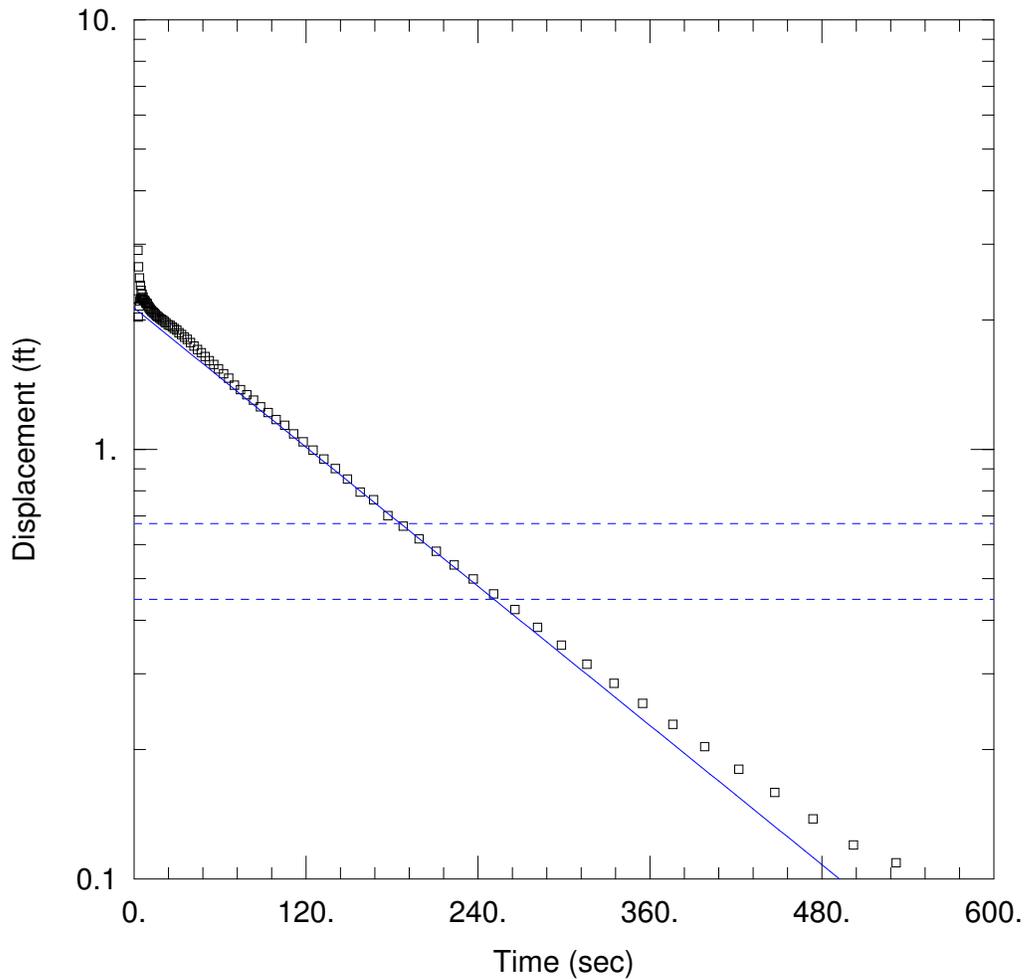
Initial Displacement: 1.916 ft  
 Total Well Penetration Depth: 11.54 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.54 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0001627 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.286 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-07-15\_out\_1.aqt  
 Date: 10/05/07

Time: 15:11:39

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-07-15-o1  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-07-15)

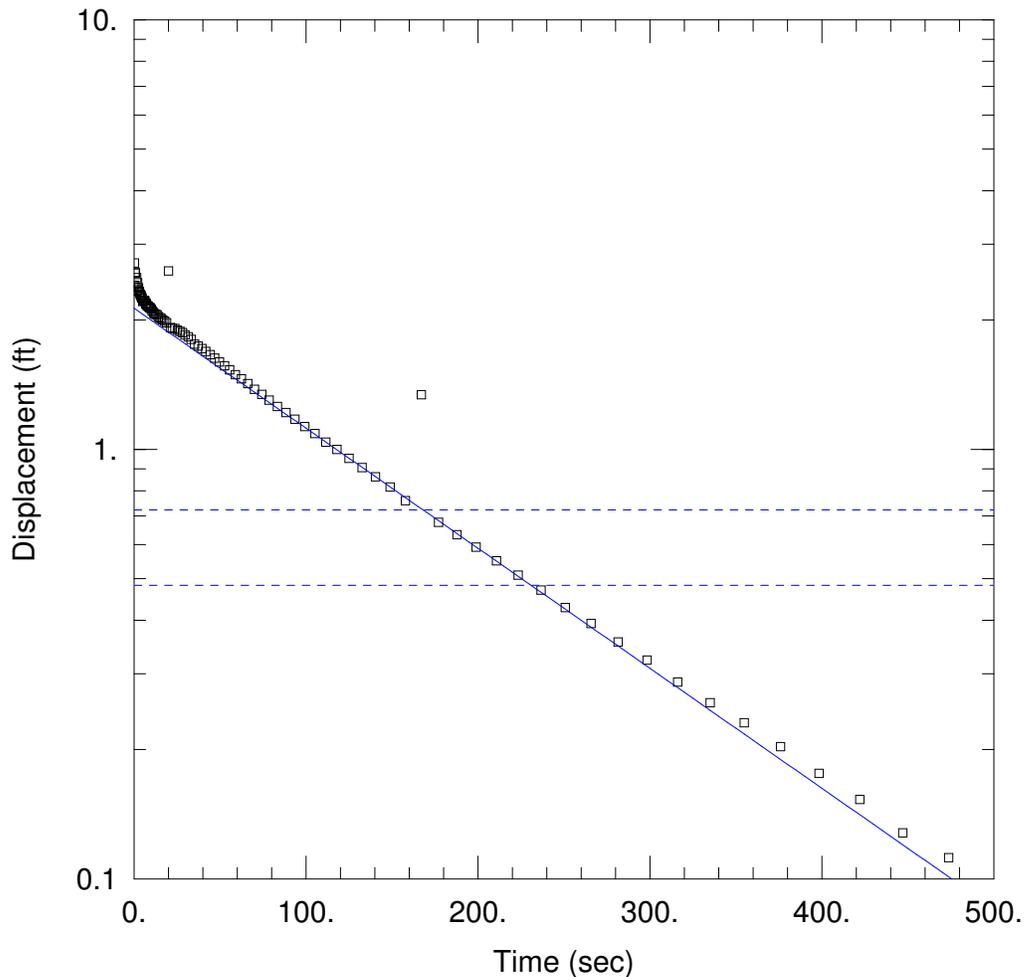
Initial Displacement: 2.238 ft  
 Total Well Penetration Depth: 11.54 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.54 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0002164 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.132 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-07-15\_out\_2.aqt  
 Date: 10/05/07

Time: 15:13:07

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-07-15-o2  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-07-15)

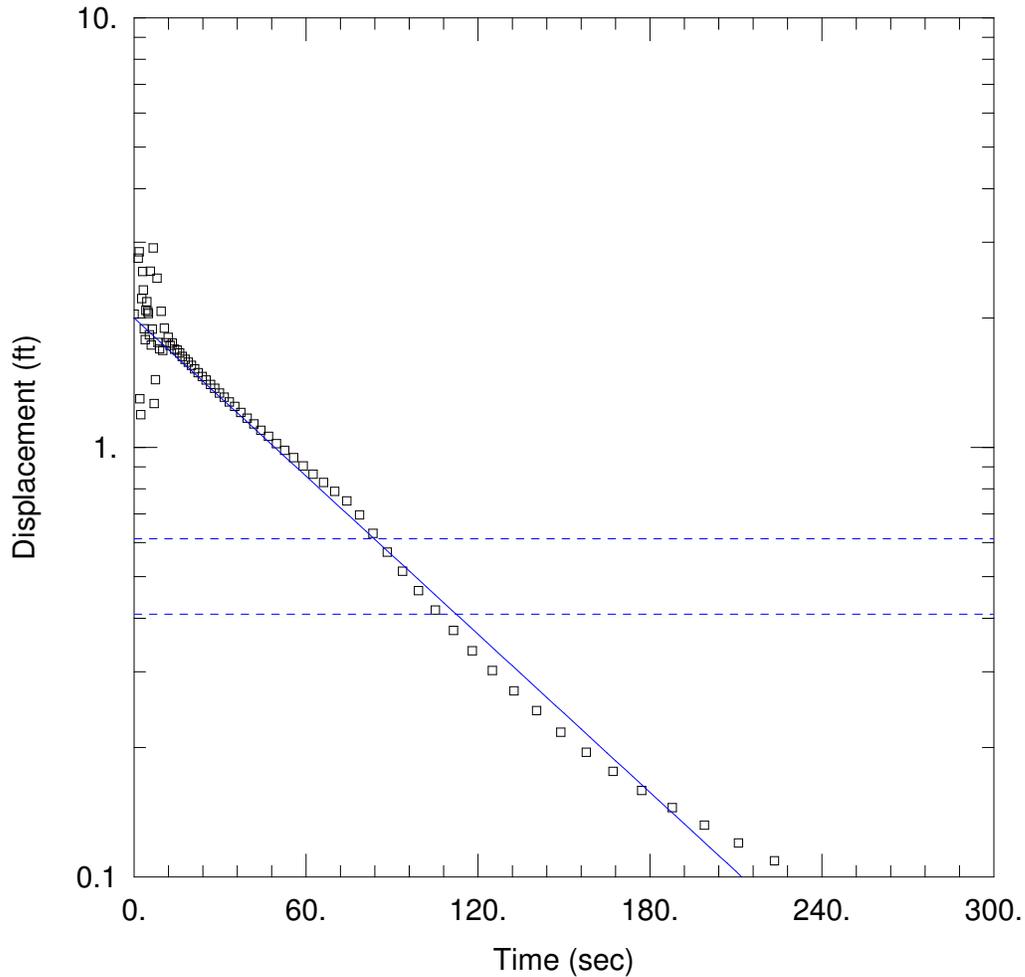
Initial Displacement: 2.41 ft  
 Total Well Penetration Depth: 11.54 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.54 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.000224 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.13 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-08-15\_in\_1.aqt  
 Date: 10/05/07

Time: 15:13:58

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-15-i1  
 Test Date: 4/13/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-08-15in1)

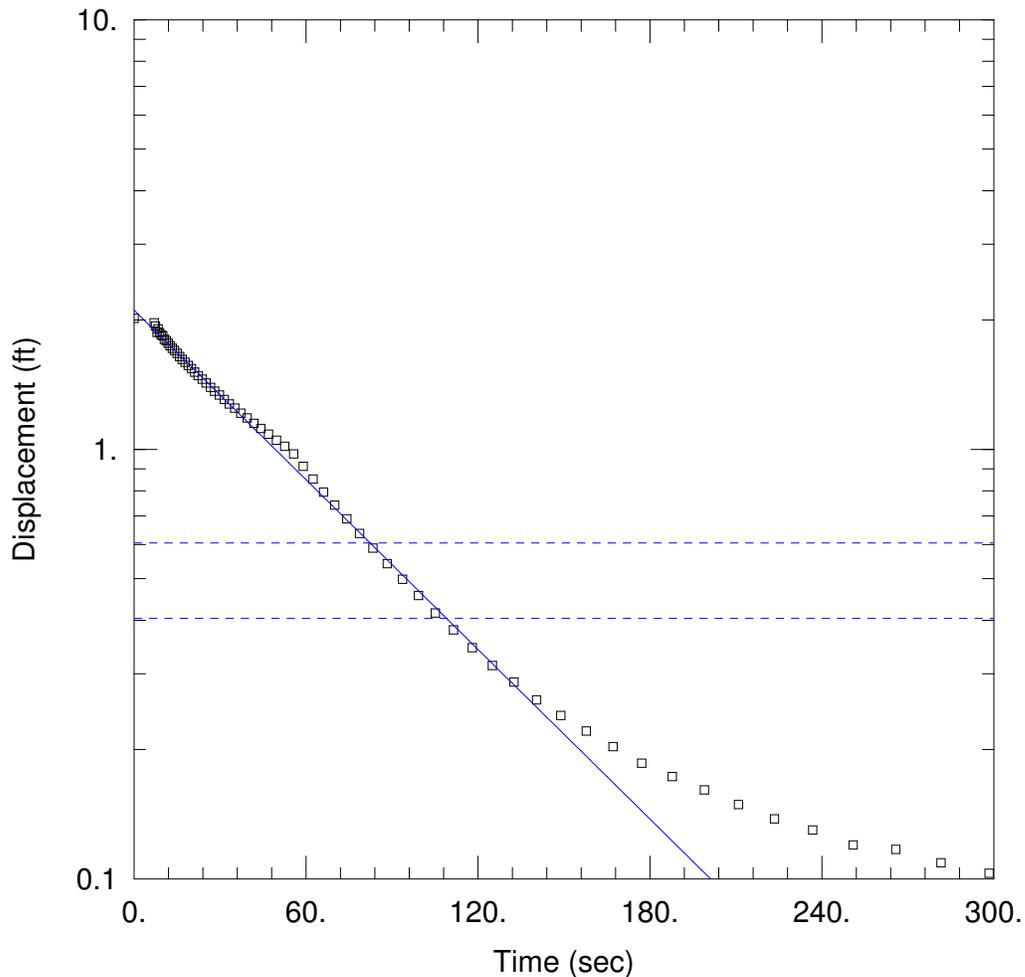
Initial Displacement: 2.043 ft  
 Total Well Penetration Depth: 10.42 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.42 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0004843 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.999 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-08-15\_in\_2.aqt  
 Date: 10/05/07

Time: 15:14:40

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-15-in2  
 Test Date: 4/13/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-08-15-i2)

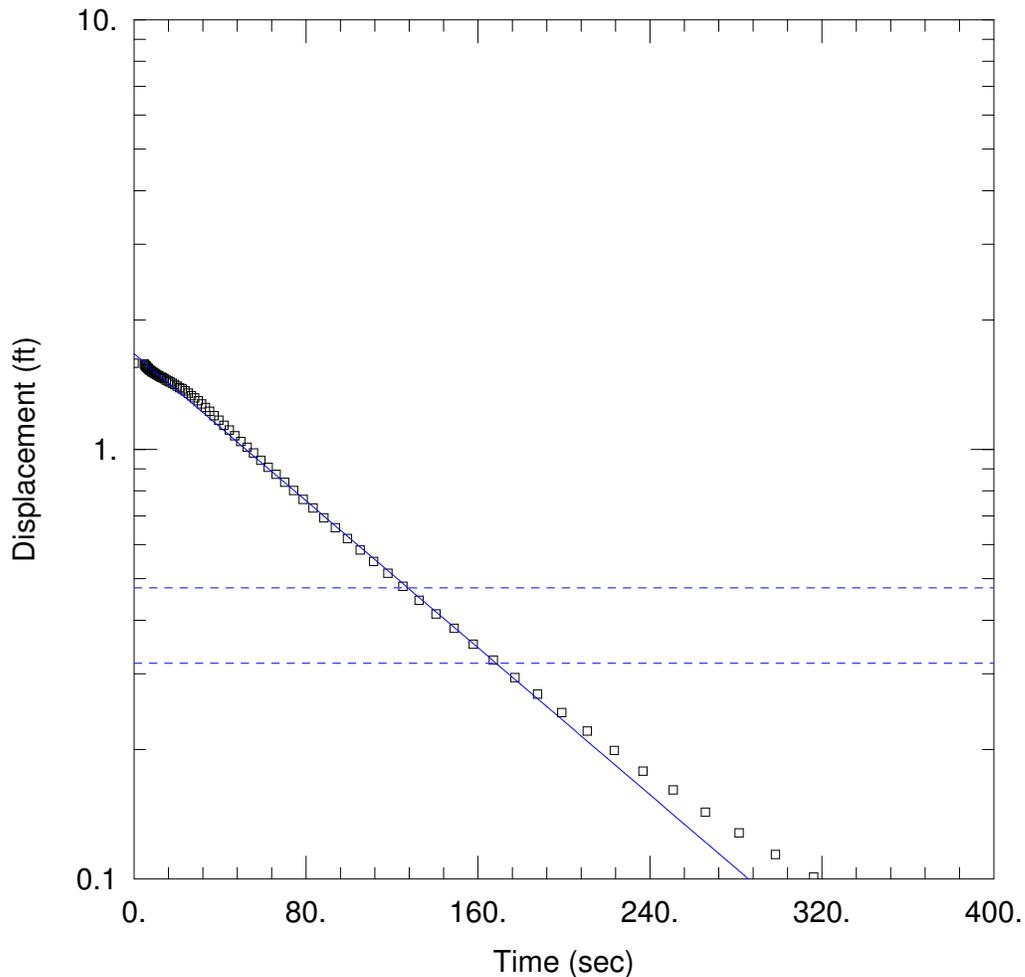
Initial Displacement: 2.018 ft  
 Total Well Penetration Depth: 10.42 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.42 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0005196 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.108 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-08-15\_out\_1.aqt  
 Date: 10/05/07

Time: 15:15:30

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-15-o1  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-08-15-o1)

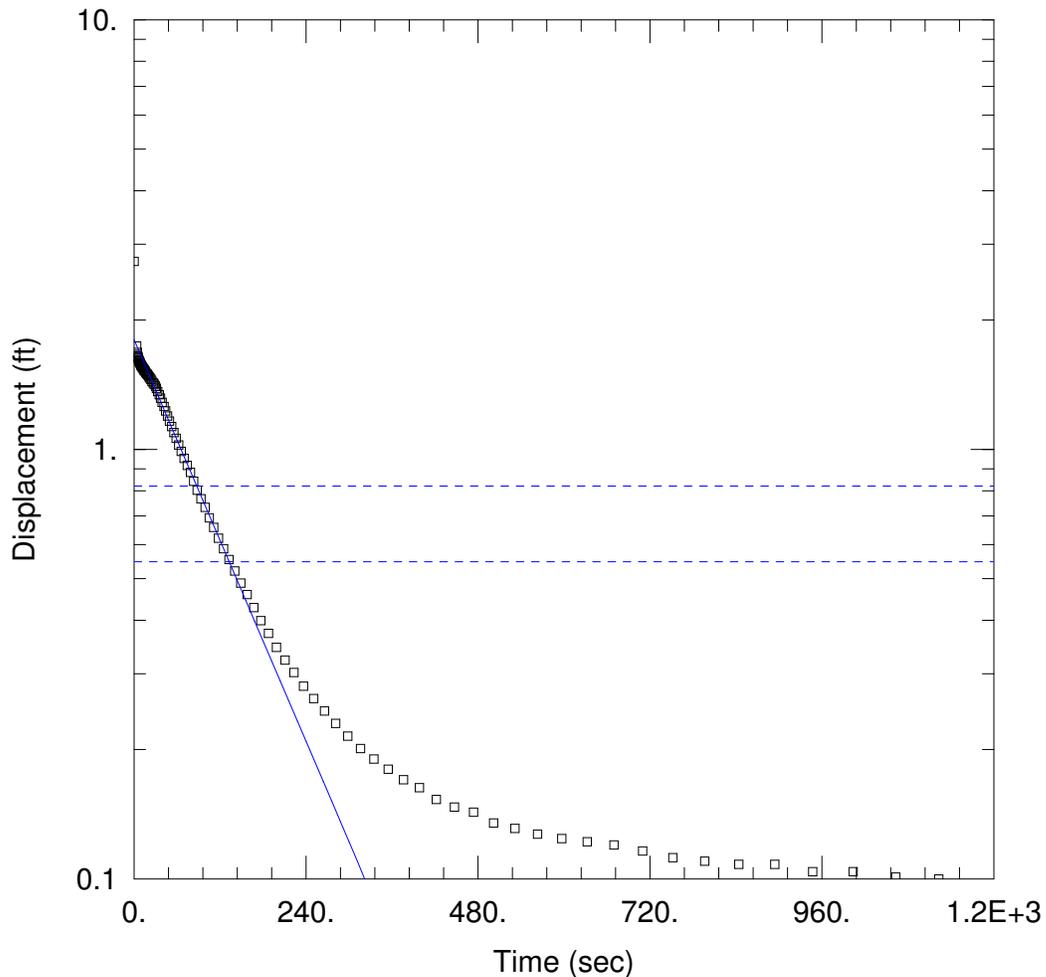
Initial Displacement: 1.587 ft  
 Total Well Penetration Depth: 10.42 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 10.42 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0003377 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.669 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-08-15\_out\_2.aqt  
 Date: 10/05/07

Time: 15:15:09

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-15-o2  
 Test Date: 4/13/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-08-15)

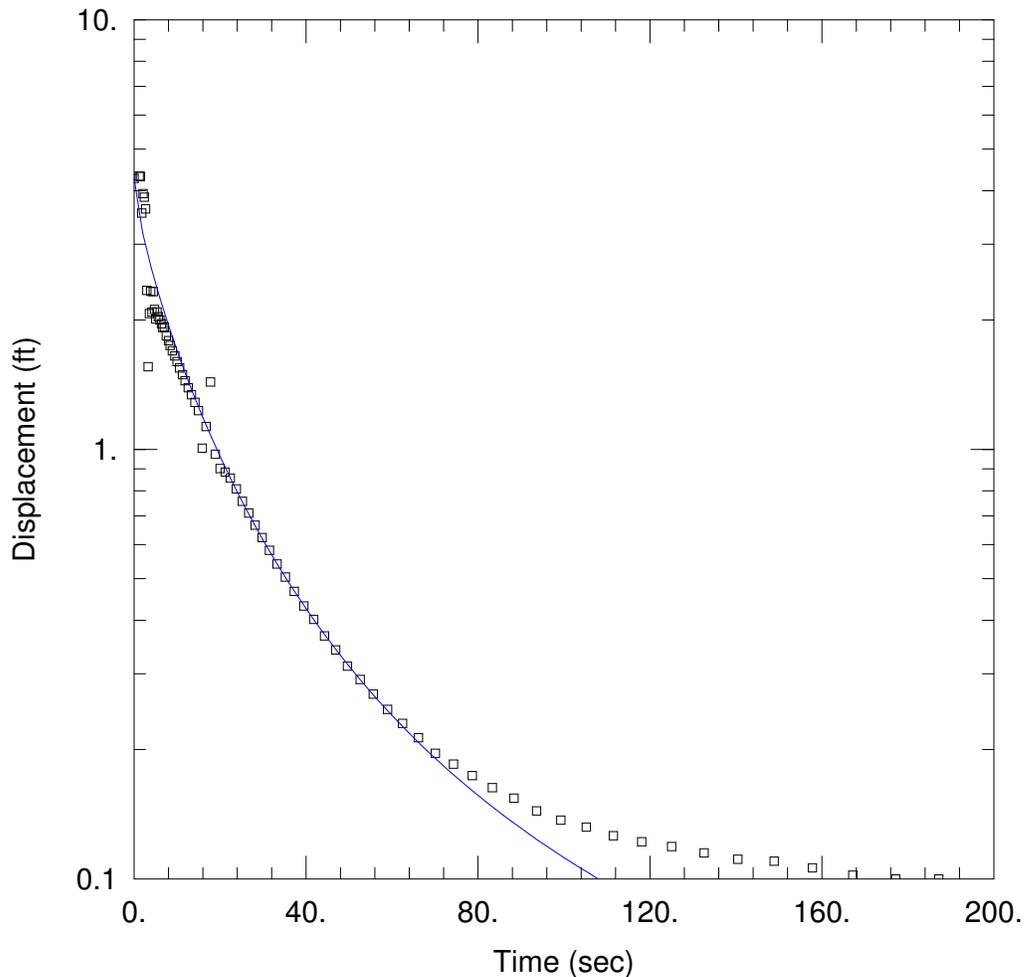
Initial Displacement: 2.736 ft  
 Total Well Penetration Depth: 10.42 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 110.4 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.0003075 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.799 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-08-35\_in\_1.aqt  
 Date: 10/05/07

Time: 15:16:05

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-35-i1  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-08-35\_i1)

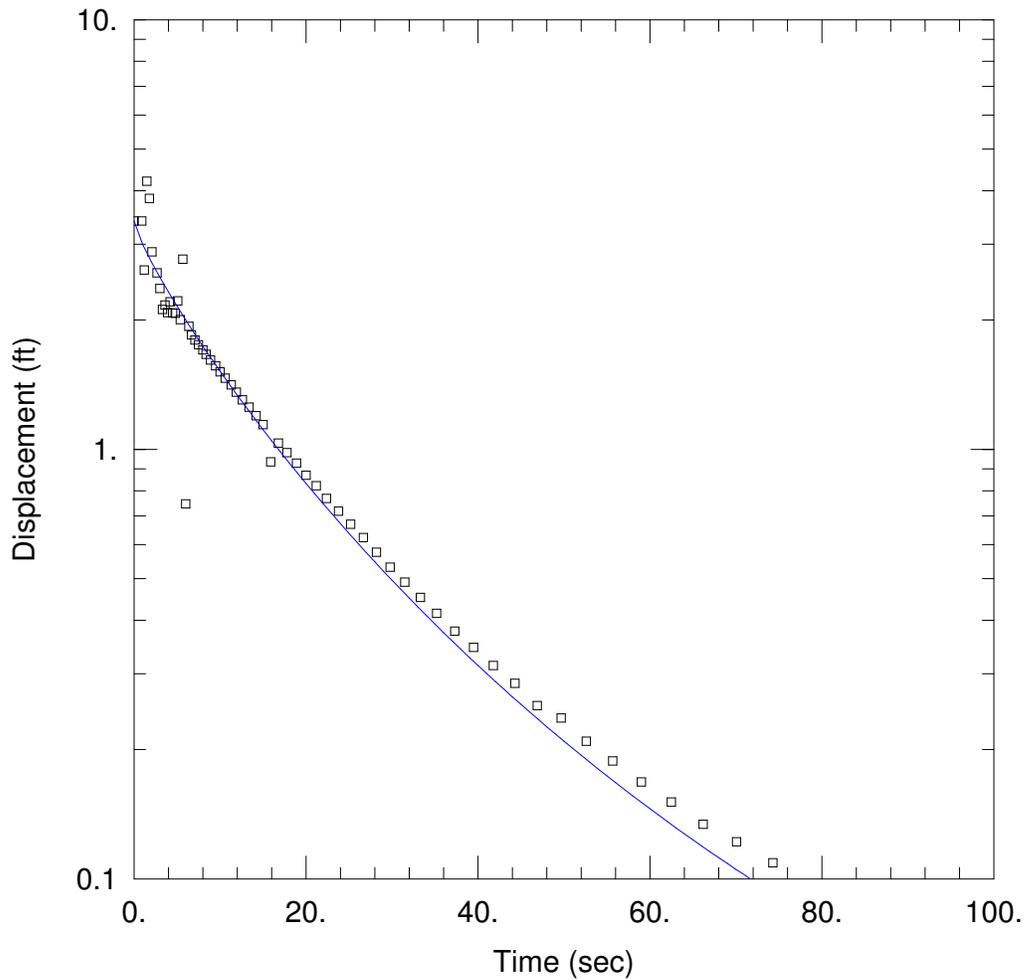
Initial Displacement: 4.272 ft  
 Total Well Penetration Depth: 28.24 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 28.24 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.002275 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.001821 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \...\RMW-08-35\_in\_2.aqt  
 Date: 10/05/07

Time: 15:16:28

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-03-35-i2  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-08-35\_i2)

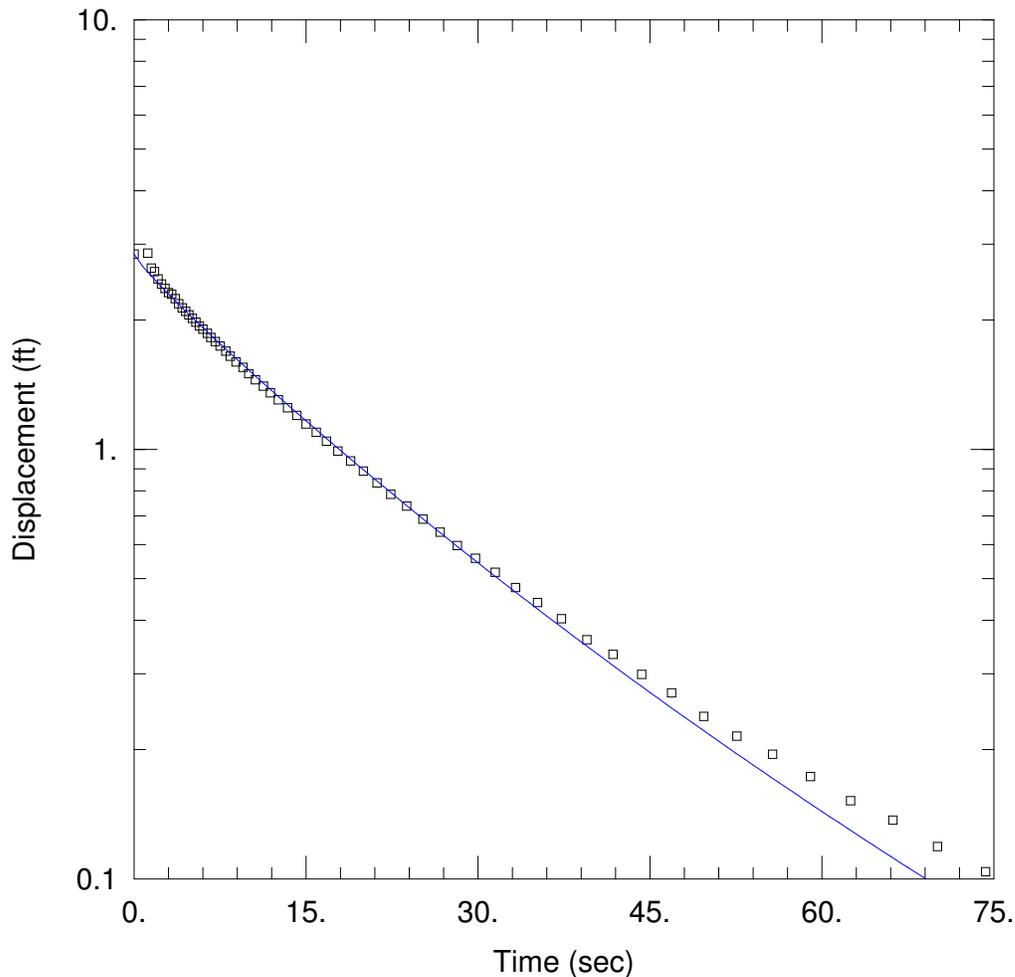
Initial Displacement: 3.399 ft  
 Total Well Penetration Depth: 28.24 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 28.24 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.002765 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.0002123 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \\...\RMW-08-35\_out\_1.aqt  
 Date: 10/05/07

Time: 15:16:46

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-35-o1  
 Test Date: 4/13/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-08-35\_o1)

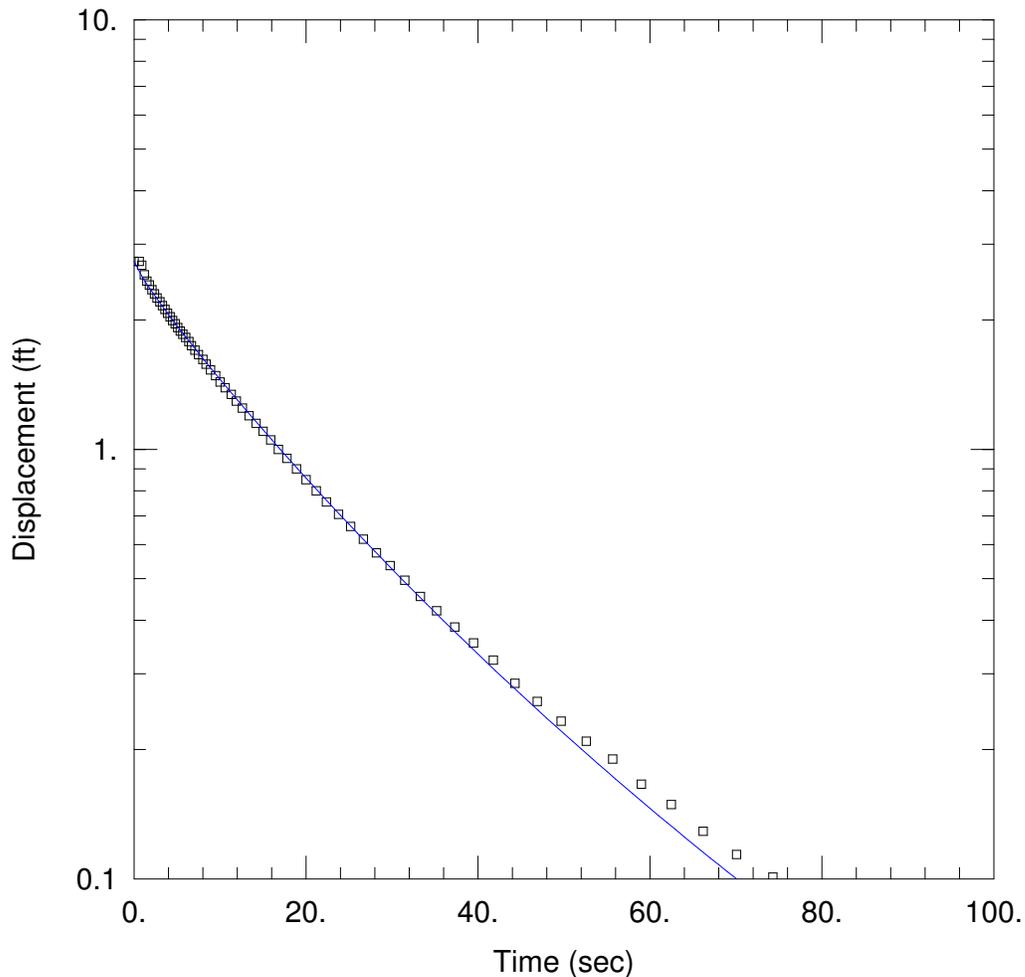
Initial Displacement: 2.846 ft  
 Total Well Penetration Depth: 28.24 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 28.24 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.002492 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 3.213E-5 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \\...\RMW-08-35\_out\_2.aqt  
 Date: 10/05/07

Time: 15:17:03

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-08-35-o2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-08-35\_o2)

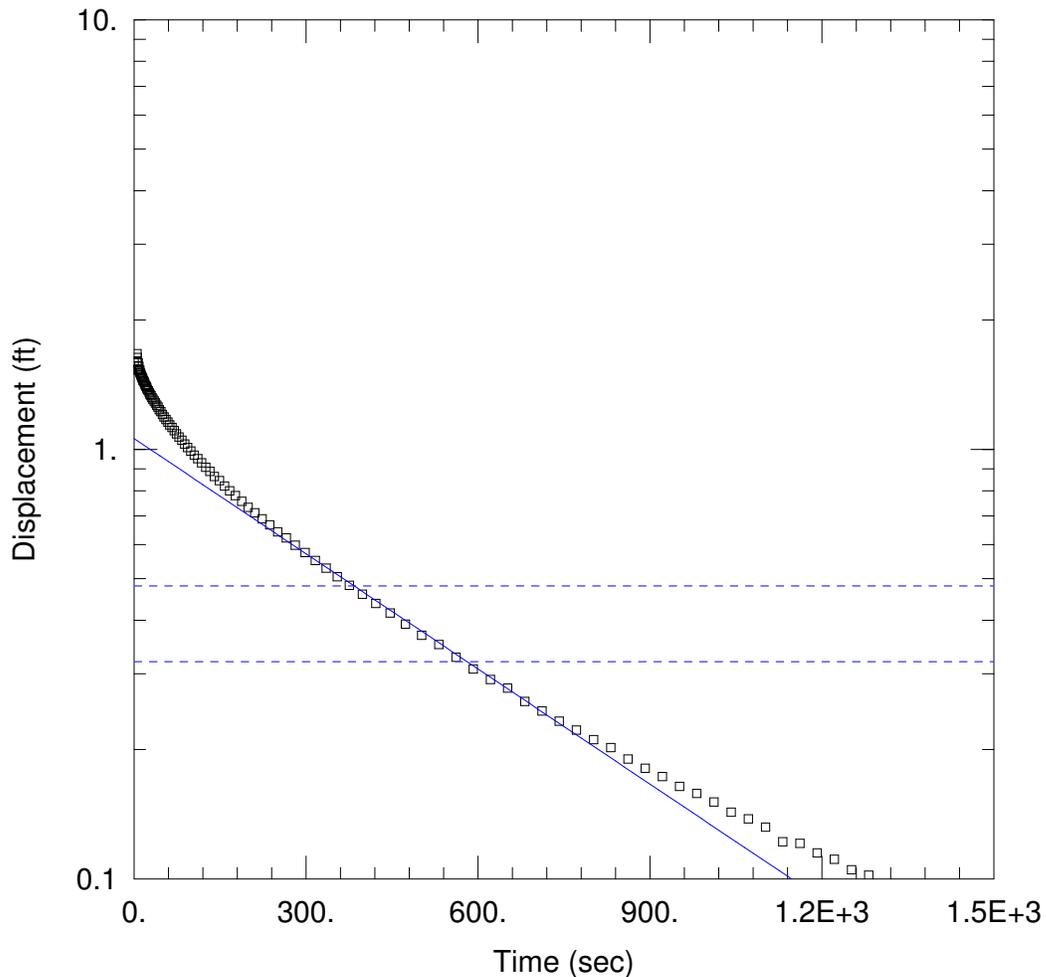
Initial Displacement: 2.736 ft  
 Total Well Penetration Depth: 28.24 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 28.24 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.002448 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 4.907E-5 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \...\RMW-09-15\_in\_1.aqt  
 Date: 10/05/07

Time: 15:17:33

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-15-i1  
 Test Date: 4/12/2006

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-15)

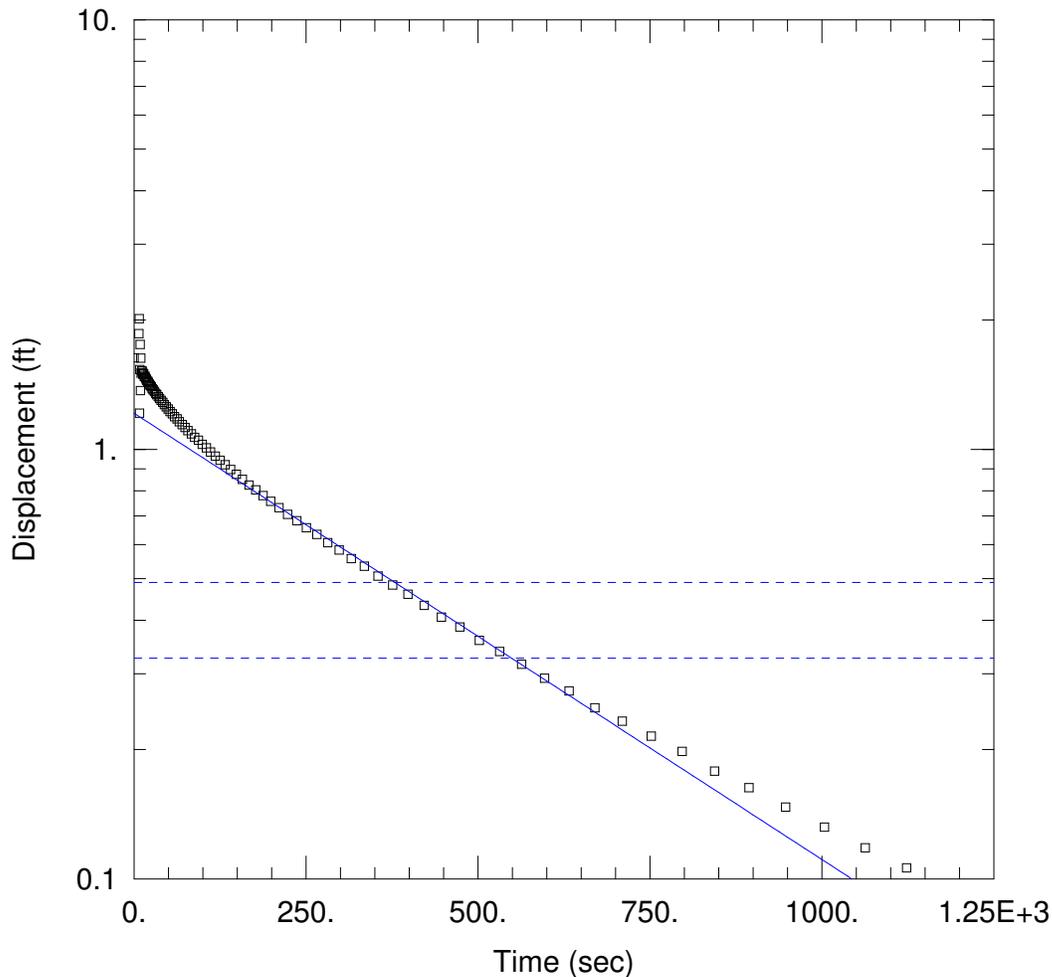
Initial Displacement: 1.601 ft  
 Total Well Penetration Depth: 11.64 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.64 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 7.175E-5 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.059 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-09-15\_in\_2.aqt  
 Date: 10/05/07

Time: 15:17:50

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335338  
 Location: AMCO Superfund  
 Test Well: RMW-09-15-i2  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-15-i2)

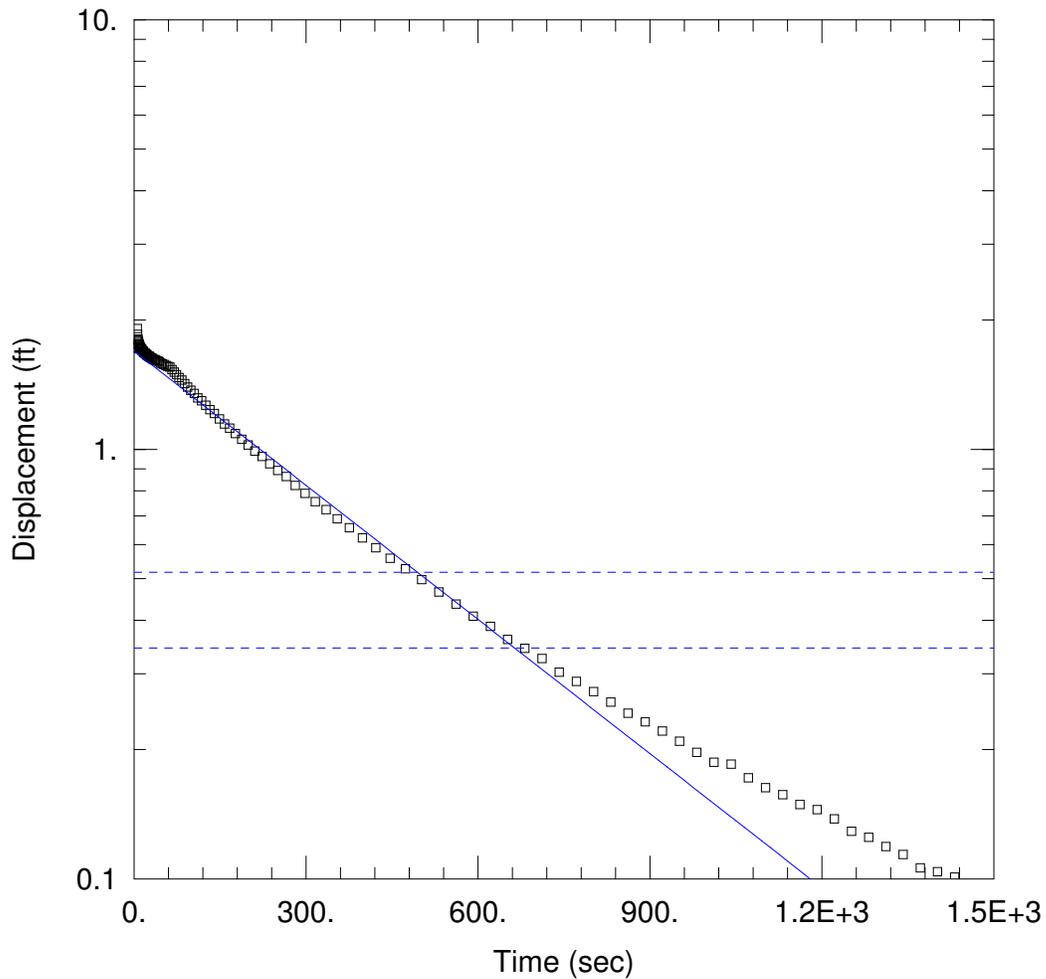
Initial Displacement: 1.632 ft  
 Total Well Penetration Depth: 11.64 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.64 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 8.341E-5 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.213 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-09-15\_out\_1.aqt  
 Date: 10/05/07

Time: 15:18:06

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-15-o1  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-15-o1)

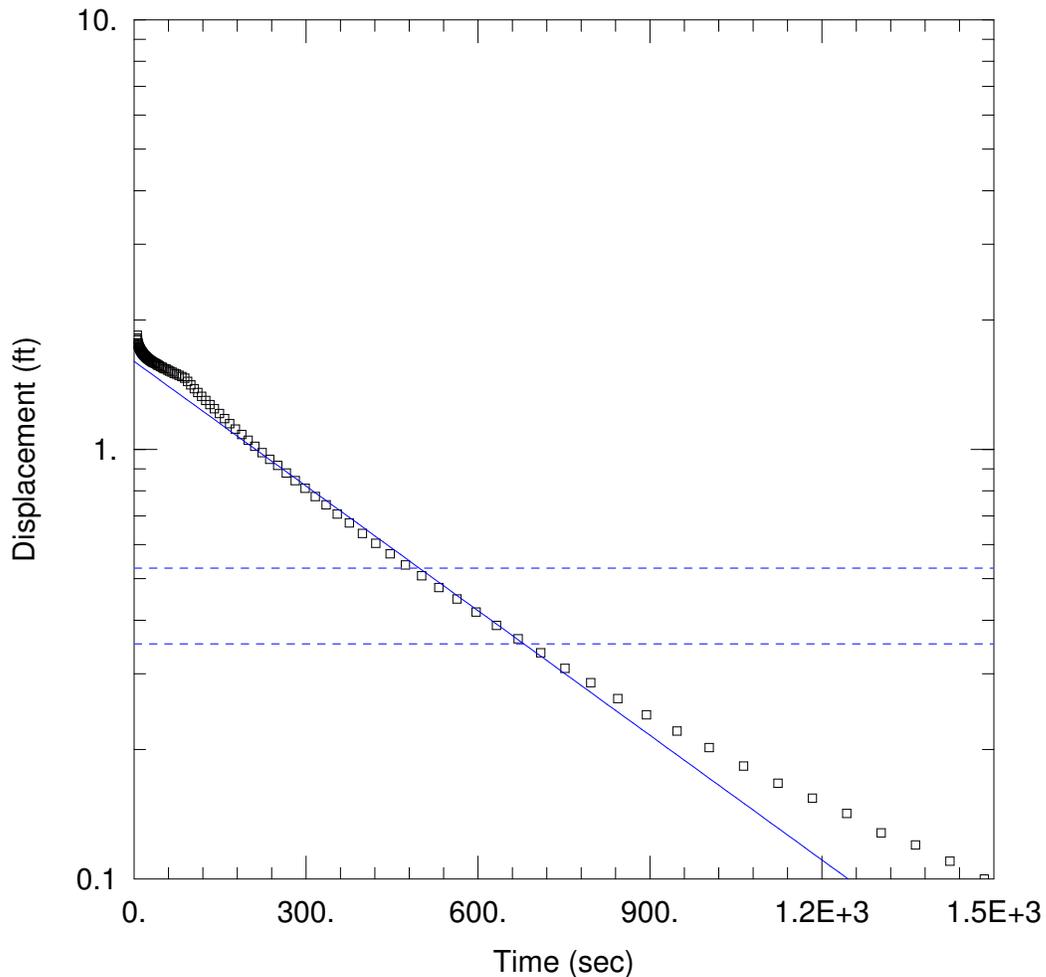
Initial Displacement: 1.724 ft  
 Total Well Penetration Depth: 11.64 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.64 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 8.36E-5 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.693 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-09-15\_out\_2.aqt  
 Date: 10/05/07

Time: 15:18:18

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-15-o2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-15-o2)

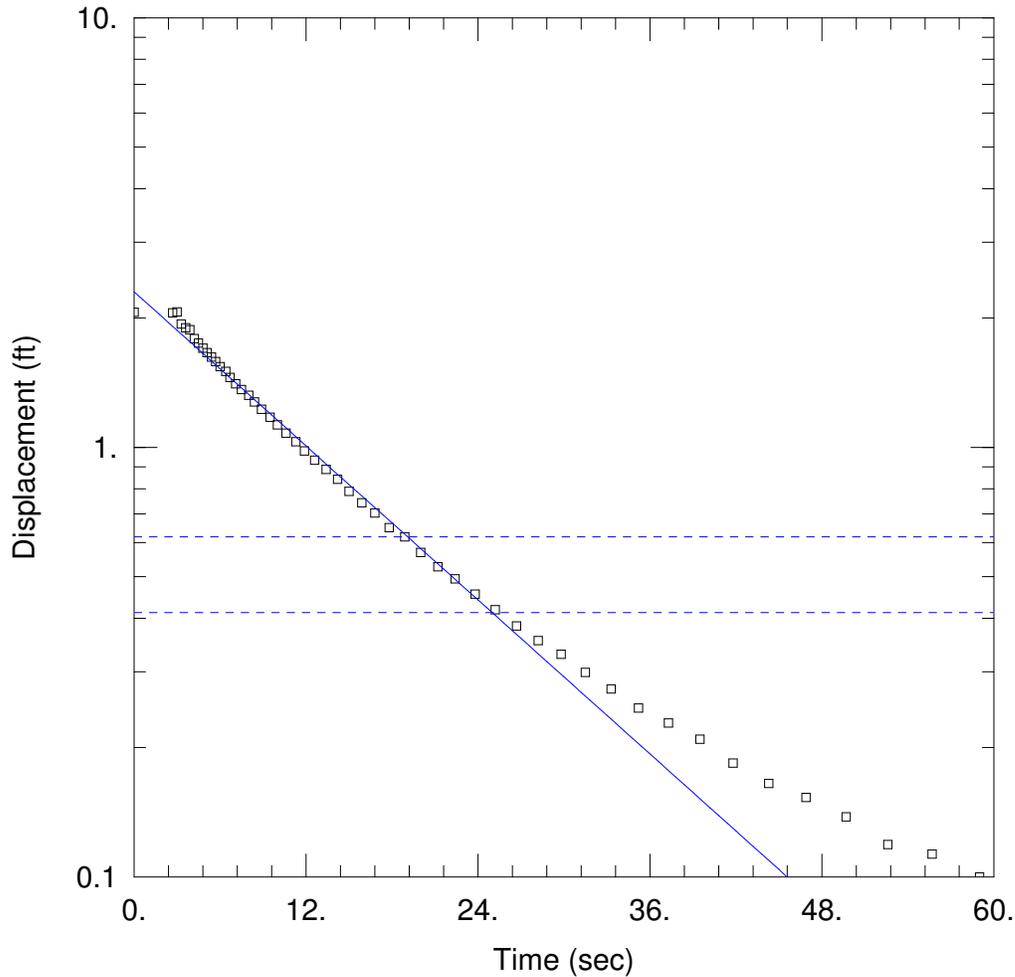
Initial Displacement: 1.762 ft  
 Total Well Penetration Depth: 11.64 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.64 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 7.765E-5 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 1.602 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-09-35\_in\_1.aqt  
 Date: 10/05/07

Time: 15:18:57

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-35-i1  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-35-i1)

Initial Displacement: 2.062 ft  
 Total Well Penetration Depth: 31.51 ft  
 Casing Radius: 0.08333 ft

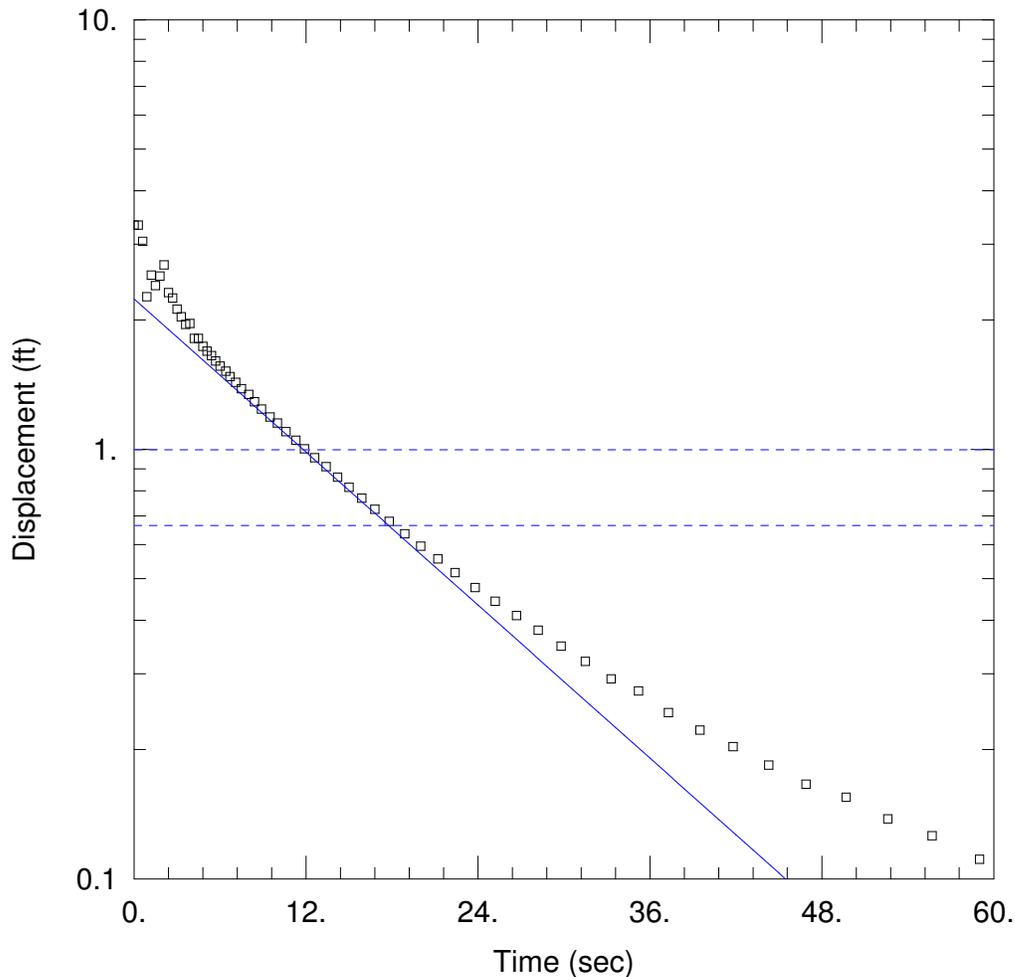
Static Water Column Height: 31.51 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.002778 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.302 ft





WELL TEST ANALYSIS

Data Set: \...\RMW-09-35\_out\_1.aqt  
 Date: 10/05/07

Time: 15:19:45

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-35-o1  
 Test Date: 4/12/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-35-o1)

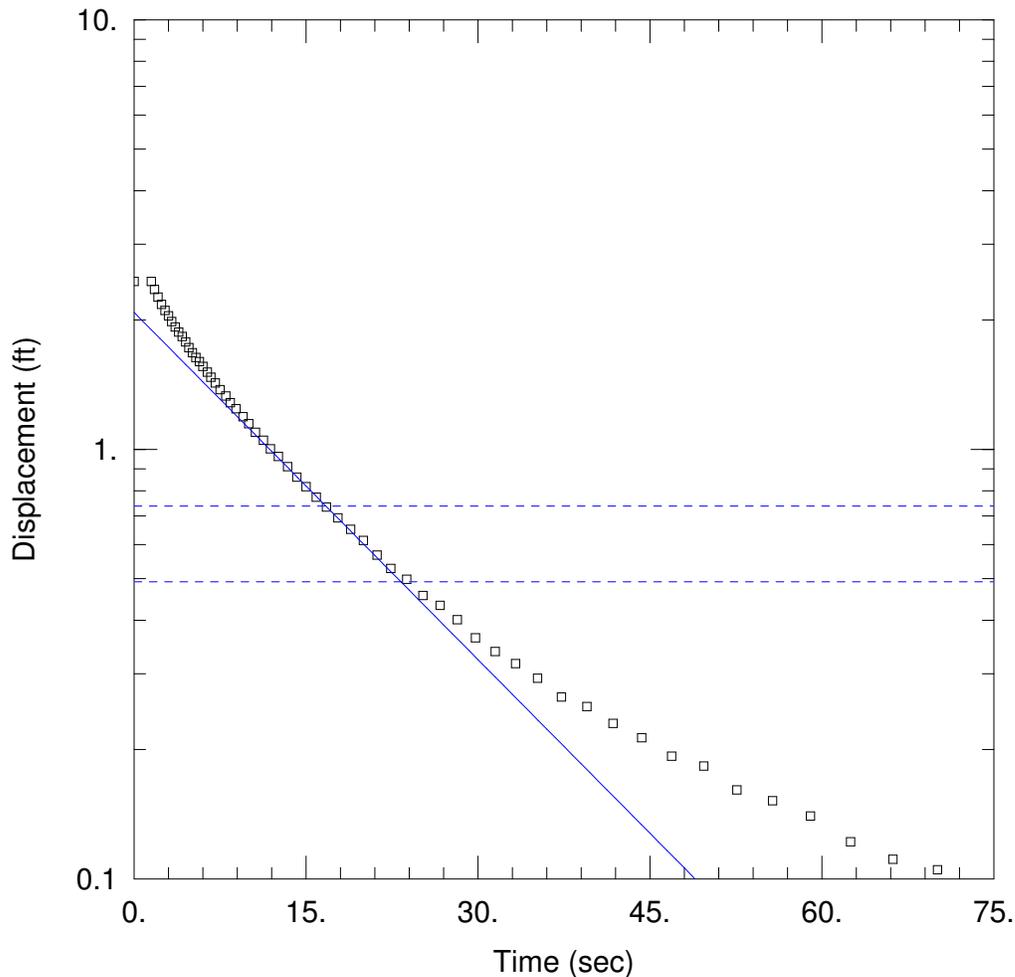
Initial Displacement: 3.325 ft  
 Total Well Penetration Depth: 31.51 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 31.51 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.002761 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.24 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-09-35\_out\_2.aqt  
 Date: 10/05/07

Time: 15:20:33

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-09-35-o2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-09-35)

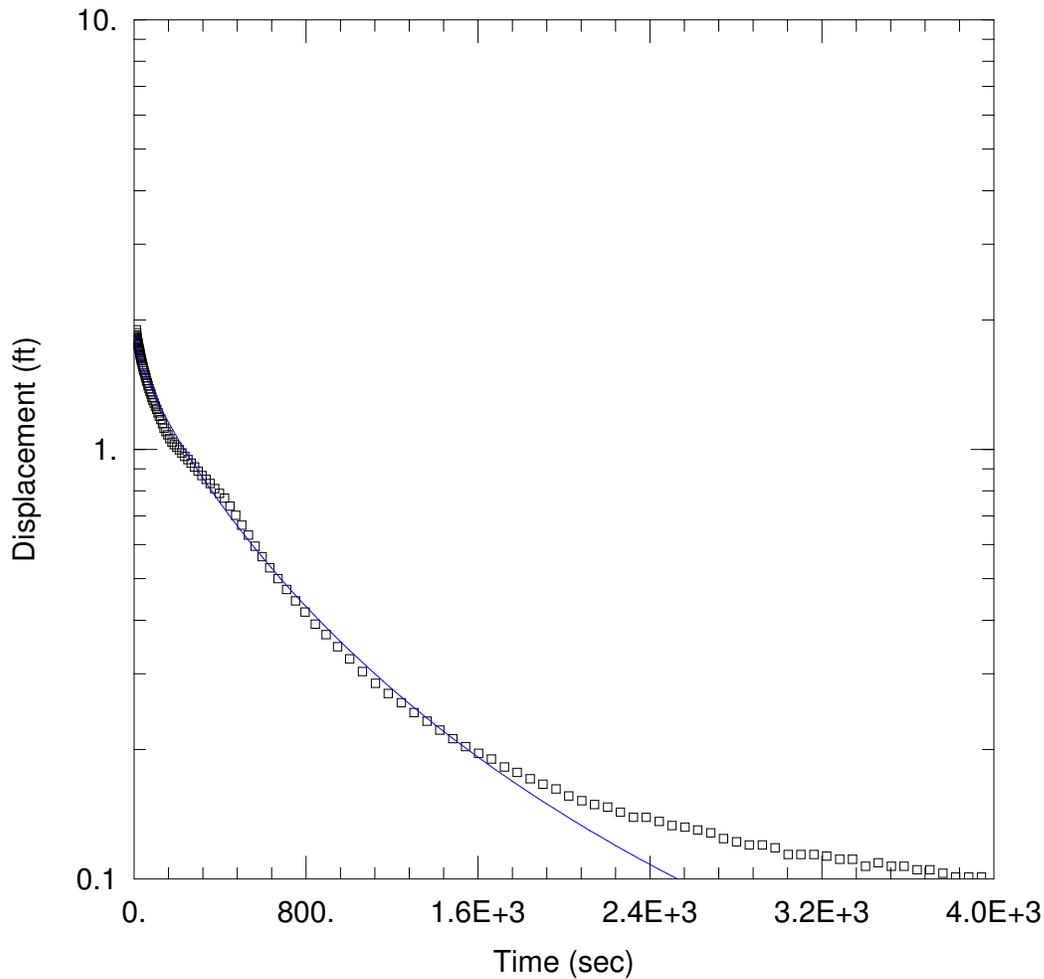
Initial Displacement: 2.459 ft  
 Total Well Penetration Depth: 31.51 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 31.51 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.002505 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.083 ft



### WELL TEST ANALYSIS

Data Set: \...\RMW-10-15\_in\_1.aqt  
Date: 10/05/07

Time: 15:21:22

### PROJECT INFORMATION

Company: CH2M HILL  
Client: US EPA Region IX  
Project: 335389  
Location: AMCO Superfund  
Test Well: RMW-10-15-i1  
Test Date: 4/14/2005

### AQUIFER DATA

Saturated Thickness: 50. ft

### WELL DATA (RMW-10-15-i1)

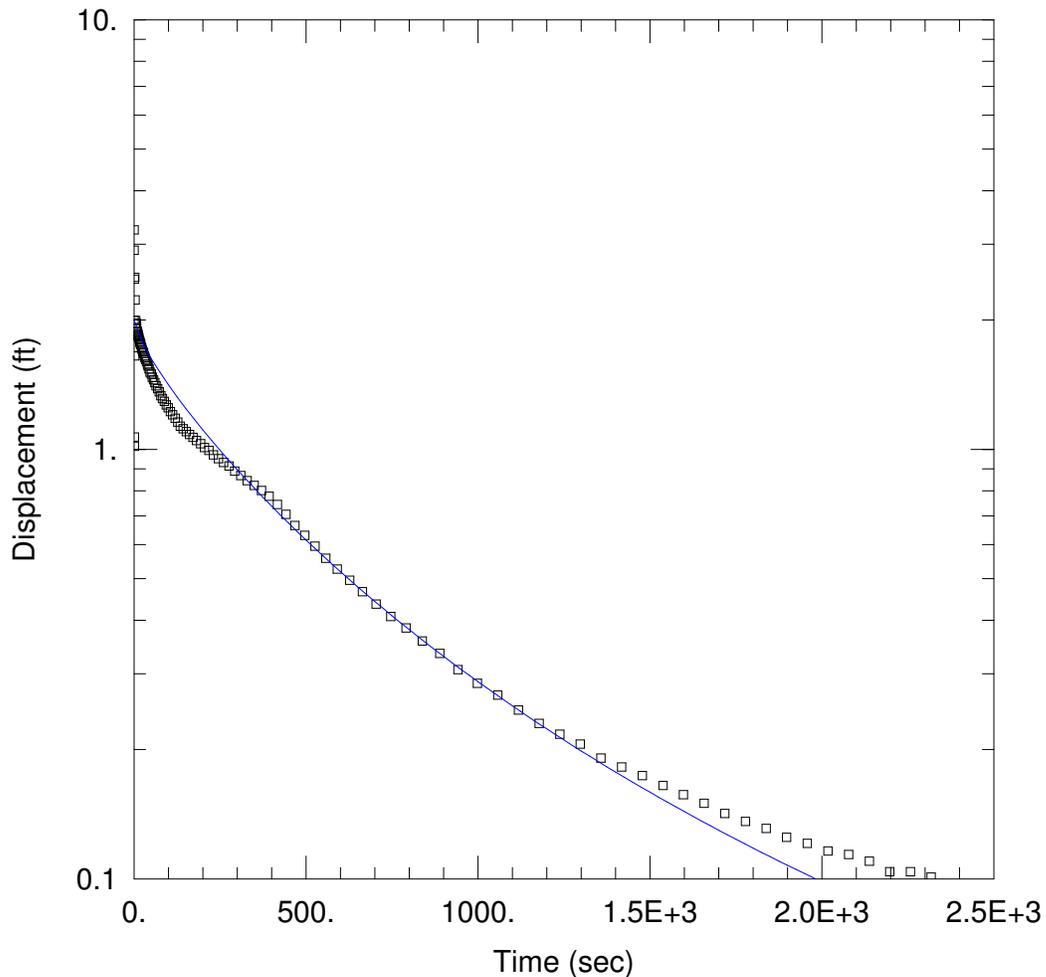
Initial Displacement: 1.839 ft  
Total Well Penetration Depth: 11.36 ft  
Casing Radius: 0.08333 ft

Static Water Column Height: 11.36 ft  
Screen Length: 10. ft  
Wellbore Radius: 0.08333 ft

### SOLUTION

Aquifer Model: Unconfined  
Kr = 5.519E-5 cm/sec  
Kz/Kr = 1.

Solution Method: KGS Model  
Ss = 0.001725 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \...\RMW-10-15\_in\_2.aqt  
 Date: 10/05/07

Time: 15:21:37

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-15-i2  
 Test Date: 4/15/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-10-15)

Initial Displacement: 1.998 ft  
 Total Well Penetration Depth: 11.36 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.36 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

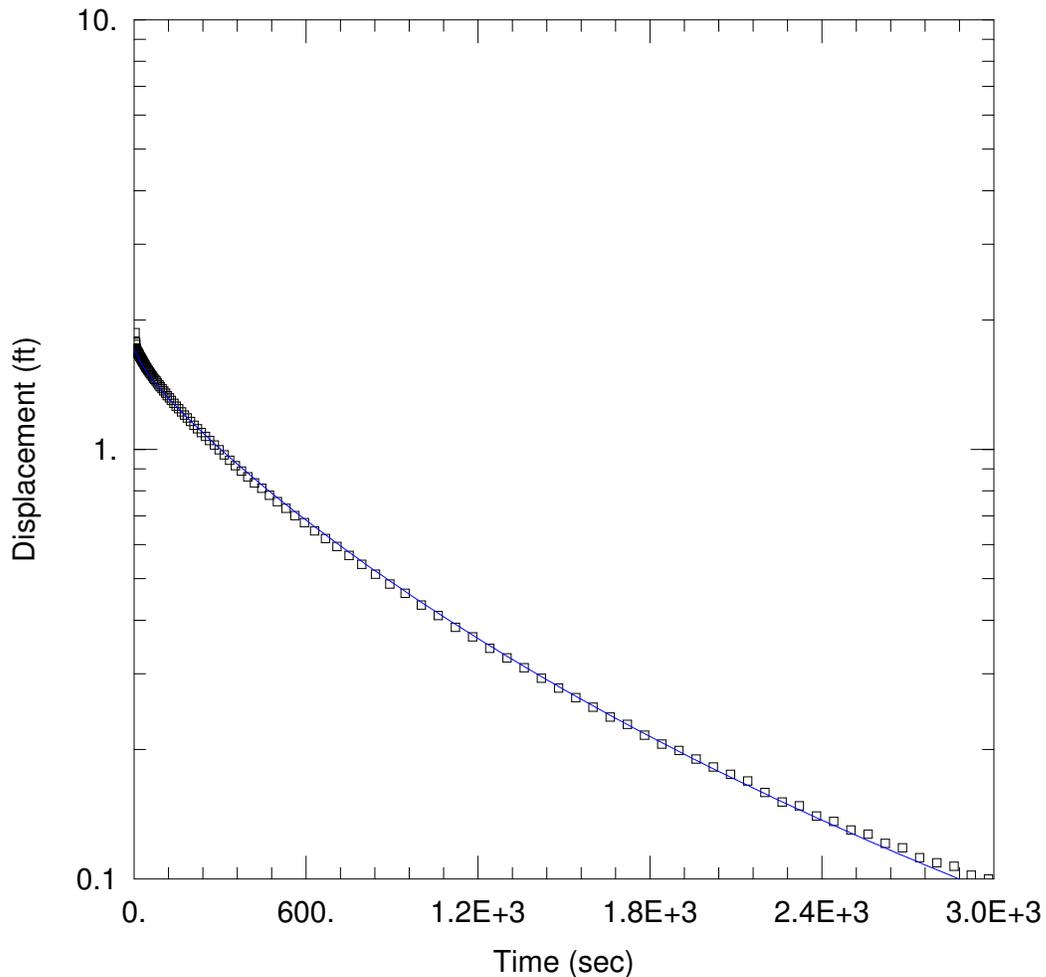
SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 7.58E-5 cm/sec  
 Kz/Kr = 1.

Ss = 0.0007096 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \\...\RMW-10-15\_out\_1.aqt  
 Date: 10/05/07

Time: 15:21:54

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-15-o2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-10-15-o1)

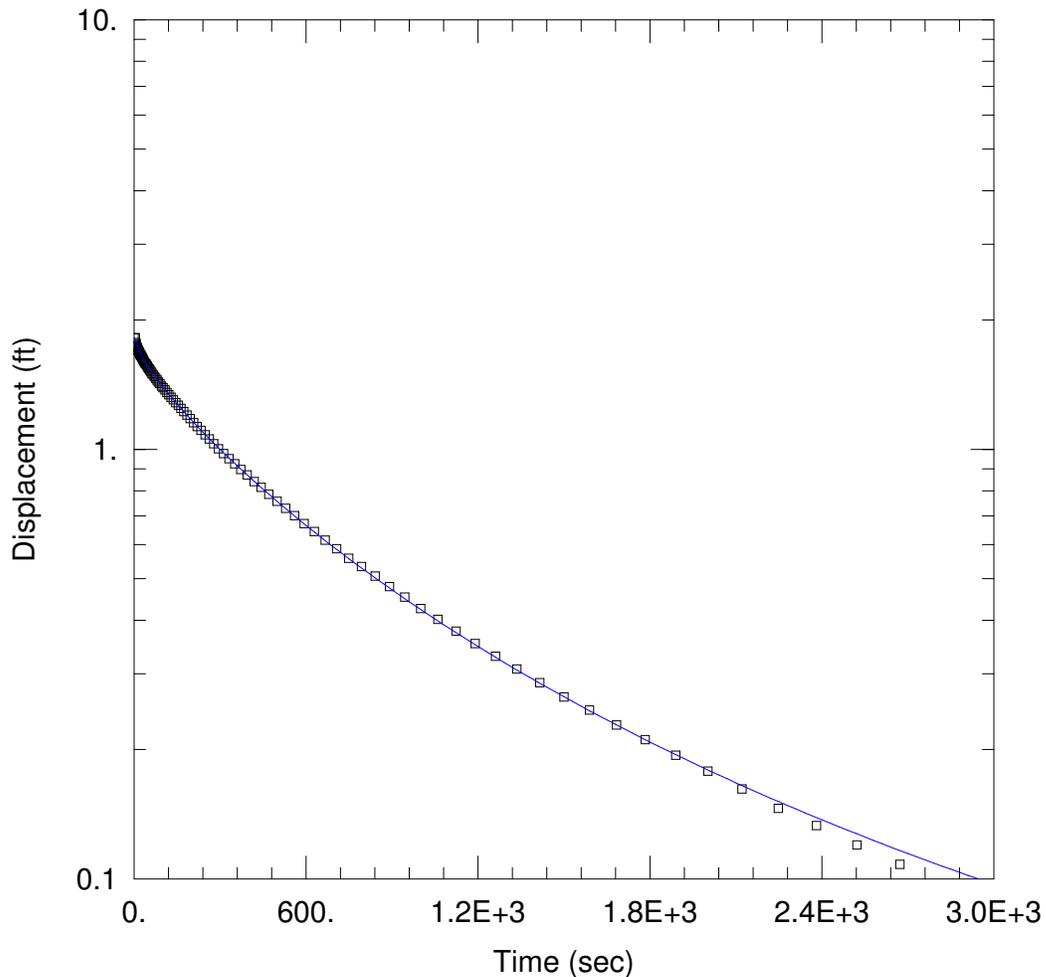
Initial Displacement: 1.71 ft  
 Total Well Penetration Depth: 11.36 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.36 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 4.787E-5 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.0005001 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \\...\RMW-10-15\_out\_2.aqt  
 Date: 10/05/07

Time: 15:22:29

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-15-o2  
 Test Date: 4/18/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-10-15)

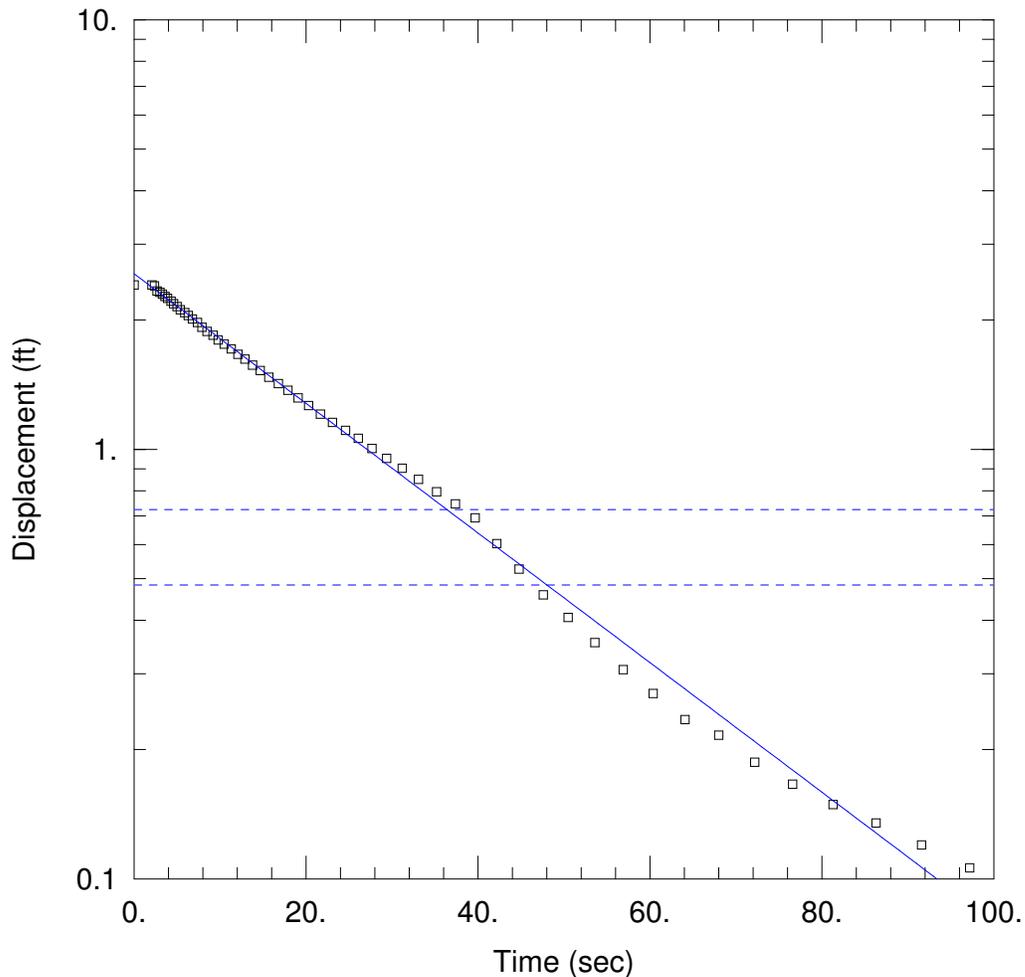
Initial Displacement: 1.817 ft  
 Total Well Penetration Depth: 11.36 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 11.36 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Confined  
 Kr = 4.904E-5 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.0009007 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \...\RMW-10-35\_in\_1.aqt  
 Date: 10/05/07

Time: 15:23:16

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-35-i1  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-10-35-i1)

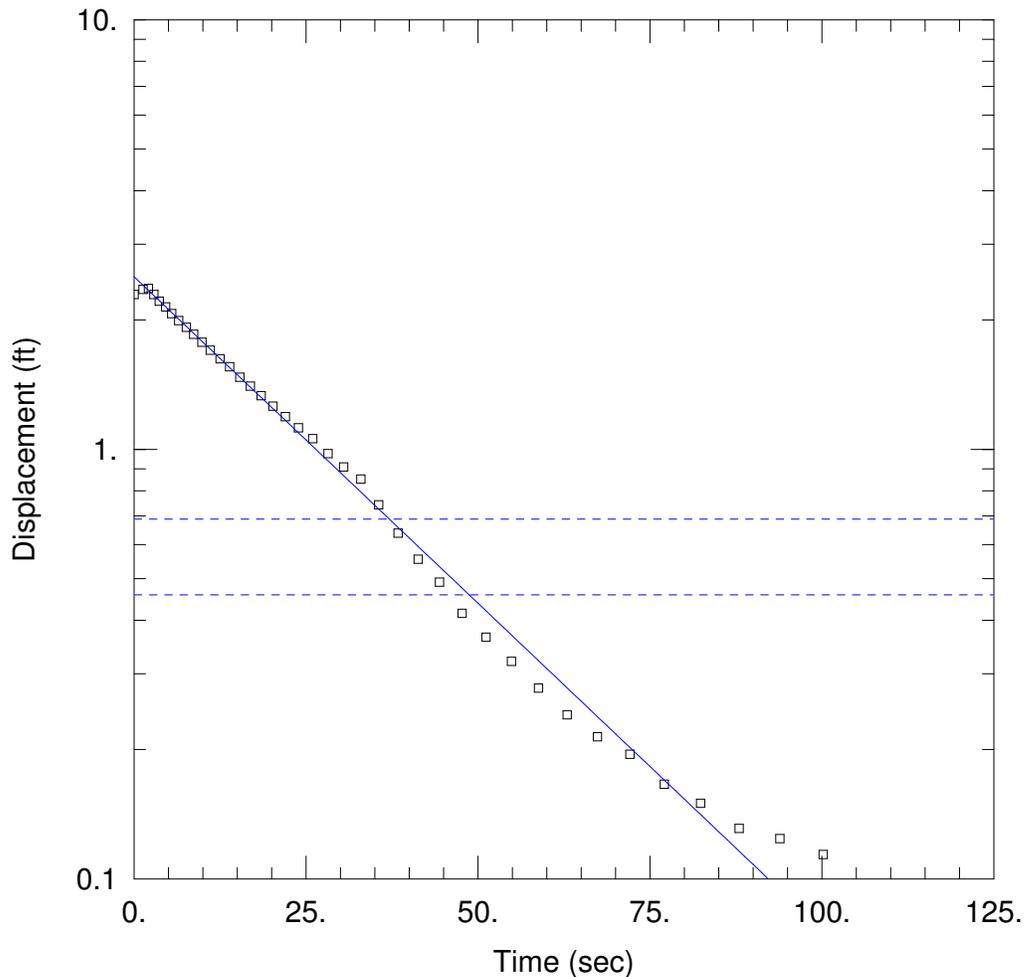
Initial Displacement: 2.414 ft  
 Total Well Penetration Depth: 30.5 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 30.5 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.001395 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.561 ft



WELL TEST ANALYSIS

Data Set: \...\RMW-10-35\_in\_2.aqt  
 Date: 10/05/07

Time: 15:23:42

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-35-i2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (RMW-10-35-i2)

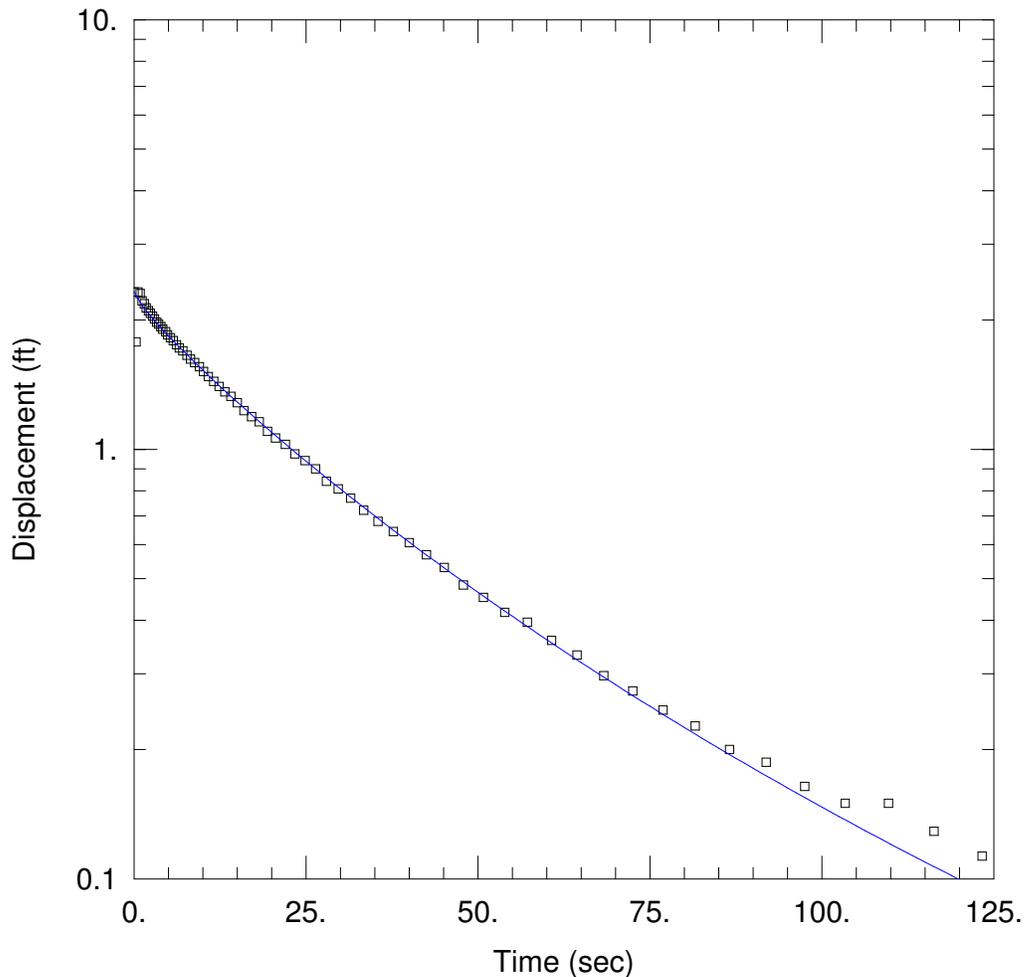
Initial Displacement: 2.292 ft  
 Total Well Penetration Depth: 30.5 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 30.5 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 K = 0.001406 cm/sec

Solution Method: Bouwer-Rice  
 y0 = 2.521 ft



WELL TEST ANALYSIS

Data Set: \\...\RMW-10-35\_out\_1.aqt  
 Date: 10/05/07

Time: 15:24:09

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-35-o1  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-10-35-o1)

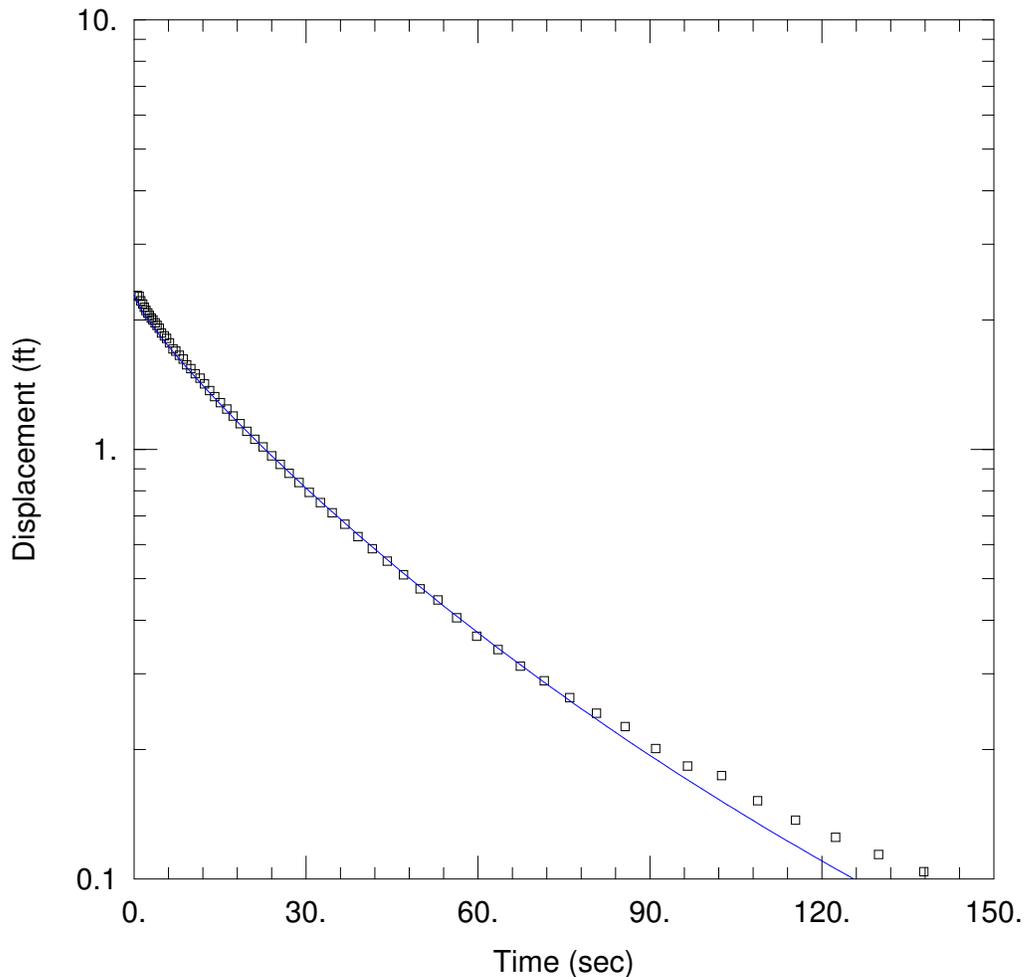
Initial Displacement: 2.325 ft  
 Total Well Penetration Depth: 30.5 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 30.5 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.001367 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.0001206 ft<sup>-1</sup>



WELL TEST ANALYSIS

Data Set: \\...\RMW-10-35\_out\_2.aqt  
 Date: 10/05/07

Time: 15:23:55

PROJECT INFORMATION

Company: CH2M HILL  
 Client: US EPA Region IX  
 Project: 335389  
 Location: AMCO Superfund  
 Test Well: RMW-10-35-o2  
 Test Date: 4/14/2005

AQUIFER DATA

Saturated Thickness: 50. ft

WELL DATA (RMW-10-35-o2)

Initial Displacement: 2.283 ft  
 Total Well Penetration Depth: 30.5 ft  
 Casing Radius: 0.08333 ft

Static Water Column Height: 30.5 ft  
 Screen Length: 10. ft  
 Wellbore Radius: 0.08333 ft

SOLUTION

Aquifer Model: Unconfined  
 Kr = 0.0013 cm/sec  
 Kz/Kr = 1.

Solution Method: KGS Model  
 Ss = 0.0001537 ft<sup>-1</sup>

## **Survey Information**

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May 23, 2005  
#04-08-054

## SURVEY REPORT

Mr. Bill Frohlich  
CH2M Hill  
155 Grand Avenue, Suite 1000  
Oakland, Ca 94612

Re: AMCO, Oakland, California  
Subject: Monitoring Well Survey

Dear Mr. Frohlich:

Horizontal and Vertical control was established at the AMCO site from offsite monuments.

**Vertical Control:** NAVD '88 site elevations were established from NGS monument J1444 located in the City of Oakland at the intersection of 5<sup>th</sup> and Chestnut Streets (see attached NGS data sheet). A conventional level loop was run from J1444 to site control and then back to J1444.

**Horizontal Control:** NAD '83 Epoch 1997.30

California coordinate system Zone 3 Coordinates were established at the site based on NGS monument HT0664 located at the Port of Oakland Franklin D. Roosevelt Pier (see NGS data sheet attached). NAD '83 coordinates were established on site control points CA1 through CA7 by RTK GPS survey. A conventional traverse was run between RTK points to confirm compatibility and to establish secondary control.

See Attachment 'A' for survey results. Please feel free to call me at (707) 255-2729 ext. 115 should you have any questions.

Sincerely,

**CHAUDHARY & ASSOCIATES, INC.**  
A California Corporation

  
Edward A. Krumrei, P.E.  
Project Manager





# ATTACHMENT 'A'

**Chaudhary & Associates, Inc.,**  
 851 Napa Valley Corporate Way, Suit G  
 Napa, CA 94558-7551  
 Project #04-08-054  
 Date of Survey: April 8, 2005  
 Client: CH2M Hill / AMCO  
 Rev.6-7-05

Name	Northing	Eastng	Latitude	Longitude	Elevation	Description
CA.1	2119673.63	6042832.59			8.75	WELL MON
CA.3	2119771.67	6042514.39			8.30	WELL MON
					10.68	RMW-06-15 Ground
					10.71	RMW-06-15 RIM
201	2119932.64	6042961.31	37°48'11.83	122°17'43.76	10.47	RMW-06-15 Top of Casing
202	2119931.28	6042959.86	37°48'11.81	122°17'43.77	10.62	RGW-05
203	2119926.69	6042958.49	37°48'11.77	122°17'43.79	10.62	RGW-05-CPT
204	2119917.13	6042963.62	37°48'11.67	122°17'43.72	10.94	RSB/G-29
205	2119934.88	6042971.32	37°48'11.85	122°17'43.63	10.95	RSB/G-35
206	2119929.90	6042989.87	37°48'11.80	122°17'43.40	11.30	RSB/G-34
207	2119905.53	6043001.47	37°48'11.57	122°17'43.25	11.37	RSB/G-28
208	2119937.12	6043011.99	37°48'11.88	122°17'43.13	11.54	RSB/G-36
209	2119896.78	6043033.39	37°48'11.49	122°17'42.85	11.25	RSB/G-27
210	2119890.02	6043051.03	37°48'11.42	122°17'42.63	11.22	RSP-01
211	2119896.41	6043051.45	37°48'11.49	122°17'42.62	11.18	RGW-01
212	2119897.20	6043048.67	37°48'11.49	122°17'42.66	11.22	RGW-01-CPT
213	2119891.73	6043055.27	37°48'11.44	122°17'42.58	11.14	RSB/G-01
214	2119925.47	6043064.69	37°48'11.77	122°17'42.47	10.89	RSB/G-26
215	2119930.66	6043045.20	37°48'11.82	122°17'42.71	11.24	RSB/G-37
216	2119954.93	6043081.03	37°48'12.07	122°17'42.27	11.31	RSB/G-25
217	2119964.44	6043054.31	37°48'12.16	122°17'42.60	10.97	RSB/G-38
218	2119974.39	6043022.41	37°48'12.25	122°17'43.00	10.64	RSB/G-39
219	2119986.99	6042985.07	37°48'12.37	122°17'43.47	10.42	RSB/G-40
220	2119961.73	6042977.72	37°48'12.12	122°17'43.56	10.43	RSB/G-41
221	2119857.24	6042986.47	37°48'11.09	122°17'43.42	10.64	RSB/G-30
222	2119840.02	6043031.83	37°48'10.92	122°17'42.85	10.86	RSB/G-02
223	2119846.76	6043039.95	37°48'10.99	122°17'42.76	11.02	RSP-02
224	2119798.12	6042921.64	37°48'10.49	122°17'44.22	10.07	RGW-06-CPT

## ATTACHMENT 'A'

Name	Northing	Eastings	Latitude	Longitude	Elevation	Description
225	2119797.00	6042924.55	37°48'10.48	122°17'44.18	10.07	RGW-06
226	2119710.02	6042878.32	37°48'09.61	122°17'44.74	9.50	RSP-10
227	2119665.39	6042775.14	37°48'09.15	122°17'46.01	9.85	PP-NW-SG-0904
228	2119611.47	6042770.26	37°48'08.62	122°17'46.06	10.03	PP-SW-SG-0904
229	2119627.77	6042897.78	37°48'08.81	122°17'44.48	9.64	PP-E-SG-0904
					10.33	RMW-09-35 Ground
					13.45	RMW-09-35 RIM
230	2119597.44	6042939.14	37°48'08.51	122°17'43.95	13.22	RMW-09-35 Top of Casing
					10.26	RMW-09-15 Ground
					13.40	RMW-09-15 RIM
231	2119597.79	6042947.48	37°48'08.52	122°17'43.85	12.74	RMW-09-15 Top of Casing
232	2119612.00	6042942.57	37°48'08.65	122°17'43.91	9.75	RGW-08-CPT
233	2119600.63	6042941.22	37°48'08.54	122°17'43.93	10.01	RGW-08
234	2119757.96	6042973.77	37°48'10.10	122°17'43.56	10.12	RSB/G-31
235	2119779.70	6042949.47	37°48'10.31	122°17'43.87	10.54	RSB/G-32
					10.45	RMW-07-15 Ground
					10.49	RMW-07-15 RIM
236	2119756.28	6042936.12	37°48'10.08	122°17'44.03	10.10	RMW-07-15 Top of Casing
237	2119720.57	6042930.78	37°48'09.72	122°17'44.09	10.31	RGW-07-CPT
238	2119722.26	6042924.46	37°48'09.74	122°17'44.16	10.30	RGW-07
239	2119723.18	6042920.48	37°48'09.75	122°17'44.21	10.99	RSB/G-33
240	2119686.13	6042960.19	37°48'09.39	122°17'43.71	9.52	RSP-09
241	2119632.99	6043130.45	37°48'08.90	122°17'41.58	9.53	RSP-07
242	2119674.54	6043225.24	37°48'09.32	122°17'40.41	9.78	15 OS
243	2119671.39	6043214.70	37°48'09.29	122°17'40.54	10.30	4 OS
244	2119670.24	6043210.87	37°48'09.28	122°17'40.58	10.40	RGW-11
245	2119668.62	6043218.99	37°48'09.27	122°17'40.48	9.72	RGW-11-CPT
246	2119674.52	6043209.99	37°48'09.32	122°17'40.60	10.35	RSB/G-14
247	2119725.68	6043225.76	37°48'09.83	122°17'40.41	10.60	RSB/G-13
248	2119793.91	6043254.74	37°48'10.51	122°17'40.07	9.60	RSB/G-12
					10.43	RMW-03-15 CONC
					10.45	RMW-03-15 RIM
249	2119832.29	6043245.05	37°48'10.89	122°17'40.20	10.00	RMW-03-15 Top of Casing
250	2119832.58	6043243.42	37°48'10.89	122°17'40.22	10.58	RGW-10
251	2119831.01	6043247.96	37°48'10.88	122°17'40.16	10.06	RGW-10-CPT
252	2119835.93	6043248.03	37°48'10.92	122°17'40.16	10.30	RSB/G-10

## ATTACHMENT 'A'

Name	Northing	Easting	Latitude	Longitude	Elevation	Description
253	2119816.14	6043214.50	37°48'10.72	122°17'40.57	10.95	RSB/G-11
254	2119845.81	6043203.22	37°48'11.02	122°17'40.72	11.10	RSB/G-09
255	2119850.54	6043158.85	37°48'11.05	122°17'41.27	12.05	15 OS
256	2119859.57	6043158.62	37°48'11.14	122°17'41.28	12.12	6 OS
257	2119865.57	6043158.46	37°48'11.20	122°17'41.28	12.12	RSB/G-08
258	2119883.50	6043112.63	37°48'11.37	122°17'41.86	11.85	RSB/G-07
259	2119819.61	6043144.97	37°48'10.74	122°17'41.44	12.13	RGW-12
260	2119819.47	6043139.94	37°48'10.74	122°17'41.50	12.06	RGW-12-CPT
261	2119817.91	6043144.70	37°48'10.73	122°17'41.44	12.17	RSB/G-42
263	2119809.70	6043168.00	37°48'10.65	122°17'41.15	12.28	RSB/G-17
265	2119827.90	6043094.21	37°48'10.82	122°17'42.07	11.66	RSB/G-16
					11.73	RMW-08-35 CONC
					14.94	RMW-08-35 RIM
266	2119849.09	6043052.90	37°48'11.02	122°17'42.59	14.60	RMW-08-35 Top of Casing
					11.76	RMW-08-15 CONC
					14.88	RMW-08-15 RIM
267	2119857.71	6043054.37	37°48'11.10	122°17'42.58	14.61	RMW-08-15 Top of Casing
268	2119819.24	6043057.35	37°48'10.72	122°17'42.53	11.78	RGW-02
269	2119818.97	6043063.02	37°48'10.72	122°17'42.46	11.66	RGW-02-CPT
270	2119815.81	6043037.86	37°48'10.69	122°17'42.77	10.87	RSB/G-03
271	2119818.59	6043037.61	37°48'10.71	122°17'42.78	11.31	RSB/G-03A
272	2119813.54	6043041.31	37°48'10.66	122°17'42.73	11.58	RSP-03
					11.21	RMW-02-32 CONC
					11.22	RMW-02-32 RIM
273	2119750.16	6043138.76	37°48'10.05	122°17'41.50	10.91	RMW-02-32 Top of Casing
					11.07	RMW-02-45 CONC
					11.08	RMW-02-45 RIM
274	2119738.81	6043138.41	37°48'09.94	122°17'41.50	10.67	RMW-02-45 Top of Casing
					10.74	RMW-02-13 CONC
					10.77	RMW-02-13 RIM
275	2119729.07	6043136.11	37°48'09.85	122°17'41.53	10.50	RMW-02-13 Top of Casing
					10.82	MW-14 CONC
					10.83	MW-14 RIM
276	2119728.90	6043152.75	37°48'09.85	122°17'41.32	10.56	MW-14 Top of Casing
277	2119715.31	6043132.35	37°48'09.71	122°17'41.57	10.62	RGW-13-CPT
278	2119722.32	6043134.43	37°48'09.78	122°17'41.55	10.57	RGW-13

## ATTACHMENT 'A'

Name	Northing	Easting	Latitude	Longitude	Elevation	Description
279	2119752.80	6043109.50	37°48'10.08	122°17'41.87	11.49	RSB/G-22
280	2119773.42	6043070.51	37°48'10.27	122°17'42.36	11.57	RSP-04
281	2119783.56	6043078.98	37°48'10.37	122°17'42.25	11.84	MW?
282	2119773.49	6043072.77	37°48'10.27	122°17'42.33	11.58	RSB/G-04
283	2119708.98	6043093.39	37°48'09.64	122°17'42.06	11.42	RSB/G-21
					11.22	RMW-01-17 CONC
					14.34	RMW-01-17 RIM
284	2119692.44	6043062.76	37°48'09.47	122°17'42.43	13.64	RMW-01-17 Top of Casing
					11.04	RMW-01-35 CONC
					14.67	RMW-01-35 RIM
285	2119694.87	6043054.43	37°48'09.50	122°17'42.54	14.30	RMW-01-35 Top of Casing
286	2119731.12	6043054.99	37°48'09.85	122°17'42.54	11.22	RSP-05
287	2119729.40	6043061.42	37°48'09.84	122°17'42.46	11.07	RSB/G-05
288	2119676.51	6043079.05	37°48'09.32	122°17'42.23	11.08	RSB/G-19
289	2119672.55	6043073.34	37°48'09.28	122°17'42.30	10.92	RGW-03-CPT
290	2119667.96	6043072.03	37°48'09.23	122°17'42.31	10.75	RGW-03
291	2119646.61	6043134.55	37°48'09.03	122°17'41.53	10.57	RSB/G-20
313	2119851.85	6042896.69	37°48'11.02	122°17'44.54	9.38	RSP-11
314	2119906.04	6042913.13	37°48'11.55	122°17'44.35	9.54	RSP-12
378	2119671.95	6043005.37	37°48'09.26	122°17'43.15	9.71	RSP-08
					9.77	RMW-10-35 Ground
					13.07	RMW-10-35 RIM
392	2119526.34	6042980.61	37°48'07.82	122°17'43.42	12.75	RMW-10-35 Top of Casing
					9.74	RMW-10-15 Ground
					13.23	RMW-10-15 RIM
393	2119513.81	6042979.03	37°48'07.69	122°17'43.43	12.89	RMW-10-15 Top of Casing
					9.27	RMW-5-15 Ground
					9.30	RMW-5-15 RIM
394	2119502.68	6043116.85	37°48'07.61	122°17'41.71	8.90	RMW-5-15 Top of Casing
					10.09	RMW-4-15 Ground
					13.11	RMW-4-15 RIM
395	2119603.90	6043231.73	37°48'08.63	122°17'40.31	12.82	RMW-4-15 Top of Casing
396	2119686.10	6043046.31	37°48'09.41	122°17'42.64	11.06	RSP-06
405	2119696.79	6043152.90	37°48'09.53	122°17'41.31	10.84	RSB/G-23
406	2119751.14	6043167.98	37°48'10.07	122°17'41.14	11.33	RSB/G-24
407	2119803.41	6043180.37	37°48'10.59	122°17'41.00	12.46	RSB/G-18

# ATTACHMENT 'A'

Name	Northing	Eastings	Latitude	Longitude	Elevation	Description
451	See #481					
452	2119493.12	6043239.56	37°48'07.53	122°17'40.18	11.50	BMW1 Top of Casing
453	2119493.51	6043239.45	37°48'07.54	122°17'40.19	9.12	BMW1 AC
454	2119430.96	6043040.68	37°48'06.88	122°17'42.65	12.61	BPZ1 Top of Casing
455	2119431.43	6043040.77	37°48'06.89	122°17'42.65	10.30	BPZ1 AC
456	2119583.16	6043031.84	37°48'08.38	122°17'42.79	13.54	BMW3 Top of Casing
457	2119583.35	6043032.09	37°48'08.39	122°17'42.79	10.85	BMW3 CONC BASE
458	2119584.64	6043032.70	37°48'08.40	122°17'42.78	10.25	BMW3 Ground
459	2119460.55	6042863.39	37°48'07.14	122°17'44.86	13.16	BMW8 Top of Casing
460	2119460.91	6042863.47	37°48'07.14	122°17'44.86	10.78	BMW8 CONC BASE
461	2119461.92	6042863.79	37°48'07.15	122°17'44.86	10.19	BMW8 Ground
462	2119576.66	6042830.02	37°48'08.28	122°17'45.31	13.14	BMW7 Top of Casing
463	2119576.92	6042830.26	37°48'08.28	122°17'45.30	10.69	BMW7 CONC BASE
464	2119577.93	6042830.73	37°48'08.30	122°17'45.30	10.41	BMW7 Ground
465	2119704.32	6043318.20	37°48'09.64	122°17'39.26	8.40	BMW6 Top of Casing
466	2119704.12	6043318.26	37°48'09.64	122°17'39.26	8.91	BMW6 RIM
467	2119705.19	6043318.34	37°48'09.65	122°17'39.26	8.87	BMW6 AC
481	2119622.25	6043122.35	37°48'08.79	122°17'41.68	9.16	MW-12 Top of Casing
					9.54	MW-12 Rim
					9.44	MW-12 AC
483	2119843.78	6043050.48	37°48'10.97	122°17'42.63	11.79	RSB/G-15
484	2119691.77	6043050.81	37°48'09.47	122°17'42.59	11.01	RSB/G-6





November 4, 2005  
#04-08-054

## SURVEY REPORT

Mr. Bill Frohlich  
CH2M Hill  
155 Grand Avenue, Suite 1000  
Oakland, Ca 94612

Re: AMCO, Oakland, California  
Ref: Monitoring Well Survey  
Subject: Date of Survey 10/18/05

Dear Mr. Frohlich:

Horizontal and Vertical control was established at the AMCO site from offsite monuments.

**Vertical Control:** NAVD '88 site elevations were established from NGS monument J1444 located in the City of Oakland at the intersection of 5<sup>th</sup> and Chestnut Streets (see attached NGS data sheet). A conventional level loop was run from J1444 to site control and then back to J1444.

**Horizontal Control:** NAD '83 Epoch 1997.30 California coordinate system Zone 3 Coordinates were established at the site based on NGS monument HT0664 located at the Port of Oakland Franklin D. Roosevelt Pier (see NGS data sheet attached). NAD '83 coordinates were established on site control points CA1 through CA7 by RTK GPS survey. A conventional traverse was run between RTK points to confirm compatibility and to establish secondary control. Additional control points No. 601 and 602 set for this survey.

See Attachment 'A' for survey results. Please feel free to call me at (707) 255-2729 ext. 115 should you have any questions.

Sincerely,

**CHAUDHARY & ASSOCIATES, INC.**  
A California Corporation

Edward A. Krümrei, P.E.  
Project Manager



**Chaudhary & Associates, Inc.,**  
 851 Napa Valley Corporate Way, Suit G  
 Napa, CA 94558-7551  
 Project #04-08-054  
 Date of Survey: October 18, 2005  
 Client: CH2M Hill / AMCO

Name	Northing	Easting	Latitude	Longitude	Elevation	Number	Description
254	2119845.81	6043203.22			11.10	RSB/G-09	
651	2119746.02	6042933.47			10.08	RMW-07-35	Northedge Top of Casing
					10.45	RMW-07-35	Rim
					10.42	RMW-07-35	Concrete
652	2119628.72	6043101.57			8.94	RMW-12-50	Northedge Top of Casing
					9.33	RMW-12-50	Rim
					9.27	RMW-12-50	AC
653	2119625.72	6043111.43			9.04	RMW-12-32	Northedge Top of Casing
					9.45	RMW-12-32	Rim
					9.44	RMW-12-32	AC
654	2119578.17	6042842.31			13.56	RMW-14-50	Northedge Top of Casing
					13.56	RMW-14-50	Rim
					10.39	RMW-14-50	Ground
655	2119397.02	6042992.94			13.08	RMW-13-35	Northedge Top of Casing
					13.00	RMW-13-35	Rim
					10.38	RMW-13-35	AC
659	2119928.89	6043326.95			8.25	RMW-11-35	Northedge Top of Casing
					8.53	RMW-11-35	Rim
					8.52	RMW-11-35	AC



# Field Methods and Procedures

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## C.1 Field Sampling Procedures

### C.1.1 Depth-Discrete Groundwater Sampling and Cone Penetrometer Testing

Depth-discrete groundwater samples were collected using a combination of Waterloo Profiler<sup>®</sup> and Hydropunch<sup>®</sup> techniques (within the same boring) from temporary borings advanced with a Vibra-Push<sup>™</sup> rig. Prior to groundwater sample collection, a stratigraphic interpretation was obtained from an adjacent borehole at each location to adjust sample depths as necessary to target water-bearing zones.

#### C.1.1.1 Stratigraphic Logging

A CPT rig was used to collect data for stratigraphic interpretation at all locations, unless access was prevented by site conditions. A CPT generates a stratigraphic interpretation by advancing a CPT “cone” at a constant 2 centimeters per second (cm/s) (Figure C-1). The CPT cone measures cone bearing stress ( $Q_t$ ), sleeve friction ( $F_s$ ), and porewater pressure ( $U$ ) generated during advancement of the cone. A stratigraphic interpretation is made based on cone-bearing stress and the friction ratio ( $R_f$ )<sup>1</sup> between the cone-bearing stress and the sleeve friction (Figure C-2). Generally, cohesive soils (clays) have higher friction ratios ( $R_f$ ), lower cone bearing ( $Q_t$ ), and generate large excess porewater pressures during advancement of the CPT cone. Cohesionless soils (sands) tend to have lower friction ratios ( $R_f$ ), higher cone bearing ( $Q_t$ ), and generate little excess porewater pressure during advancement of the cone.

Continuous core was collected at three locations that the CPT rig could not access due either overhead clearance restrictions (RGW-14 and RGW-15) or problems penetrating soil at the former facility yard (RGW-12). Continuous core was collected in three foot sections with the same Vibra-Push<sup>™</sup> rig. Soil cores were logged as detailed in Section C.1.2.4.

#### C.1.1.2 Grab Groundwater Sampling – Waterloo Profiler<sup>®</sup>

The Waterloo Profiler<sup>®</sup>, which is designed to collect depth-discrete groundwater samples in a single direct-push hole with one probe entry, was originally proposed to collect all depth-discrete groundwater samples. However, shallow, low-yield groundwater zones were identified for sampling through interpretation of the CPT and lithologic logs, and failed attempts to use the Waterloo Profiler<sup>®</sup>. Therefore, all potential groundwater sampling intervals identified shallower than approximately 20 feet below ground surface (bgs) were completed, as possible, with a Hydropunch<sup>®</sup> and in one case with a temporary well.

Under ideal conditions the Waterloo Profiler<sup>®</sup> is designed to increase the speed of sampling and increase precision at which depth grab groundwater samples are collected. The

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<sup>1</sup> The friction ratio ( $R_f$ ) is sleeve friction ( $F_s$ ) divided by the cone-bearing stress ( $Q_t$ ).

Waterloo Profiler<sup>®</sup> tip was equipped with sample intake ports arranged radially around the cone-tip direct-push rod. Each of the six intake ports are constructed with an outer coarse and inner fine screen and are 0.5 cm in diameter, giving a total inlet area of approximately 1.2 square centimeters (cm<sup>2</sup>) (0.19 square inches [in.<sup>2</sup>]).

The Profiler tip was attached to 4-foot lengths of hollow, heavy-duty threaded steel pipe that extended to the ground surface. The Waterloo Profiler<sup>®</sup> was advanced using the large direct push rig (equipped with Vibra-Push<sup>®</sup> and hydraulic hammer capability), which was also used for the continuous coring at RGW-12, RGW-14, and RGW-15. Four-foot lengths of pipe were continually added as the tool was advanced deeper into the ground to the sampling depth. To prevent the sample ports from clogging as the tool was advanced through the soil, distilled water was slowly pumped through the tubing and out of the sampling ports. A very small amount of water was injected (approximately 10 mL per minute). In addition to keeping the ports open, injecting distilled water while advancing the tool purges the tubing of the water leftover from the previous sampling, preventing cross contamination of the subsequent groundwater sample.

Once the tool had been advanced to the desired sampling depth, the direction flow of the pump was reversed, and groundwater from the aquifer was extracted. Purging of the system was required, since the tubing and ports contained distilled water that had been pumped down the system. The electric conductivity, pH, temperature, dissolved oxygen, and salinity were monitored using the in-line sensors mounted in a flow-cell at the end of the sampling line. However, the groundwater yield at many sample intervals was too low to be continuously measured in the flow cell; the normal flow cell requires approximately 500 milliliters (mL) of water before it is full and the sensors are submerged. In many of the sample intervals, visually obvious when formation water was being extracted due to the dramatic increase in turbidity and periodic measurements of parameters were made if possible. At a few intervals yields were so low determination of formation water was based on turbidity alone (typically above 1000 nephelometric turbidity units [NTU] versus 0 NTU for distilled water), and there was barely sufficient groundwater volume to fill the full number of sample containers (three 40 mL VOA). The amount of groundwater purged prior to sampling always exceeded the amount of distilled water used during tool advancement.

Groundwater samples were conveyed to the surface via small-diameter Teflon<sup>®</sup> tubing that was attached to a fitting inside of the Profiler tip and passed up through the inside of the threaded steel pipes. A common Waterloo Profiler<sup>®</sup> sampling system configuration includes the use of a peristaltic pump with in-line sample containers. Standard 40-milliliter (mL) glass volatile organic ampoules (VOA) sample bottles are held in stainless-steel bottle holders used to collect the sample directly from the suction side of the pump so the sample does not contact the pump head tubing or the atmosphere. However, high suspended solids content and gas in the sampling line prevented the system from working properly. Gas in the sample line is likely the result of suction-induced degassing of dissolved gasses (e.g., carbon dioxide, oxygen, methane, ethane, etc.) The stainless-steel tubes repeatedly plugged with sediment and gas generated in the sampling line continuously bubbled through the water in the sample vials, potentially adversely impacting the quality of the sample. For these reasons, the sample manifold was not and the samples were collected on the effluent side of the pump head using standard procedures for filling of VOAs.

### C.1.1.3 Hydropunch® and Temporary Well Grab Groundwater Sampling

From the depth at which groundwater was first encountered to approximately 20 feet bgs, yields were so low that the Waterloo Profiler®, with a very small sample intake area, was unable to function. For this reason a Hydropunch® tool was used to sample groundwater zones shallower than 20 feet bgs due to low groundwater yields. A Hydropunch® tool with a Hydropunch® screen 1 foot in length has an approximate screen area of 183 cm<sup>2</sup> (28 in.<sup>2</sup>) When this method was used, the Hydropunch® was driven on the end of the same rods used to advance the Waterloo Profiler® tool. Once the target depth was reached, the rods retracted exposing a 1-foot stainless-steel screen, and allowing groundwater to flow into the tool.

Teflon® tubing was lowered to screen interval of the Hydropunch® sampler, and groundwater samples were conveyed to the surface and collected using the same procedures detailed for the Waterloo Profiler®. Once the sample was collected, rods were retracted from the boring. If a second interval was to be sampled using Hydropunch®, then the rods were decontaminated and driven to the lower depth in the same boring.

At one sample interval (RGW-11 at 10 feet bgs), a temporary ¾-inch PVC well was used in place of the Waterloo Profiler® or the Hydropunch® tool. Groundwater yields at this location were so low that the PVC well was left in overnight to allow accumulation of sufficient volume to allow collection of samples. At all depths, often fewer than a full number of VOAs required were collected because of limited yields.

### C.1.1.4 CPT and Grab Groundwater Sampling Borehole Abandonment

Once sampling was completed at each CPT and grab groundwater sampling borehole was grouted from the bottom up. A rod with a disposable tip was advanced to the total depth of the borehole. A PVC pipe was placed in the rod, and the rod was then retracted. Each hole was sealed by the emplacement of cement grout through a PVC tremie pipe, displacing borehole water as the grout was injected and the pipe was removed. The surface of the hole was restored to the original condition.

## C.1.2 Monitoring Well Drilling and Construction

### C.1.2.1 Drilling

Rotosonic drilling was used at most locations for well construction, including all locations within the facility where the highest levels of contamination are present. In the initial phase, at locations with limited-access, a limited-access hollow-stem-auger rig was used for well installation. After the initial rounds of groundwater sampling, it was determined that addition wells were need. At the time these newer wells were installed (in September 2005), a recently constructed limited-access rotosonic rig was now available and used to install these newer wells.

During drilling, soil samples were collected continuously for lithologic interpretation (Section C.1.1.1). At a minimum of 5-foot intervals, a portion of the sample was placed into a sealable plastic bag and screened in the field for total organic vapors using a photoionization detector (PID).

### C.1.2.2 Rotosonic Drilling

Rotosonic drilling is a technologically advanced method using a combination of tool rotation, hydraulic direct-push, and mechanically-generated oscillations to advance a dual walled of drill casing. Advantages of the rotosonic drilling method over other methods are that it:

- Drills through most type of alluvial soils.
- Yields continuous, relatively undisturbed cores.
- Uses no fluid (mud or air) to return drill cuttings.
- Flush-cases the borehole during drilling to minimize the risk of cross-contamination within the borehole, which is particularly import in areas of highest contamination.
- Typically yields significantly fewer cuttings than conventional methods.

The inner drill pipe contains a core bit and acts as the core barrel sampler, while the outer pipe is used to prevent the collapse of the borehole during drilling and during the removal of core samples and construction of monitoring wells. The inner drill pipe is advanced in front of the outer drill pipe, collecting a continuous core sample. To recover the sample, the outer drill pipe is advanced down over the inner core barrel to hold the boring open, and the core barrel is lifted to the surface for sample recovery. The sample is vibrated out of the drill pipe into a plastic sheath for visual logging.

### C.1.2.3 Hollow-Stem-Auger Drilling

A track-mounted CME 750, limited-access drill rig utilizing hollow-stem auger drilling methods was used for installation of monitoring wells which are located in areas difficult to access with the larger rotosonic rig (MW-04-15, RMW-05-15, RMW-08-15, RMW-08-35, RMW-09-15, RMW-09-35, RMW-10-15, and RMW-10-35).

Hollow-stem-auger rigs typical uses 5-foot sections of hollow drill pipe with auger flights welded to exterior (augers). These augers are rotated and downward pressure is applied to advance the borehole and remove soil cuttings. The hollow portion of the drill pipe allows insertion of a 5-foot core barrel to be advanced ahead of the drill bit allowing the collection of relatively undisturbed core for lithological logging. "Undisturbed" samples for soil samples for analytical or physical properties can also be collected through the auger.

### C.1.2.4 Logging and Field Documentation

Logging of unconsolidated soil was performed by inspection of the continuous cores. Soil samples were visually classified in the field by a qualified geologist using the Unified Soil Classification System (USCS) (ASTM 2000a & b). In addition to the USCS classification, the boring logs include a description of color, consistency, grain-size distribution, changes in soil types, moisture content, and observations, such as debris. The logs also note approximate upper and lower limits of each distinct soil type encountered, signs of disturbance, and any problems encountered.

Additional information recorded on the boring logs includes:

- Sampler type, drilling method, and equipment used.

- Depth to water as first encountered during drilling.
- Date and time of start and completion of boring.
- Names of driller and onsite geologist.
- Observable contamination such as discoloration or odor.

General QC procedures applied during drilling activities included:

- Visually checking the ground surface in the vicinity of each boring to ensure that drill rig fluids (fuel or hydraulic fluid) did not leak and contaminate potential soil sample locations.
- Verifying that the drill pipes were decontaminated prior to use at each of the locations.
- Verifying that all sampling equipment was decontaminated between sampling intervals.

#### C.1.2.5 Monitoring Well Installation and Construction

All monitoring wells were constructed with new, decontaminated, 4-inch, flush-jointed and threaded, Schedule 40 PVC well casing and screen, with a threaded PVC bottom cap. The slot size for screened intervals was 0.02-inch. All but two wells were constructed with screens intervals 10-feet in length, Monitoring wells RMW-02-32 and RMW-12-32 were constructed with five-foot screen lengths to maximize the distance between the vertical distance between the screen interval of nearby wells screened shallow and deeper intervals at the same locations. The filter pack was constructed with RMC No. 3 Monterey Sand, which extended from the bottom of the screen interval to a minimum of one foot above the top of the screen. A one to two foot bentonite seal consisting of pure 1/4-inch to 3/8-inch sodium bentonite chips were placed above the filter pack. A sanitary seal consisting of Portland cement grout was placed above the bentonite seal to near ground surface. Wells were completed above ground with a protective steel casing and bollards or flush with the ground surface using a traffic-rated utility box. Depths, dimensions, and materials used in well installation was recorded and have been presented in a well construction diagrams (Appendix B).

The first installation of monitoring well RMW-12-32 was unsuccessful. Upon development of the originally constructed well, pieces of PVC well screen and filter pack sand were encountered removed from this well. It was determined that the well screen was broken and the well had to be replaced. Because of the very high density of underground utilities at this location, it was not possible to abandon the original well location and replace the well at a nearby location (the preferable option). Since no alternative location was possible, this well was reconstructed in the same borehole. The very high pH measurements since reconstruction of well RMW-12-32 indicate that Portland cement grout either from the original construction of this well or the reconstruction is likely mixed with or in direct contact with the filter pack.

#### C.1.2.6 Monitoring Well Development

Newly-installed monitoring wells were developed no sooner than 24 hours after completion. A development record were maintained for each monitoring well. Development records include:

- Monitoring well number.
- Date and time of development.
- Development method.
- Monitoring well depth.
- Volume of water produced.
- Description of water produced.
- Post-development water level and monitoring well depth.
- Field analytical measurements, including pH, temperature, electrical conductivity, and turbidity.

Immediately prior to well development, the depth to groundwater, with respect to the top of the north side of the wells casing (surveyed reference point), was measured and recorded. A piston-type bottom suction bailer was used to remove heavy sediments that may have accumulated during well construction. Once the well sediments was removed, well development began by surging the well screen with a close fitting surge-block, starting at the bottom of the screen and proceeding upwards, throughout the screened zone. Surging was conducted for three minutes per foot of well screen interval. Following surging, the well was pumped to remove the fine materials that have been drawn into the well. During pumping, measurements of pH, temperature, and specific conductance were recorded.

Development continued by alternately surging and pumping until the discharge water is free from sand and silt, the turbidity is substantially reduced, and the pH, temperature, and specific conductance have stabilized. Development activities were repeated and until the water removed from the well is as clear of turbidity as practicable. Except for wells RMW-03-15 and RMW-06-15, which are low yield wells, a minimum of ten casing volumes of water was removed from each well.

### C.1.3 Surveying

All existing and new groundwater monitoring wells, grab groundwater sampling locations, non-residential soil gas sampling locations, non-residential soil sampling locations, and permanent soil gas probe locations were surveyed by a California-licensed land surveyor. The horizontal surveyed point for all monitoring wells was the north side of casing, and the vertical surveyed points included the north side of the top of casing, the north side of the well box, and ground surface immediately north of the well. For all grab groundwater sampling locations, non-residential soil gas sampling locations and non-residential soil sampling locations, the surveyed location was the center of the finished boring. For permanent soil gas probes the surveyed location was the center of the utility box.

Horizontal datum was referenced to the California State Plane Grid System, Zone 2, based on the North American Datum of 1983 (NAD83). The vertical datum was referenced to the National Geodetic Vertical Datum 1988 (NGVD 88) benchmarks. A horizontal and vertical accuracy of  $\pm 0.01$  foot was reported for all locations. Survey reports are available in Appendix B.

### C.1.4 Water Level and LNAPL Thickness Measurements

During each groundwater sampling event, depth to groundwater was measured from the marked survey point on the north side of the well casing. Water level measurements for

each event were collected on the same day. LNAPL in MW-14 was measured once on March 14, 2005, at the time a LNAPL sample was collected from this well, using an oil-water interface probe. All measurements of depth to water and depth to LNAPL were made to the nearest 0.01 foot.

### C.1.5 NAPL Sampling

A disposable polyethylene bailer was used to collect a LNAPL sample from monitoring well MW-14. Approximately 20 mL of LNAPL was placed in two 40 mL VOAs with no preservative. The samples were shipped to the appropriate laboratories in accordance with Department of Transportation (DOT) regulations for exempted quantities of hazardous materials.

### C.1.6 Monitoring Well Sampling

The groundwater monitoring program included sampling of monitoring wells constructed as part of this RI as well as the six monitoring wells owned by Union Pacific Railroad at the 1401 3<sup>rd</sup> Street railroad yard.

#### C.1.6.1 Purging and Sampling

During groundwater sampling events, all monitoring wells, except monitoring wells RMW-03-15 and BPZ-01, were purged and sampled using low-flow (minimal drawdown) sampling methods. Low-flow groundwater sampling is the process of purging and sampling wells at low-flow rates from within the well screen zone to minimize purging and improve sample quality. Low-flow groundwater sampling has the advantage of producing a groundwater with less disturbance resulting in more representative results for sensitive parameters, and a representative groundwater sample with far less total well purge water than is obtained from conventional sampling of monitoring wells, in which three well volumes are purged prior to sampling (Yeskis and Zavala 2002).

Low-flow sampling procedures used in this investigation were adapted from ASTM method D6771-02 (2002). Low-flow pumps with variable flow rate control were used. From first quarter (March) 2005 to third quarter (September) 2005 Fultz submersible pumps (Lewistown, PA) were used, with a practical flow rate from zero to two gallons per minute (gpm). Beginning in the first quarter (January) 2006 to the present, BESST Blatypus<sup>®</sup> brand (San Rafael, CA) positive displacement pumps were used, with a practical flow rate of zero to two gpm. Fultz pumps are submersible impeller pumps capable of low-flow rates. Blatypus<sup>®</sup> pumps are positive displacement pumps that differ from the more common bladder pumps in that cycling of groundwater up and down in the drive line is used in place of a bladder. The method of sampling was changed because of the advantages of:

- Pumps being dedicated to each well, the positive displacement pumps do not need to be decontaminated between each well. The need for no decontamination reduces the potential for cross contamination and increases the sampling efficiency.
- Less equipment is required to operate the positive displacement pumps increasing efficiency and reducing costs.
- The lower equipment requirements, no below surface electrical usage, and fewer moving parts increase the reliability of the positive displacement pumps.

Fultz pumps were decontaminated between each well in accordance with procedures described below. Blatypus pumps are dedicated to each well, and left in place in EPA monitoring wells or removed and stored individually for UPRR owned wells.

Because of the shallowness of the water table, typically the screen interval of most wells is entirely submerged. The pump intake was placed in the middle of the screen interval. As possible a flow rate for each well was used, between 100 and 500 mL/minute, that did not lower the water level more than 10 percent of the screen length. Monitoring wells RMW-06-15 and RMW-12-32 exhibited slowly declining water levels even when purged at minimum rate of 100 mL/minute. Although the water levels do continually decline in these wells, there is enough yield from the formation that it was determined that low-flow purging could continued to be used for these two wells.

Monitoring wells RMW-03-15 and BPZ-01 purged dry at even the lowest purge rate. For these wells it was determined that low-flow purge was not the appropriate sampling method. Sampling of these two wells is done by bailing the well dry, and collected a sample with 24 hours after purging. For both these wells, less than 80% recovery is achieved in this 24 hour period and often insufficient groundwater is available to fill the full complement of sample bottles.

For the wells sampled using low-flow purging, water quality indicator parameters were measured using direct-reading meters in a flow-through cell. Measurements were taken every three to five minutes at the flow rate described above. Stabilization is achieved after all parameters have stabilized for three successive readings. The stabilization criteria are as follows:

Field Parameter	Stabilization Criteria
pH	± 0.1
Electric conductivity	± 3%
Oxidation-reduction potential	± 10 millivolts (mV)
Dissolved oxygen	± 0.3 mg/L
Turbidity	± 10% (when turbidity > 10 NTU)

NTU = nephelometric turbidity unit.

An initial change in the measurements typically indicates that water is being drawn from a different source (“active” versus “stagnant” water), and stabilization of these parameters indicates that the water is coming from a steady-state source (the formation immediately surrounding the well screen near the pump intake). If stabilization cannot be achieved, purging was terminated after 45 minutes.

After completion of the purging phase, the flow-through cell was removed and the groundwater samples were collected directly from the pump discharge tubing. All samples were collected in certified, pre-cleaned sample containers. Sample volumes to be field-filtered were filtered using a disposable 0.45-micron in-line filter and collected in the appropriate sample container. The first 500 mL of sample passed through the in-line filter

was not collected in the sample container to ensure that the filter media has equilibrated to the sample.

### C.1.6.2 Field Analyses

Ferrous iron, alkalinity, and carbon dioxide were measured in the field using a Hach<sup>®</sup> portable colorimeter and test kits. These parameters were recommended for field analysis because they are highly unstable and should be analyzed as soon as possible after sample collection. Procedures for field analysis are summarized in the following subsections.

All glassware or plasticware used in the analyses were cleaned prior to sample collection by thoroughly washing. If the concentration of an analyte is above the range detectable by the titrimetric or colorimetric methods, the analysis were repeated by diluting the groundwater sample with distilled water until the analyte concentration fall to a level within the range of the method.

Field analyses were not regularly conducted on groundwater from the following wells for the reasons given:

- RMW-3-15:
  - Groundwater from this well is considered heavily “disturbed” by the total purge method used for this well that purged dry. For this reason field analyses of unstable parameters were likely not representative of formation water at this location.
  - Insufficient volume often precluded collection of the full complement of samples containers, and the decision was made to fill as many sample containers as possible rather than conduct field analyses that were unlikely to be meaningful for the above reason.
- RMW-12-32:
  - The carbon dioxide method using sodium hydroxide to conduct the titration. The groundwater from this sample reacted with the sodium hydroxide solution creating a flocculate precipitate that interfered with use of the carbon dioxide analysis.
  - The elevated pH due to grout in contact with the filter pack, interfere with the alkalinity field test kit results rendering these values unreliable.
- BPZ-01:
  - Groundwater from this well was heavily “disturbed” by the total purge method used for this well that purged dry. For this reason field analyses of unstable parameters were likely not representative of formation water at this location.
  - Insufficient volume often precluded collection of the full complement of samples, and the decision was made to fill as many sample containers as possible rather than conduct field analyses that were unlikely to be meaningful for the above reason.

- This well is screened in organic-rich bay mud or peat, and is black even when filtered. The dark color of this water precluded the accurate usage of the colorimetric method of all the field test kits.
- BMW-8: This well is screened in organic-rich bay mud or peat, and is black even when filtered. The dark color of this water precluded the accurate usage of the colorimetric method of all the field test kits.

#### C.1.6.2.1 Ferrous Iron Measurements

Ferrous iron [Iron (II)] concentrations were measured in the field using colorimetric analysis with a Hach<sup>®</sup> DR/700 portable colorimeter after appropriate sample preparation. Hach<sup>®</sup> Method 8146 for ferrous iron (0 to 3.0 mg/L) was used to prepare and quantitate the samples.

#### C.1.6.2.2 Alkalinity Measurements

Alkalinity of the groundwater samples were measured in the field by titrimetric analysis using Hach<sup>®</sup> Method 8221 (0 to 5,000 mg/L as calcium carbonate).

#### C.1.6.2.3 Carbon Dioxide Measurements

Carbon dioxide were measured in the field use titrimetric analysis after appropriate sample preparation. Hach<sup>®</sup> titrimetric method CA-23 (using a caustic titrant and phenolphthalein indicator) for carbon dioxide was used to prepare and analyze the samples. The Hach<sup>®</sup> method CA-23 is equivalent to the CHMetric<sup>®</sup> kit proposed in the SAP.

### C.1.7 Aquifer Testing

To determine the aquifer hydraulic conductivity slug tests were conducted on by performing both falling-head (“slug in”) and rising-head (“slug out”) tests at each location. Because of the ease and rapidity of slug testing, a total of two falling-head and two rising-head test were conducted on each well tested.

Equipment used for slug testing included:

- A 3.5-inch diameter, 5-foot long solid polyethylene “slug.”
- Disposable nylon rope.
- Data logging Mini-Troll<sup>®</sup> pressure transducer.
- Laptop computer for programming the pressure transducer in the field.

#### C.1.7.1 Falling-Head Test

The falling-head test is the first step in the two-step slug testing procedure. The following steps describe procedures followed during performance of the falling head test.

1. The aquifer test data form was prepared with entries for:

- Well number
- Project number
- Project name
- Aquifer testing team
- Climatic data
- Reference point elevation

- Identification of measuring equipment being used
  - Static water level
  - Date
2. The static water level in the well was measured to the nearest 0.01 foot.
  3. The decontaminated pressure transducer was lowered into the well and the displaced water is allowed to return to its static level. Typically 12 hours or more (i.e., overnight) was allowed for static water level to re-equilibrate. The water level was checked again before testing to ensure the water level had returned to the static level recorded before the transducer was inserted.
  4. The decontaminated slug device was lowered into the well to just above the water level in the well.
  5. The data logger was started and the slug was quickly lowered, but not dropped, below the water level in the well, not disturbing the pressure transducer.
  6. Data recording was not stopped before the water level in the well had recovered to at least 80 percent of the initial water level.

#### C.1.7.2 Rising Head Test

After completion of the falling head test, the rising head test is performed. The following steps describe the rising head slug test procedure.

1. The water level in the well was measured to the nearest 0.01 foot to ensure that it had returned to the static water level.
2. Data recording was initiated and the slug quickly withdrawn from the well.
3. Data recording was not stopped before the water level in the well had recovered to at least 80 percent of the initial water level.

#### C.1.7.3 Slug Test Data Analysis

Data obtained during slug testing was analyzed using methods appropriate for the nature of data obtained from the slug tests. Based on the responses of the water levels during slug testing, it was determined that two analytical methods were appropriate for analysis of the data.

- As proposed in the SAP, the common Bouwer and Rice method for unconfined aquifers (Bouwer and Rice 1976, Bouwer 1989) was used for most analysis of the wells tested (i.e., RGW-03-15, RGW-07-15, RGW-08-15, RGW-09-15, and RGW-10-35 slug-in). This method assumes that the only factor affecting the response of the water level in the well is the flow of groundwater to/from the well, and that release/storage of water from aquifer storage is negligible and can be disregarded.
- An analysis method different than that proposed in the SAP was used for analysis of several wells to due to the mid-response curvature to the data in these wells (i.e., RGW-08-35, RGW-10-15, and RGW-10-35 slug-out). This mid-response curvature of the data suggests that in addition to flow of groundwater to/from these wells, that release/storage of water from aquifer storage was also a significant factor in response of

the water level in these wells. Use of the KGS [Kansas Geological Survey] method (Hyder et al. 1994) for wells with this type of recovery response provides a more accurate estimation of hydraulic conductivity. Although a value for specific storage (i.e., water storage per unit aquifer volume) is provided by this model, the calculated value for specific storage is mathematically so highly sensitive that this value returned by the model is considered unusably inaccurate.

AQTESOLV for Windows version 3.5 (HydroSOLV 1996-2003) software was used to aid in the analysis of the slug test data. This software contains a large library of methods for analysis of aquifer slug and pumping test, increases the ease and accuracy of analysis, and provides detailed aquifer test reports (Appendix B).

## C.1.8 Soil Sampling

### C.1.8.1 On-Facility and Off-Facility Soil Sampling

Near-surface soil samples were collected using a Geoprobe<sup>®</sup> rig equipped with a hydraulic percussion hammer for tool advancement. Continuous soil cores were collected with a stainless-steel Macro-Core<sup>®</sup> sample tube (2.125-inch diameter by 48 inches long) lined with clear butyrate sleeves. The soil samples were collected from a depth interval of one to two feet bgs and at four to five-foot bgs, whenever possible. When concrete was present, ground surface was considered to be the bottom of the concrete (as thick as 40 inches in areas). Samples were only collected from unsaturated soils. Saturated soils, likely due to proximity to the water table, were first encountered at approximate depths varying from two to eight feet bgs throughout the on- and off-facility parcels.

Once the core was obtained, moisture content (i.e., degree of saturation) was roughly identified through the clear butyrate sleeve and intervals for analytical sample collection were identified. The sleeve was then horizontally cut, moisture content was verified, and the sleeve was capped at each end with a Teflon<sup>®</sup> sheet covered by a polyethylene cap for submittal for volatile organic compound (VOC) analysis. The clear butyrate sleeve containing the remainder of the soil core was then longitudinally cut to expose the recovered sediments and logged as detailed in Section C.1.1.1. Once logged, soil was collected from the identified analytical sample interval(s) and composited in a disposable, resealable plastic bag. Each composite was placed in a shaded area and allowed stabilize for approximately five minutes. Headspace was then scanned with a photoionization detector (PID), equipped with a 11.6 electron-volt (eV) lamp, for total volatile organic compounds. Finally, additional soil aliquots for laboratory analysis (as required by the Sampling and Analysis Plan) were collected and the remaining soil was added to the drill cuttings for proper disposal.

Following sampling, each borehole was backfilled with a cement grout, and finished to the original surface condition.

### C.1.8.2 Residential Soil Sampling

At residential parcels, soil samples were collected for chemical and soil physical property analysis. Soil sampling at all these locations was conducted using hand tools, specifically stainless steel hand augers and slide hammers with a stainless steel sampling shoe. The proposed sampling depth at each location was 0.5 to 1.0 and 2.5 to 3.0 feet bgs. All but one

sample was collected at the proposed depth. This one sample was collected at 2.0 to 2.5 feet bgs because of soil conditions that prevent augering to a greater depth. All down-hole sampling tools were decontaminated between locations and between sampling depths.

#### *Residential Samples for Chemical Analysis*

Prior to sampling, a hand auger was used to dig to the depth just above the sample interval. Sampling then was completed using a slide hammer to drive a sampling "shoe" containing a 2-inch diameter, 6-inch long stainless steel sleeve. In accordance with EPA method 5035, immediately after retrieval of the sample three Encore™ sample containers were used to collect soil for VOC analysis from "undisturbed" soil core remaining in the sampling "shoe." After collection of the VOC sample, the remaining soil homogenized and then transferred to certified, precleaned 8-ounce glass jars with Teflon® line-lids for distribution to additional laboratories for the remaining analyses.

#### *Residential Samples for Soil Physical Property Analysis*

Prior to sampling, a hand auger was used to dig to the depth just above the sample interval. Sampling then was completed using a slide hammer to drive a sampling "shoe" containing a 3-inch diameter, 6-inch long brass sleeve. The physical properties sample in the brass sleeve was then removed from the sampling "shoe." The ends of the brass sleeve were covered with Teflon® sheets and sealed with end caps.

### **C.1.9 Residential Produce Sampling**

The residential backyard produce sampling procedure was developed to minimize the loss of VOCs due to bruising and prevent contamination of the sample from direct contact with any other materials. Other than the one-liter certified pre-clean glass jar with a Teflon® lined-lid, the only other piece of sampling equipment was a pair of cleaned stainless steel scissors. The open jar was positioned below produce. The jar was angled to minimize the impact of the falling produce and thereby minimizing bruising. The stainless steel scissors were used to cut the stem allowing the produce to fall into the jar. To the extent possible each jar was filled with produce. Care was taken that no contact was made with any other objects, including the sampler's gloved hands, to avoid inadvertent contamination of the sample. In most cases, one MS/MSD was collected for each type of produce grown. Fewer than one MS/MSD per type of pepper were collected because of the wide variety of peppers being grown. Immediately after collection, each produce sample was placed on dry ice.

All produce samples were shipped on dry ice in accordance with DOT regulations for shipping exempted quantities of hazardous materials.

### **C.1.10 Soil Gas Sampling**

Soil gas samples were collected from temporary borings on site, in residential backyards, and from permanent soil gas probes.

#### **C.1.10.1 Soil Gas Survey Sampling**

The following subsections describe the procedures used to collect soil gas samples from the temporary borings.

### C.1.10.1.1 System Set-up

Soil gas survey samples on site were collected from temporary borings advanced by a Geoprobe® direct-push rig (same rig as used for soil sampling) using Post Run Tubing (PRT) equipment. The PRT system consists of a series of hardened steel rods, a PRT drive-point holder, and expendable aluminum drive points. The PRT system was driven to the desired sample depth (approximately 2.5 feet bgs [below concrete bottom/top of soil]), then slightly retracted (3 to 4 inches), allowing the expendable drive point to “fall out” of the drive-point holder and exposing the PRT drive-point holder to the surrounding soil pore space. A PRT adapter and Teflon® tubing were advanced down the inner rods and secured to the expendable point holder. New tubing was used at each sampling point.

Above ground, the sample tubing exits the drilling rods and attaches to the vacuum tank apparatus, equipped with a flow rate meter. A “T-junction” is installed on the intake side of the vacuum tank apparatus and two gas-tight disposable 60-mL syringes are installed on the other branch of the junction. Each syringe was individually pressure tested prior to being attached to the sampling system to ensure that syringe had no defects, which could potentially cause leakage.

To achieve a leak-free seal between the aboveground atmosphere and the probe, hydrated granular (fine) bentonite was packed over the contact point with ground surface.

### C.1.10.1.2 Purge Volume Testing

To ensure that stagnant or ambient air was removed from the sampling system and to ensure that samples collected are representative of subsurface conditions, a purge volume test was conducted at the first sampling point (RSG-21). RSG-21 was chosen for the purge volume test as it is located near the center of the Site, where historical concentrations have been greatest. First, a system volume was calculated by:

$$(V \times L) + a \tag{1}$$

where:  $V$  = interval volume of tubing per foot.

3/16” inside diameter (ID) tubing (1/4” outside diameter [OD])

= 5.43 mL/ft (milliliters per foot)

1/4” ID tube (5/16” OD) tubing = 9.65 mL/ft.

$L$  = Total length of tubing below and above ground.

$a$  = Annular space around the soil probe implant (this volume was estimated at 25 mL).

Step purge tests of one, three, and seven system purge volumes were conducted as a means to determine the purge volume to be applied at all sampling points. After mobile laboratory analysis of these samples, it was determined that removing seven system volumes yielded the highest VOC concentrations, and therefore, most representative sample. A seven tubing volume purge was used at all subsequent soil gas sampling locations.

### C.1.10.1.3 Purging/Flow Rate

Sample points were purged and sampled using the vacuum system on the rig. Once the appropriate purge volume had been calculated (as detailed in the preceding Section), the

system was purged at a constant flow rate of 0.4 CFH (189 mL/min), as regulated with the in-line flow meter, until the appropriate volume was purged. Once purging was complete, the line connected to the vacuum apparatus was clamped closed and sampling procedures began as detailed in the following Section.

To ensure a representative soil gas sample was being collected, and that the sampling system was not short-circuiting to the atmosphere, a tracer gas was used to detect leaks. An aerosol can of electronic duster containing 1,1-difluoroethane (DFA)(propellant) was used for leak detection. 1,1-Difluoroethane is an ideal leak detection compound because the on-site mobile laboratory was able to analyze for this compound, it is non-toxic, is not a compound of concern at the facility, and does not react with any of the known contaminants of concern. DFA (and 1,1,1,2 trifluoroethane [TFA], another duster compound propellant) are so highly volatile that when released from pressurized containers, they instantly volatilize and are lost to the atmosphere, and for this reason rarely if ever remain as contaminants at any site. Prior and during purging of each soil gas sample location, the compressed air was sprayed around the base of the boring and at all connections.

1,1-Difluoroethane was detected in two soil gas survey samples (RSG-03 and RSG-42 [duplicate]), indicating that short circuiting or leakage was occurring. These samples were subsequently recollected successfully, with no 1,1-difluoroethane detected in the second sample collected. This second sample was used added to the database for analytical results at this location.

#### C.1.10.1.4 Soil Gas Sampling Procedure

Once purging was complete, and the line connected to the vacuum pump apparatus was clamped closed, a sample was extracted from the line (from the alternate branch of the "T-junction", on the intake side of the vacuum tank). Two 60 mL, disposable syringes (fitted with valves) were filled in sequence by manually retracting the plungers and drawing soil gas into the body of the syringe. Special care was taken to match the purge rate of approximately 200 mL/min during sample collection.

Following sample collection, the valve on each syringe was closed, wrapped in foil to eliminate exposure to sunlight, and immediately delivered to the mobile laboratory. Once at the mobile laboratory, each sample was logged onto the chain of custody and analyzed. If a sample was not immediately analyzed, then it was stored in a sealed plastic container, and not exposed to any light.

#### C.1.10.2 Residential Soil Gas Sampling

Soil gas survey samples were collected in residential backyards by using a commercially-available slide-hammer to drive a 3/8-inch-diameter hollow rod with a closed retractable PRT soil vapor sampling tip attached. The soil gas sampling tool was driven to desired sampling depth of 2.5 feet bgs.. Prior to advancing the bar, small-diameter (1/4 -inch OD by 3/16-inch ID) Teflon<sup>®</sup> tubing was strung through the drive rod and attached the hose-barb fitting retractable tip. Once driven to the desired depth (2.5 feet bgs), the bar was retracted approximately 2 inches, exposing 2-inch stainless steel screen (similar to the procedure described Section C.1.10.1.3). Because of saturated soil due to irrigation, soil gas samples in South Prescott Park were driven to 2 feet bgs. An inert sealing material (e.g., hydrated powdered bentonite) was packed over the contact point with ground surface to seal the

hole. The same leak detection methods (including spraying aerosol DFA or TFA) detailed in Section C.1.10.1.4 were used during residential soil gas sampling.

Once the tip was driven to the desired depth, the tubing was attached to a hand vacuum pump (with an approximate volume of 15 mL per stroke) through a "T-junction" as described in Section C.1.10.1.4. The other branch of the "T-junction" was attached to the swage fitting on the Summa canister sample train (canister and in-line stainless-steel filter) after removing the brass cap used during transport. Once all connections were made approximately three tubing volumes were purged prior to sample collection using the hand pump. Following purging, the pump tubing was clamped off and the twist valve on the canister was opened, drawing soil gas into the canister, and the beginning sample time was recorded. Once the vacuum in the canister had dissipated, the twist valve was closed, and the time recorded. After the final canister pressure had been verified, the brass cap was replaced and tightened over the swage fitting. Ideally -5 to -0.5 pounds per square inch (psi) of vacuum would remain in the Summa canister. This remaining vacuum allows the lowest possible detection limit and allows a check of the canister pressure upon receipt by the laboratory. Any loss of vacuum during from the time of sample to receipt by the laboratory would indicate leakage of the canister during storage and/or transit.

### C.1.10.3 Permanent Soil Gas Probe Installation and Sampling

Permanent soil gas probes (Geoprobe<sup>®</sup> Permanent Soil Vapor Implants; Salina, KS) were installed at depths ranging from 2 to 4 feet bgs. Permanent soil gas probes at the facility were installed using a Geoprobe<sup>®</sup> rig (RSP-1 through RSP-6), and permanent soil gas probes installed in the interceptor trench backfill (RPS-7) and in the utility trench backfill sand (RSP-8 through RSP-12) were installed using hand tools. Each probe was constructed with a 6-inch stainless-steel mesh screen implant attached to 5/16-inch OD by 1/4-inch ID Teflon<sup>®</sup> tubing extending to the ground surface. The screen implants were imbedded in RMC No. 2/12 Monterey sand that extended above and below the screen interval of the probe. One quarter foot of dry granular bentonite was placed on top of the sand pack, then the borehole was grouted to near-surface with neat Portland cement grout. Each probe was completed with a flush-mounted traffic-rated (aircraft runway) well box, which was set in concrete. At ground surface, within the well box, the Teflon<sup>®</sup> tubing was fitted with stainless-steel Swagelock<sup>®</sup> fittings that can be connected to soil gas sampling equipment and sealed when not in use. Construction diagrams of the permanent soil gas probes are provided in Appendix B.

Sampling of permanent soil gas probes began by attaching a sampling "T"-junction with attached Summa canister and purge pump to the soil gas probe fitting. Purging and sampling of the permanent soil gas probes was conducted in the same manner as the residential soil gas sampling, as described in Sections C.1.10.1.3 and C.1.10.1.4.

### C.1.11 Crawl Space Air and Ambient Air Sampling

#### C.1.11.1 Summa Canister Sampling

Crawl space air and ambient air samples were collected on the same day as the soil gas samples at each residential location. Each crawl space air or ambient air sample was collected as an integrated sample over a period of approximately 4 hours. The Summa

canisters and flow controllers were pre-calibrated by the laboratory to collect the necessary volume over the specified time period.

The sampling train (Summa canister, vacuum gauge, flow controller, in-line particulate filter) for ambient air samples was placed so that the sample inlet was approximately 1 meter (3.3 feet) aboveground surface, the approximate breathing level of a child. For crawl space samples, the Teflon<sup>®</sup> tubing connected to the Summa canister was advanced inside the crawl space area.

The following information was recorded on the sampling log: the canister serial number, the flow controller serial number, the ambient temperature, the initial and ending pressure of the canister, and sampling start and end time. The pressure of each canister was checked prior to and after sampling. To accomplish the pressure check, a vacuum gauge was attached directly to the canister without the flow controller in place; the canister valve was opened; the pressure recorded; and the valve was closed.

Background ambient air samples were collected at an off-site location over two 4-hour periods during the morning and afternoon times of the sampling date.

#### C.1.11.2 Low Detection Limit Naphthalene Sampling

Although not originally proposed in the SAP, to evaluate that vapor intrusion potential of naphthalene low-detection detection limit sampling was completed in May 11 and 12, 2005. To meet the low detection limit analysis high volume air samples are required. To perform this sampling a Tisch<sup>™</sup> TE-5170V (Tisch Environmental Inc.; Village of Cleves, OH) electrically powered high volume air sampler with a Tisch<sup>™</sup> PUF (polyurethane foam) TE-1000 sample cartridge holder.

Prior to sampling each of the seven Tisch<sup>™</sup> air sampler was individually calibrated to adjust and determine the exact air flow through rate. In accordance with manufactures manual, calibration was conducted in by adjusting a flow adjustment valve while measuring a series of values for the internal vacuum (magnehelic reading) and the pressure drop (in inches of water) across test PUF sample cartridge. Then using a manufacturer provided Excel spreadsheet (Tisch undated) a flow rate calibration curve was developed using the pressure drop across the sampler at various magnehelic readings which also required, the barometric pressure and ambient temperature at the time of calibration and the time of sampling. The corresponding magnehelic readings and pressure drop during calibration were recorded in a field notebook. Temperature and barometric pressure readings for Oakland for the period of calibration and sampling were obtained hourly reading from automated weather stations (Wunderground.com 2005). Based on the final calibration air flow rates for each sampler were estimated as shown in Table C-1.

TABLE C-1  
Tisch™ PUF High Volume Air Sampler Sampling Operation Parameters  
AMCO Superfund Site  
Oakland, California

Sample ID	Sampler SN	Flow Rate (m <sup>3</sup> /min)	Operation Time (min)	Sample Volume	
				m <sup>3</sup>	liters
322-BA-AM-0505*	1839	0.217	400	86.8	86,800
322-BA-PM-0505*		0.212	406	86.1	86,100
1428AA-0505	1836	0.215	404	86.9	86,900
1428AA-0505 (Duplicate)	1837	0.213	403	85.8	85,800
1432AA-0505	1841	0.208	403	83.8	83,800
1436AA-0505	1840	0.213	404	86.1	86,100
326AA-0505	1838	0.204	445	90.8	91,800
360AA-0505	1842	0.191	405	77.4	77,400

**Notes:**

m<sup>3</sup> = cubic meters  
min = minutes  
SN = serial number

\*Background samples using same sampler for morning and afternoon samples

Temperature at calibration = 65.5°F

Barometric pressure at calibration = 30.05 inches of water

Average temperature during sampling = 61.8°F

Average barometric pressure at sampling = 30.07 inches of water

Tisch™ samplers were set up in the backyards of each residence sampled and at the background location (the sampler intake is 4 feet above the ground surface). PUF sample cartridges provided by the analytical laboratory (Air Toxics; Rancho Cordova, CA) were loading into the sampler. Each glass sample cartridge was pre-cleaned, and packed with a precise amount of SVOC sorbant material held in place between polyurethane foam pads, which in turn were secured with stainless steel screen at each end. The Tisch™ samples were then turned on and operated for a prescribed amount of time at a flow rate set at the time of calibration. A run time (400 minutes or more) was established to obtain total air sample volume, as indicated by the laboratory, that was necessary to achieve the method detection limit.

After completion of the sample time, the sample cartridge removed, wrapped in aluminum foil, and placed in a ziplock bag provided by the analytical laboratory. The sample cartridges were placed on ice and couriered to the analytical laboratory the following day. The total air sample volume was reported to the analytical laboratory for the calculation of the air concentration of naphthalene.

The information recording on the sampling datasheets included the Tisch™ sampler location, sampler serial number, sampler field designation (PUF-1 through PUF-7), sampling start and stop time, and sampling crew.

## C.2 Quality Control Samples

QC samples were collected or prepared to assist in determining data reliability. These QC samples include field duplicates, equipment blanks, and laboratory QC samples (for MS/MSDs). QC samples are normally collected from locations that are suspected to be of moderate contamination. QC samples were collected using the same procedures as the collection of the target sample.

### C.2.1 Field Duplicates

The field duplicate is an independent sample collected as close as possible to the original sample from the same source and is used to document sampling precision. The duplicate samples were labeled and packaged in the same manner as other samples so that the laboratory cannot distinguish between samples and duplicates. To the extent possible duplicate samples were taken from locations that were suspected or known to be at least moderately contaminated. Field duplicates were collected by alternately filling sample and sample duplicate containers at a location of known or suspected contamination. Each duplicate was taken using the same sampling and preservation method as other samples. Field duplicates were collected at a minimum frequency of one in every 10 samples.

### C.2.2 Equipment Blanks

Equipment blanks were collected to verify that contamination was not introduced to samples through the use of decontaminated equipment.

During groundwater and soil sampling, equipment blanks were generally collected at minimum frequency of once per day by pouring blank water over or through decontaminated sampling equipment into the sample bottles. Commercially available ultra-pure water was used, using the same preservation methods and packaging and sealing procedures used during collection of groundwater samples. Exceptions to the frequency of sampling are described in Appendix D. After the installation of the positive displacement pumps for groundwater sampling, it was determined because of the exclusive use of dedicated and disposable equipment that the equipment blanks on unused disposable equipment could be reduced to once per event.

Because background air concentrations could not be considered “clean” for the purposes of collecting equipment blanks (see Section 5.0), Summa canister equipment blanks were collected.

### C.2.3 Trip Blanks

The purpose of trip blanks is to verify that volatile contamination is not introduced to samples during transportation or through transportation materials. Commercially available trip blanks prepared with ultra-pure water were purchased and analyzed for VOCs only.

One trip blank was submitted each day of monitoring well sampling for VOCs. The trip blank was carried in a sample cooler throughout the day and were returned to the laboratory with the field samples.

### C.2.4 Ambient Blanks

The use of ambient blanks was introduced for the groundwater monitoring program after the installation of the positive displacement pumps in the monitoring well. Ambient blanks were generally collected twice per week. Ambient blanks were collected at the well head by filling sample containers with ultra-pure blank water.

### C.2.5 Laboratory QC Samples

Laboratory QC samples were collected to perform MS and MSD analyses. An MS is an aliquot of a sample spiked, at the laboratory, with a known concentration of target analyte(s) and provide a measure of the method accuracy. The MSD is a laboratory split sample of the MS and is used to determine the precision of the method.

For groundwater, twice the normal water volume was collected for laboratory QC samples. Extra volumes collected for laboratory QC samples were labeled as such on sample bottles and paperwork. For soil and groundwater, an MS/MSD was collected at the discretion of the field crew, at a frequency of one in every 20 consecutively collected samples. For produce, generally one MS/MSD was collected for each type of produce sample. The exception to this frequency was for peppers, which were present in a large number of different types.

## C.3 Decontamination

### C.3.1 Drilling Equipment

Downhole rods, drill pipes, and any other non-dedicated drilling or sampling equipment that came in contact with soil or groundwater was steam-cleaned prior to drilling subsequent borings. Steam cleaning occurred at containment areas where decontamination water was collected for disposal.

### C.3.2 Sampling and Measurement Equipment

A decontamination station was established at the Site for cleaning reusable equipment. Detergent, brushes, and water were stored at the decontamination station in 5-gallon plastic buckets. All decontamination water was contained and collected for disposal.

The following is the general procedure that was used for decontaminating non-dedicated field equipment that directly or indirectly contacted samples during sampling activities:

- Physically remove any visible solids.
- Wash with non-phosphate detergent (i.e., Liquinox®).
- Rinse with potable water.
- Rinse with deionized water.

Any equipment that came in contact with NAPL (e.g., oil-water interface probe) also was rinsed with isopropyl alcohol prior to the deionized water rinse.

Cleaned equipment was stored in a clean area, and potentially-contaminated equipment was restricted to the decontamination area. Rinse water was transferred to labeled 55-gallon drums for subsequent storage prior to disposal.

Summa canisters and flow controllers used during soil gas and air sampling were certified clean by the laboratory. The PRT soil gas sampling equipment was decontaminated in the same manner as soil sampling equipment.

## C.4 Investigation-derived Waste Management

In the process of conducting the RI field activities, the field team generated the following different types of potentially-contaminated IDW:

- Used personal protective equipment (PPE)
- Disposable sampling equipment
- Soil cuttings
- Free product (NAPL)
- Purge water
- Decontamination fluids

The procedures used for managing of these IDW are listed below:

- Used PPE and disposable equipment was bagged, tied off, and placed in a municipal refuse dumpster on site. These wastes are generally not considered hazardous and can be sent to a municipal landfill. None of the PPE used during the investigation was grossly-contaminated (e.g., contaminated with NAPL) and therefore did not require decontaminated prior to disposal.
- A small amount (< 1 liter) of LNAPL generated during sampling of monitoring well MW-14. This product was placed in partially filled drum containing groundwater that was prior to testing suspected to be hazardous waste. DOT-approved 55-gallon drums with secondary containment were used. This drum was designated and labeled as hazardous waste.
- Soil cuttings generated using the direct-push or drilling rigs were typically placed into DOT-approved 55-gallon drums. During rotosonic drilling in some locations “heaving sand” conditions required water washing, which generated large volumes of mixed soil and water. This saturated soil and water mixture was placed in a 4,900 gallon upright polyethylene tank with secondary containment. All drums and tanks were labeled as potential waste pending analysis.
- All purge water and decontamination fluids generated during the RI were placed into DOT-approved 55-gallon drums or the abovementioned polyethylene storage tank. All drums and tanks were labeled as potentially hazardous waste pending analysis.
- All IDW generated during field activities was stored on site in a locked and fenced yard at 1448 3<sup>rd</sup> Street where the field office was located.

- All IDW stored in drums and storage tanks were sampled and analyzed for chemical constituents as required by the destination disposal facility. All materials were designated and labeled as non-hazardous or hazardous waste in accordance with state and federal regulations. The wastes were transported and disposed by a certified waste-handling subcontractor. Wastes characterized as hazardous was disposed within 90 days of waste generation.

## C.5 Sample Management Procedures and Documentation Requirements

This section discusses the sample management procedures that were followed during the performance of field activities. This section includes information regarding sample containers and preservatives and procedures for sample packaging and transportation, sample identification, sample labeling, and sample documentation.

### C.5.1 Sample Containers and Preservatives

Sample containers for soil and groundwater were typically purchased with certificates of cleanliness from approved laboratory-product suppliers. Clean butyrate sleeves were provided by the drilling subcontractor. Sample containers for produce, soil gas, and air samples were provided by the laboratories.

#### C.5.1.1 Groundwater and NAPL

For VOC samples submitted to a fixed laboratory, a sufficient amount of 1:1 hydrochloric acid were inside the vials to lower the sample pH to less than 2 (2 mL). The vials were filled so that no gas was present after sample collection. Filled containers were checked by inverting the vial and tapping to reveal any air bubbles. If air bubbles were present, up to two more attempts were made to top off with vial without air bubbles, after which a new container was used. If the chemistry of the groundwater was such that the acid preservative generated gas bubbles, a preservative free VOA was used. Preservative free VOAs were noted on the COC to alert the laboratory to the shortened holding time. VOA containing sample were placed on ice after collection and during shipping. The holding time for preserved VOC samples was 14 days and the holding time for unpreserved samples was 7 days.

In accordance with recommendations of the EPA chemist at the Region IX laboratory (Richmond, CA) groundwater samples for 1,4-dioxane and SVOC analysis were collected in unpreserved 1-liter glass amber bottles and chilled on ice. The analytical holding time for this analysis were 7 days prior to extraction and 40 days following extraction. The exception was a grab groundwater sample collected for 1,4-dioxane analysis were collected in VOAs using the same procedures for collection of VOC samples in VOAs.

Samples for total metals or silica analysis were placed into 1-liter polyethylene bottles preserved by nitric acid and cooled to 4 °C. The maximum holding time is 28 days for mercury and silica and 6 months for other metals.

Samples for field-filtered metals analysis were passed through a disposable 0.45-micron in-line filter immediately prior to collection. In accordance with recommendations of the EPA

chemist at the Region IX laboratory (Richmond, CA), the samples were subsequently were placed into 500 mL polyethylene bottles preserved by nitric acid and ice. The maximum holding time is 28 days for dissolved mercury and 6 months for other dissolved metals.

Samples for hexavalent chromium were placed in one 125-mL polyethylene bottle and on ice. The analytical holding time for this method is 24 hours.

Samples for cyanide analysis were placed in 250 mL polyethylene bottles preserved with sodium hydroxide and placed on ice. The maximum holding time for cyanide is 14 days.

Samples to be analyzed for major anions (chloride, sulfate, nitrate, nitrite) or TDS were placed in a 500 mL polyethylene bottle without headspace and ice. The maximum analytical holding time for chloride and sulfate were 28 days; the maximum analytical holding time for nitrate and nitrite was 48 hours; the maximum analytical holding time for TDS were 7 days. Because of the short holding time for the anions sample, all samples were delivered to the EPA laboratory in Richmond, CA within 24 hours of collection.

In accordance with recommendations of the EPA chemist at the Region IX laboratory (Richmond, CA), samples collected for methane, ethane, and ethene (dissolved gasses) were collected in three preserved 40 mL VOA. The VOAs were filled so that no headspace is present after sample collection. If air bubbles were present, up to two more attempts were made to top off with vial without air bubbles, after which a new container was used. If the chemistry of the groundwater was such that the acid preservative generated gas bubbles, a preservative free VOA was used. Preservative free VOAs were noted on the COC to alert the laboratory to the shortened holding time. The container was cooled on ice prior to shipping. The maximum analytical and contract holding times for methane, ethane, and ethene is 14 days for preserved samples and 7 days for unpreserved samples. All samples for dissolved gasses were delivered to the EPA laboratory in Richmond, CA within 24 hours of collection.

Samples for total petroleum hydrocarbons as diesel and motor oil were placed in two 1-liter amber bottle and chilled on ice. The analytical holding time for this method is 28 days.

Samples collected for TOC were placed in one 250-mL polyethylene bottle preserved with sulfuric acid ( $H_2SO_4$ ) and cooled to on ice. No headspace was allowed to remain in the sample bottle. The analytical holding time for TOC is 28 days.

### C.5.1.2 Soil

All soil samples at on and off-facility parcels were collected using a Geoprobe<sup>®</sup> in clear butyrate sleeves (see Section C.2.8.1). In accordance with the SAP, samples submitted for VOC analysis were collected the bottom 4-inch section of the butyrate sleeves, that was cut from the remaining 4 feet of the sleeve, and capped with Teflon<sup>®</sup> sheet and plastic end caps. The remaining portion of the butyrate sleeve was split longitudinally, and after lithological logging, the remaining soil homogenized and distributed to 8-ounce glass jars to be shipped to various laboratories analysis of SVOC, 1,4-dioxane, organochlorine pesticides, PCBs, metals, and dioxins/furans, as indicated by SAP.

Residential soil samples were collected in 2-inch-diameter, 6-inch-long stainless steel sleeves. Samples for VOC analysis were sub-coned using Encore<sup>®</sup> sample containers, which

were then sealed in an Encore<sup>®</sup> sample pouch. The sleeve was then sealed with Teflon<sup>®</sup> sheeting end caps for all other analyses.

The maximum analytical holding time for VOCs in soil is 48 hours. The analytical holding time for 1,4-dioxane, SVOCs, polychlorinated biphenyls, and organochlorine pesticides is 14 days prior to extraction and 40 days following extraction. The analytical holding time for mercury is 28 days, and 6 months for other metals. The analytical holding time for dioxins/furans is 30 days prior to extraction and 45 days following extraction.

Soil samples for physical parameter analyses were collected in 2-inch-diameter, 3-inch-long stainless-steel sleeves, and capped with Teflon<sup>®</sup> sheeting and end caps to retain moisture. Holding times do not apply.

### C.5.1.3 Soil Gas and Air

#### C.5.1.3.1 VOC Soil Gas and Air Samples

On and off-facility soil gas samples for analysis by the on-site laboratory were collected in 60 mL gas tight syringes, wrapped in aluminum foils (to prevent degradation of sensitive VOCs by sunlight), and delivered to the on-site mobile laboratory for immediate analysis.

All VOC samples of air and soil gas from South Prescott Soil, residential soil gas sampling, permanent soil gas probes were collected in Summa canisters, as described in Sections C.1.10.1.4. The samples were kept at room temperature until analysis. The samples collected in syringes were analyzed as soon as possible by the mobile laboratory. The samples collected in Summa canisters have a maximum analytical holding time of 14 days.

#### C.5.1.3.2 Naphthalene Air Samples

Ambient air samples for naphthalene (SVOC) analysis were collected using 80 grams of sorbent material packed in a PUF cartridge provided by the analytical laboratory. The precleaned glass PUF cartridges are 6.5 cm in diameter and 12 cm long. The sorbent is held in place between two polyurethane pads, which are secured by stainless steel screens. The hold time is 7 days for the sorbent once the SVOC sample was collected.

## C.5.2 Sample Identification and Labeling

RI sample names were designated by the location ID and date (month and year). Other identifying designations were included to differentiate between media.

For samples being shipped to EPA Region IX laboratory or to one of the CLP ("EPA" contract laboratory program) laboratories, sample labels were generated using the Field Operations and Records Management System (FORMS) II Lite<sup>™</sup> software (DynCorp 2002). In addition to the unique RI sample designation, each sample shipped to a CLP laboratory had a unique CLP ID, as provided in the case assignment. The following information was printed on each sample container and was covered with clear plastic tape:

- Field Sample ID
- CLP ID (provided by the CLP manager)
- Case number
- Type of analysis requested
- Preservative used
- Date and time collected

For non-CLP samples, sample labels include the same information, minus the case number and CLP ID, which were not applicable. COCs were completed on paper forms in accordance with standard chain-of-custody requirements.

Custody seals were placed over the lids of each sample container. Custody seals on the VOA vials were placed around the lid to prevent covering the septum.

Immediately following sample collection, the filled sample containers with completed labels were sealed with custody seals, placed in plastic ziplock bags and placed in a cooler containing ice. VOA vials (three vials per sample) were wrapped together in bubble wrap, secured with tape, and placed into labeled, plastic ziplock bags. All other glass bottles were bubble-wrapped and placed into labeled, plastic ziplock resealable bags.

### C.5.3 Sample Packaging and Shipment

The following procedures apply to samples to be shipped to a laboratory. Samples to be analyzed by a mobile laboratory were directly relinquished to the laboratory as soon as possible after sample collection.

#### C.5.3.1 Preparation of Sample Coolers

1. All previous labels used on the cooler were removed.
2. All drain plugs were sealed inside and out with duct tape.
3. A layer of cushioning bubble wrap was placed at the bottom of the cooler.
4. A sorbant pad was placed at the base of each cooler to collect any water in the event of a release.
5. The cooler was lined with a large plastic bag to contain samples.
6. All ice was double-bag and seal.

#### C.5.3.2 Packing Samples in Coolers

##### *Unfrozen Samples*

1. Chain-of-custody (COC) forms were placed in the ziplock bag and taped to the underside of the cooler lid.
2. All glass sample containers were packaged in bubble wrap and secured with clear mailing tape.
3. Samples were placed in an upright position in the cooler.
4. The void space between samples was filled with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.
5. Ice was placed on top of and between the samples.
6. The remaining voids were filled with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.
7. The large plastic bag containing samples and packing material was custody sealed.

### *Frozen Samples*

The packing procedure for shipping frozen samples differs from shipping other samples in that no bagging is used and the cooler must not be fully sealed. Use of bagging and/or sealing material can cause the cooler to explode in transit due to pressure from expanding gas as the dry ice sublimates (evaporates). Frozen conditions inside the cooler prevent any liquids from being released in transit.

1. At least three 1/4-inch diameter holes were drilled in the upper portion of the cooler.
2. The chain-of-custody (COC) form was placed in the Ziplock bag and taped to the underside of the cooler lid.
3. The bottom of the cooler was lined with dry ice. The dry ice was not bagged.
4. All glass sample containers were packaged in bubble wrap and secured with clear mailing tape.
5. Samples were placed in an upright position in the cooler.
6. The void space between samples was filled with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.
7. The remaining dry ice was placed on top of and between the samples.
8. The remaining voids were filled with recyclable cornstarch popcorn, double-bagged ice, or bubble wrap.

#### **C.5.3.3 Closing and Shipping of Cooler**

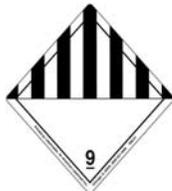
Coolers were packed with packing material surrounding the bottles to prevent breakage during transport. Water ice were sealed in plastic bags to prevent melting ice from soaking the packing material. No bagging of was done for coolers containing dry ice. Sample documentation was enclosed in sealed plastic bags taped to the underside of the cooler lid. Coolers were secured with packing tape and custody seals as described below. For coolers shipped using dry ice, while taping the coolers closed, care was taken to not tape over or seal the three vent holes.

The coolers were then delivered to the appropriate laboratory by the sampling team or by overnight courier the day of sample collection. Each day's sample shipment was reported to the EPA Region 9 Regional Sample Control Center (RSCC) Coordinator. For Friday shipments, the RSCC was contacted prior to noon to coordinate with laboratories that received sample shipments on Saturday. Samples were only shipped on Friday if the laboratory provided assurance that analytical holding times would not be exceeded.

### *Frozen Samples*

Shipping coolers with frozen samples required additional labeling as follows:

1. The DOT class 9 miscellaneous hazardous materials label (provided below) were affixed to the top and front of the cooler.



2. A label was affixed to the front of the cooler, including the weight of dry ice in kilograms:

Carbon Dioxide, Solid  
UN 1845  
\_\_\_\_\_kg

### C.5.4 Sample Custody and Documentation

A sample is physical evidence collected from a hazardous waste site, from the immediate environment, or from another source. Because of the potential evidentiary nature of samples, the possession of samples must be traceable from the time the samples are collected until they are introduced as evidence. In addition to field notebooks, there are a number of documents for tracking sample custody.

Sample labels and traffic reports/chain of custody records were generated using the FORMS II Lite™ software (DynCorp Systems & Solutions, LLC, 2002). Chain-of-custody procedures were used to maintain and document sample collection and possession. After sample packaging, the following one or more of the COC paperwork forms were generated, as necessary, for the appropriate samples:

- Organic traffic report & chain of custody record
- Inorganic traffic report & chain-of-custody record
- EPA Region IX Chain-of-Custody Record
- Overnight shipping courier air bill

Completed field quality assurance/quality control summary forms were sent to the RSCC at EPA's Region 9 Quality Assurance Office at the conclusion of each sampling event.

The following sample custody documentation procedures applied to all samples, including those to be analyzed by a mobile laboratory.

#### C.5.4.1 Chain of Custody

Because samples collected during any investigation could be used as evidence, their possession must be traceable from the time the samples are collected until they are introduced as evidence in legal proceedings. Chain-of-custody procedures are followed to document sample possession.

#### C.5.4.1.1 Definition of Custody

A sample is under custody, if one or more of the following criteria are met:

- It is in your possession.
- It is in your view, after being in your possession.
- It was in your possession and then you locked it up to prevent tampering.
- It is in a designated secure area.

#### C.5.4.1.2 Field Custody

In collecting samples for evidence, only enough sample quantity to provide a good representation of the media being sampled was collected. To the extent possible, the quantity and types of samples and sample locations were determined before the actual field work.

The field sampler was personally responsible for the care and custody of the samples collected until they were transferred or dispatched properly.

The site manager and/or the task manager determined whether proper custody procedures were followed during the field work, and decided if additional samples are required.

#### C.5.4.1.3 Transfer of Custody and Shipment

Samples were accompanied by a COC record. When transferring samples, both the individuals relinquishing and receiving the samples signed, dated, and noted the time on the record. This record documents custody transfer from the sampler, often through another person, to the analyst at the laboratory.

Samples were packaged properly for shipment and dispatched to the appropriate laboratory for analysis, with a separate COC record accompanying each shipping container (one for each field laboratory and one for samples driven to the laboratory). Shipping containers were sealed with custody seals for shipment to the laboratory. Courier names and other pertinent information were entered in the "Received by," section of the COC record.

All shipments were accompanied by the COC record identifying its contents. The original record and copy accompanies the shipment to the laboratory, and a separate copy was sent to be retained by the site manager.

If sent by mail, the package was registered with return requested. If sent by common carrier, a bill of lading was used. Freight bills, postal service receipts, and bills of lading are retained as part of the permanent documentation.

#### C.5.4.1.4 Laboratory Custody Procedures

A designated sample custodian accepted custody of the shipped samples and verified that the packing list sample numbers match those on the COC records. Pertinent information as to shipment, pickup, and courier was entered in the "Remarks" section. The custodian then entered the sample numbers into a bound notebook, which is arranged by project code and station number.

The laboratory custodian used the sample identification number or assigns a unique laboratory number to each sample and was responsible for seeing that all samples were transferred to the proper analyst or stored in the appropriate secure area.

The custodian distributed samples to the appropriate analysts. Laboratory personnel were responsible for the care and custody of samples from the time they were received until the sample is exhausted or returned to the custodian. The data from sample analyses were recorded on the laboratory report form.

When sample analyses and necessary QA checks have been completed in the laboratory, the unused portion of the sample was disposed of properly. All identifying stickers, data sheets, and laboratory records have been retained as part of the documentation. Sample containers and remaining samples were disposed of in compliance with all federal, state, and local regulatory requirements.

#### C.5.4.2 Custody Seals

When samples were shipped to the laboratory, they were placed in containers sealed with custody seals. Sample custody seals were obtained from the RSCC in the EPA's QAO. One or more custody seals must be placed on each side of the shipping container (cooler).

#### C.5.4.3 Field Notebooks

In addition to COC records, a bound field notebook was maintained by each sampling team leader to provide a daily record of significant events, observations, and measurements during field investigations. All entries were signed and dated. The field notebooks have been kept as a permanent record.

#### C.5.4.4 Corrections to Documentation

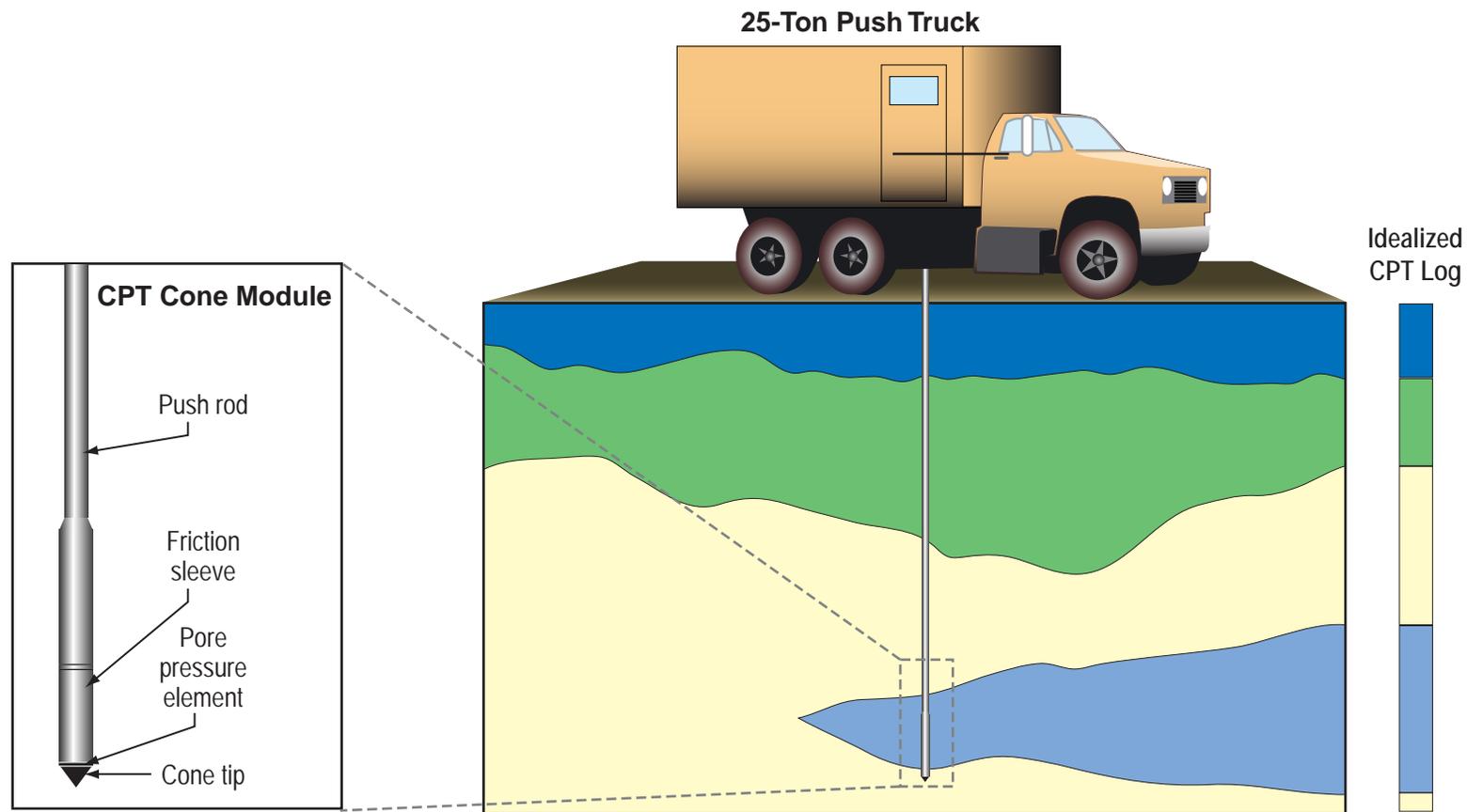
All original data recorded in field notebooks, sample identification tags, COC records, and receipts-for-sample forms were written with waterproof ink, unless prohibited by weather conditions. None of these accountable serialized documents are to be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error was made on an accountable document assigned to one team, the team leader may make corrections simply by drawing a single line through the error and entering the correct information. The erroneous information should not be obliterated. Any subsequent error discovered on an accountable document should be corrected by the person who made the entry. All subsequent corrections must be initialed and dated.

## References

- ASTM 2000a. *Method D2487-00. Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)*. American Society of Testing and Materials.
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- Tisch undated. *TE-5170 Total Suspended Particulate MFC High Volume Air Sampler: Operations Manual*. Tisch Environmental, Inc. Village of Cleves, Ohio.
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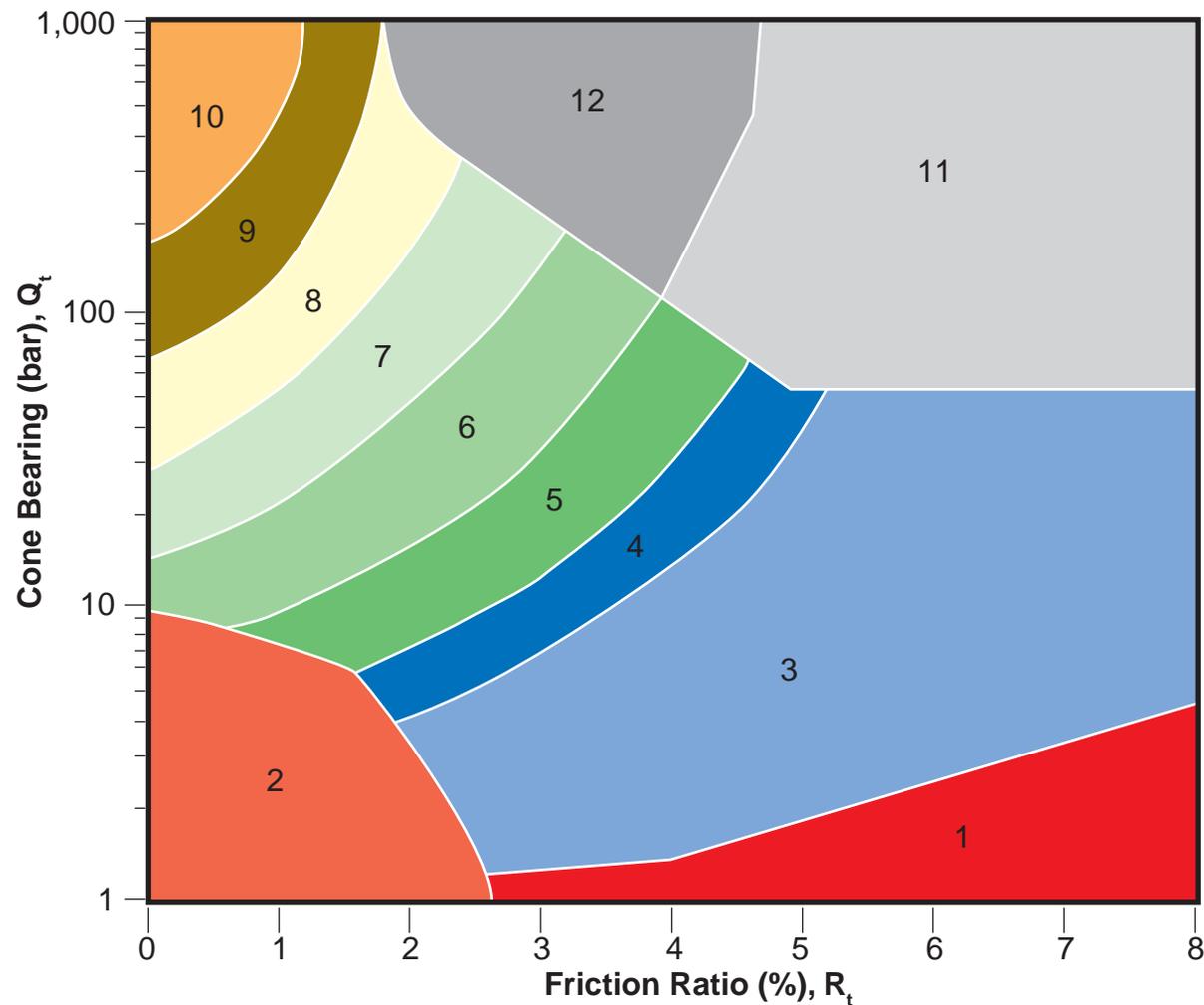


**FIGURE C-1**  
**CPT RIG ASSEMBLY AND CONE MODULE**  
 REMEDIAL INVESTIGATION REPORT  
 AMCO CHEMICAL SUPERFUND SITE  
 OAKLAND, CALIFORNIA

**LEGEND**

ZONE	Soil Behavior Type
1	Sensitive fine grained
2	Organic clay
3	Clay
4	Silty clay to clay
5	Clayey silt to silty clay
6	Sandy silt to clayey silt
7	Silty sand to sandy silt
8	Sand to silty sand
9	Sand
10	Gravelly sand to sand
11	Very stiff fine grained, overconsolidated or cemented
12	Sand to clayey sand, over consolidated or cemented

$$R_t = \frac{F_3 \text{ (sleeve friction)}}{Q_t} \times 100$$



After Robertson, P.K. 1990. Soil classification using the cone penetration test. *Canadian Geotechnical Journal*.

**FIGURE C-2**  
**CONE PENETROMETER TESTING:**  
**SOIL BEHAVIOR TYPE INTERPRETATION**  
 REMEDIAL INVESTIGATION REPORT  
 AMCO CHEMICAL SUPERFUND SITE  
 OAKLAND, CALIFORNIA