PORT OF OAKLAND

RECEIVED
By Alameda County Environmental Health 10:53 am, Jul 02, 2015

July 1, 2015

Mr. Keith Nowell
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Way Parkway
Alameda, California 94502-6540

Subject: **RO0000101**
Soil and Groundwater Investigation Work Plan,
Former Kaiser Underground Storage Tank Site,
2801 Seventh Street
Berth 30, Port of Oakland

Dear Mr. Nowell:

Please find enclosed, a Soil and Groundwater Investigation Work Plan, Former Kaiser Yard Underground Storage Tank Site, Berth 30, Port of Oakland, Oakland, California ("Work Plan") prepared on the behalf of the Port of Oakland ("Port") by Terraphase Engineering, Inc. ("Terraphase"). The work plan was prepared under a directive of the Alameda County Environmental Health to investigate an underground storage tank ("UST") site located in the present day Berth 30 Container Terminal due to UST removal activities in April 1992. The removal action was preparatory for the then redevelopment of Port land for the present day Berth 30 container Terminal. The work plan was prepared to investigate the UST site for residual petroleum hydrocarbons noted upon the 1992 UST removal. Terraphase will implement the work plan upon obtaining approval of the plan from ACDEH.

I declare, under the penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge. If you have any questions of comments about please contact me at jprall@portoakland.com or at (510) 627-1373.

Sincerely,

John Prall, P.G.
Port Associate Environmental Scientist

Enclosure noted in text
CC: Anne Whittington, Port of Oakland
Michele Heffes, Port of Oakland

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone: (510) 627-1100 ■ Facsimile: (510) 627-1826 ■ Web Page: www.portofoakland.com

SOIL AND GROUNDWATER INVESTIGATION WORK PLAN
KAISER YARD UST, BERTH 30
PORT OF OAKLAND, OAKLAND, CALIFORNIA

Prepared for

Port of Oakland
530 Water Street
Oakland, California 94607

Prepared by

Terraphase Engineering Inc.
1404 Franklin Street, Suite 600
Oakland, California 94612

July 1, 2015

Project Number 0059.007.001

terraphase engineering

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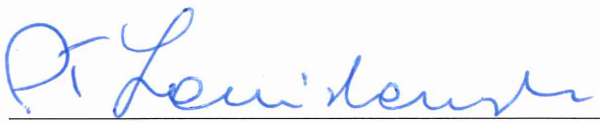
Acronyms and Abbreviations

ACEH	Alameda County Environmental Health
ACPWA	Alameda County Public Works Agency
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, xylenes
ESLs	Environmental Screening Levels
GPS	global positioning system
HASP	Health and Safety Plan
PID	photoionization detector
PPM	parts per million
QC	quality control
RWQCB	Regional Water Quality Control Board
Terraphase	Terraphase Engineering Inc.
TPH	total petroleum hydrocarbons
TPHd	total petroleum hydrocarbons as diesel
TPHg	total petroleum hydrocarbons as gasoline
TPHmo	total petroleum hydrocarbons as motor oil
ug/L	micrograms per liter
USA	Underground Service Alert
USEPA	United Stated Environmental Protection Agency
UST	Underground Storage Tank

Certification

Information, conclusions, and recommendations in this document have been prepared by a California Professional Geologist.



7/1/15

Peter T. Zawislanski
California Professional Geologist (7210)
California Certified Hydrogeologist (925)

Date

1.0 INTRODUCTION

Terraphase Engineering Inc. (Terraphase) has prepared this *Soil and Groundwater Investigation Work Plan* ("the Work Plan") on behalf of the Port of Oakland ("the Port") for the former Kaiser Yard, Underground Storage Tank (UST) Site, located in Berth 30 of the Port of Oakland, Oakland, California ("the Site"; Figure 1).

The soil and groundwater investigation was requested by the Alameda County Environmental Health (ACEH) in their March 20, 2015 email from Mr. Keith Nowell (ACEH) to Mr. John Prall of the Port (Appendix A). This request was issued following a review of the Site prompted by the submittal of the *Low Threat Closure Request, Kaiser Yard UST, Berth 30, Port of Oakland, 2801 7th Street, Oakland, California* on March 27, 2014.

The purpose of the Work Plan is to describe the methods planned to investigate the potential residual impact to soil and groundwater from three USTs formerly located at the Site. The Work Plan proposes the advancement of soil borings in the vicinity of the former USTs for the purpose of collecting soil and groundwater samples.

1.1 Background

The Site is located in Berth 30 of the Port of Oakland and in an area formerly occupied by Kaiser Steel Corporation ("Kaiser") from 1965 to 1985. During that time, Kaiser utilized three USTs for equipment refueling. The tanks included one 5,000 gallon gasoline, UST, one 3,000 gallon gasoline UST, and one 5,000 gallon diesel UST. Ancillary equipment included vent piping, two fuel dispenser islands, and product conveyance piping, were all located under a concrete pad.. . During redevelopment activities for the then future Berth 30, the three USTs and associated facilities were removed from the Site in 1992 (ARCADIS 2014).

Prior to removal, the USTs were inspected for fuel content. The diesel UST contained no residual liquid, whereas both of the gasoline USTs contained approximately 1.5 inches of residual liquid, which was pumped out. The USTs were also inspected for integrity following removal; no holes or cracks were identified (ARCADIS 2014).

During the removal of the USTs and associated piping, approximately 120 cubic yards of soil was excavated and stockpiled at the Site. Figure 2 presents the approximate locations of the UST site and excavation footprint. The excavation was approximately 38 feet by 17 feet and extended to a depth of approximately 9.5 to 11 feet deep. Groundwater was encountered at a depth of approximately 9 feet below ground surface. There were no odors or obvious signs of staining on the excavated soil or sidewalls of the excavation, although a potential film of free product was observed on the groundwater. The water was pumped from the excavation then allowed to recharge, and a similar film was observed. This process of pump and recharge was repeated until a total of approximately 800 gallons of water was pumped from the excavation. At this time a grab groundwater sample was collected from the excavation, and soil samples were

collected from six locations along the sidewalls of the excavation at a depth of approximately 8.5 feet below ground surface (bgs), just above the apparent water table. The grab groundwater and sidewall soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline (TPHg), TPH as diesel (TPHd), benzene, toluene, ethylbenzene, and xylenes (BTEX), and total lead.

TPHg, TPHd, and BTEX were not detected above the laboratory reporting limits in the six sidewall soil samples, and lead was detected at very low levels equivalent to regional background concentrations (Geomatrix 1992).

In the grab groundwater sample, TPHg, benzene, ethylbenzene, toluene, and total xylenes were detected at concentrations of 4,100 micrograms per liter (ug/L), 3.4 ug/L, 62 ug/L, 1.4 ug/L, and 860 ug/L, respectively. TPHd and total lead were not detected above laboratory reporting limits (Geomatrix 1992).

Following sample collection, the excavation was backfilled with import soil and clean stockpile soil as approved by the ACEH.

At the request of the ACEH, the Port submitted a work plan to install groundwater monitoring wells in the vicinity of the former USTs in 1993. The ACEH did not approve the work plan until 1996, at which point the Port notified the ACHE that it was not feasible to safely complete an investigation in this area of Berth 30 due to the location of the site within the truck gate driveway.

In 2008 the Port responded to a request by ACEH to upload the site groundwater monitoring data to GeoTracker, by providing a summary of the site history and remedial activities, and presenting the rationale for not installing monitoring wells in 1996. The Port also expressed interest in working with the ACEH to gain closure at the Site in this summary.

The Port submitted a closure request to the ACEH in 2014 under the Low Threat Closure Policy. During their review, the new ACEH case officer realized that monitoring wells had not been installed, which prompted the request for the preparation of this Work Plan and subsequent investigation.

2.0 SOIL AND GROUNDWATER INVESTIGATION

The proposed investigation comprises the advancement of six soil borings for the collection of soil and grab groundwater samples in the vicinity of the former UST Site. The proposed soil boring locations are shown on Figure 2. The borings will be advanced in all four compass directions of the former UST excavation zone. The methods and procedures of this soil and groundwater investigation are discussed further below.

2.1 Pre-Field Activities

2.1.1 Health and Safety Plan

A Site specific Health and Safety Plan (HASP) will be prepared and will be followed by the on-site project personnel during the Site activities. The HASP will be prepared in accordance with OSHA 29 CFR 1910.120 and Cal OSHA Title 8 Section 5192(e). Site personnel, including on-site subcontractors, will be required to familiarize themselves with and sign the HASP to minimize safety hazards. The HASP will identify the specific chemical compounds that have been encountered at the Site and will present the chemical properties and a task-specific health and safety risk analysis. The HASP will also include the Port Guidelines for Working in Active Marine Terminals (Appendix B).

2.1.2 Permitting

A parcel soil boring permit application will be prepared and submitted to Alameda County Public Works Agency (ACPWA). Any other pertinent permits, access agreements, or approvals will be obtained as required.

2.2 Utility Survey

Proposed soil boring locations will be marked out with white paint. The soil boring locations will be confirmed using a portable Global Positioning System device with sub-meter accuracy.

A private subsurface utility locating company will mark out any potential subsurface structures within a 10-by-10 foot area surrounding each of the proposed soil boring locations. Utility location will be performed with a combination of radio-detection, ground penetrating radar and electro-magnetic induction methods, as necessary. Underground Services Alert (USA) will be notified a minimum of 48 hours prior to commencing drilling activities.

2.3 Sampling Methodology

2.3.1 Soil Sampling

Soil samples will be collected using both a hand auger and a hydraulic actuated, direct-push drill rig. Terraphase will subcontract a California-licensed drilling contractor to advance the soil

borings under the supervision of Terraphase field staff working under the direction of a California Professional Geologist. Prior to drilling, each location will be hand-cleared to a depth of 5 feet bgs to confirm the absence of underground utilities at the location. The direct-push rig will advance borings from 5 feet bgs to the target depth (approximately 12 feet bgs). The core barrel will be lined with a clear plastic liner to facilitate lithological logging. Soil from borings advanced using a hand auger will be logged using cuttings extracted directly from the auger bucket.

Boring logs will be prepared in the field and completed under the direction of a California Professional Geologist. The borings will be logged using the Unified Soil Classification System. In addition to standard descriptors (e.g., soil types, moisture, grain size), other pertinent field observations will be recorded, including color, odors encountered, and visual observations of unusual conditions.

The soil cores will be field-screened using a photoionization detector (PID) to assess the potential impact from fuels associated with the former USTs. At a minimum, the soil cores will be screened using the PID every 3 feet and when changes in soil characteristics are observed. The field screening method will included the following:

- Fill a Ziploc® baggie approximately one half full of soil and seal completely;
- Vigorously shake the bag for 30 seconds twice in a 10-minute period to allow for headspace development;
- Unzip the corner of the bag and quickly insert the PID probe approximately 1 to 2 inches;
- Record the maximum meter response.

Soil with headspace readings greater than 25 parts per million (ppm) will be collected and submitted to the analytical laboratory for analysis. If it is determined that a soil sample should be collected, the soil will be extracted from a relatively undisturbed portion of the core using a laboratory-provided TerraCore sampling kit. Soil samples will not be collected below the water table.

2.3.2 Grab Groundwater Sampling

Grab groundwater samples will be collected from each soil boring. Soil borings will be advanced to approximately 2 feet below the groundwater table. It is anticipated that groundwater will be encountered at approximately 10 feet bgs. A temporary, 1-inch slotted PVC casing will be placed in the boring to keep the boring from collapsing and to allow groundwater to enter the casing. The casing will remain in the boring until sufficient water is collected for sampling. An electronic depth-to-water meter will be used to measure the depth to water in the boring. Once sufficient

water has entered the boring, a disposable Teflon bailer will be used to collect a grab groundwater sample. The sample will be transferred to laboratory-supplied sample containers. A new bailer will be used at each boring location. Observations of potential free product or petroleum related sheen will be documented in the field logs.

Water quality parameters, including temperature, pH and specific conductance, will be measured in the field using a calibrated water quality meter and recorded on the field forms.

2.3.3 Sample Handling and Documentation

Samples will be placed in laboratory-supplied and, , preserved containers. Sample containers will be labeled, logged on chain-of-custody forms, and placed in an ice-chilled cooler for transport to a California-certified laboratory for analysis.

Samples will be tracked using chain-of-custody forms. Copies of these documents will be maintained in the project files, as well as annotated in the applicable field logbook. The field logbook provides a means of recording data collection activities performed at the Site.

Sample labels will be completed in waterproof, permanent ink, and will have a self-adhesive backing to allow for attachment to the sample container.

2.3.4 Field Quality Control Samples

Field quality control (QC) samples will include the collection of an equipment blanks during the soil boring advancement of soil borings. In addition, one (1) trip blank will be included in each cooler that contains samples for BTEX analysis.

One equipment blank will be collected per day by pouring distilled water over the decontaminated equipment used for sampling and collecting the resulting water for analysis. The equipment blank will be analyzed for the same constituents as the soil and groundwater samples to ensure that proper decontamination procedures were followed during the field activities.

2.4 Equipment Decontamination

To prevent potential cross-contamination between sample locations, non-disposable equipment that comes into contact with soil, solids or groundwater will be decontaminated prior to initiating work at each subsequent sampling location. Equipment will be decontaminated using a three-step process: (1) non-phosphate detergent wash, (2) potable water rinse, and (3) distilled water rinse.

2.5 Borehole Abandonment

After soil and groundwater sampling is complete, the borings will be abandoned by using a neat cement grout in accordance with ACPWA boring permit requirements. The temporary casing will be removed, and the boreholes will be filled with the neat-cement grout to the surface.

2.6 Sample Analysis

The soil and groundwater samples collected from the borings during this field investigation will be submitted to an analytical laboratory certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program, for the analysis of:

- TPHg by EPA Method 8015
- BTEX by EPA Method 8260

The required volumes, preservation methods, holding times, and analytical reporting limits for the analytical methods are presented in Table 1.

2.7 Investigation-Derived Waste

Equipment wash water and waste soil generated during this investigation will be stored in separate 55-gallon drums and handled and disposed of in accordance with state and federal requirements. The drums will be temporarily staged at the Site in a location approved by the Port.

Terraphase will collect a four-point composite sample (four sub-samples) of the waste soil generated during the drilling. One sample will also be collected from the waste water drum. The waste samples will be collected in laboratory supplied containers, properly labeled, placed into an ice-chilled chest, and submitted to an analytical laboratory for chemical analysis of the following analytes:

- Title 22 metals (CAM 17): antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc, by EPA Method 6010/7470
- TPHg, TPHd and TPH as motor oil (TPHmo) by EPA Method 8015 [TPH-d and TPHmo should be analyzed with and without a silica gel cleanup procedure.]
- BTEX by EPA Method 8260

The required volumes, preservation methods, holding times, and analytical reporting limits for the analytical methods are presented in Table 1.

Following characterization, the waste to be transported and disposed of at an appropriate facility. Waste manifests will be signed by a representative of the Site owner.

2.8 Soil Boring Survey

Following the advancement of the soil borings, the elevation, northings, and eastings of the soil will be surveyed using a hand-held GPS unit with sub-meter accuracy.

3.0 QUALITY CONTROL

Analytical data will be reviewed and data validation reports will be prepared in general accordance with the principles for data validation presented in the U.S. Environmental Protection Agency (U.S. EPA) National Functional Guidelines for Inorganic Laboratory Data Review (U.S. EPA 2010).

4.0 DATA EVALUTION AND REPORTING

4.1 Screening Criteria

Upon receipt, the analytical results will be compared with the following screening criteria for soil and groundwater.

Soil. The soil analytical results will be compared with the Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESLs), Direct Exposure Screening Levels, Construction/Trench Worker Exposure Scenario (RWQCB 2013; Table K-3). Based on the impermeable site cover limiting surface water infiltration, the exposure of potentially impacted shallow soil is greatest to site workers completing maintenance activities that involve trenching.

Groundwater. The groundwater analytical results will be compared with the RWQCB ESLs for Groundwater (groundwater is not a current or potential drinking water resource; RWQCB 2013; Table F-1b). This criterion is appropriate because the groundwater in the area is generally not suitable as a drinking water source due to high total dissolved solids concentrations, and ESLs are typically protective of human health and ecological receptors.

4.2 Investigation Summary Report

A report will be prepared summarizing the results of the field investigation. The report will include:

- A brief site history including the number and type of USTs
- description of the current site use
- a summary of sampling activities
- analytical results
- data validation reports
- boring logs
- survey data
- field sampling forms
- discussion of findings and the interpretation of the analytical results
- recommendations for site closure or further investigation.

The report will be reviewed and signed by a California Professional Geologist.

5.0 SCHEDULE

The work will commence upon approval of the Work Plan by ACEH. Due to the high traffic associated with the Berth 30 site use, the soil and groundwater sampling activities may need to occur at night, on weekends, or during the scheduled monthly safety stand down practiced by the Port terminals. The work will be scheduled with the Port and Berth 30 tenant at time that will maximize the safety of the field staff conducting the investigation and minimize the impact on Port operations. Field activities will be conducted in accordance with the Port Guidelines for Working in Active Marine Terminals (Appendix B).

In addition, the investigation may need to be conducted in phases if shipping containers are blocking access to the proposed sample locations.

It is anticipated that the summary report will be submitted to ACEH within 60 days of the receipt of analytical data.

6.0 REFERENCES

ARCADIS. 2014. Low Threat Closure Request, Kaiser Yard UST, Berth 30, Port of Oakland, 2801 7th Street, Oakland, California. March 27.

Geomatrix. 1992. Removal of Underground Storage Tanks, Kaiser Yard, 2801 Seventh Street, Oakland, California. June.

San Francisco Bay Regional Water Quality Control Board (RWQCB). 2013. Environmental Screening Levels. December.

U.S. Environmental Protection Agency. 2010. U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Inorganic Data Review. Office of Solid Waste and Emergency Response. EPA 540-R-08-01. January.

TABLES

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Table 1
Analytical Laboratory Methods, Sample Requirements, and Reporting Limits
Kaiser Yard UST, Berth 30
Port of Oakland, Oakland, California

Analyte	Matrix	Method	Container	Minimum Sample Volume	Preservation	Hold Time (days)	Reporting Limits[1]
TPH as gasoline	solids	EPA 8015	TerraCore	5 grams	methanol; chill to 4 ± 2°C	14	1 mg/kg
TPH as gasoline	water	EPA 8015	3 x 40mL VOA	40 mL	hydrochloric acid; chill to 4 ± 2°C	14	50 ug/L
BTEX	solids	EPA 8260	TerraCore	5 grams	methanol; chill to 4 ± 2°C	14	5 ug/kg
BTEX	water	EPA 8260	3 x 40mL VOA	40 mL	hydrochloric acid; chill to 4 ± 2°C	14	0.5 ug/L
Additional Analyses for Waste Characterization Purposes Only							
TPH as diesel and motor oil[2]	solids	EPA 8015B	glass jar	50 grams	chill to 4 ± 2°C	14	1 - 5 mg/kg
TPH as diesel and motor oil[2]	water	EPA 8015B	amber glass	500 mL	chill to 4 ± 2°C	14	50 - 300 ug/L
Metals[2]	solids	EPA 6010B	glass jar	2 grams	chill to 4 ± 2°C	180	0.25 - 1 mg/kg
Metals[2]	water	EPA 6010B	polyethylene bottle	100 mL	nitric acid; chill to 4 ± 2°C	28	3 to 20 ug/L

Note:
1 = reporting limits may vary depending on matrix interference and dilution
2 = analyses completed only for the characterization of investigation derived waste
BTEX = benzene, toluene, ethylbenzene, and xylenes
°C = degrees Celsius
EPA = Environmental Protection Agency
mg/kg = milligrams per kilogram
mL = milliliter
TPH = total petroleum hydrocarbons
ug/kg = micrograms per kilogram
ug/L = micrograms per liter

FIGURES

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0 500 1,000 1,500 2,000 Feet

1 inch = 1,000 feet

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SAFETY FIRST

terraphase engineering

CLIENT:	Port of Oakland
PROJECT:	Berth 30
PROJECT NUMBER:	0059.00X.00X

Site Location Map

FIGURE 1

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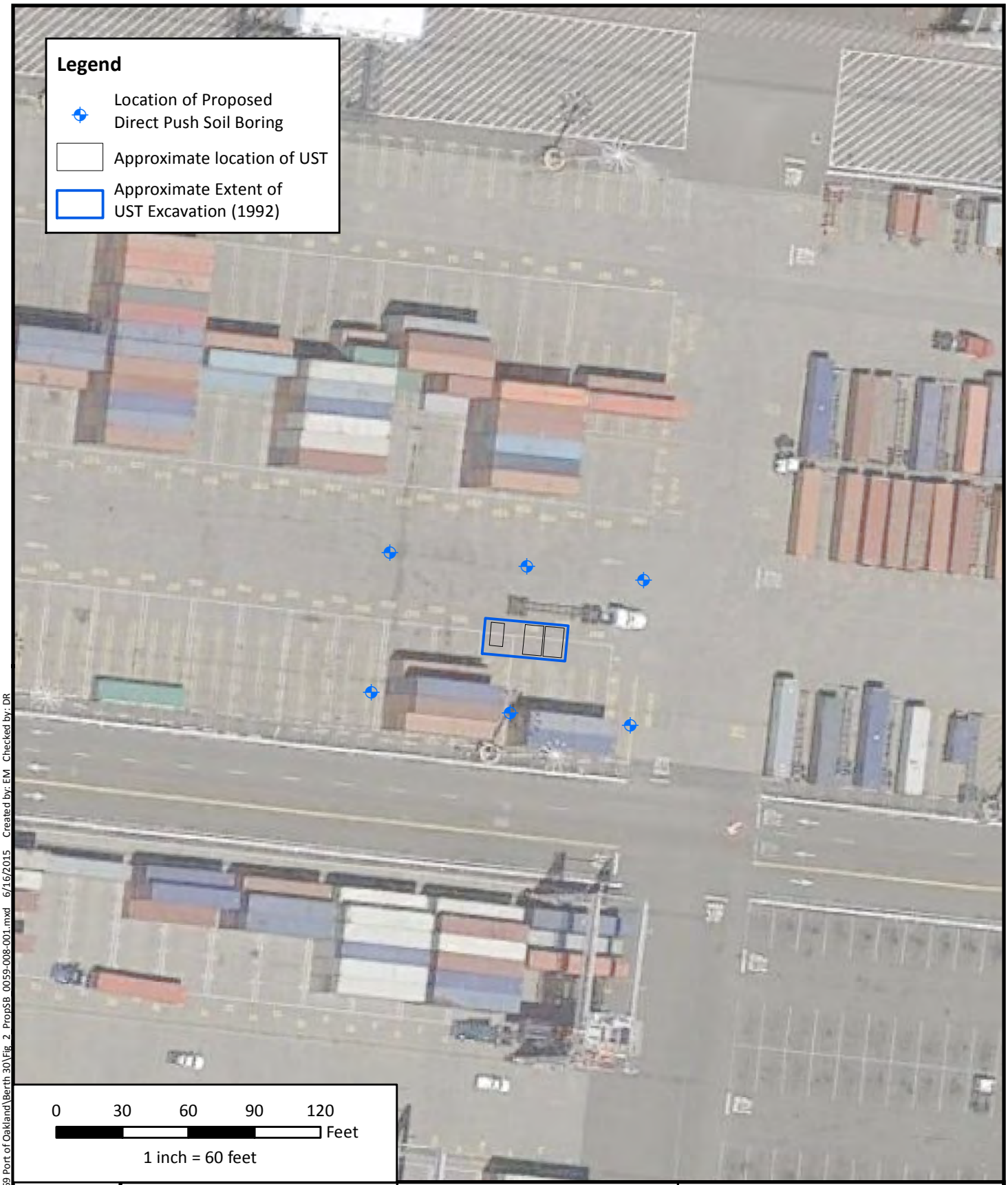

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CLIENT:	Port of Oakland
PROJECT:	Berth 30
PROJECT NUMBER:	0059.00X.00X

Proposed Soil Boring Locations

FIGURE 2

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APPENDIX A
ACEH TECHNICAL REPORT REQUEST

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John Prall

From: Nowell, Keith, Env. Health <Keith.Nowell@acgov.org>
Sent: Friday, March 20, 2015 7:56 AM
To: John Prall
Cc: Diane Heinze; Roe, Dilan, Env. Health
Subject: Fuel leak case RO101, Port of Oakland / Kaiser & Powerine Oil / Berths 30, 2800-2801 7th Street

Dear Mr. Prall,

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the subject fuel leak case. The Berth 30 site includes the location of three former underground storage tanks (USTs) which were removed in April, 1992. The tanks consisted of one 3,000- and one 5,000-gallon USTs used for the storage of gasoline and one 5,000-gallon UST used for the storage of diesel fuel. The three tanks occupied a shared pit. Though no visible holes were apparent in the USTs, visible staining was reported in the soil beneath the two 5,000-gallon USTs and petroleum hydrocarbon odors emanated from the tank pit upon their removal. A quarter-inch-thick layer of free phase product was observed on the groundwater infiltrating into the tank pit.

Approximately 800 gallons of groundwater infiltrating into the pit was pumped out and disposed offsite. Following evacuation of the pit water, a grab-groundwater sample was recovered from tank pit recharge water and found to include 4,100 micrograms per liter (µg/L) total petroleum hydrocarbons as gasoline (TPHg) and 3.4 µg/L benzene. The presence of groundwater in the pit precluded the recovery of soil samples from beneath the base of the tanks.

On June 30, 1993 and again on June 10, 1996, ACEH requested monitoring wells be installed for this fuel release site. Recent conversations between ACEH and Port of Oakland staff members have indicated the wells have not been installed.

Therefore, at this juncture, ACEH requests preparation of a work plan for a soil and groundwater investigation of this area.

Technical Report Request

Please upload technical reports to the ACEH ftp site (Attention: Keith Nowell), and to the SWRCB Geotracker website, in accordance with the following specified file naming convention and schedule:

- **May 4, 2015 – Work Plan for Soil and Groundwater Investigation** (file name: RO0000101_WP_R_yyyy-mm-dd)

Thank you for your cooperation. ACEH looks forward to working with you and your consultants to advance the case toward closure. Should you have any questions regarding this correspondence or your case, please call me at (510) 567-6764 or send an electronic mail message at keith.nowell@acgov.org.

Regards,
Keith Nowell

Keith Nowell PG, CHG
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda , CA 94502-6540

phone: 510 / 567 - 6764
fax: 510 / 337 - 9335
email: keith.nowell@acgov.org

PDF copies of case files can be reviewed/downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

APPENDIX B
GUIDELINES FOR WORKING IN ACTIVE MARINE TERMINALS

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PORT OF OAKLAND
CONTRACTOR SAFETY

WORKING IN ACTIVE MARINE TERMINALS

The Port Wharfinger Department coordinates Port-sponsored access to the marine terminals. Before entering terminals, contact the appropriate Wharfinger. Any deviation from established procedures or work schedules should be cleared at least 24 hours in advance (or as soon as feasible).

The primary issues when working in marine terminals are:

- The safety of contractor, terminal, trucking, terminal employees, and Port employees.
- Minimizing interference with terminal and vessel operations.
- Security: Vehicle inspection & personnel identification (valid California Driver's license or equal).

VEHICLES

Vehicles brought into the terminal must be equipped with identifying signs on each side. Vehicles not so equipped will not be admitted.

Limit on-terminal vehicles to those necessary to perform the work. Park others outside.

Minimize the need to drive around the terminal. Stage operations and remain there. Enter and exit the terminal only via company vehicle.

Obey terminal driving rules, including speed limits. Terminal equipment has the right-of-way.

SITE OF OPERATIONS

The area of operations shall encumber no more space than is required to perform the work safely.

Delineate the area of operation using traffic cones, K-rail, caution tape, or other high-visibility method. Park vehicles to form a protective barrier.

Workers must wear hard hats, hard-toed shoes, and high visibility clothing (with reflective elements at night).

Individuals must remain in the area of operations.

Use a "spotter" where workers are exposed to traffic.