PORT OF OAKLAND

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Alameda County
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Environmental Health

November 14, 2002

Mr. Barney Chan
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: **Final Site Investigation Workplan**
UST Site HF-16 at Building H-204 Ninth Avenue Terminal
LOP 6894

(79 8th Ave 06)

Dear Mr. Chan:

As you may remember we met last year with the Port's consultant, Susanne von Rosenberg of GAIA to discuss the underground storage tank (UST) cases at 9th Avenue Terminal and the development of workplans for the remediation of the various sites. Please find enclosed for your review the "Final Site Investigation Workplan for UST HF-16, LOP 6894."

We are prepared to implement the workplan as soon as approval is received from your office. If you have any questions, please do not hesitate to contact me at (510) 627-1184.

Sincerely,

Douglas P. Herman
Associate Port Environmental Scientist

Encl : Final Site Investigation Workplan
UST Site HF-16 at Building H-204 Ninth Avenue Terminal
LOP 6894

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FINAL SITE INVESTIGATION WORK PLAN

UST SITE HF-16 at Building H-204

(LOP 6894)

Ninth Avenue Terminal

October 8, 2002

Prepared for

Port of Oakland
530 Water Street
Oakland, California 94607

Prepared by:

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1.0 INTRODUCTION

The Port of Oakland (Port) has prepared this workplan for underground storage tank (UST) site HF-16, located at the Ninth Avenue Terminal Complex (Terminal) at the Port (Figures 1 and 2), near former Building H-204. This UST site is in the local oversight program (LOP 6894). The listed address for this UST site is 79 8th Avenue, Oakland. The tank site is physically located on 8th Avenue, approximately 1,100 feet southwest of Embarcadero Road.

This UST site is part of a larger development area, designated as the Oak to Ninth District, which will be redeveloped. The goals of the redevelopment are to create a mixed-use waterfront neighborhood.[1] The proposed plan anticipates a significant first phase of development east of the Clinton Basin, including the Ninth Avenue Terminal area. This first phase could include housing at appropriate densities (e.g., 20 to 70 dwelling units per acre), as well as a mix of retail, restaurant, cafes and marine service use. Second-story commercial and residential uses could also be developed. No single-family residential use is being proposed.

This workplan has been prepared in response to a request from the Alameda County Health Services Agency Environmental Health Services Department (Alameda County). The overall objective of the investigation activities proposed for UST Site HF-16 is to obtain regulatory closure of the site prior to site redevelopment. This workplan is organized into eight sections:

- Section 1.0 – Introduction – presents general information and the purpose of the workplan;
- Section 2.0 – Background – presents UST Site HF-16 background and description, and geologic setting information;
- Section 3.0 – Previous Site Investigations and Results – presents a description of site investigation activities conducted at UST Site HF-16 to date;
- Section 4.0 – Data Gaps – presents a summary of the data gaps that need to be addressed before a closure request and decision can be made;
- Section 5.0 – Proposed Investigation – presents the recommendations for addressing the data gaps identified in Section 4;
- Section 6.0 – QA/QC Program
- Section 7.0 – Proposed Schedule – presents a tentative schedule for completion of the work proposed in Section 5; and,
- Section 8.0 – References – presents the documents reviewed and/or utilized to evaluate UST Site HF-16.

The information presented in this workplan integrates information from prior reports and draws on studies conducted by the Port and by others. The health and safety plan is provided in Appendix A.

2.0 BACKGROUND

The Ninth Avenue Terminal is a break bulk cargo facility located on the Oakland Inner Harbor in East Oakland, California. It has been owned by the Port since at least the late 1920s. The Terminal study area is an irregularly shaped parcel of land, encompassing approximately 25 acres, excluding the wharves. It was leased to a variety of tenants, and continues to have limited light industrial and commercial activity. The Terminal is bordered by Embarcadero Road, Interstate 880, and railroad tracks to the north, Clinton Basin to

[1] This information reflects the conceptual redevelopment plan. The public participation process has not been completed and modifications to the proposed plan may occur.

the west, the Inner Harbor/Oakland Estuary to the south, and Brooklyn Basin to the east. The land use is the Terminal vicinity is commercial/industrial. The majority of the Terminal is paved with asphaltic concrete. The remainder of the Terminal is occupied by buildings or concrete foundation slabs remaining from former buildings. Wharves constructed of concrete or asphalt over a wood frame extend along the southeast and southwest sides of the Terminal.

Various aboveground and underground utilities exist throughout the Terminal. Storm water runoff is collected by numerous catch basins; the majority of the storm water is conveyed to a main storm drain collector system below 8th Avenue that discharges to the Inner Harbor. There are storm drains further north that discharge into Clinton Basin; known storm drains in the UST HF-16 area all feed the main collector under 8th Avenue. Sanitary sewer improvements consist of laterals extending from buildings to main sewer lines below Eighth and Tenth Avenues. The sanitary sewer main lines flow toward a large collector pipe under Embarcadero Road. Other on-site subsurface utilities include domestic and fire protection water supply, natural gas, electricity, fire alarm, and telephone lines, and abandoned fuel pipes.

Site investigations have been conducted at the Terminal since 1992. Multiple companies have conducted numerous rounds of investigation (see references). Investigation activities included tank removals, soil borings, hydropunch sampling, monitoring well installation, subsurface utility investigations, geophysical investigations, and tide studies. Flux chamber sampling, to evaluate the flux of volatile organic compounds through a specific area of site soils, has also been conducted. Regular groundwater monitoring has been conducted since late 1996.

Due to the large size of the property, and the diverse nature of tenant activities, the investigation efforts were classified into various investigation areas (Areas A through R). UST site HF-16 is located on the northeast side of Area N (Figure 2).

Site Groundwater and Geology

The Ninth Avenue Terminal is generally flat with elevations ranging from approximately 9 to 14 feet above Port datum, which is the mean lower low water mark, or 3.2 feet below mean sea level. The soils beneath the site consist primarily of an organic-rich clay (Young Bay Mud) overlain by approximately 3 to 6 feet of fill materials. The fill material consists primarily of an angular gravel with silt and sand lenses. Shoreline areas tend to be underlain by up to 7 to 9 feet of fill consisting of interbedded layers of sand, gravel, silt and clay. The majority of the borings installed at the Terminal terminate in the Young Bay Mud (they extend to depths between 10 and 20 feet below ground surfact (bgs)). Based on the limited number of deeper borings installed, the Young Bay Mud extends to depths of 23 to 27 feet bgs. It is underlain by another series of clay layers. Immediately below the Young Bay Mud is a thin layer of a stiff greenish clay approximately 3 feet thick. This layer underlain by a pale brown silty clay with sand that grades into a silty sand. This formation is most likely the Merritt Sand.

Shallow groundwater is typically encountered at 3 to 10 feet bgs. Groundwater elevation contours for the Year 2000 are found in references 37 and 40. Groundwater elevation contour patterns have remained relatively consistent since 1996. In general, groundwater elevations tend to be higher in the central portion of the site with flow radiating outward toward the shorelines of Clinton Basin and Brooklyn Basin. The bulkhead wall extending along the southeastern and southwestern portions of the site appears to act as a barrier to the flow of groundwater (SCI 1997b). In deep boring SCIMW 31D, groundwater was first encountered at a depth of 40 feet bgs; the stable elevation was at 9 feet bgs (SCI 1998), indicating a strong upward vertical gradient.

Tidal influence on groundwater elevations and storm drains has been observed at the site. Wells located along the Clinton and Brooklyn Basin shorelines are tidally influenced, while interior wells and those adjacent to the concrete bulkhead are not. Tidal fluctuations of as much as two feet have been observed in

near-shore wells. Research suggests that tidal influence extends inland more than 80 feet along that portion of the shoreline which is not protected by the concrete bulkhead. Very minor changes in groundwater levels were recorded approximately 10 feet from the bulkhead during tidal changes.

Tidal waters have been observed to extend throughout the storm drainage system, as far inland as the drainage catchment north of the Embarcadero along the sanitary sewer main line. Elevated groundwater levels measured along selected utilities during tide studies indicate that there may be exfiltration from storm drains.

3.0 TANK SITE HISTORY AND PREVIOUS SITE INVESTIGATIONS

This UST area is situated about 100 feet inland from the Clinton Basin shoreline; the shoreline is unprotected (i.e., there is no bulkhead).

Tank Background

Former Building H-204 was constructed in 1945 as a gasoline service station operated as part of a bulk fuel processing area. Research indicates that various tenants of the Ninth Avenue Terminal including, at minimum, Bay City Fuel Oil Company, East Bay Oil Company (now Gold Shield Distributors), C.D. Ericson, and Groeniger, operated the tank system. It is believed that two 1,000-gallon tanks were installed and utilized at this location between 1945 and 1974; Building H-204 was demolished in 1974. There is no record of removal of any tank(s). Only limited information regarding the tank system could be obtained from the former tenants (SCI 1997). Data relevant to UST Site HF-16 are presented in Tables 1 and 2, and Figures 3 and 4.

Prior Investigations

As noted earlier, extensive investigations have been completed at the Ninth Avenue Terminal. A UST survey and a separate geophysical survey were conducted in this area to determine the location of any tank(s). The UST survey located a metallic anomaly perpendicular to the Clinton Basin shoreline. Test pit SCITP-14, excavated to locate the metallic anomaly, showed that the anomaly consisted of a 1-inch diameter cast iron pipe. No tank was found in this area. Other investigations pertaining specifically to this tank location included the installation of one monitoring well (SCIMW-24) located approximately 10 feet southwest, and apparently downgradient of the suspected tank location, and boring RMA-24, located approximately 25 feet northwest of the suspect tank location.

Soil samples collected from SCIMW-24 contained total petroleum hydrocarbons quantified as gasoline, diesel, and motor oil (TPH-g, TPH-d, and TPH-mo), as well as benzene, ethylbenzene, toluene, and xylene (BTEX). Concentrations of TPH in samples from the six-foot interval were higher than the concentrations at the three-foot interval; concentrations of BTEX were greater in the shallower sample. Concentrations of TPH (in the various ranges) ranged from 20 mg/kg to 910 mg/kg; benzene was detected at a concentration of 1.6 mg/kg in SCIMW-24 at 3.0 feet bgs. The same constituents that were detected in soil were also detected in the groundwater sample collected in May 1997, soon after the well was installed and developed. TPH-g was detected at a concentration of 5,000 µg/L; TPH-d and TPH-mo were detected at concentrations of 2,700 µg/L and 2,100 µg/L, respectively. BTEX were detected at concentrations of 720 µg/L, 220 µg/L, 37 µg/L, and 120 µg/L, respectively. Free product was detected in this well during one sampling event (in August of 1999). Other constituents detected in SCIMW-24 during the initial well sampling included Chromium (VI) at 160 µg/L, and lead at 6.3 µg/L. No pesticides or PCBs or VOC other than BTEX were detected.

SCIMW-24 has been monitored 11 times since 1997. Concentrations of TPH constituents have fluctuated, with no apparent trend. Benzene concentrations have also fluctuated between 760 ug/L to 2,700 ug/L. The

most recent monitoring event (July 2002) detected benzene at a concentration of 1,600 ug/L. This fluctuation was seen for the other BTEX compounds as well. THP-g concentrations have consistently remained higher than TPH-d and TPH-mo concentrations.

RMA-24 was installed on behalf of Keep on Trucking (KOT) in 1996. According to field observations by SCI, free product was found in RMA-24. However, a soil sample collected from 6.5 to 7 feet bgs and the grab groundwater sample collected from this boring did not show any TPH (the samples were not analyzed for BTEX).

No free product was identified in SCITP-14, located immediately adjacent to, and downgradient of, the suspected tank location; however, a petroleum odor was identified between 3 and 5 feet bgs. A sample collected at 4 feet bgs contained TPH-g, TPH-d, and TPH-mo and xylenes. No benzene, toluene, or ethylbenzene were found. The grab groundwater sample collected from SCITP-14 contained elevated concentrations of TPH-g, TPH-d, and TPH-mo, at 18,000 µg/L, 15,000 µg/L, and 41,000 µg/L, respectively. Benzene was detected at a concentration of 1,700 µg/L. Soil and groundwater data for these nearby sample locations are provided in Figures 3 and 4.

Five other data points are located within 75 feet of the suspect tank location; an additional 11 are within 75 to 150 feet of the tank location. These data points include eight borings, six test pits, and one monitoring well. A water line is located adjacent to the suspect tank location, a storm sewer line is located within 75 feet of the suspected tank site, and a sanitary sewer, and additional storm sewer and water lines are located within 75 to 150 feet of the tank site. The borings, test pits, and monitoring wells relevant to this tank site are listed in the table below. Data pertaining to these sample points, compiled from reports dated 1992-2001, is presented in the attached data tables.

Type of Sample Location	**Within 75 Feet**	**Within 75 to 150 Feet**
Borings	B-7, SCI-9, SCI-12, RMA-24	SCI-8, SCI-10, SCI-11, SCI-43, SCI-44, SCI-45
Test Pits	SCITP-14, SCITP-19,	SCITP-3, SCITP-4, SCITP-18, SCITP-20, SCITP-26
Monitoring Wells	SCIMW-11, SCIMW-24	None

Three borings are sufficiently close to provide meaningful upgradient/sidegradient information. These are B-7, SCI-9, and SCI-12. Two sample locations are located generally downgradient: SCIMW-11, and SCITP-19.

Borings B-7 is located generally upgradient of the suspected tank site, boring SCI-12 is located in close proximity and approximately 20 feet south, and boring SCI-9 is located approximately 65 feet south-southeast of the suspected tank site. These latter two sample locations appear to be cross-gradient of the suspected tank site. Boring B-7 was only sampled for TPH-d and TRPH; only ambient levels were detected. Concentrations of TPH in soil at SCI-12 were very similar to those detected at SCIMW-24; BTEX concentrations were approximately one order of magnitude greater in SCI-12 than in SCIMW24. No BTEX and only ambient levels of TPH were detected in soil at SCI-9. The grab groundwater sample from SCI-9 contained TPH-d and TPH-mo in the same concentration range as SCIMW-24; BTEX were not detected, and the sample was not analyzed for TPH-g. The grab groundwater sample from SCI-12 contained TPH and BTEX concentrations in the same range as SCIMW-24. The grab groundwater sample from B-7 was only analyzed for TPH-d; no TPH-d was detected.

The downgradient data are inconsistent. No soil samples were collected from SCIMW-11. The soil sample from SCITP-19 contained higher concentrations of TPH-d and TPH-mo than the concentrations detected in the immediate vicinity of the suspect tank site. This sample was not analyzed for TPH-g or BTEX. The

groundwater sample from SCITP-19 contained levels of TPH consistent with those detected in SCITP-14. TPH-d was detected in SCIMW-11 at concentrations of 400 µg/L and 180 µg/L in 1996 and 1997, respectively. TPH-g has been detected at insignificant concentrations (51 µg/L to 140 µg/L) between the December 1998 and May 2001 sampling events. TPH-g has been non-detect during the last two sampling events (December 2001 and July 2002).

GAIA's analysis of the data from the previous investigations and available site history suggests the following:

- **Tank Status:**
  - Several anomalies were identified during a geophysical survey. It is unknown if any follow-up investigation was conducted for most of the identified anomalies. Therefore, the presence of the tank or tanks associated with these anomalies is unknown. However, no anomalies were encountered in the suspect tank area, and prior test pits have not uncovered any evidence of a tank.

- **Distribution of Contaminants in Soil:**
  - There are no significantly high concentrations of TPH and related compounds in soil samples collected from nearby upgradient locations SCI-9, B-7, or RMA-24.
  - Significantly elevated concentrations of TPH and related compounds were detected in soil samples collected from nearby downgradient locations SCITP-14, SCI-12, and SCIMW-24. Concentrations are greater at SCITP 18, which is further downgradient of the UST site. Significantly elevated concentrations of TPH and related compounds were also detected in soil samples collected from SCITP-19. SCITP-19 appears to be cross-gradient to the suspect tank site, but may be downgradient during some tide stages.
  - Elevated concentrations of TPH were detected in soil samples collected from cross-gradient locations SCI-43, SCI-44, and SCI-45.

- **Distribution of Contaminants in Groundwater**
  - There are no significantly high concentrations of TPH and related compounds in groundwater samples collected from nearby upgradient locations B-7 or RMA-24, but TPH-d and TPH-mo were detected in SCI-9 at concentrations of 2,500 µg/l and 2,300 µg/l, respectively.
  - High concentrations of TPH and related compounds were detected in groundwater samples collected from nearby downgradient locations SCITP-14 (grab sample), SCI-12 (grab sample), and SCIMW-24. Significantly elevated concentrations of TPH and related compounds were also detected in the grab groundwater sample collected from SCITP-19, which appears to be cross-gradient to the suspect tank site, but may be downgradient during some tide stages.
  - Elevated concentrations of TPH were detected in groundwater grab samples collected from cross-gradient locations SCI-43, SCI-44, and SCI-45.

4.0 DATA GAPS

Based on the results of the investigations and historical information discussed above, and the proposed future use of the property, several data gaps still exist before site closure can be completed. The most significant data gap for this UST site is the lack of information regarding the extent of contamination associated with this tank site. In addition, the potential tank(s) may still be present. These data gaps are addressed by the proposed investigation described in Section 5. Once these data gaps have been addressed, GAIA will either recommend additional work to characterize the site and/or recommend that formal closure be requested for this site.

5.0 PROPOSED INVESTIGATION PROGRAM

To address the data gaps outlined above, the Port proposes to conduct a two-phase investigation. Phase 1 will involve investigation (excavation of trenches) to define the extent of contamination in the vicinity of the suspect tank site and confirm or refute the presence of the suspect USTs. Phase 2 will consist of advancement of hydraulic push soil borings to collect soil and groundwater samples to refine the nature and extent of contamination uncovered by the trenching effort.

On-site personnel will be required to review the health and safety plan included in Attachment A prior to commencement of field activities. GAIA will also contact Underground Service Alert (USA) a minimum of 72 hours prior to excavation and drilling activities. In addition, GAIA will contract with a private utility locator to mark the vicinity of former Building H-204 where drilling is anticipated. GAIA will coordinate with the Port to obtain any necessary permits to complete the work.

All drilling and sampling equipment will be decontaminated between sample intervals to minimize the possibility of cross-contamination. All samples designated for chemical analysis will be handled and transported in accordance with proper regulatory protocol. All investigation derived waste (IDW) will be properly labeled and contained in DOT-approved 55-gallon drums and stored on-site.

Trenching

Trenching has been chosen as the first step in the investigation program because it is the most effective way to investigate a larger area. Because the tank(s) associated with Building H-204 have not been located during prior geophysical investigations, investigating the extent of contamination around Building H-204 is the most effective next step in the investigation of this area. The primary objective of the trenching would be to define the extent of contamination in the area of concern, as well as any "hot spots". Since the likely source of contamination in this area would be the tank(s), any tank(s) still present in the area should become apparent during the trenching effort. Alternatively, if no tank(s) are identified during this step of the investigation, it is likely that the tanks were, in fact, removed at some point in the past.

The trenches will be excavated in the area of former Building H-204, and will extend past the know areas of contamination identified by previous investigations. One trench will transit what is thought to be the footprint of former Building H-204. If pipelines or other indicators that might lead to a potential tank location are identified during the trenching effort, they will be pursued. Additional excavation may be conducted based upon the findings of the initial trenching pattern. Soil samples will be collected from the trenches based on field observations. At minimum, samples will be collected in areas/directions where data are currently lacking (i.e., northeast and southeast [upgradient]). If groundwater is encountered, one grab groundwater sample will be collected from each trench location. The trench and proposed sample locations are shown on Figure 5. Samples will be collected near the center of former Building H-204 and in four locations approximately 15 feet north, south, east, and west of the center of the former building, as indicated on Figure 5.

Soil samples will be collected by hammering a brass tube into the sidewall or bottom of the excavation (if the excavation is physically accessible per OSHA regulations) or by collecting a soil sample from the backhoe bucket and placing it into a glass jar or pushing a brass tube into the soil. Soil sample tubes will immediately be sealed with Teflon™ film and plastic caps, labeled, placed in a chilled cooler, and transported under chain-of-custody protocol to a state-certified analytical laboratory for chemical analysis. To monitor for evidence of organic vapors, additional soil will be collected from the sample location, and

placed into resealable plastic bags. The headspace will be monitored for volatile organic vapors using a photo-ionization detector (PID). In addition, the soil will be visually classified in accordance with the Unified Soil Classification System (USCS). Groundwater samples will be collected by lowering the appropriate bottles into the trench.

The trenches will be backfilled with soil removed from the trenches and compacted with a hoe-pack. The trench locations will be patched with asphalt, and each location will be measured from features at the Terminal that will ensure accurate mapping of the trench locations on site figures.

If a tank or tanks are located, they will be removed as soon as appropriate arrangements can be made. Sampling of any tank excavation(s) will be performed as required by the size(s) of any tank(s) uncovered.

The soil and grab groundwater samples will be analyzed for TPH-g, TPH-d, and TPH-mo, for BTEX, and methyl tert-butyl ether (MTBE) using EPA Method 8015/8021. Given the presence of TPH-g in a number of the prior samples, select samples will also be analyzed for chlorinated VOCs using EPA Method 8010. The VOC analysis is designed to detect 1,2-DCA and ethylene dibromide, common lead scavengers for leaded gasoline.

All drilling and sampling equipment will be decontaminated between samples to minimize the possibility of cross-contamination. All investigation-derived waste (IDW) will be properly labeled and contained in DOT-approved 55-gallon drums and stored on-site. The Port will have the IDW removed by their hazardous material contractor for proper waste disposal.

Soil Borings

(as)

Additional soil and groundwater samples will be collected during a second phase of investigation, if required. These samples will be collected using a Geoprobe-type truck-mounted hydraulically driven soil coring system. Boring locations will be identified based upon the field screening and laboratory analytical results for samples collected from the initial trenching effort. It is anticipated that a maximum of ten to twelve soil borings will be advanced during this phase of investigation (one day of probing). The borings will be advanced approximately 10 feet bgs at each location, and one groundwater and up to two soil samples will be submitted for analysis from each boring, depending on field screening results. Additional soil and/or groundwater samples may be collected and held by the laboratory for follow-up analysis.

Soil samples will be collected with a stainless steel sample barrel attached to the drilling rod. The soil samples will be collected using a sampling barrel nested within a large diameter drive casing, which will be hydraulically advanced into the underlying soils. The smaller diameter sampling barrel will be lined with polyethylene tubes that will be used to collect samples for chemical analysis and for lithologic description. The sampling barrel will be placed at the end of the sampling rods and inserted into the drive casing to collect undisturbed soil cores as the drive casing is driven into the underlying soils. Soil sample tubes will be cut at the desired depth and immediately sealed with Teflon™ film and plastic caps, labeled and placed in a cooler. The remaining sample core will be used for lithologic description. The samples will be labeled and placed in a cooler with ice, and transported under chain-of-custody protocol to a state-certified analytical laboratory for chemical analysis. To monitor for evidence of contamination during drilling, a portion of the sample will be placed into resealable plastic bags to monitor the headspace for volatile organic vapors using an organic vapor analyzer (OVA). The soil will be visually classified in accordance with the USCS. Bentonite grout will be placed in the annular space utilizing a tremmie pipe to within 2 feet of the surface grade upon completion of each boring. Each boring will be patched with asphalt. Each soil boring location will be measured from features at the Terminal that will ensure accurate mapping of the boring locations on site figures.

Groundwater samples will be obtained from at least two depth intervals from each boring location, one sample near the top of the water table, the other at least five feet below the top of the water table. A temporary screened casing will be advanced into the borehole by the Geoprobe sampling barrel to allow groundwater to enter the boring. A length of polyethylene tubing will then be inserted into the interior of the sampling barrel, and a vacuum pump will be used to retrieve a sample. The samples will be immediately decanted into laboratory-supplied bottles and placed on ice in a cooler for delivery to the project laboratory. The soil and grab groundwater samples will be analyzed for some or all of the following constituents, depending on the results of the trench samples: TPH-g, TPH-d, and TPH-mo, for BTEX, and methyl tert-butyl ether (MTBE) using EPA Method 8015/8021, and chlorinated VOCs using EPA Method 8010.

All drilling and sampling equipment will be decontaminated between sample intervals to minimize the possibility of cross-contamination. All samples designated for chemical analysis will be handled and transported in accordance with proper regulatory protocol. All IDW waste will be properly labeled and contained in DOT-approved 55-gallon drums and stored on-site. The Port will have the IDW removed by their hazardous material contractor for proper waste disposal.

6.0 QA/QC PROGRAM

During this investigation, field quality assurance/quality control (QA/QC) will be ensured by following standard sampling protocols and field documentation requirements. To ensure valid and representative samples, drilling and sampling equipment will be decontaminated between borings and waste materials generated during sampling will be properly contained. The analytical laboratory is subject to its own QA/QC program. Four formats will be used to document the implementation of field activities, as follows:

- Field log book;
- Field Data Sheets;
- Sample Labels; and,
- Chain-of-custody form.

Field Log Book

All field data will be recorded in a logbook while in the field. Logged data includes soil boring specifications and sample-collection information including sample date and time, location, depth, client, analytical methods, samplers' initials, and the name and address of the laboratory. In addition, other pertinent information, such as descriptions of anomalous conditions, will be recorded.

Field Data Sheets

Geologic trench and boring logs will be completed in the field to describe the lithology of each trench and boring installed. These indicate the depth of the fill-bay mud interface, the depth of encountered groundwater, and any anomalies such as hydrocarbon odors.

Sample Labels

Sample labels will be completed in waterproof ink at the time of sample collection and before the sample is placed in the cooler. The following information will be included on the sample label: sample ID number, date and time, sample location, depth, client, analyses, preservative, and sampler's initials.

Chain-of-Custody Procedures

A chain-of-custody (COC) form will be used to record all samples collected. The COC will be checked for completeness at the end of each day and signed by the sampler. Information on the chain-of-custody record includes: sample date and time, sample ID and location, matrix, number of containers, required analyses, preservative, turnaround time, project manager's name, project number, project name and location, client and laboratory names, and sampler signature(s).

Equipment Decontamination

Decontaminated drilling equipment will be used at each boring to prevent cross-contamination. The drilling equipment will be steam cleaned prior to arriving on site and between borings. The decontamination procedures for all down-hole drilling equipment will include removing residue by scraping, steam cleaning with a high-pressure steam washer, and air drying. A new pair of disposable nitrile gloves will be donned before each sample is collected.

Investigation-Derived Waste

Investigation-derived waste (IDW) will be placed in labeled, 55-gallon, United States Department of Transportation (DOT) 17H IDW drums. These drums will be left on the site pending receipt of final laboratory data and subsequent disposal by the Port. The Port will have the IDW removed by a Port designated hazardous waste contractor.

Laboratory QA/QC Procedures

All analytical testing will be performed by a Cal-EPA ELAP-accredited hazardous-waste laboratory. Each laboratory is required to maintain its own QA/QC program. The laboratory is responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody. Upon receipt of the samples, the laboratory checks the original chain-of-custody documents and compares them with the labeled contents of each sample container for accuracy and traceablity. The laboratory checks all sample containers for integrity, and records any observations on the original COC record; the COC form is then signed and dated by the laboratory.

Each sample is logged into the laboratory by assigning it a unique sample number. All samples received as part of the same shipment receive the same work order. Each container of the sample is identified by appending sequential letters to the end of the sample number. The laboratory number and the sample ID number are recorded on the laboratory report.

7.0 PROPOSED INVESTIGATION SCHEDULE

The proposed schedule is dependent on the review cycle by Alameda County. We anticipate that mobilization for Phase I would be completed within 2 to 3 weeks following approval of the workplan by the County. A draft investigation report, including recommendations for future actions, will be submitted within eight weeks of the completion of the investigation and related site activities (including any UST removal, if required), and the final report will be submitted within six weeks of receipt of County comments.

8.0 REFERENCES

The references below represent the complete list of available references for the Ninth Avenue Terminal. Reports containing information used in this workplan are shown in bold.

1. Arcadis Geraghty & Miller, Inc. *Results of Subsurface Vapor Characterization Activities, Port of Oakland, Ninth Avenue Terminal, Oakland, California*, June 1998.

2. Baseline. *Soil Sampling Activities, Midland Ross Corporation Facility, 845 Embarcadero*, January 1988.

3. Clayton Environmental Consultants. (Clayton 1993). *Subsurface Investigation at Liquid Carbonic Corporation, 901 Embarcadero, Oakland*, February 1993.

4. Clayton Environmental Consultants. (Clayton 1994). *Work Plan for Limited Subsurface Investigation, Quarterly Sampling, and Free Phase Recovery at the Keep on Trucking Site,* December 1994.

5. Clayton Environmental Consultants. (Clayton 1995a). *Work Plan for Limited Subsurface Investigation at the Keep on Trucking Site,* February 1995.

6. Clayton Environmental Consultants. (Clayton 1995b). *Work Plan for Limited Subsurface Investigation, Quarterly Sampling, and Free Phase Recovery at the Keep on Trucking Site,* Revised Feb. 21, 1995.

7. Clayton Environmental Consultants. (Clayton 1996c). *Limited Subsurface Investigation at the Keep on Trucking Site,* June 22, 1995.

8. Clayton Environmental Consultants. (1995d). *Limited Subsurface Investigation at the Keep on Trucking Site,* July 1995.

9. Clayton Environmental Consultants. (Clayton 1995e). *Limited Subsurface Investigation, Quarterly Sampling, and Free Phase Product Recovery at the Keep on Trucking Site,* July 25, 1995.

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TABLES

TABLE 1. SOILS
NINTH AVENUE TERMINAL
UST SITE HF-16 (LOP 6894)

PETROLEUM HYDROCARBON, BTEX, PESTICIDE AND PCB CONCENTRATIONS IN SOIL

SAMPLE DESIGNATION	CONSULTANT	SITE REF AREA	SAMPLE DEPTH (ft)	DATE SAMPLED	PROXIMITY (Feet)	OIL & GREASE (mg/kg)	TPH as GAS (mg/kg)	TPH as DIESEL (mg/kg)	TPH as MOTOR OIL (mg/kg)	TRPH (mg/kg)	BENZENE (mg/kg)	ETHYL-BENZENE (mg/kg)	TOLUENE (mg/kg)	TOTAL XYLENES (mg/kg)	4,4'-DDD (mg/kg)	4,4'-DDE (mg/kg)	4,4'-DDT (mg/kg)	OTHER HERBS/ PESTS (mg/kg)	AROCLOR 1260 (mg/kg)	OTHER PCBs (mg/kg)
9AV-B10-10	Uribe	L	10	11/19/1992	150	--	--	<1H	--	**50**	--	--	--	--	--	--	--	--	--	--
9AV-B10-4	Uribe	L	4	11/19/1992	150	--	--	<5	--	**50**	--	--	--	--	--	--	--	--	--	--
RMA-24@6.5-7	RMA	N	6.5	11/22/1996	75	--	<10	<10	--	--	--	--	--	--	--	--	--	--	--	--
SCI-10@5	SCI	L	5	5/22/1996	150	--	--	**28YH**	**370YH**	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
SCI-11@3.5	SCI	O	3.5	5/22/1996	150	--	--	<1	<5	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
SCI-12@6.5	SCI	N	6.5	5/22/1996	75	--	**800**	**330YHL**	**940YH**	--	**12.0**	**13.0**	**34.0**	**48.1**	--	--	--	--	--	--
SCI-43@4.5	SCI	N	4.5	1/23/1997	150	--	**310YH**	**9,200 L**	**1,600YL**	--	<0.25	<0.25	<0.25	<0.25	--	--	--	--	--	--
SCI-44@2	SCI	N	2	1/23/1997	150	--	--	**1,300H**	**3,200H**	--	--	--	--	--	--	--	--	--	--	--
SCI-44@4.5	SCI	N	4.5	1/23/1997	150	--	--	**6,600**	**1,400YL**	--	--	--	--	--	--	--	--	--	--	--
SCI-45@5	SCI	N	5	1/23/1997	150	--	**380YH**	**23,000**	**2,600YL**	--	<0.25	<0.25	<0.25	<0.25	--	--	--	--	--	--
SCI-45@8.5	SCI	N	8.5	1/23/1997	150	--	--	**95**	**56YLH**	--	--	--	--	--	--	--	--	--	--	--
SCI-8@5.5	SCI	L	5.5	5/22/1996	150	--	--	**7.4YH**	**120YH**	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
SCI-9@5.5	SCI	L	5.5	5/22/1996	150	--	--	<1	<5	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
SCIMW-24@3	SCI	N	3	4/29/1997	75	<50	**440**	**20YHL**	**140**	--	**1.6**	**11**	**0.31J**	**6.4**	<0.006	<0.006	<0.006	ND	<0.012	ND
SCIMW-24@6	SCI	N	6	4/29/1997	75	--	**910**	**140HL**	**200**	--	**0.63**	**2.4**	<0.5	**3.9**	--	--	--	--	--	--
SCITP-14@4	SCI	N	4	2/5/1997	75	--	**270**	**99YHL**	**420**	--	<0.13	<0.13	<0.13	**5.2**	--	--	--	--	--	--
SCITP-18@3.5	SCI	O	3.5	4/23/1997	150	**16,000**	**1,100YH**	**10,000HL**	**11,000YHL**	--	<0.025	<0.025	<0.025	<0.025	<1.2	<1.2	<1.2	ND	<2.4	ND
SCITP-18@6.5	SCI	O	6.5	4/23/1997	150	**250**	<1	**66YH**	**390YH**	--	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--
SCITP-19@2.5	SCI	N	2.5	4/24/1997	75	--	--	**38,000YH**	**32,000YHL**	--	--	--	--	--	--	--	--	--	--	--
SCITP-19@6	SCI	N	6	4/24/1997	75	**98**	**25YH**	**33YH**	**18YHL**	--	<0.005	<0.005	<0.005	<0.005	<0.03	<0.03	<0.03	ND	<0.06	ND
SCITP-20@3	SCI	L	3	4/24/1997	150	**130**	<1	**2YH**	**13YHL**	--	<0.005	<0.005	<0.005	<0.005	<0.006	<0.006	<0.006	ND	<0.012	ND
SCITP-26@3	SCI	N	3	4/28/1997	150	**470**	**71YH**	**200YHL**	**610 L**	--	<0.25	<0.25	<0.25	<0.25	<0.03	<0.03	<0.03	ND	<0.06	ND
SCITP-26@5	SCI	N	5	4/28/1997	150	--	--	**2.2YH**	**17YH**	--	--	--	--	--	--	--	--	--	--	--

TABLE 1. SOILS
NINTH AVENUE TERMINAL
UST SITE HF-16 (LOP 6894)

pH AND METALS CONCENTRATIONS IN SOIL

SAMPLE DESIGNATION	CONSULTANT	SITE REF AREA	SAMPLE DEPTH (ft)	DATE SAMPLED	PROXIMITY (Feet)	pH	ANTIMONY (mg/kg)	ARSENIC (mg/kg)	BARIUM (mg/kg)	BERYLLIUM (mg/kg)	CADMIUM (mg/kg)	TOTAL CHROMIUM (mg/kg)	CHROMIUM VI (mg/kg)	COBALT (mg/kg)	COPPER (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	MOLYB-DENUM (mg/kg)	NICKEL (mg/kg)	POTASSIUM (mg/kg)	SELENIUM (mg/kg)	SILVER (mg/kg)	THALLIUM (mg/kg)	VANADIUM (mg/kg)	ZINC (mg/kg)
9AV-B10-10	Uribe	L	10	11/19/1992	150	--	--	**1.9**	**62**	--	**0.2**	**30**	--	--	--	**67**	**0.1**	--	--	--	<0.4	<0.5	--	--	--
9AV-B10-4	Uribe	L	4	11/19/1992	150	--	--	**3.8**	**22**	--	**0.4**	**36**	--	--	--	**12**	<0.1	--	--	--	<0.4	<0.5	--	--	--
RMA-24@6.5-7	RMA	N	6.5	11/22/1996	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-10@5	SCI	L	5	5/22/1996	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-11@3.5	SCI	O	3.5	5/22/1996	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-12@6.5	SCI	N	6.5	5/22/1996	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-43@4.5	SCI	N	4.5	1/23/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-44@2	SCI	N	2	1/23/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-44@4.5	SCI	N	4.5	1/23/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-45@5	SCI	N	5	1/23/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-45@8.5	SCI	N	8.5	1/23/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-8@5.5	SCI	L	5.5	5/22/1996	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-9@5.5	SCI	L	5.5	5/22/1996	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24@3	SCI	N	3	4/29/1997	75	--	--	--	--	--	--	--	--	--	--	**18**	--	--	--	--	--	--	--	--	--
SCIMW-24@6	SCI	N	6	4/29/1997	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCITP-14@4	SCI	N	4	2/5/1997	75	--	--	--	--	--	--	--	--	--	--	**57**	--	--	--	--	--	--	--	--	--
SCITP-18@3.5	SCI	O	3.5	4/23/1997	150	--	--	--	--	--	--	--	--	--	--	**6.7**	--	--	--	--	--	--	--	--	--
SCITP-18@6.5	SCI	O	6.5	4/23/1997	150	--	--	--	--	--	--	--	--	--	--	**44**	--	--	--	**1,000**	--	--	--	--	--
SCITP-19@2.5	SCI	N	2.5	4/24/1997	75	--	--	--	--	--	--	--	**0.02**	--	--	**25**	--	--	--	--	--	--	--	--	--
SCITP-19@6	SCI	N	6	4/24/1997	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCITP-20@3	SCI	L	3	4/24/1997	150	--	--	--	--	--	--	--	<0.01	--	--	**6.8**	--	--	--	--	--	--	--	--	--
SCITP-26@3	SCI	N	3	4/28/1997	150	--	--	--	--	--	--	--	<0.05	--	--	**150**	--	--	--	**800**	--	--	--	--	--
SCITP-26@5	SCI	N	5	4/28/1997	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
TPH = Total Petroleum Hydrocarbons
DDD = Dichlorodiphenyldichloroethane
DDE = Dichlorodiphenyldichloroethene
DDT = Dichlorodiphenyltrichloroethene
PCBs = Polychlorinated Biphenyls
MEK = Methylethylketone

mg/kg = milligrams per killogram or parts per million
Y = Sample exhibits fuel pattern which does not resemble std
H = heavier hydrocarbons than indicated standard
L = lighter hydrocarbons than indicated standard
Z = Sample exhibits unknown single peak or peaks
J = estimated value

All detected concentrations shown in bold
<number, i.e. <50 = Compound not detected at or above stated reporting limit
N/A= Not available
-- = Not Analyzed
ND = Not detected

TABLE 2. GROUNDWATER

NINTH AVENUE TERMINAL
UST SITE HF-16 (LOP 6894)

PETROLEUM HYDROCARBON, BTEX, PESTICIDE AND PCB CONCENTRATIONS IN GROUNDWATER

SAMPLE DESIGNATION	CONSULTANT	SITE REF AREA	DATE SAMPLED	GROUNDWATER ELEVATION Port Datum (FEET)	PROXIMITY (Feet)	OIL & GREASE (µg/L)	TPH as GAS (µg/L)	TPH as DIESEL (µg/L)	TPH as MOTOR OIL (µg/L)	BENZENE (µg/L)	ETHYL-BENZENE (µg/L)	TOLUENE (µg/L)	TOTAL XYLENES (µg/L)	MTBE (µg/L)	4,4'-DDD (µg/L)	4,4'-DDE (µg/L)	4,4'-DDT (µg/L)	OTHER HERBS/ PESTS (µg/L)	AROCLOR-1260 (µg/L)	OTHER PCBs (µg/L)
9AV-B10-W1	Uribe	L	11/21/1992	N/A	75	--	--	<800	--	--	--	--	--	--	--	--	--	--	--	--
RMA-24	RMA	N	11/22/1996	N/A	75	--	<500	<500	--	--	--	--	--	--	--	--	--	--	--	--
SCI-10	SCI	L	5/22/1996	N/A	150	--	--	**840YH**	**1,200Y**	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCI-11 (total)	SCI	O	5/23/1996	N/A	150	<5,000	--	**340Y**	<250	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCI-11	SCI	O	5/23/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-12	SCI	N	5/22/1996	N/A	75	--	**18,000**	**2,400YHL**	**14,000Y**	**810**	**680**	**2,200**	**3,900**	--	--	--	--	--	--	--
SCI-43	SCI	N	1/23/1997	N/A	150	--	**13,000YH**	**190,000**	**12,000YL**	<2.5	<2.5	<2.5	<2.5	--	--	--	--	--	--	--
SCI-45	SCI	N	1/23/1997	N/A	150	--	**25,000YH**	**490,000**	**29,000YL**	<0.5	<0.5	**2.9**	<0.5	--	--	--	--	--	--	--
SCI-8	SCI	L	5/22/1996	N/A	150	--	--	**2,100YH**	**1,400Y**	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCI-9	SCI	L	5/23/1996	N/A	150	--	--	**2,500YH**	**2,300**	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	8/28/1996	N/A	75	<5,000	<50	**400YHL**	<250	<5.0	<5.0	<5.0	<5.0	--	--	--	--	--	<1.0	ND
SCIMW-11	SCI	N	1/17/1997	N/A	75	--	<50	**180**	<250	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	9/23/1998	4.72	75	--	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/10/1998	3.32	75	--	**51**	<59	<350	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/6/1999	3.48	75	--	--	<50	<300	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/1/1999	4.07	75	--	**110**	<50	<300	**0.86**	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	10/4/2000	4.00	75	--	**69**	<50	<300	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/3/2001	2.54	75	--	**140**	<50	<300	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	11/28/2001	5.94	75	--	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-11	SCI	N	7/30/2002	2.64	75	--	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1997	4.44	75	<5,000	**5,000**	**2,700 L**	**2,100 L**	**720**	**220**	**37**	**120**	--	<0.094	<0.094	<0.094	ND	<0.47	ND
SCIMW-24	SCI	N	9/18/1998	4.96	75	--	**7,100**	**330YL**	<300	**950**	**99**	**53**	**98**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	12/11/1998	5.79	75	--	**8,300**	**800YL**	<300	**1,200**	**180**	**56**	**111**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1999	5.14	75	--	**6,700**	**1,900YL**	**660YL**	**1,100**	**120**	**31**	**89**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	8/25/1999	4.59	75	**FREE PRODUCT -- NOT SAMPLED**														
SCIMW-24	SCI	N	12/1/1999	4.99	75	--	**7,000**	**960YL**	<300	**860**	**25**	**35**	**53.6**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	4/6/2000	5.05	75	--	**4,500**	**2,600YL**	**2,100**	**1,700**	**87**	**41**	**81**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	10/10/2000	4.95	75	--	**5,400**	**1,200LY**	<300	**1,600**	**36**	**59**	**69**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/4/2001	4.94	75	--	**7,100**	**5,300HLY**	**3,600**	**2,700**	**160**	**64**	**100**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	11/28/2001	5.37	75	--	**8,900**	**5,800HLY**	**5,000**	**1,000**	**51**	**44**	**57**	--	--	--	--	--	--	--
SCIMW-24	SCI	N	7/30/2002	5.17	75		**25,000**	**2,300HLY**	**1,700**	**1,600**	**160**	<2.5	**66**	--	--	--	--	--	--	--
SCITP-14	SCI	N	2/5/1997	N/A	75	--	**18,000 L**	**15,000YLH**	**41,000 L**	**1,700**	**1,100**	**110**	**690**	--	--	--	--	--	--	--
TP-18	SCI	O	4/24/1997	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-19	SCI	N	4/24/1997	N/A	75	**14,000**	**4,300Y**	**15,000 LH**	**10,000YLH**	<0.5	<0.5	<0.5	<0.5	--	--	--	--	--	--	--
TP-3	SCI	N	1/27/97	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 2. GROUNDWATER

NINTH AVENUE TERMINAL
UST SITE HF-16 (LOP 6894)

pH AND METALS CONCENTRATIONS IN GROUNDWATER

SAMPLE DESIGNATION	CONSULTANT	SITE REF AREA	DATE SAMPLED	GROUNDWATER ELEVATION Port Datum (FEET)	PROXIMITY (Feet)	pH	ANTIMONY (µg/L)	ARSENIC (µg/L)	BARIUM (µg/L)	BERYLLIUM (µg/L)	CADMIUM (µg/L)	TOTAL CHROMIUM (µg/L)	CHROMIUM VI (µg/L)	COBALT (µg/L)	COPPER (µg/L)	LEAD (µg/L)	MERCURY (µg/L)	MOLYB-DENUM (µg/L)	NICKEL (µg/L)	POTASSIUM (µg/L)	SELENIUM (µg/L)	SILVER (µg/L)	THALLIUM (µg/L)	VANADIUM (µg/L)	ZINC (µg/L)
9AV-B10-W1	Uribe	L	11/21/1992	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RMA-24	RMA	N	11/22/1996	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-10	SCI	L	5/22/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-11 (total)	SCI	O	5/23/1996	N/A	150	--	<60	**120**	**4,000**	**18**	**14**	**1,000**	--	**130**	**1,400**	**1,100**	**15**	<20	**1,200**	--	**41**	<5.0	<5.0	**11**	**320**
SCI-11	SCI	O	5/23/1996	N/A	150	--	<60	<5.0	**290**	**2.8**	**3.4**	<10	--	<20	**73**	**4.0**	**0.25**	<20	**180**	--	**23**	<5.0	<5.0	<10	<20
SCI-12	SCI	N	5/22/1996	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-43	SCI	N	1/23/1997	N/A	150	--	<60	<5.0	**340**	<2.0	<2.0	<10	--	<20	<10	<3.0	<0.20	**22**	<20	--	<5.0	<5.0	<5.0	<10	<20
SCI-45	SCI	N	1/23/1997	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-8	SCI	L	5/22/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-9	SCI	L	5/23/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	8/28/1996	N/A	75	--	<60	<5.0	**210**	<2.0	<2.0	<10	--	<20	<10	<3.0	**0.62**	<20	<20	--	**16**	--	--	--	--
SCIMW-11	SCI	N	1/17/1997	N/A	75	--	<60	**6.2**	**300**	<2.0	<2.0	<10	--	<20	<10	<3.0	<0.20	<20	<20	--	**6.6**	<5.0	<5.0	<10	<20
SCIMW-11	SCI	N	9/23/1998	4.72	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/10/1998	3.32	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/6/1999	3.48	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/1/1999	4.07	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	10/4/2000	4.00	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/3/2001	2.54	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	11/28/2001	5.94	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	7/30/2002	2.64	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1997	4.44	75	--	--	--	--	--	--	--	**160**	--	--	**6.3**	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	9/18/1998	4.96	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	12/11/1998	5.79	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1999	5.14	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	8/25/1999	4.59	75	**FREE PRODUCT – NOT SAMPLED**																			
SCIMW-24	SCI	N	12/1/1999	4.99	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	4/6/2000	5.05	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	10/10/2000	4.95	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/4/2001	4.94	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	11/28/2001	5.37	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	7/30/2002	5.17	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCITP-14	SCI	N	2/5/1997	N/A	75	--	--	--	--	--	--	--	--	--	--	**13**	--	--	--	--	--	--	--	--	--
TP-18	SCI	O	4/24/1997	N/A	150	--	<60	**5.6**	**420**	<2.0	<5.0	<10	<10	<20	**19**	<3.0	<0.20	<20	<20	**130,000**	<5.0	--	--	--	--
TP-19	SCI	N	4/24/1997	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-3	SCI	N	1/27/97	N/A	150	--	<60	<5.0	**49**	<2.0	<2.0	<10	--	<20	<10	<3.0	<0.20	<20	<20	--	**6.4**	<5.0	<5.0	<10	**220**

TABLE 2. GROUNDWATER

NINTH AVENUE TERMINAL
UST SITE HF-16 (LOP 6894)

VOCs IN GROUNDWATER

SAMPLE DESIGNATION	CONSULTANT	SITE REF AREA	DATE SAMPLED	GROUNDWATER ELEVATION Port Datum (FEET)	PROXIMITY (Feet)	ACETONE (µg/L)	MEK/ 2-BUTANONE (µg/L)	CARBON DISULFIDE (µg/L)	CHLORO-BENZENE (µg/L)	CHLORO-ETHANE (µg/L)	1,1-DICHLORO-ETHANE (µg/L)	1,2-DICHLORO-ETHANE (µg/L)	1,1-DICHLORO-ETHENE (µg/L)	cis-1,2-DICHLORO-ETHENE (µg/L)	trans-1,2-DICHLORO-ETHENE (µg/L)	4-METHYL-2-PENTAN-ONE (µg/L)	CHLORO-ETHANE (µg/L)	TRICHLORO-ETHENE (µg/L)	VINYL CHLORIDE (µg/L)	OTHER 8240s*
9AV-B10-W1	Uribe	L	11/21/1992	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RMA-24	RMA	N	11/22/1996	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-10	SCI	L	5/22/1996	N/A	150	<20	<10	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<10	ND
SCI-11 (total)	SCI	O	5/23/1996	N/A	150	<20	<10	<5.0	<5.0	<10	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<5.0	<5.0	<10	ND
SCI-11	SCI	O	5/23/1996	N/A	150	<100	<50	<25	<25	<50	<25	<25	<25	<25	<25	<50	<25	<25	<50	ND
SCI-12	SCI	N	5/22/1996	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-43	SCI	N	1/23/1997	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-45	SCI	N	1/23/1997	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-8	SCI	L	5/22/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCI-9	SCI	L	5/23/1996	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	8/28/1996	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	1/17/1997	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	9/23/1998	4.72	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/10/1998	3.32	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/6/1999	3.48	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	12/1/1999	4.07	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	10/4/2000	4.00	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	5/3/2001	2.54	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	11/28/2001	5.94	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-11	SCI	N	7/30/2002	2.64	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1997	4.44	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	9/18/1998	4.96	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	12/11/1998	5.79	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/6/1999	5.14	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	8/25/1999	4.59	75	**FREE PRODUCT -- NOT SAMPLED**														
SCIMW-24	SCI	N	12/1/1999	4.99	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	4/6/2000	5.05	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	10/10/2000	4.95	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	5/4/2001	4.94	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	11/28/2001	5.37	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCIMW-24	SCI	N	7/30/2002	5.17	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SCITP-14	SCI	N	2/5/1997	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-18	SCI	O	4/24/1997	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-19	SCI	N	4/24/1997	N/A	75	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TP-3	SCI	N	1/27/97	N/A	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
TPH = Total Petroleum Hydrocarbons
DDD = Dichlorodiphenyldichloroethane
DDE = Dichlorodiphenyldichloroethene
DDT = Dichlorodiphenyltrichloroethene
PCBs = Polychlorinated Biphenyls
MEK = Methylethylketone

µg/L = micrograms per liter or parts per billion
Y = Sample exhibits fuel pattern which does not resemble std
H = heavier hydrocarbons than indicated standard
L = lighter hydrocarbons than indicated standard
Z = Sample exhibits unknown single peak or peaks
J = estimated value

All detected concentrations shown in bold
<number, i.e. <50 = Compound not detected at or above stated reporting limit
N/A= Not available
-- = Not Analyzed
ND = Not detected

FIGURES

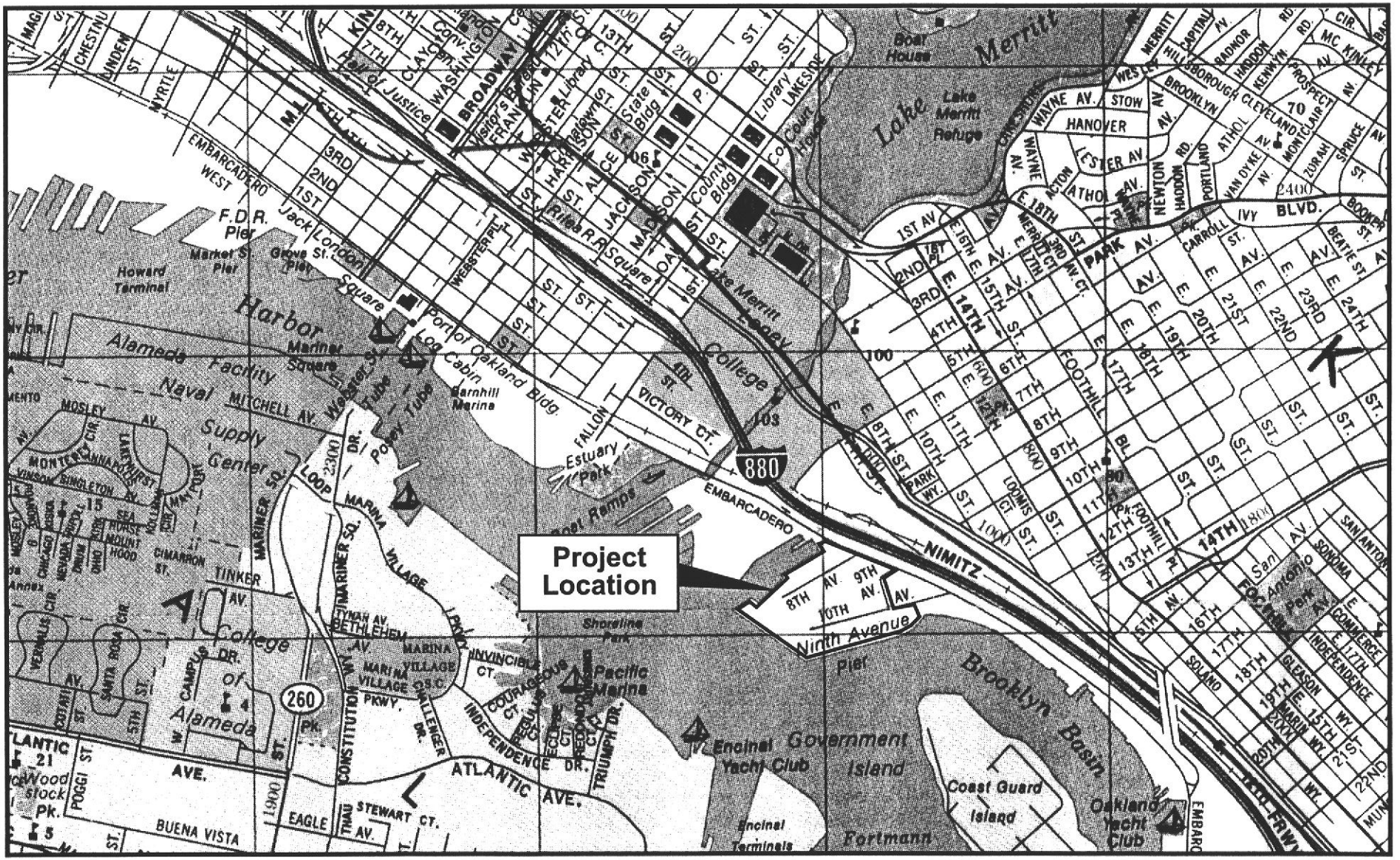
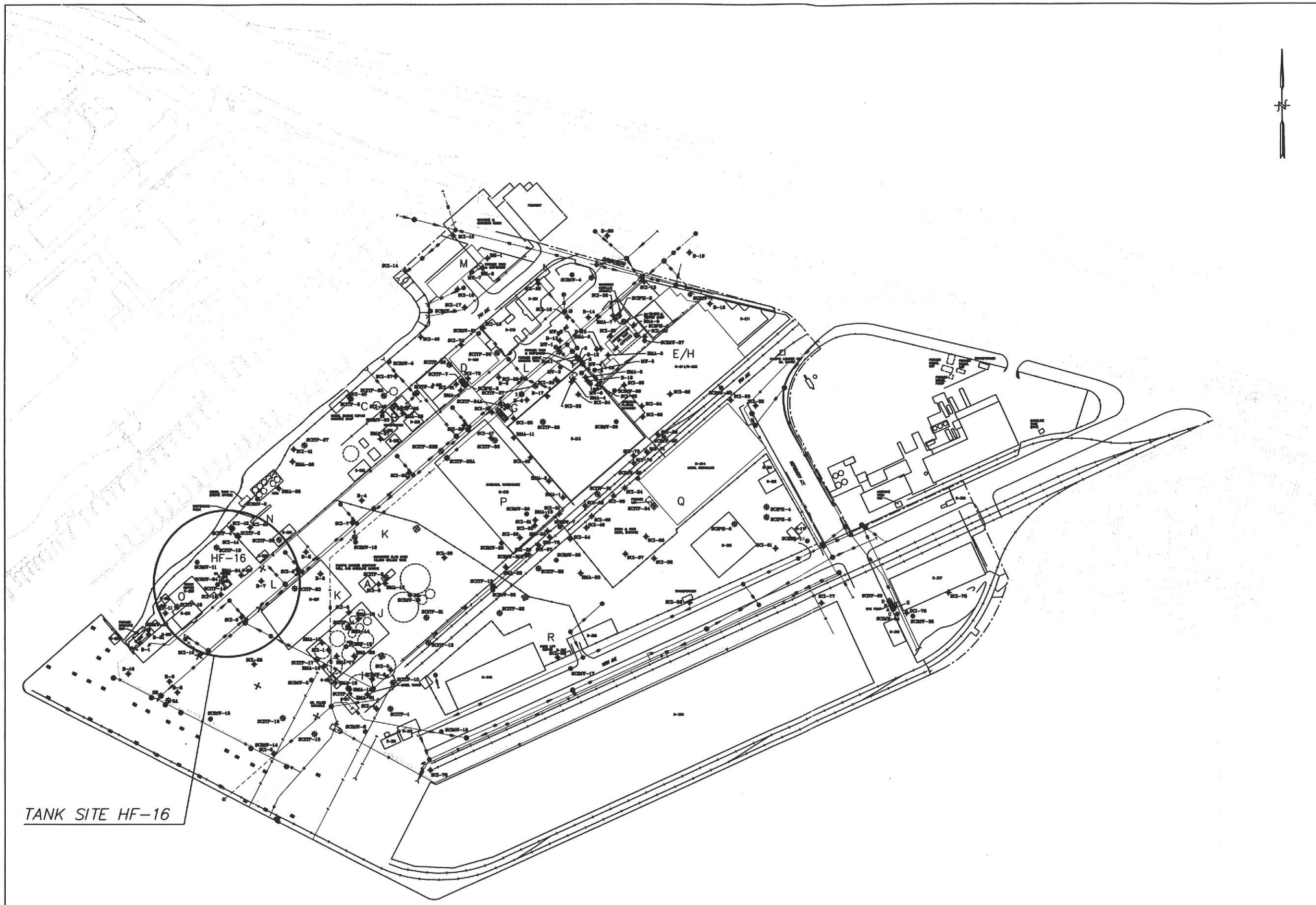


Figure 1

Vicinity Map
Port of Oakland
Ninth Avenue Terminal

GAIA consulting, inc.

168344.A5.01•Vicinity Map•11/13/01•ccc•T112001001SFO



LEGEND:

- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- DEMOLISHED BUILDING
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- FENCE LINE
- RAILROAD
- BOUNDARY LINE
- OVERHEAD LIGHT STANDARD
- EXISTING ABOVE OR UNDERGROUND STORAGE TANK
- FORMER ABOVE OR UNDERGROUND STORAGE TANK

GRAPHIC SCALE

NINTH AVENUE TERMINAL
PORT OF OAKLAND
TANK HF-16
TANK LOCATION

GAIA consulting, inc

Project No.	Figure
168344	2

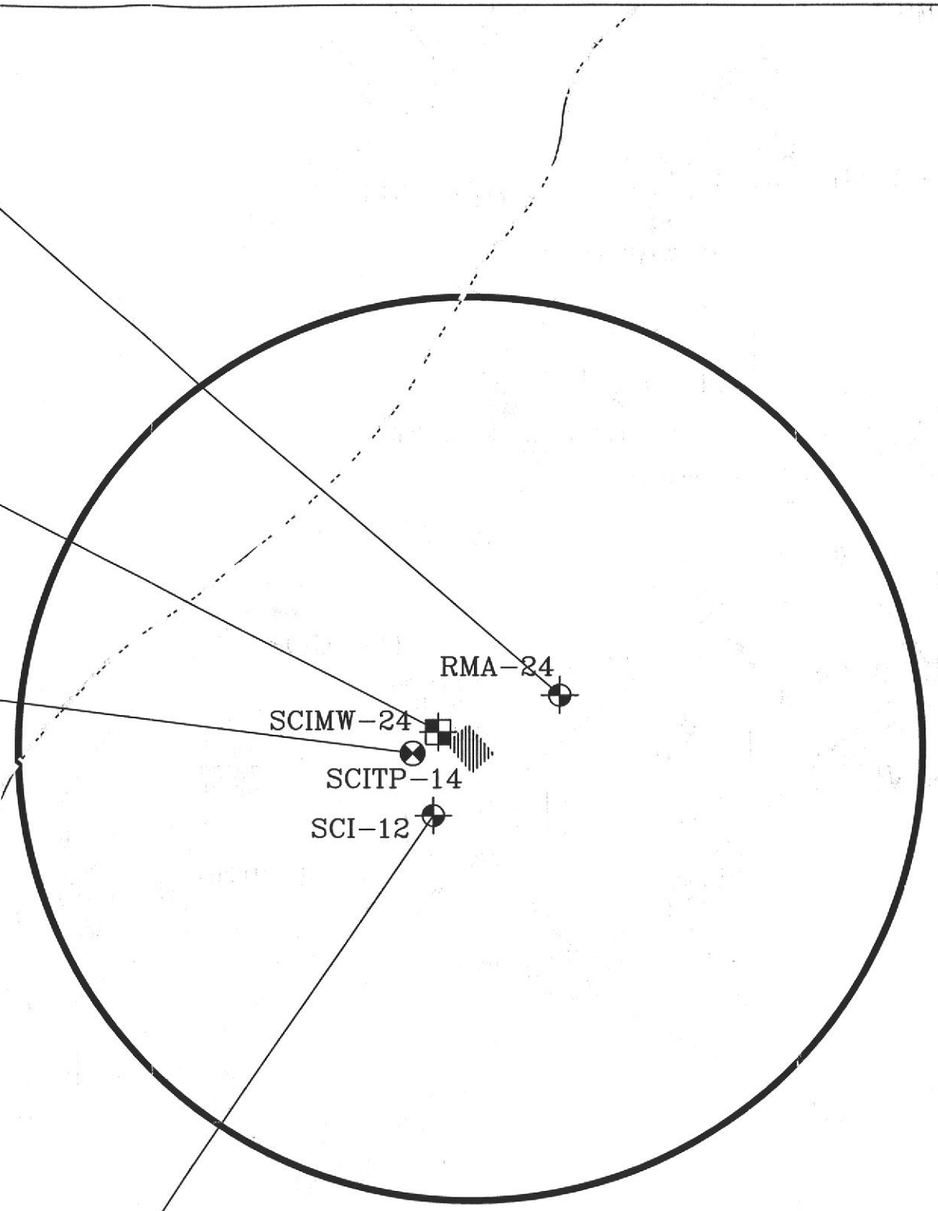
Plot Date: 07-23-02 Filename: TANKLOC-HF-16.Dwg

SAMPLE LOCATION	Depth (ft.)	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
RMA–24	6.5	<10	<10	--	--	--	--	--

SAMPLE LOCATION	Depth (ft.)	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCIMW–24	3	440	20YHL	140	1.6	11	0.31J	6.4
SCIMW–24	6	910	140HL	200	0.63	2.4	<0.5	3.9

SAMPLE LOCATION	Depth (ft.)	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCITP–14	4	270	99YHL	420	<0.13	<0.13	<0.13	5.2

SAMPLE LOCATION	Depth (ft.)	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCI–12	6.5	800	330YHL	940YH	12.0	13.0	34.0	48.1



GRAPHIC SCALE

0 50 100 150

LEGEND:

- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- DEMOLISHED BUILDING
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- FENCE LINE
- RAILROAD
- BOUNDARY LINE
- OVERHEAD LIGHT STANDARD
- EXISTING ABOVE OR UNDERGROUND STORAGE TANK
- FORMER ABOVE OR UNDERGROUND STORAGE TANK
- COMPOUND NOT DETECTED AT THE REFERENCED DETECTION LIMIT
- NOT ANALYZED

TPH–d DIESEL–RANGE PETROLEUM HYDROCARBONS

TPH–g GASOLINE–RANGE PETROLEUM AT THE REFERENCED

TPH–mo MOTOR OIL RANGE PETROLEUM HYDROCARBONS

Y SAMPLE EXHIBITS FUEL PATTERN WHICH DOES NOT RESEMBLE STANDARD

H HEAVIER HYDROCARBONS THAN INDICATED STANDARD

L LIGHTER HYDROCARBONS THAN INDICATED STADARD

Z SAMPLE EXHIBITS UNKNOWN SINGLE PEAK OR PEAKS

J ESTIMATED VALUE

NOTE: ALL CONCENTRATIONS IN mg/kg

NINTH AVENUE TERMINAL
PORT OF OAKLAND
TANK HF–16
SOIL DATA

GAIA consulting, inc

Project No. 168344

Figure 3

Plot Date: 10–11–02 Filename: SOILDATA–HF–16.Dwg

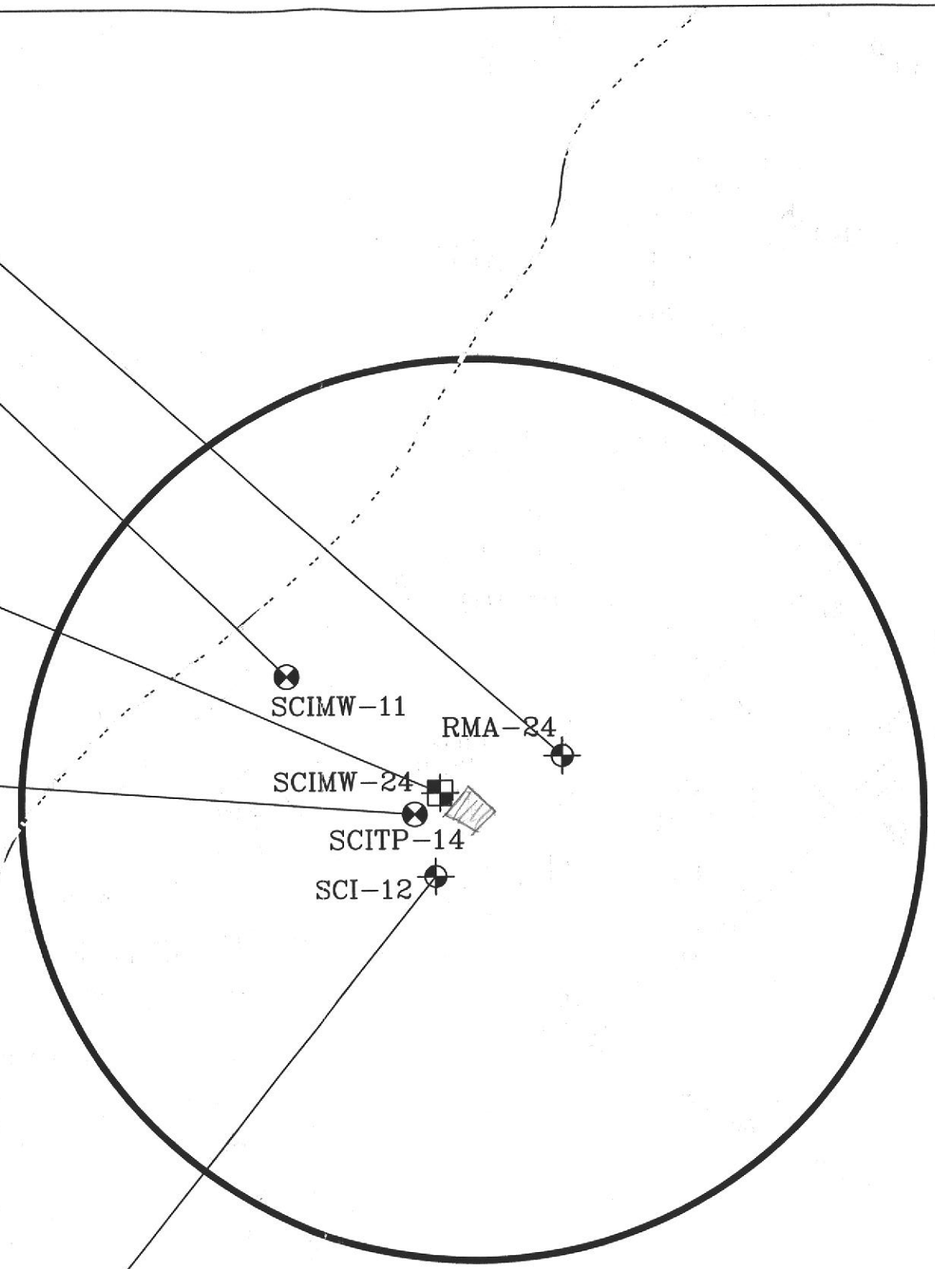
SAMPLE LOCATION	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
RMA–24	<500	<500	--	--	--	--	--

SAMPLE LOCATION	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCIMW–11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5

SAMPLE LOCATION	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCIMW–24	25,000	2,300 HLY	1,700	1,600	160	<2.5	66

SAMPLE LOCATION	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCITP–14	18,000 L	15,000 YLH	41,000 L	1,700	1,100	110	690

SAMPLE LOCATION	TPH–g	TPH–d	TPH–mo	benzene	ethylbenezene	toluene	total xylenes
SCI–12	18,000	2,400 YHL	14,000 Y	810	680	2,200	3,900



GRAPHIC SCALE

0 50 100 150

LEGEND:

- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- DEMOLISHED BUILDING
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- FENCE LINE
- RAILROAD
- BOUNDARY LINE
- OVERHEAD LIGHT STANDARD
- EXISTING ABOVE OR UNDERGROUND STORAGE TANK
- FORMER ABOVE OR UNDERGROUND STORAGE TANK
- <0.5 COMPOUND NOT DETECTED AT THE REFERENCED DETECTION LIMIT
- -- NOT ANALYZED
- TPH–d DIESEL–RANGE PETROLEUM HYDROCARBONS
- TPH–g GASOLINE–RANGE PETROLEUM AT THE REFERENCED
- TPH–mo MOTOR OIL RANGE PETROLEUM HYDROCARBONS
- Y SAMPLE EXHIBITS FUEL PATTERN WHICH DOES NOT RESEMBLE STANDARD
- H HEAVIER HYDROCARBONS THAN INDICATED STANDARD
- L LIGHTER HYDROCARBONS THAN INDICATED STADARD
- Z SAMPLE EXHIBITS UNKNOWN SINGLE PEAK OR PEAKS
- J ESTIMATED VALUE

NOTE: ALL CONCENTRATIONS IN µg/L
MWs LAST SAMPLED IN JULY 2002

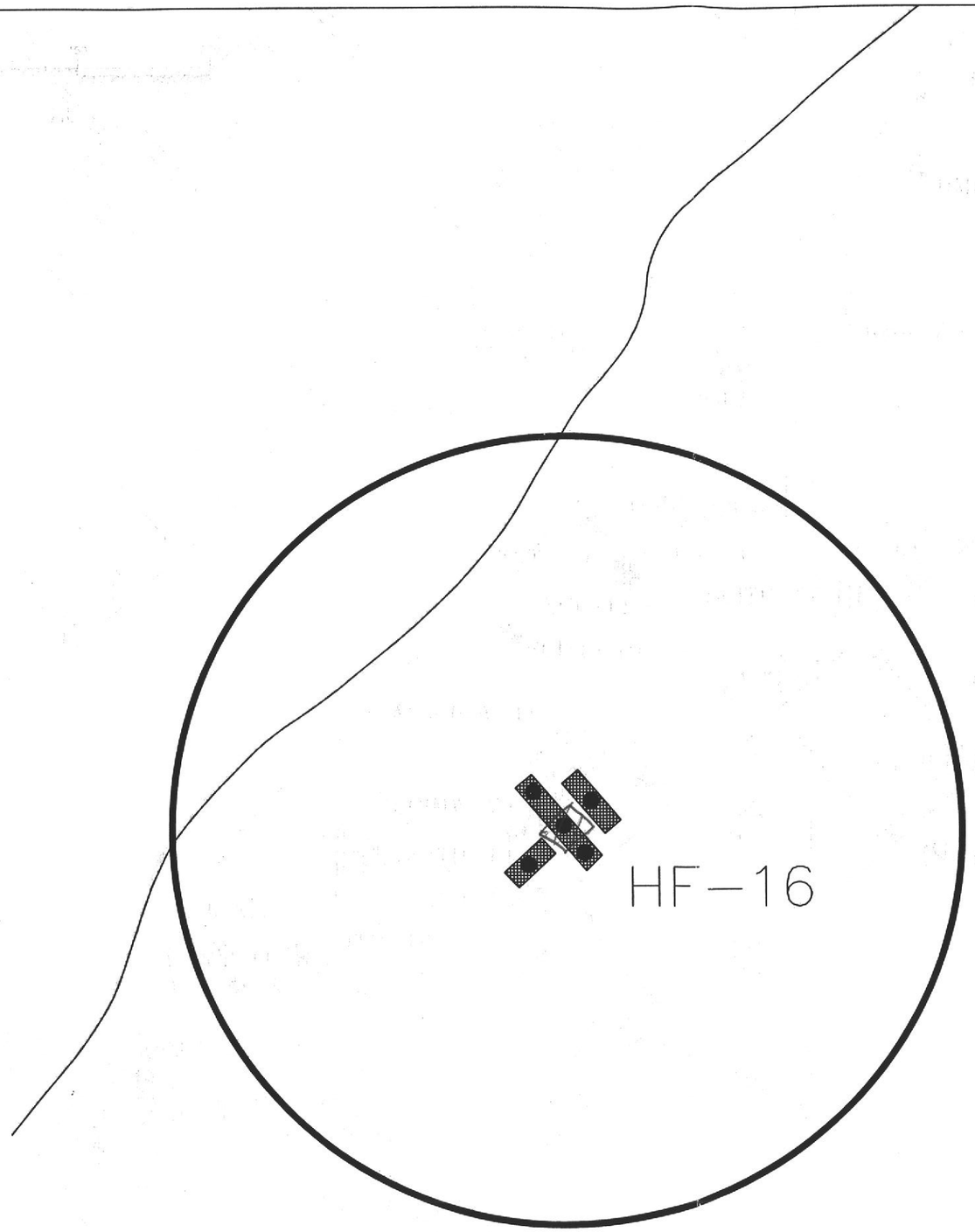
NINTH AVENUE TERMINAL
PORT OF OAKLAND
TANK HF–16
GROUNDWATER DATA

GAIA consulting, inc

Project No. 168344

Figure 4

Plot Date: 10–11–02 Filename: GWDATA–HF–16.Dwg



LEGEND:

- PROPOSED TRENCH LOCATION (10 FEET FROM EDGE OF BUILDING)
- PROPOSED SAMPLE LOCATION (15 FEET FROM EDGE OF BUILDING)
- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- DEMOLISHED BUILDING
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- FENCE LINE
- RAILROAD
- BOUNDARY LINE
- OVERHEAD LIGHT STANDARD
- EXISTING ABOVE OR UNDERGROUND STORAGE TANK
- FORMER ABOVE OR UNDERGROUND STORAGE TANK

NINTH AVENUE TERMINAL
PORT OF OAKLAND
TANK HF-16
PROPOSED BORING LOCATION

GAIA consulting, inc	Project No. 168344	Figure 5

Plot Date: 10-11-02 Filename: FIG5-HF-16.Dwg

APPENDIX A

GAIA Consulting, Inc.

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project Title: 9th Avenue UST Site HF-16
(LOP6894, H-204)

Project No.: 180.015

Client: Port of Oakland

530 Water Street

Oakland, CA 94607

Date: July 24, 2002

This form may be used for those site activities that pose a significant threat of exposure to site contaminants or hazards (e.g., well installation, soil borings, water/soil sampling, excavation/ trenching). The GAIA Consulting, Inc. Health and Safety Director will determine whether or not this form is appropriate for any given activity at the site. It is the responsibility of the Project Manager to complete the Health and Safety Plan (HSP). The Health and Safety Director must sign the HSP. All project personnel must receive a copy of this form, familiarize themselves with its contents, and sign the signature page before work begins.

1. **Site Name and Address**

   9th Avenue Terminal
   Oakland, CA

2. **Site Personnel and Assigned Responsibilities**

Principal-in-Charge:	June Dougherty
Project Manager:	Susanne von Rosenberg, P.E.
Site Safety Officer:	Melba Policicchio
Other Field Personnel:	Craig Zeff

3. **Site Description and Background (attach site map)**

Extensive site background including results of previous investigations can be found in the attached Work Plan in Sections 2.0 and 3.0.

4. **Planned Site Activities**

- Backhoe trenching to determine presence of potential underground storage tank(s) and/or extent of contamination.
- Geoprobe-type hydraulic push soil borings
- Soil and groundwater sampling from Geoprobe borings.
- Utility location (done by USA and private utility locator company).

5. **Chemical Data Summary**

__X__ Available Chemical Information has been requested from client.

See full table with details of all nearby boring and well location samples and analytical results on data table attached to Workplan.

Known Compounds	Source (soil/water/drum, etc.)	Known Concentrations Range (ppm, mg/kg, mg/l)	
		Lowest	Highest
TPH as gasoline (as diesel and motor oil also detected)	Water	51 ug/l	25000 ug/l
Benzene (EBTX also detected)	Water	0.86 ug/l	2700 ug/l
Lead (other metals also detected)	Water	4.0 ug/l	1100 ug/l
TPH as gasoline (as diesel and motor oil also detected)	Soil	25 mg/kg	1100 mg/kg
Benzene (EBTX also detected)	Soil	0.63 mg/kg	12 mg/kg
Lead (Ar, Ba, Cd, Cr, also detected)	Soil	6.7 mg/kg	150 mg/kg

6. Potential Physical, Mechanical, Electrical, and Biological Hazards

(Check all boxes that potentially apply to the project)

X	Do not stand near backhoe buckets and earthmoving equipment.
X	Wear hard hat, safety glasses, and steel toed boots when working around drill rig.
X	Use noise meter to survey area to determine if the OSHA PEL-TWA of 85 decibels is exceeded in any area. If so, mark area and use earplugs or earmuffs within area.
X	If noise survey is not performed as a precautionary measure, wear ear muffs or plugs when working within 25 feet of operating machinery.
X	Verify that all equipment is in good condition.
☐	Do not stand or walk under elevated loads or ladders.
X	Do not stand near unguarded excavation and trenches.
X	Do not enter excavation or trenches over 4 feet deep that are not properly guarded, shored, or sloped.
X	Consult Health and Safety Director if other mechanical hazards exist.
X	Discuss location of buried utilities with USA and private party utility locator.
X	Locate and mark buried utilities, and notify USA (Date: USA Tag No.
X	Have buried utilities cleared by private utility locating company.
X	Maintain at least 10-foot clearance from overhead power lines.
X	Contact utility company for minimum clearance from high voltage power lines. If unavoidably close to buried or overhead power line, have power turned off, with circuit breaker locked and tagged.
X	Wear protective gloves when handling samples (see Item #10)
☐	Avoid standing in water when operating electrical equipment.
☐	If equipment must be connected by splicing wires, make sure all connections are properly taped.
☐	Be familiar with specific operating instructions for each piece of equipment.
X	Do not walk near building foundation if shored.
☐	Avoid contact with potentially infectious waste.
☐	Be aware of and avoid contact with potentially rabid animals.
☐	Use appropriate insect repellant to avoid disease carrying or poisonous insects. Avoid breathing dust in dry desert or central valley areas (valley fever, Hanta virus, etc.).

7. Health and Safety Procedures Required by the Facility

(Describe any client-specified safety requirements or check "Not Applicable" if there are none).

Work area may require wearing hard hat and safety vest while on site.

8. Special Procedures and Precautions

	Not Applicable.
☐	Obtain permit for confined space entry.
☐	Monitor oxygen and organic vapors before entering. If following values are exceeded, do not enter: (a. oxygen less than 19.5 percent or greater than 25%; b. LEL greater than 10%).
☐	If radiation meter indicates 2mR/hr or more, leave the area and consult DHS.
X	**Dust Suppression:** Stockpiled soil will be covered to prevent airborne conditions of affected soil.
☐	**Dust Suppression:** Dust suppression for vehicular traffic and earth moving operations will be implemented (area water spray).
☐	**Dust Suppression:** Perimeter ambient air monitoring will be used to analytically measure chemical concentrations of known constituents in fugitive dust. The laboratory analytical results will be used to determine that adequate dust control measures are employed to avoid off-site migration of contaminated dust.

9. Air Monitoring Procedures

Note: If applicable, see last page of this HSP for Total Dust Equivalency calculation instructions.

☐	**Not Applicable**	Because no chemical contamination or excessive dust is expected, no air monitoring will be performed.
X	**Volatile organics only** **Metal levels in soil are too low to warrant dust monitoring, thus only VOCs will be monitored.**	VOC concentrations in the breathing zone will be monitored using a PID or FID, during intrusive activities, or any time activities or site conditions change.
☐	**Uncontaminated dust only;** Total dust monitoring w/Real Time Dust Monitors	Monitoring will be performed when there is visual dust, using a Real Time Total Dust Meter, to detect if total dust levels are above the OSHA PEL for dust of 10 mg/m3.

☐	**Contaminated dust only**; Total dust monitoring w/Real Time Dust Monitors	To obtain current information about potential exposure conditions to contaminated airborne dust, Real Time Total Dust Meter(s) will be used to monitor the breathing zone or immediate work area. Calculations have been done to determine the total airborne dust level necessary to reach the Permissible Exposure Level (Cal/OSHA, PEL-TWA) of given it's highest known concentration in soil. The compound with the highest soil concentration, and the lowest PEL is _____. Subsequently, it has the lowest Total Dust Equivalency Level of _____. This is the amount of total dust necessary in the breathing zone to create an inhalation exposure exceeding the PEL of _____. Since, the number is **above/below** the OSHA PEL for simple Nuisance Dust/Particulate (non-toxic) of 10 mg/m3, then the Action Level to upgrade to respiratory protection during site activities will be the more conservative limit, mg/m3. See item #10 for a detailed description of Action Levels, Activities, and corresponding PPE.

☐	**Volatile organics and uncontaminated dust**	VOC concentrations in the breathing zone will be monitored using a PID or FID, during intrusive activities, or any time activities or site conditions change. Monitoring will be performed when there is visual dust, using a Real Time Total Dust Meter, to detect if total dust levels are above the OSHA PEL for dust of 10 mg/m3.

☐	**Volatile organics and contaminated dust**	VOC concentrations in the breathing zone will be monitored using a PID or FID, during intrusive activities, or any time activities or site conditions change. To obtain current information about potential exposure conditions to contaminated airborne dust, Real Time Total Dust Meter(s) will be used to monitor the breathing zone or immediate work area. Calculations have been done to determine the total airborne dust level necessary to reach the Permissible Exposure Level (Cal/OSHA, PEL-TWA) of _____ given its highest known concentration in soil. The compound with the highest soil concentration, and the lowest PEL is __. Subsequently, it has the lowest Total Dust Equivalency Level of_____. This is the amount of total dust necessary in the breathing zone to create an inhalation exposure exceeding the PEL of _____. Since, the number is **above/below** the OSHA PEL for simple Nuisance Dust/Particulate (non-toxic) of 10 mg/m3, then the Action Level to upgrade to respiratory protection during site activities will be the more conservative limit, _____ mg/m3. See item #10 for a detailed description of Action Levels, Activities, and corresponding PPE.
☐	**Methane**	Methane will be monitored using an LEL/O2 meter (Combustible Gas Indicator such as a GasTech) during excavation or confined space activities, to protect against explosion hazards. Methane is an asphyxiant and is not considered to be an inhalation hazard.

10. Action Levels

☐	**Not Applicable (No air monitoring will be performed)**	

Note: If PID/FID readings in the breathing zone exceed 5 ppm consistently and Level C is required, contact the Project Manager before proceeding.

Volatile Organics		**PID/FID**	
	Activities/Locations	**Action Level**	**Level of Protection**
X	Trenching/Drilling/ sampling of soil and groundwater	0 to 5 ppm	Level D with steel toed boots, safety glasses, hard hat, and latex inner gloves and nitrile or neoprene outer gloves or nitrile index gloves. Regular or polycoated Tyvek is optional.
		5 to 50 ppm	Level C: Level D as above plus a half face respirator with organic vapor/dust combination cartridges, and chemical/safety goggles, and polycoated tyvek.
		50 to 250 ppm	Level C as above EXCEPT with a Full FACE respirator.
		> 250 ppm	Upgrade to Level B or Cease operations until vapors dissipate and readings are below 200 ppm.

Uncontaminated Dust		Total Dust Meter	
	Activities/Locations	**Action Level**	**Level of Protection**
☐	Drilling/sampling of soil and groundwater	0<10 mg/m3	Level D with steel toed boots, safety glasses, hard hat, and latex inner gloves and nitrile or neoprene outer gloves. Regular or polycoated Tyvek is optional.
		> 10 mg/m3	Level C: Level D as above plus a half face respirator with dust/mist cartridges, chemical goggles, and regular or polycoated tyvek. Or use dust suppression methods.

Contaminated Dust		Total Dust Meter	
	Activities/Locations	**Action Level**	**Level of Protection**
☐	Drilling/sampling of soil and groundwater	0<10 mg/m3 or _____ mg/m3 level calculated in Item #9	Level D with steel toed boots, safety glasses, hard hat, and latex inner gloves and nitrile or neoprene outer gloves. Regular or polycoated Tyvek is optional.
		>10 mg/m3 or _____ mg/m3 level calculated in Item #9	Level C: Level D as above plus a half face respirator with dust/mist cartridges, chemical goggles, and regular or polycoated tyvek. Or use dust suppression methods.

Other			
	Activities/Locations	**Action Level**	**Level of Protection**
☐	Drilling/sampling of soil and groundwater		

11. Decontamination

☐	**Not Applicable.**
X	**General:** A designated decontamination area will be setup within the Contamination Reduction Zone prior to the commencement of work. The designated area will accommodate both personnel and vehicles that have been in the Exclusion Zone and then pass through the Contamination Reduction Zone to enter the Support zone.
X	**Specific:** Set up decon as necessary before work begins. Decon in the following order (as appropriate): Wash/Rinse/Remove: Outer boots, outer gloves, tyvek, respirator, inner gloves. Wash and rinse hands and face.

12. Sample Handling and Investigation – Derived Waste Management

☐	Chemical contamination not suspected. If contamination is encountered, contact the project manager regarding special sample handling or waste management requirements.
X	Sample contamination known or suspected. Wear gloves when handling samples.
X	Place soil cuttings and equipment rinsate wastewater in labeled 55 gallon drums or other appropriate containers.

13. Emergency Contacts (names and telephone numbers)

Police:	911
Fire:	911
Ambulance:	911
Hospital: Alameda Hospital	510-522-3700
Facility Health and Safety Officer (if applicable):	
GAIA Health and Safety Director:	June Dougherty 510-774-6972

Written Directions to Nearest Hospital (attach route map)

See attached written directions and map.

14. **By my signature below, I hereby indicate that I have read and understand this HSP and I agree to follow the guidelines therein.**

Name (Print) Name (Signature) Date

TO THE SUBCONTRACTOR: ***This plan has been prepared solely for the use of GAIA Consulting, Inc .personnel. It is supplied to you for informational purposes only. You are responsible for your own health and safety program.***

15. **Checklist**

This HSP contains the following attachments.

X Site Map

X Hospital Route Map

X Data/Sample Results (see workplan)

16. Signatures

Note: For sites with known or suspected chemical contamination, the HSP must be reviewed and approved by the Health and Safety Director or her designee.

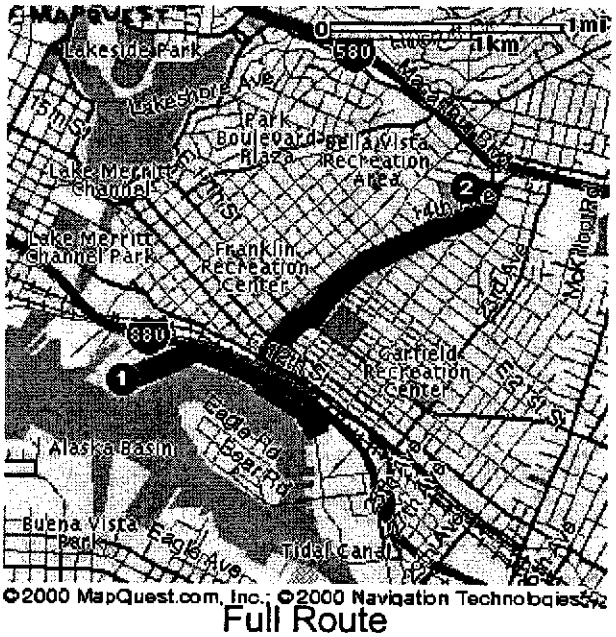
Jane Dougherty 7/24/02

GAIA Consulting, Inc. Health and Safety Director Date

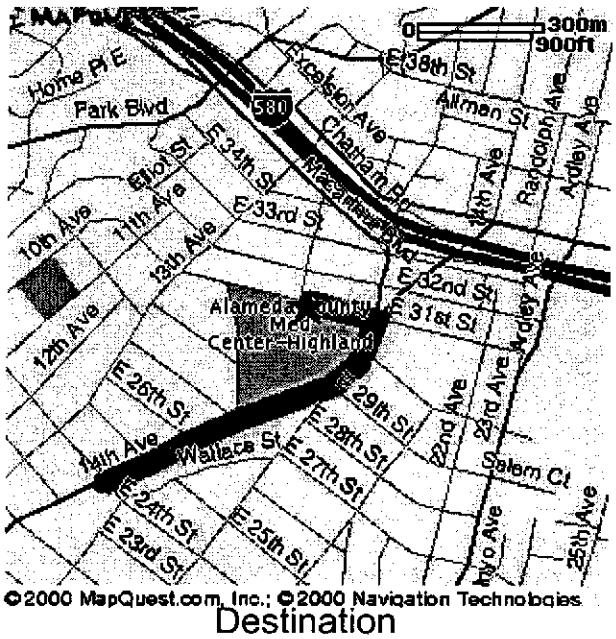
Yahoo! Maps - Driving Directions

Starting from: 101 10th Ave, Oakland, CA 94606-5135
Arriving at: ★ 1411 E 31st St, Oakland, CA 94602-1018
Distance: 2.7 miles **Approximate Travel Time:** 8 mins

- Email Directions
- Get Reverse Directions
- Text Only Driving Directions

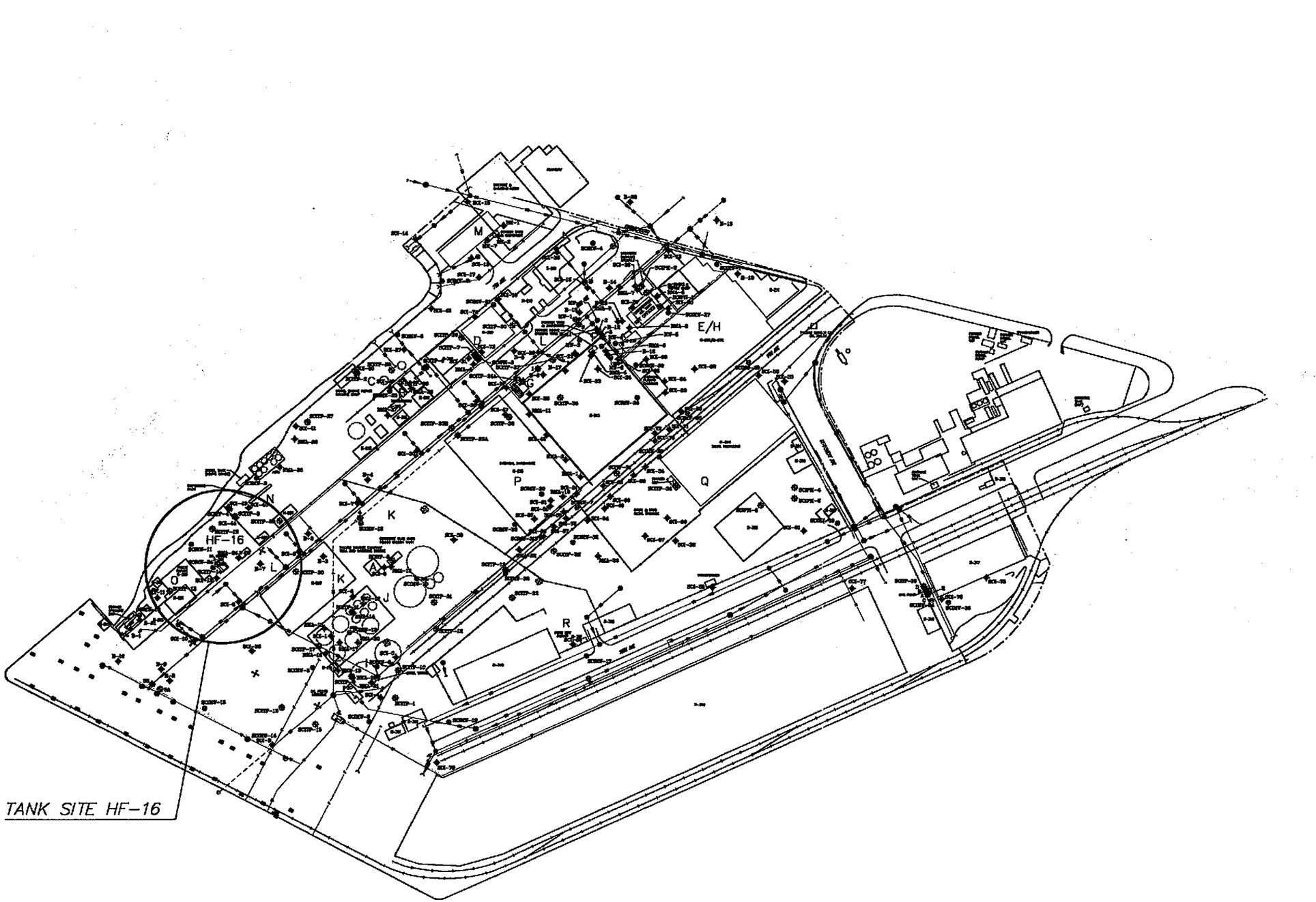


Full Route



Destination

	Directions	Miles
1.	Start out going Northeast on **10TH AVE** towards **DEFREMERY AVE.**	0.3
2.	Take the **I-880 SOUTH** ramp towards **SAN JOSE.**	0.1
3.	Merge onto **I-880 S.**	0.2
4.	Take the **EMBARCADERO** exit towards **16TH AVE.**	0.1
5.	Turn LEFT onto **EMBARCADERO E.**	0.2
6.	Turn LEFT onto **16TH AVE.**	0.3
7.	Turn LEFT onto **E 12TH ST.**	0.1
8.	Turn RIGHT onto **14TH AVE.**	0.3
9.	Turn SLIGHT LEFT onto **15TH AVE.**	0.1
10.	Turn SLIGHT RIGHT onto **14TH AVE.**	0.8
11.	Turn LEFT onto **E 31ST ST.**	0.1



LEGEND:

- SOIL BORING LOCATION
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- DEMOLISHED BUILDING
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- FENCE LINE
- RAILROAD
- BOUNDARY LINE
- OVERHEAD LIGHT STANDARD
- EXISTING ABOVE OR UNDERGROUND STORAGE TANK
- FORMER ABOVE OR UNDERGROUND STORAGE TANK

NINTH AVENUE TERMINAL
PORT OF OAKLAND
TANK HF-16
TANK LOCATION

GAIA consulting, inc

Project No.	Figure
168344	

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