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March 12, 1992

Mr. Barney M. Chan
Hazardous Material Specialist
Alameda County Health Care Services Agency
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

Reference: Phase II Site Investigation Work Plan, Pacific Dry Dock and Repair Yard I, Western Section; Versar Project No. 7703.26

Dear Mr. Chan:

Enclosed please find one copy of Versar's work plan entitled "Phase II Site Investigation Work Plan, Pacific Dry Dock and Repair Yard I, Western Section, Oakland, California" for your review. The work plan includes the target contaminant concentrations discussed in our telephone conversation of March 5, 1992. The scheduled startup date is March 30, 1992. I would appreciate a response to the work plan prior to startup.

If you have any questions or comments regarding this work plan, please do not hesitate to call me at (916) 962-1612.

Sincerely,

Lawrence Kleinecke
Geohydrologist/Chemist

cc: Mr. George Brooks, Crowley Maritime Corporation
Mr. Dan Schoenholz, Port of Oakland

5330 PRIMROSE DRIVE • SUITE 228 • FAIR OAKS, CALIFORNIA 95628
TELEPHONE: (916) 962-1612 • FAX: (916) 962-2678

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PHASE II SITE INVESTIGATION WORK PLAN
PACIFIC DRY DOCK AND REPAIR YARD I
WESTERN SECTION
OAKLAND, CALIFORNIA

Prepared for:

Crowley Maritime Corporation
2401 Fourth Avenue
P.O. Box 2287
Seattle, Washington 98111

Prepared by:

Versar Inc. - Sacramento
5330 Primrose Drive, Suite 228
Fair Oaks, California 95628-3520

Versar Project No. 7703.26.1

March 12, 1992

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FOREWORD

This site investigation work plan was prepared by Versar Inc. of Sacramento, California for Crowley Maritime Corporation. Mr. Lawrence Kleinecke, Geohydrologist/Chemist, prepared this work plan. Mr. R. Stephen Wilson, Senior Geologist, reviewed this work plan. This work will be performed under the supervision of Mr. R. Stephen Wilson, Senior Geologist, and Mr. James R. Frantes, R.G., Pacific Regional Manager.

Prepared By:

Lawrence Kleinecke
Geohydrologist/Chemist

Approved for Release:

R. Stephen Wilson
Program Manager

James R. Frantes, R.G. 4534
Pacific Regional Manager

REGISTERED GEOLOGIST
James R. Frantes
No. 4534
STATE OF CALIFORNIA

DISCLAIMER

The purpose of this site investigation work plan is only to inform the client of the environmental conditions as they currently exist at the subject site. Versar Inc. does not assume responsibility for the discovery and elimination of hazards that could possibly cause accidents, injuries, or damage. Compliance with submitted recommendations and/or suggestions in no way assures elimination of hazards or the fulfillment of a client's obligation under any local, state or federal laws or any modifications or changes thereto. In many cases, federal, state, or local codes require the prompt reporting to relevant authorities if a release occurs. It is the responsibility of the client to notify authorities of any conditions that are in violation of the current legal standards.

Factual information regarding operations, conditions and test data was obtained, in part, from the client and has been assumed by Versar to be correct and complete. Since the facts stated in this work plan are subject to professional interpretation, they could result in differing conclusions. In addition, the findings and conclusions contained in this work plan are based on various quantitative and qualitative factors as they existed on or near the date of the survey. Therefore, if the recommendations made in this work plan are not implemented within a reasonable period of time, there can be no assurances that intervening factors will not arise that will affect the conclusions reached herein.

Versar makes no warranty and assumes no liability with respect to the use of information contained in this work plan. No changes to its form or content may be made without Versar's express written approval.

This work plan reflects conditions, operations, and practices as observed on the date of the site visit. Changes or modifications to procedures and/or facilities made after the site visit are not included.

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Appendix A. Site Safety Plan

1.0 INTRODUCTION

Versar Inc. (Versar) has been retained by Crowley Maritime Corporation (Crowley) to perform an Immediate Source Removal and a Phase II Site Investigation of the Pacific Dry Dock and Repair Yard I Facility (hereinafter referred to as the Site) located at 1441 Embarcadero in Oakland, California. The Site is one of two facilities (Pacific Dry Dock and Repair Yards I and II, respectively) operated by Crowley in the Oakland area. Figures 1 and 2 show the site location and layout, respectively. This Immediate Source Removal and site investigation will be restricted to the western section of the Site. The investigation of the remainder of the Site has been addressed within a separate work plan (Versar, 1991).

1.1 Site History

Since 1935, the Site has been used as a boat repair and dry dock facility. Prior to 1953, the Site was the only developed area along the local shoreline. Since 1953, the land use in the surrounding areas has been primarily light industrial or commercial office space.

The Site is currently operating on a limited basis. However, the practice of repairing and refurbishing sea-going vessels has generated various regulated and non-regulated wastes. Activities at the Site also utilized many products which are regulated materials. These products and waste materials include: waste sand blasting materials, oil-based paints, solvents, acids, caustics, waste oils, hydrocarbon-contaminated water, and motor fuels.

During December 1989 and January 1990, Versar conducted an assessment of the Site (Versar, 1990). The findings of the assessment identified petroleum hydrocarbons, volatile and semi-volatile organic compounds, metals, and non-metals (arsenic, cyanide and sulfides) in the soil and sediments at the Site.

Also, a 400-gallon, unleaded gasoline underground storage tank (UST), which was not in use and not intended to be used in the future, was identified near the northwest corner of the Site. A regulatory review did not identify any ongoing or historical investigations or problems at the Site.

During September 1991, the 400-gallon unleaded gasoline UST was removed from the Site under the supervision of Versar (Versar, 1991). Soil and ground-water samples were collected following the UST removal and found to contain petroleum hydrocarbons, benzene, toluene, ethylbenzene, xylenes, and organic lead. It should be noted that the contamination was identified primarily in the ground-water sample. Table 1 summarizes the laboratory analytical results from the UST removal (Versar, 1992).

As contamination was identified during the UST removal, and concentrations of petroleum hydrocarbons were identified during the site assessment, Alameda County Health Care Services Agency (ACHCSA) requested a work plan sufficient to determine the extent of soil and ground-water contamination and provides for the remediation of any contamination (ACHCSA, 1991). Versar was subsequently retained to conduct an investigation of the soils at the Site. The investigation consisted of collecting soil samples from 45 locations using soil coring techniques. Ground-water samples were collected from ten locations which had temporary piezometers installed in soil borings. Significant concentrations of petroleum hydrocarbons were identified at various locations at the site. Section 3.0 contains a more complete assessment of the extent of the contamination. The laboratory analytical results from the soil and ground-water sampling are summarized in Tables 2 through 5. Figures 3 and 4 show the soil and ground-water sampling locations, respectively.

1.2 Immediate Source Removal and Investigation Objectives

As petroleum hydrocarbon contamination was identified in the soils beneath the Site, Versar proposes an immediate source removal action which will be conducted prior to installation of eight ground-water monitoring wells. The action is intended to be a source abatement, not a full scale remediation.

The objectives of the immediate source removal are to:

- Remove identified contaminated soils containing greater than 1 milligram per kilogram (mg/kg) total of benzene, toluene, ethylbenzene and xylenes (BTEX), 10 mg/kg of total petroleum hydrocarbons (TPH) as gasoline, 100 mg/kg of TPH as diesel, and 1,000 mg/kg of TPH as oil and grease to the extent possible.
- Determine and implement a treatment methodology appropriate for the removed soils.
- Replace the removed soils with clean material.

The objectives of the site investigation are to:

- Determine the extent and magnitude of free and dissolved product in the ground water beneath the Site.
- Accurately assess the occurrence and movement of ground water beneath the Site.
- Provide data sufficient for the development of a Preliminary Assessment Report (PAR).

1.3 Scope of Work

This work plan presents the background, rationale and methodology of the proposed Immediate Source Removal and Phase II Site Investigation. The Immediate Source Removal will be conducted first and will include:

- Excavating and removing between 1,500 and 3,000 cubic yards of petroleum hydrocarbon-contaminated soil.
- Separating the removed soils into non-contaminated and contaminated piles.

- Backfilling the excavations with clean fill material.
- Determining and implementing an appropriate methodology for treatment of the removed soils.

The site investigation will follow the immediate source removal and will include:

- Drilling eight boreholes to depths of between ten and 15 feet below ground surface (bgs).
- Installing ground-water monitoring wells in the boreholes.
- Collecting soil and ground-water samples for laboratory analysis.
- Analyzing soil and ground-water samples to accurately determine constituent concentrations.
- Preparing a comprehensive report presenting the results and conclusions of the immediate source removal and site investigation.

- Any offsite borings / wells?

2.0 SITE DESCRIPTION

This section presents a description of the Site with respect to its physical location, layout, geology and soils, and hydrology. Beneficial uses of the ground water beneath the site are also discussed.

2.1 Site Location

The Site is located at 1441 Embarcadero in Oakland, California, in the central portion of the north bank of Brooklyn Basin. Brooklyn Basin, an estuary of Oakland Inner Harbor, is bounded by Government Island to the south, and the city of Oakland to the north. Oakland Inner Harbor extends in an easterly direction from San Francisco Bay to San Leandro Bay. East and west of the Site are light industrial businesses and commercial offices. North of the Site are the Embarcadero, the Nimitz Freeway, Southern Pacific and Western Pacific Railways and a Bay Area Rapid Transit railway.

2.2 Site Layout

The western portion of the Site, which is paved with asphalt, occupies approximately 58,240 square feet and supports several structures. The buildings include an office building; two machine shops, one of which has an associated canopy-covered area; an unused storage building; and a cinderblock drum-storage shed. Other surface structures include an unused above-ground waste-oil storage tank located adjacent to the other machine shop, and four unused above-ground storage tanks located south of the storage building. The 400-gallon gasoline UST was formerly located immediately south of the drum storage shed. A large generator, which formerly adjoined one of the machine shops, was removed from the site in February 1992.

A sheet metal bulkhead abutts the southern edge of the Site, separating the Site from Brooklyn Basin. A chain-link fence separates the Site from the Embarcadero.

2.3 Site Geology and Soils

The Site is located in the Coast Ranges geomorphic province. The Site is situated between the Hayward Fault (on the east) and the San Andreas Fault (on the west) and is tectonically active. The underlying bedrock consists of Mesozoic volcanic and metavolcanic rocks found throughout the Coast Ranges. Overlying the bedrock are Quaternary marine and nonmarine alluvial sediments consisting of clays and silts.

The Site is nearly level at an elevation of between five and ten feet above lower low water (National Geodetic Vertical Datum of 1929). Data collected from sampling activities has indicated the soils beneath the Site consist of sand, silt, and clay, with wood and brick fragments. These soils appear to be fill material, and extend from the surface to bay muds, which begin between eight and 12 feet bgs. The bay muds consist of tan-grey silty clay with shell fragments and thin layers of sands or gravels.

Stratographic units identified beneath the Site include a layer of sand and gravel which extends from the asphalt surface to a typical depth of between two and four feet. The sand and gravel layer occurs over 90 percent of the Site. In the central portion of the Site, between boreholes BH7, BH9, and BH24, the sand and gravel layer extends to the bay muds. A metal bulkhead extends along the east and south boundaries of the Site. Gravels extend from the surface to the bay muds adjacent to the bulkhead.

A clay unit is found beneath the sand and gravel layer in the northern portion of the Site near the offices. The clay unit occurs between seven and nine feet bgs and extends between boreholes BH4, BH6, and south to BH7. The remainder of the Site

consists of minor discontinuous units of sands, gravels, silts, and clays which extend to the bay muds.

2.4 Site Hydrology

Ground water was identified during Versar's investigation (Versar, 1992) between four feet bgs in gravels found under the south side of the Site (near the edge of Brooklyn Basin), and eight feet bgs beneath the north side of the Site (near the Embarcadero) in minor sand or gravel layers. The depth to ground water varies greatly at the Site due to the extreme variation in the local soil composition. In general, the ground water is slightly elevated (one to two feet) along the south edge of the Site. The elevated water level may occur as a result of tidal influences, which is typical of bayside hydrology, or may be due to mounding of ground water against the shoring at the southern boundary of the site. The ground water appears to follow interconnected pockets of sand, gravels, and artificial subsurface conduits such as buried piping or utility lines. Both ground-water flow and depth are subject to tidal influences.

2.5 Beneficial Uses of Water

The ground water identified in the shallow soils beneath the Site occurs primarily as a result of seawater intrusion. Based on the proximity to the salt water estuary, the ground water is believed to be highly saline and unfit for consumption. There is therefore no apparent beneficial use for the shallow ground water beneath the Site.

3.0 PROPOSED IMMEDIATE SOURCE REMOVAL METHODS AND PROCEDURES

Preliminary analysis of subsurface soils and ground water indicates that the soils in three areas of the Site contain elevated concentrations of petroleum hydrocarbons (as gasoline, diesel, and hydrocarbon oil and grease) and BTEX contamination. These areas are: (1) the area immediately east of the above-ground storage tanks; (2) the area surrounding the UST excavation; and (3) two areas near the office building. Figures 5 through 7 graphically depict the identified areas of soil contamination. This section describes the proposed source removal methods, procedures and laboratory analysis to be performed under this work plan.

3.1 Immediate Source Removal Methods and Procedures

Soil excavation will be conducted by a licensed general contractor, under the direct supervision of Versar. Soils containing greater than 1 mg/kg BTEX, 10 mg/kg of TPH as gasoline, 100 mg/kg of TPH as diesel and 1,000 mg/kg of TPH as oil and grease will be removed from each of the previously mentioned locations and temporarily stored on plastic sheeting at the Site. The extent of soils to be removed will be determined based on visual observations, headspace analysis (as further explained in section 4.2), and laboratory analysis of samples collected from the bottom and sides of the excavations. Removed soils will be separated, if necessary, into "non-contaminated" (soils containing less than 1 mg/kg of TPH as gasoline, 10 mg/kg of TPH as diesel, or 50 mg/kg of TPH as oil and grease) and "contaminated" piles as determined by field and laboratory (confirmation) analyses. Constraints on the extent of soils which will be removed include: (1) the presence of shallow ground water beneath the Site; (2) the presence of above-ground structures at the Site; and (3) property boundaries. Figure 8

shows the estimated minimum and maximum extent of the excavations.

Excavation will begin near the center or edge of an area of known soil contamination and continue to a depth at which ground water is actively migrating into the excavation or at which petroleum hydrocarbon concentrations are below previously stated target concentrations as determined by laboratory analysis of removed soils. Confirmation samples will be collected from the bottom and sides of the excavation for laboratory analysis to determine if further excavation is necessary. If a significant amount of ground water exhibiting hydrocarbon sheen or free product is found entering the excavation, it will be removed using a vacuum truck or comparable means for disposal at a recycling facility.

The removed soils will be temporarily stored at the Site prior to treatment and disposal. The soils will be placed on plastic sheeting, bermed, and covered to control the release of runoff and organic vapor emission during storage. The excavations will then be backfilled with clean, self-compacting sand or other appropriate material. Following completion of excavation activities, the appropriate method of treatment and disposal will be determined based on the volume of soil and associated treatment costs.

Confirmation sampling will include the collection and analysis of one soil sample from each 20 linear feet of excavation sidewall, one sample from each 200 square feet of exposed base above the ground-water table (if any), one sample from each 50 cubic yards of removed soil (to be composited into a maximum of five samples), and one ground-water sample from each excavation in which ground water is present.

Soil samples will be collected by removing a portion of the wall or base material with as little disturbance as possible

using a backhoe, driving a previously decontaminated brass tube into the center of the material until the tube is filled completely with no headspace, and sealing the tube with Teflon™ tape and plastic caps. All soil samples will be stored at approximately 4°C in an ice chest prior to delivery to the laboratory for analysis.

Ground-water samples will be collected using a decontaminated bailer or polyethylene dipper lowered into the excavation. Samples will be placed in laboratory supplied decontaminated containers and stored at approximately 4°C prior to delivery to the laboratory for analysis. All soil and ground-water samples will be delivered to the laboratory following EPA protocols using Versar's chain of custody document.

3.2 Laboratory Analytical Methods

Confirmation soil samples will be analyzed by a State of California Environmental Protection Agency (Cal EPA)-certified analytical laboratory. The laboratory will analyze the soil samples for the following analytes:

- Oil and Grease by EPA Method 5520 C&F.
- Total petroleum hydrocarbons as diesel (TPH-D) by the California Department of Health Services (DHS) LUFT manual method.
- Total petroleum hydrocarbons as gasoline (TPH-G) by the DHS LUFT method.
- BTEX by a modified EPA Method 8020.

The excavated soils will be characterized for disposal by collecting, compositing, and analyzing samples from the spoils piles. The laboratory will analyze the soil samples for the following analytes:

- Volatile organic compounds by EPA Method 8240.
- California 17 metals using ICAP or AA.

- Reactivity, in water, acid, and basic media.
- Corrosivity by EPA Method 150.1.
- Ignitability by EPA Method 1010.
- CCR Title 22 Bioassay using Fathead Minnows by the DHS Method.

4.0 PROPOSED SITE INVESTIGATION METHODS AND PROCEDURES

Preliminary analysis of ground water indicates that three areas of the Site are impacted with petroleum hydrocarbons (as gasoline and diesel) and BTEX contamination. These areas are: (1) the area immediately east of the storage tanks; (2) the area surrounding the UST excavation; and (3) immediately south of the office building.

To more accurately determine the extent and magnitude of free and dissolved product in the ground water, Versar proposes to drill and install a total of eight ground-water monitoring wells at or near the impacted areas. Figure 9 shows the areas of identified ground-water contamination.

To determine the lateral extent of the ground-water contamination, monitoring wells will be installed near the edges of each plume. To determine the magnitude of the contamination, monitoring wells will be installed near the center of the plume (if appropriate). Figure 10 shows the proposed monitoring well locations.

Prior to initiation of investigation activities, permits will be obtained from the Alameda County Flood Control and Water Conservation District, the San Francisco Bay Conservation and Development Commission, the City of Oakland, and ACHCSA.

4.1 Soil Sampling and Analysis

The borehole drilling, soil sampling, and ground-water monitoring well installation will be performed by Woodward Drilling, a licensed C-57 driller under the direct supervision of Versar. The boreholes will be drilled using 8.0-inch outside diameter (O.D.) hollow-stem augers. Soil samples will be collected at a minimum of 5-foot intervals beginning at the soil surface, using California modified split-spoon samplers lined with decontaminated brass tubes. Each borehole will be drilled

to a minimum depth of ten feet or to the surface of the bay mud which is located up to 12 feet bgs. Soil cuttings will be stored in labeled drums pending the results of laboratory analysis, as further discussed in section 4.8 - Contaminated Materials Control.

As the drilling progresses, a description of the subsurface stratigraphy will be documented in borehole logs by a Versar geologist. The borehole logs will include a description of the soil type (using the Unified Soil Classification System), plasticity, moisture content, color, staining, and trace gas readings. Also included in the logs will be a description of the monitoring well construction.

Soil samples will be collected in brass tubes which line the split-spoon sampler. The site supervisor will ensure that the samplers and the brass tubes are decontaminated prior to collecting each sample. Each sample will be subjected to field analysis with a Foxboro 128 GC Organic Vapor Analyzer (OVA) using field headspace procedures. The middle brass sample tube will be reserved for possible laboratory analysis. The ends of the tube will be covered with Teflon™ film and fitted with plastic end caps. Soil samples will be selected for chemical analysis based on visual observations and field screening by on-site personnel. Samples selected for laboratory analysis will be labeled and sealed in individual plastic bags. The laboratory samples will be placed in an ice chest and stored at approximately 4°C.

Field soil headspace analysis will be used for screening of soil as a method of obtaining qualitative data. This data may be used only for relative comparison of samples collected from different locations at the site. The field headspace analysis will be performed with an OVA or equivalent instrument which yields a qualitative result in parts per million (ppm).

Field headspace analysis will be performed with an OVA, using the following procedures:

- The OVA will be operated in the regular mode according to the manufacturers instructions; results will be recorded in ppm.
- A background reading will be obtained from the ambient air in the area, and the results recorded.
- After placing the soil sample into a Ziploc™ bag, the bag will be sealed, allowing some ambient air to be included. The bag will then be agitated for thirty seconds, and allowed to warm in the sun to volatilize organic vapors in the soil.
- The Ziploc™ bag will be opened a minimum amount in order to allow the OVA probe to be inserted.
- The air within the Ziploc™ bag will be monitored with the OVA and the results recorded.
- The Ziploc™ bag will be resealed, stored undisturbed for 15 minutes, and a second reading obtained and recorded.

At least one sample from each borehole will be submitted to a Cal EPA-certified laboratory for analysis. The laboratory will analyze the soil samples for the following constituents:

- Oil and Grease by EPA Method 5520 C&F.
- Total petroleum hydrocarbons as diesel (TPH-D) by the DHS LUFT manual method.
- Total petroleum hydrocarbons as gasoline (TPH-G) by the DHS LUFT manual method.
- BTEX by a modified EPA Method 8020.

Not all of the samples will be analyzed for all the above constituents.

4.2 Monitoring Well Installation

Ground-water monitoring wells will be installed in each of the eight boreholes drilled at the Site. The monitoring wells will be constructed using approximately five feet of two-inch

inner diameter (ID) Schedule 40 PVC screen, and with two-inch ID Schedule 40 PVC casing to the surface. Both the screen and the casing will have threaded joints. Clean sand will be placed in the annular space between the screen and the boring wall to a height of two feet above the top of the screen. Both the sand pack and the screen slot size will be determined in the field following a sand sieve analysis of the aquifer material. Approximately one foot of bentonite pellets will be placed above the sand and hydrated. The well will be sealed by filling the annular space above the bentonite with Portland Type I/II cement to just below the ground surface.

A locking cap will be placed on top of the PVC casing and a waterproof traffic cover set in concrete over the well. The traffic cover will be set slightly above grade to prevent surface water from entering the well during sampling. Figure 11 shows the proposed construction of the ground-water monitoring wells. All of the augers, bits, and down-hole sampling equipment will be either decontaminated using a high-pressure steam cleaner or replaced between boreholes.

Following installation each well will be developed. Development will continue until the withdrawn ground water is as free of sand, silt, and turbidity as possible. Well development water will be labeled and contained pending receipt of laboratory analytical results as further discussed in section 4.8 - Contaminated Materials Control.

Each monitoring well will be surveyed to a point of known elevation and the elevations recorded in a field notebook. Elevation data will be used to determine ground-water flow directions and gradients.

4.3 Ground-Water Sampling and Analysis

Ground-water samples will be collected from each of the monitoring wells at the Site. Prior to sample collection, the wells will be purged as described in the following section, which summarizes the Versar protocol for purging a well prior to sampling:

- Check the ambient air surrounding the monitoring well using a field instrument capable of detecting organic hydrocarbons and record the reading in the field notebook.
- Check the air space inside the monitoring well with an PID and record the reading in the field notebook.
- Measure the water level in the monitoring well using a decontaminated electronic water level and product interface meter with an acoustical indicator. All measurements will be made to the nearest 0.01 foot and measured relative to a mark make on the well casing. Record the depth of water, and any free product thicknesses identified, in the field notebook.
- Lower a 1.25-inch O.D., dedicated, decontaminated, transparent bailer to the water surface in the monitoring well and carefully sample the uppermost interval of water. Retrieve the bailer and examine the surface of the water for floating product or visible sheen.
- Lower the decontaminated the electronic water level detector to the bottom of the monitoring well and note the total depth of the well. Record the depth measurement in the field notebook.
- Insert the dedicated bailer into the monitoring well and begin to purge the well. A calibrated receptacle must be positioned near the well to receive all of the fluid purged. The water will be withdrawn from the top of the water column. Do not allow the purge rate to reach a point where the recharge water is entering the borehole in an agitated state. A minimum of three casing volumes will be purged from the well (or to dryness, as applicable).
- A grab sample of the purged fluid will be taken at the commencement of evacuation and after each well volume. The conductivity, temperature and pH of the grab sample

will be measured and recorded in the field notebook. Purging will continue past the minimum three well-volumes until the measured conductivity temperature and pH stabilize in the grab samples.

- Measure the purged volume in the designated receptacle. After the minimum specified volume has been withdrawn and the water conductivity, temperature and pH have stabilized (or the well has been pumped dry), stop bailing, note the time, remove the bailer, and measure the depth to water relative to a mark on the well casing. Make the appropriate entries on the field notebook.

Ground-water samples will be collected using the procedures given below:

- Measure the water level in the monitoring well using a decontaminated water level and interface meter. All measurements must be made to the nearest 0.01 foot, and measured relative to a mark on the well casing. Record the depth of the water, and any free product thicknesses identified, in the field notebook. A water sample may be collected after the ground-water level recovers to greater than 80 percent of the original level.

- Inspect the dedicated, 1.25-inch O.D. bailer to ensure that the bottom check valve assembly is working correctly.

- Insert the bailer into the monitoring well and carefully lower the bailer. Take extreme care to avoid agitating and aerating the fluid column in the well.

- Slowly withdraw the bailer and transfer the water sample to the appropriate laboratory-cleaned containers.

- Temperature, specific conductance, pH, turbidity, and organic vapor concentration must be measured on aliquots of water prior to recovery of the primary samples. Water used for field measurements is not to be used to fill sample containers designated for laboratory analysis.

A ground-water sample from each monitoring well will be analyzed by a Cal EPA-certified analytical laboratory. The laboratory will analyze the ground-water samples for the following analytes:

- Total petroleum hydrocarbons as diesel (TPH-D) by the DHS LUFT manual method.
- Total petroleum hydrocarbons as gasoline (TPH-G) by the DHS LUFT method.
- BTEX by a modified EPA Method 8020.

Additionally, one sample will be analyzed for:

- Oil and Grease by EPA Method 5520 C&F.
- Total Dissolved Solids by EPA Method 160.1.
- Salinity.

4.4 Decontamination Procedures

The decontamination procedures for drilling and field sampling equipment are presented below. Nondedicated and nondisposable sampling and well purging equipment will be carefully cleaned prior to each use, as follows:

- Carefully brush off any loose, foreign debris with a soft bristle brush.
- Rinse the equipment thoroughly in clean water.
- Wash the equipment in a nonphosphate detergent or Alconox™ bath.
- Rinse thoroughly in clean water.
- Rinse thoroughly with deionized water.
- Air dry in a dust-free environment.
- Store in clean, disposable plastic bags or other suitable clean cover until use.

Clean, disposable gloves will be worn by all field personnel when handling decontaminated equipment.

4.5 Field Quality Control

Sampling methods detailed in this work plan will be strictly adhered to; deviations or additions to this plan will be

carefully documented in the field notebook. All field observations, field-generated forms, and labels will be noted and attached to the field notebook. Any photographs will be logged in the field notebook and labeled when returned from the photographic developing laboratory.

4.6 Sample Handling

All samples will be collected, placed in containers, preserved, and analyzed within the time constraints consistent with applicable US EPA, and California Regional Water Quality Control Board (CRWQCB)-San Francisco Region procedures. All sample containers will be precleaned in accordance with prescribed EPA methods.

All samples will be tracked using Versar's standard chain-of-custody document. The chain-of-custody record will include the following information:

- Sample number
- Signature of collector
- Date and time of collection
- Sample type
- Signature of persons involved in the chain of possession
- Inclusive dates of possession
- Analytical parameters
- Pertinent field observations

The custody record will be completed using waterproof ink. Any corrections will be made by drawing a line through and initialing the error, then entering the correct information.

Custody of the samples begins at the time of sample collection and will be maintained until samples are relinquished for shipment to the laboratory, or until samples are hand delivered to the designated laboratory sample custodian.

Each sample shipment will be accompanied by a chain-of-custody record identifying its contents. The original record will accompany the shipment and the copy will be retained by the

sampling team leader. The original (the top copy) will be enclosed in a plastic Ziploc™ bag and secured to the inside of the cooler lid with tape.

4.7 Site Safety Procedures

A designated site safety officer will be appointed for the investigation. The site safety officer will be responsible for the adherence to a site safety plan and will be present during all of the drilling and sampling operations. Site personnel will wear gloves when handling the contaminated drill cuttings and samples. In addition, the drill cuttings and samples will be monitored with an analytical field instrument. If the site safety officer determines that harmful levels of organic vapors are present, all site personnel with don Tyvek™ coveralls and respirators with the appropriate cartridges. This equipment will be worn until the site safety officer determines that no harmful vapors are present. A copy of the site safety plan is included as Appendix A.

4.8 Contaminated Materials Control

Drill cuttings and purge water recovered during this investigation will be stored in sealed, Department Of Transportation-approved 55-gallon drums, or similar containers, in a secure area on site. The contents of the drums and the dates of collection will be clearly marked on appropriate labels. All equipment, decontamination material, and disposable personal protective gear will also be placed in appropriate containers. When the hazardous characteristics of these materials have been determined, they will be disposed of using proper procedures.

5.0 ADDITIONAL STUDIES

When the data obtained from the work described in this plan has been analyzed, additional activities may be required at the Site. The additional work may include the installation of additional ground-water monitoring wells to further define the extent of potential contamination, aquifer or geotechnical testing to further define the subsurface environment, or the implementation of a remedial action plan.

6.0 WORK SCHEDULE

The work will be initiated following the finalization and approval of this work plan. The mobilization will begin immediately thereafter upon scheduling of Woodward Drilling and clearance of the borehole locations by utility locators. Borehole drilling, monitoring well installation, and sample collection is expected to take three to four days. Sample results will be available 30 working days after the laboratory receives the samples.

7.0 REPORT PREPARATION

The report will be presented in a format consistent with the lead agency's request and will include a presentation of the results of the Site investigation and all previous investigations. The report will also include Versar's conclusions derived from the investigation.

8.0 REFERENCES

California Regional Water Quality Control Board-San Francisco Bay, List of Sites-Toxic Substances and List of Sites-Fuel Leaks.

California Regional Water Quality Control Board-Tri Regional Staff Board Recommendations for Investigation of Leaking Underground Tanks, August 1990.

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U.S. Geological Survey Topographical Map, 7.5 Minute Series, Oakland East Quadrangle, 1959 (Photorevised, 1980).

U.S. Geological Survey Topographical Map, 7.5 Minute Series, Oakland West Quadrangle, 1959 (Photorevised, 1980).

Versar Inc., Site Assessment of Pacific Dry Dock Yards 1 and 2, Oakland, California; Versar Job No. 6695.9, October 2, 1990.

Versar Inc., Summary of Tank Removal Activities, Pacific Dry Dock Yard I, 1441 Embarcadero, Oakland, California; Versar Project No. 7703.26, January 14, 1992.

Versar Inc., Site Investigation Work Plan for Pacific Dry Dock and Repair Yard I Eastern Section, Oakland, California; Versar Project No. 7703.27.1, June 10, 1991.

Alameda County Health Care Services Agency, Request for Work Plan for the Unauthorized Petroleum Fuel Release at 1441 Embarcadero, Oakland, California 94606, October 29, 1991.

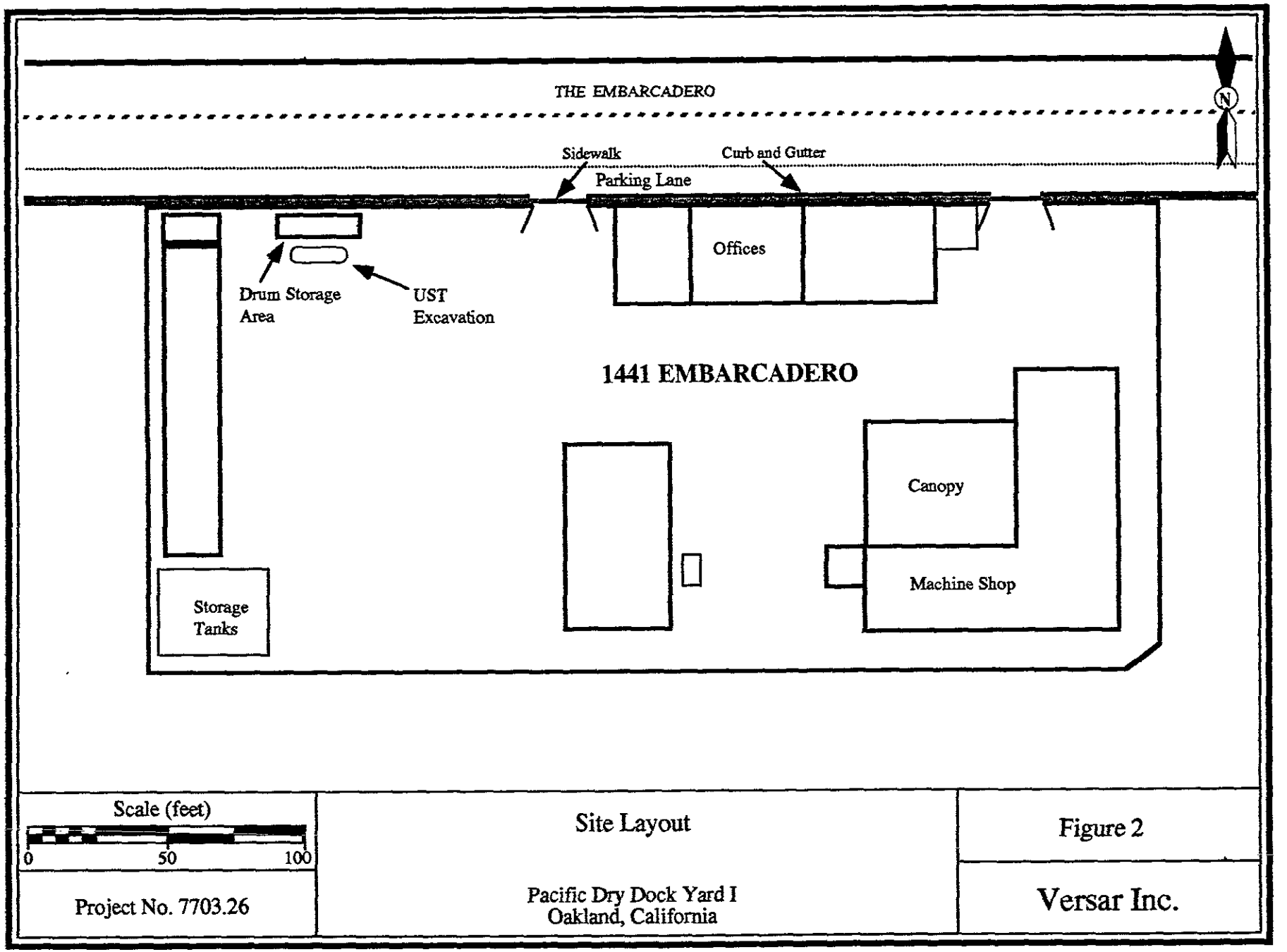
9.0 APPENDIX

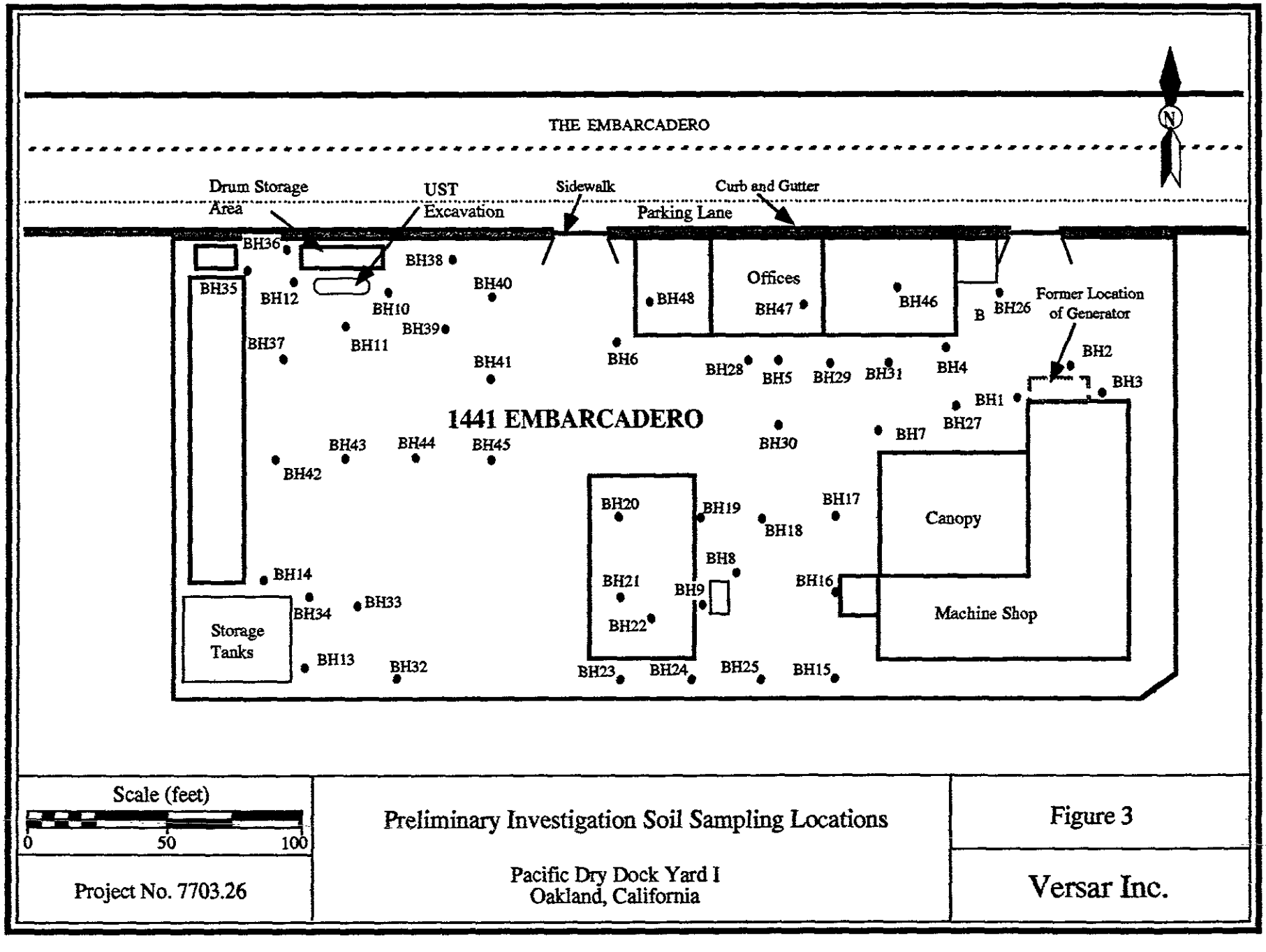
Appendix A comprises the Appendix of this work plan. The content of Appendix A is listed below.

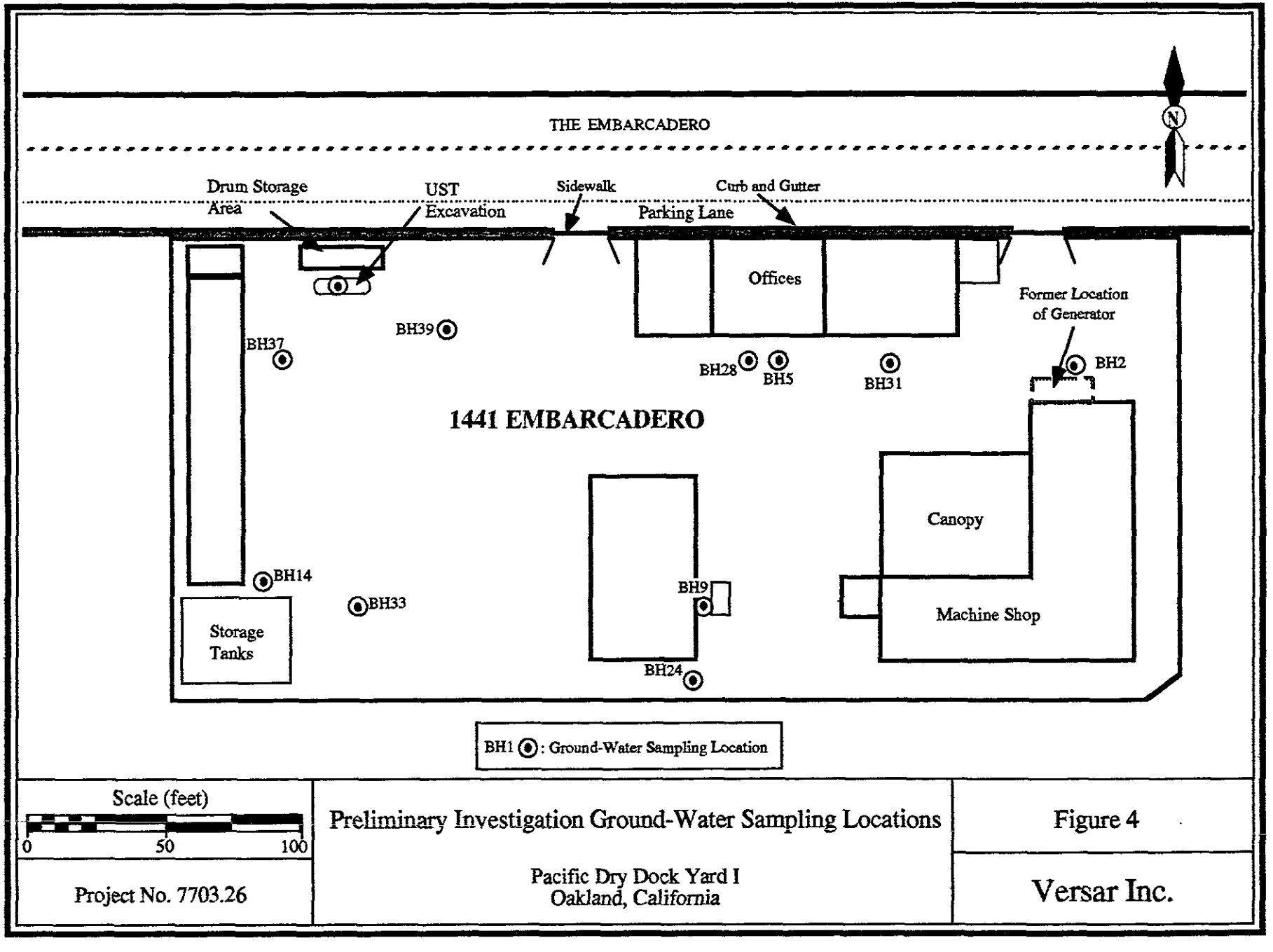
Appendix A. Site Safety Plan

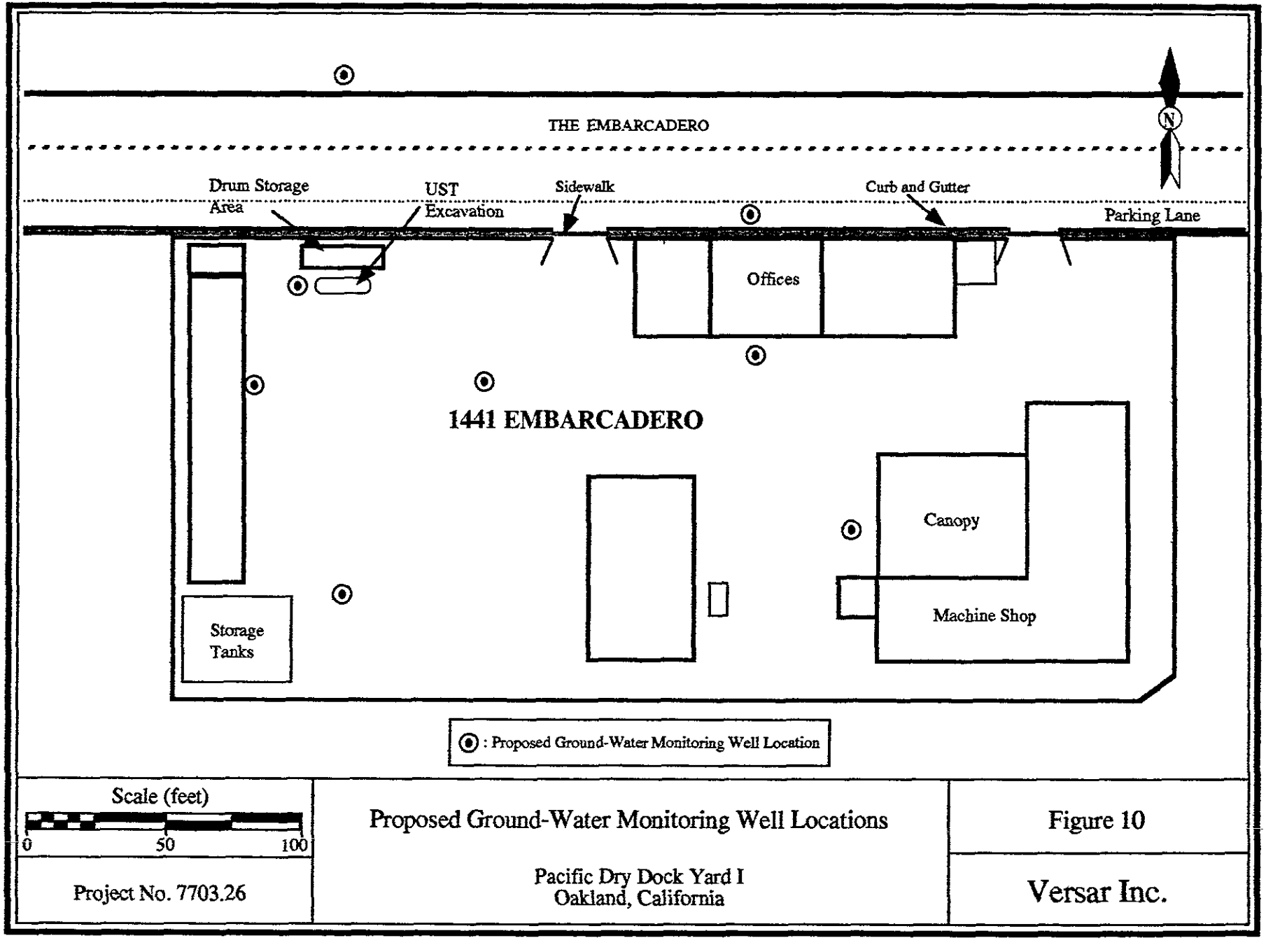
SOURCE: USGS TOPO 1959

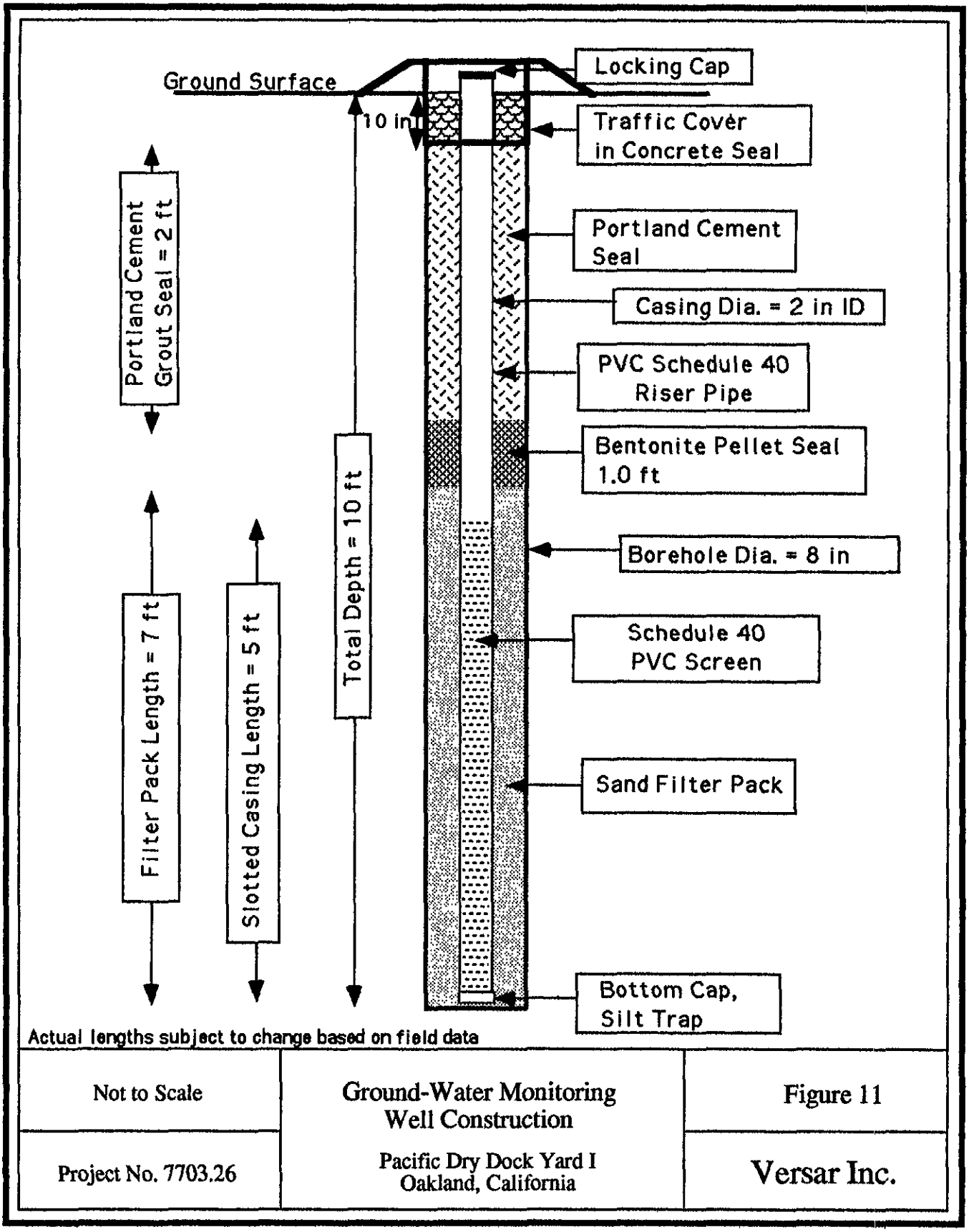
Scale (miles) 0 0.25 0.50	Site Location	Figure 1
Project No. 7703.26	Pacific Dry Dock Yard I Oakland, California	Versar Inc.


THE EMBARCADERO
N
Sidewalk
Curb and Gutter
Parking Lane
Offices
Drum Storage Area
UST Excavation
1441 EMBARCADERO
Canopy
Machine Shop
Storage Tanks
Scale (feet)
0
50
100
Site Layout
Figure 2
Project No. 7703.26
Pacific Dry Dock Yard I
Oakland, California
Versar Inc.


THE EMBARCADERO
N
Drum Storage Area
UST Excavation
Sidewalk
Curb and Gutter
Parking Lane
BH36
BH38
BH35
BH12
BH40
BH10
BH39
BH37
BH11
BH41
BH6
BH48
Offices
BH47
BH46
B
BH26
Former Location of Generator
BH2
BH3
BH28
BH5
BH29
BH31
BH4
BH1
BH27
1441 EMBARCADERO
BH30
BH7
BH43
BH44
BH45
BH42
BH20
BH19
BH18
BH17
Canopy
BH8
BH14
BH21
BH9
BH16
BH34
BH33
BH22
Machine Shop
Storage Tanks
BH13
BH32
BH23
BH24
BH25
BH15
Scale (feet)
0
50
100
Preliminary Investigation Soil Sampling Locations
Figure 3
Project No. 7703.26
Pacific Dry Dock Yard I
Oakland, California
Versar Inc.


THE EMBARCADERO
N
Drum Storage Area
UST Excavation
Sidewalk
Curb and Gutter
Parking Lane
Offices
Former Location of Generator
BH39
BH37
BH28
BH5
BH31
BH2
1441 EMBARCADERO
Canopy
BH14
BH33
BH9
Machine Shop
Storage Tanks
BH24
BH1 : Ground-Water Sampling Location
Scale (feet)
0
50
100
Preliminary Investigation Ground-Water Sampling Locations
Figure 4
Project No. 7703.26
Pacific Dry Dock Yard I
Oakland, California
Versar Inc.


THE EMBARCADERO
N
Drum Storage Area
UST Excavation
Sidewalk
Curb and Gutter
Parking Lane
Offices
1441 EMBARCADERO
Canopy
Machine Shop
Storage Tanks
: Proposed Ground-Water Monitoring Well Location
Scale (feet)
0
50
100
Proposed Ground-Water Monitoring Well Locations
Pacific Dry Dock Yard I
Oakland, California
Figure 10
Project No. 7703.26
Versar Inc.



Not to Scale	Ground-Water Monitoring Well Construction	Figure 11
Project No. 7703.26	Pacific Dry Dock Yard I Oakland, California	Versar Inc.

Table 1

Laboratory Analytical Results from UST Removal[1]

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample No.	Date of Sampling	Medium	TPH-G[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Xylenes[3]	Organic Lead[4]
7703.26-N1	9/24/91	Soil	11	1.1	0.11	0.460	0.85	<0.5
7703.26-S1	9/24/91	Soil	130	2.0	1.4	3.8	3.8	0.95
7703.26-Pile1	9/24/91	Soil	13	0.62	0.11	1.1	6.2	4.4
7703.26-Water	9/24/91	Water	34,000	<9.4	170	480	1,900	0.39

[1]All results reported in milligrams per kilogram for soils, and milligrams per liter for water

[2]Total Petroleum Hydrocarbons as Gasoline by DHS Method; detection limit dependant on sample

[3]Analytical method - EPA Method 8020/602; detection limit dependant on sample

[4]Analytical method - DHS Method; detection limit 0.5 milligrams per kilogram for soils and 0.1 milligrams per liter for water.

Table 2

(Page 1 of 4)

Laboratory Analytical Results for Soils
(Organics)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Depth (feet)	Sample Collection Date	Total Petroleum Hydrocarbons DHS Method, LUFT Field Manual		O&G Hydrocarbons EPA Method 5520EF	Volatile Organics EPA Method 8020			
			Gasoline[1] (mg/kg)	Diesel[2] (mg/kg)	Oil and Grease[3] (mg/kg)	Benzene[4] (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
BH1-3.5	3.0-3.5	10/25/91	NA[5]	NA	ND[6]	NA	NA	NA	NA
BH2-4	3.5-4.0	10/25/91	NA	ND	ND	NA	NA	NA	NA
BH2-8	7.5-8.0	10/25/91	ND	ND	ND	ND	ND	ND	ND
BH3-2	1.5-2.0	10/25/91	NA	NA	120	NA	NA	NA	NA
BH3-8	7.0-7.5	10/25/91	NA	23	NA	NA	NA	NA	NA
BH4-6	5.5-6.0	10/25/91	4.9	560	200	ND	ND	0.0087	0.065
BH5-4	3.5-4.0	10/25/91	ND	57	ND	ND	ND	ND	ND
BH6-6	5.5-6.0	10/25/91	NA	NA	ND	NA	NA	NA	NA
BH7-4	3.5-4.0	10/25/91	NA	NA	80	NA	NA	NA	NA
BH7-6	5.5-6.0	10/25/91	NA	NA	850	NA	NA	NA	NA
BH7-8	7.5-8.0	10/25/91	ND	ND	ND	ND	ND	ND	ND

[1] Reporting limit for gasoline is 0.5 mg/kg.

[2] Reporting limit for diesel is 1.00 mg/kg.

[3] Reporting limit for oil and grease is 50 mg/kg.

[4] Reporting limits for volatile organics are, unless otherwise noted,: benzene, 0.005 mg/kg; toluene 0.005 mg/kg; ethylbenzene 0.005 mg/kg; xylenes 0.015 mg/kg.

[5] Not Analyzed.

[6] Not detected at or above the reporting limit.

Table 2

(Page 2 of 4)

Laboratory Analytical Results for Soils
(Organics)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Depth (feet)	Sample Collection Date	Total Petroleum Hydrocarbons DHS Method, LUFT Field Manual		O&G Hydrocarbons EPA Method 5520EF	Volatile Organics EPA Method 8020			
			Gasoline[1] (mg/kg)	Diesel[2] (mg/kg)	Oil and Grease[3] (mg/kg)	Benzene[4] (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
BH8-6	5.5-6.0	10/25/91	ND	ND	ND	ND	ND	ND	ND
BH9-4	3.5-4.0	10/25/91	ND	ND	370	0.0059	0.027	ND	0.035
BH10-4	3.5-4.0	10/25/91	65	9.8	90	0.022	0.047	0.52	2.3
BH10-8	7.5-8.0	10/25/91	NA	NA	120	NA	NA	NA	NA
BH11-10	9.5-10.0	10/25/91	ND	ND	ND	ND	ND	ND	ND
BH12-4	3.5-4.0	10/25/91	970	1,800	2,500	1.3	1.8	<0.20	55
BH13-9	8.5-9.0	10/25/91	52	2,100	1,800	<0.037	<0.030	<0.033	13
BH14-4	3.5-4.0	10/25/91	NA	ND	ND	NA	NA	NA	NA
BH17-1.0	0.5-1.0	1/6/92	32	1,200	NA	<0.076	<0.080	<0.084	<0.020
BH19-2.5	2.0-2.5	1/6/92	ND	ND	NA	0.0059	0.014	0.031	0.092

[1] Reporting limit for gasoline is 0.50 mg/kg.

[2] Reporting limit for diesel is 1.0 mg/kg.

[3] Reporting limit for oil and grease is 50 mg/kg.

[4] Reporting limits for volatile organics are, unless otherwise noted,: benzene, 0.005 mg/kg; toluene 0.005 mg/kg; ethylbenzene 0.005 mg/kg; xylenes 0.015 mg/kg.

[5] Not Analyzed.

[6] Not detected at or above the reporting limit.

Table 2

(Page 3 of 4)

Laboratory Analytical Results for Soils
(Organics)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Depth (feet)	Sample Collection Date	Total Petroleum Hydrocarbons DHS Method, LUFT Field Manual		O&G Hydrocarbons EPA Method 5520EF	Volatile Organics EPA Method 8020			
			Gasoline[1] (mg/kg)	Diesel[2] (mg/kg)	Oil and Grease[3] (mg/kg)	Benzene[4] (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
BH22-12.0	11.5-12.0	1/6/92	NA	NA	63	NA	NA	NA	NA
BH24-12.0	11.5-12.0	1/6/92	NA	NA	ND	NA	NA	NA	NA
BH25-4.0	3.5-4.0	1/6/92	NA	NA	58	NA	NA	NA	NA
BH26-6.0	5.5-6.0	1/6/92	ND	3.1	80	ND	0.011	<0.005	0.021
BH27-3.0	2.5-3.0	1/6/92	ND	5.9	NA	ND	0.017	0.0094	0.055
BH28-9.0	8.5-9.0	1/7/92	1.8	120	NA	ND	ND	<0.005	0.030
BH29-6.0	5.5-6.0	1/7/92	ND	ND	NA	ND	ND	0.020	0.021
BH30-4.0	3.5-4.0	1/7/92	22	2,100	NA	<0.006	ND	<0.0079	0.550
BH31-1.5	1.0-1.5	1/7/92	14	2,800	NA	<0.076	<0.080	0.089	<0.28
BH33-2.0	1.5-2.0	1/7/92	ND	340	NA	ND	0.0083	0.020	0.037
BH34-2.0	1.5-2.0	1/7/92	6.3	9.4	NA	0.017	0.011	ND	0.260

[1] Reporting limit for gasoline is 0.5 mg/kg.

[2] Reporting limit for diesel is 1.0 mg/kg.

[3] Reporting limit for oil and grease is 50 mg/kg.

[4] Reporting limits for volatile organics are, unless otherwise noted,: benzene, 0.005 mg/kg; toluene 0.005 mg/kg; ethylbenzene 0.005 mg/kg; xylenes 0.015 mg/kg.

[5] Not Analyzed.

[6] Not detected at or above the reporting limit.

Table 2

(Page 4 of 4)

Laboratory Analytical Results for Soils
(Organics)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Depth (feet)	Sample Collection Date	Total Petroleum Hydrocarbons DHS Method, LUFT Field Manual		O&G Hydrocarbons EPA Method 5520EF	Volatile Organics EPA Method 8020			
			Gasoline[1] (mg/kg)	Diesel[2] (mg/kg)	Oil and Grease[3] (mg/kg)	Benzene[4] (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
BH34-10.0	9.5-10.0	1/7/92	2.5	73	NA	0.016	0.016	0.051	0.140
BH35-6.0	5.5-6.0	1/7/92	1.7	450	NA	0.0065	0.017	0.027	0.087
BH37-4.0	3.5-4.0	1/7/92	ND	ND	NA	ND	ND	ND	ND
BH38-4.0	3.5-4.0	1/7/92	0.780	ND	NA	ND	0.0056	ND	0.110
BH39-6.0	5.5-6.0	1/8/92	ND	ND	NA	ND	0.013	0.022	0.040
BH46-3.0	2.5-3.0	1/8/92	ND	ND	NA	ND	ND	ND	ND
BH46-9.0	8.5-9.0	1/8/92	NA	NA	ND	NA	NA	NA	NA
BH47-8.5	8.0-8.5	1/8/92	9.2	1,400	ND	ND	0.011	ND	0.260
BH48-3.0	2.5-3.0	1/8/92	47	75	230	<0.076	<0.080	<0.084	1

[1] Reporting limit for gasoline is 0.5 mg/kg.

[2] Reporting limit for diesel is 1 mg/kg.

[3] Reporting limit for oil and grease is 50 mg/kg.

[4] Reporting limits for volatile organics are, unless otherwise noted,: benzene, 0.005 mg/kg; toluene 0.005 mg/kg; ethylbenzene 0.005 mg/kg; xylenes 0.015 µg/kg.

[5] Not Analyzed.

[6] Not detected at or above the reporting limit.

Table 3

Laboratory Analytical Results for Soils
(Metals)

Pacific Dry Dock and Repair Yard 1
Oakland, California

Sample Number	Sample Collection Date	Sample Depth (feet)	EPA Method 7130 Cadmium[1] (mg/kg)	EPA Method 7190 Chromium[2] (mg/kg)	EPA Method 7420 Lead[3] (mg/kg)	EPA Method 7520 Nickel[4] (mg/kg)	EPA Method 7950 Zinc[5] (mg/kg)
BH9-4	10/25/91	3.5-4.0	0.38	15	14	24	140
BH11-10	10/25/91	9.5-10.0	ND[6]	39	5.8	56	36
BH13-9	10/25/91	8.5-9.0	ND	36	8.6	42	250
TTLC[7]			100	2,500	1,000	2,000	5,000

[1] Reporting limit for cadmium is 0.250 mg/kg.

[2] Reporting limit for chromium is 1.2 mg/kg.

[3] Reporting limit for lead is 2.5 mg/kg.

[4] Reporting limit for nickel is 7.5 mg/kg.

[5] Reporting limit for zinc is 1.2 mg/kg.

[6] Not detected at or above the reporting limit.

[7] Total threshold limit concentration values.

Table 4

Laboratory Analytical Results for Water
(Organics)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Collection Date	Total Petroleum Hydrocarbons DHS Method, LUFT Field Manual			O&G Hydrocarbons EPA Method 5520DF	Volatile Organics EPA Method 8020			
		Gasoline[1] (mg/L)	Diesel[2] (mg/L)	Motor Oil[3] (mg/L)	Oil and Grease[4] (mg/L)	Benzene[5] (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)
BH2	10/25/91	ND[6]	ND	NA	NA[7]	ND	0.00051	ND	ND
BH5	10/25/91	0.25	0.45	NA	18	0.007	ND	0.0014	0.011
BH9	10/25/91	ND	ND	NA	7.3	ND	0.00056	ND	ND
BH14	10/25/91	ND	0.26	NA	NA	ND	ND	ND	ND
PIT #2	11/1/91	NA	3	NA	11	NA	NA	NA	NA
BH24	1/8/92	ND	ND	ND	NA	NA	ND	ND	ND
BH28	1/8/92	0.58	NA	NA	NA	0.0006	0.021	0.00074	0.0037
BH31	1/8/92	ND	ND	ND	NA	ND	0.00077	ND	ND
BH33	1/8/92	ND	ND	ND	NA	ND	ND	ND	ND
BH37	1/8/92	ND	ND	NA	NA	ND	0.0011	ND	ND
BH39	1/8/92	ND	ND	NA	NA	0.0014	0.0041	ND	ND

[1] Reporting limit for gasoline is 0.05 mg/L.

[2] Reporting limit for diesel is 0.05 mg/L.

[3] Reporting limit for motor oil is 0.5 mg/L.

[4] Reporting limit for oil and grease is 1 mg/L.

[5] Reporting limits for volatile organics are: benzene, 0.0005 mg/L; toluene 0.0005 mg/L; ethylbenzene 0.0005 mg/L; xylenes 0.0015 mg/L.

[6] Not detected at or above the reporting limit.

[7] Not Analyzed.

Table 5

Laboratory Analytical Results for Water
(Metals)

Pacific Dry Dock and Repair Yard I
Oakland, California

Sample Number	Sample Collection Date	EPA Method 7130 Cadmium[1] (mg/L)	EPA Method 7190 Chromium[2] (mg/L)	EPA Method 7420 Lead[3] (mg/L)	EPA Method 7520 Nickel[4] (mg/L)	EPA Method 7950 Zinc[5] (mg/L)
BH5	10/25/91	ND[6]	0.56	1.1	1.2	2.8
BH9	10/25/91	ND	ND	0.16	ND	0.08
PIT #2	11/1/91	ND	ND	0.13	ND	0.28
US EPA MCL[7]		0.005	0.10	0.050	0.10[8]	5.0[9]
Calif MCL[10]		0.010	0.050	0.050	NA	NA

[1] Reporting limit for cadmium is 0.010 mg/L.

[2] Reporting limit for chromium is 0.050 mg/L.

[3] Reporting limit for lead is 0.10 mg/L.

[4] Reporting limit for nickel is 0.30 mg/L.

[5] Reporting limit for zinc is 0.050 mg/L.

[6] Not detected at or above the reporting limit.

[7] US EPA Maximum Contaminant Level for drinking water.

[8] Proposed MCL

[9] Secondary MCL

[10] California Maximum Contamiant Level for drinking water.

Versar INC. SACRAMENTO

APPENDIX A

Site Safety Plan

Versar INC. SACRAMENTO

SITE SAFETY PLAN

FOR THE

PACIFIC DRY DOCK AND REPAIR
1441 EMBARCADERO
OAKLAND, CALIFORNIA

Prepared for:

Crowley Maritime Corporation

Prepared by:

Versar Inc. - Sacramento
5330 Primrose Drive, Suite 228
Fair Oaks, California

Versar Job No. 7703.26.1

Versar INC. SACRAMENTO

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1.0 INTRODUCTION

1.1 Background

The Crowley Maritime Corporation has retained Versar to perform a site investigation at the Pacific Dry Dock and Repair located at 1441 Embarcadero in Oakland, California.

1.2 Site Characterization

Client Name: Crowley Maritime Corporation

Location of Site: 1441 Embarcadero, Oakland, California

Client Contact Person(s):

Name: Mr. George Brooks

Topography of the area surrounding the site:

Hilly ____ Flat __X_ Hummocky ____ Marshy ____
Mountainous ____ Other ____

Area affected:

Urban ____ Rural ____ Residential ____
Industrial__X__ Commercial __X_ Other ____

Types of bodies of water bordering the site, if any:

Stream ____ River ____ Pond ____ Lake ____ Bay __X_
Ocean ____ Other ____ None ____

Are the services being provided as a consequence of orders from local, state, or federal officials?

Yes __X_ No ____

1.3 Purpose

The primary purpose of this site safety plan is to present information in regards to site safety for Versar, Inc., field personnel and contractors involved in the investigation at the site. This plan provides all personnel with an understanding of the potential chemical and physical hazards that may exist while

the investigation of the site is being performed. Secondary, the information contained herein will define the safety precautions necessary to respond to such hazards should they occur.

1.4 Objective

The primary objective is to ensure the well being of all personnel involved in the investigation, and the community surrounding the site. All personnel assigned to this project shall be familiar with the subsurface concerns and this and other site safety plans. In the situation that contaminant material is encountered, all personnel directly related shall be required to sign the Agreement Statement in Section 8.1 to certify that they have read, understood, and agreed to abide by its provisions.

1.5 Hazard Determination

Serious ____ Moderate ____ Low __X_ Unknown ____

1.6 Level of Protection

__X_ Modified level D

The minimum acceptable level of protection at this site is a Modified Level D, as described in the 5.0 Section entitled "Health and Safety Requirements."

1.7 Amendments

Any change in the scope of this project and/or site conditions must be amended in writing in the 8.2 Section entitled Site Safety Plan Amendment Sheet and approved by the Health and Safety Manager.

Proposed time frame for the site work: March 1992 through April 1992.

2.0 PROJECT PERSONNEL

During the investigation of the site, Versar personnel will be available to monitor and assist in the situation that contaminated material is encountered. In the situation that contaminated material is encountered, the following management structure will be instituted for the purpose of safety.

2.1 Project Manager: R. Stephen Wilson

The project Manager will be responsible for implementing the project and obtaining the necessary personnel and resources for the project completion. Specific duties will include:

- providing authority and resources to ensure that the Site Safety Officer is able to implement and manage safety procedures
- preparing reports and recommendations about the project to clients and affected Versar, Inc. personnel
- ensuring that all persons allowed to enter the site (i.e. EPA, contractors, state officials, visitors) are made aware of the potential hazards associated with the substances known or suspected to be on site and are knowledgeable as to the on-site copy of the specific site safety plan
- ensuring that the Site Safety Officer is aware of all of the provisions of this site safety plan and is instructing all personnel on site about the site practices and emergency procedures defined in the plan
- ensuring that the Site Safety Officer is making an effort to monitor the site safety and has designated a Field Team Leader to assist with the responsibility when necessary.

2.2 Health and Safety Manager: Richard R. Strider

The Health and Safety Manager shall be responsible for the overall coordination and oversight of the site safety plan. Specific duties will include:

- approving the selection of the types of personal protective equipment (PPE) to be used on site for specific tasks

- monitoring the compliance activities and the documentation processes undertaken by the Site Safety Officer

- evaluating weather and chemical hazard information and making recommendations to the Project Manager about any modifications to work plans or personal protection levels in order to maintain personal safety

- coordinating upgrading or downgrading of PPE with Site Safety Officer, as necessary, due to changes in exposure levels, monitoring results, weather, other site conditions

- approving all field personnel working on site, taking into consideration their level of safety training, their physical capacity, and their eligibility to wear the protective equipment necessary for their assigned tasks (i.e. respirator fit testing results)

- overseeing the air-monitoring procedures as they are carried out by site personnel for compliance with all company health and safety policies

2.3 Site Safety Officer: Lawrence Kleinecke

The Site Safety Officer shall be responsible for the implementation of the site safety plan on site. Specific duties will include:

- monitoring the compliance of field personnel for the routing and proper use of the PPE that has been designated for each task

- routinely inspecting PPE and clothing to ensure that it is in good condition and is being stored and maintained properly

- stopping work on the site or changing work assignments or procedures if any operation threatens the health and safety of workers or the public

- monitoring personnel who enter and exit the site and all controlled access points

- reporting any signs of fatigue, work-related stress, or chemical exposures to the Project Manager and/or Health and Safety Manager <u>within 24 hours</u>

- dismissing field personnel from the site if their actions or negligence endangers themselves, co-workers, or the public and reporting the same to the Project Manager and/or Health and Safety Manager within 24 hours

- reporting accidents or violations of the site safety plan to the Project Manager and/or Health and Safety Manager within 24 hours

- knowing emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire and police departments

- ensuring that all project-related personnel have signed the personnel agreement and acknowledgements form contained in this site safety plan

- coordinating upgrading and downgrading of PPE with the Health and Safety Manager, as necessary, due to changes in exposure levels, monitoring results, weather, and other site conditions

- performing air monitoring with approved instruments in accordance with requirements stated in this Site Safety Plan.

2.4 Field Team Leader: Yvonne Lembi

In the event that the Project Manager and the Site Safety Officer are not on the site, the Field Team Leader will assume all responsibility for enforcing safety procedures.

2.5 Field Personnel

All field personnel shall be responsible for acting in compliance with all safety procedures outlined in this site safety plan. Any hazardous work situations or procedures should be reported to the Site Safety officer so that corrective steps can be taken. The Health and Safety Manager and/or Site Safety Officer has the authority to halt any operation related to any contaminated material that does not follow the provisions of this Site Safety Plan.

3.0 EMERGENCIES

In the event of an accident or emergency situation, immediate action must be taken by the first person to recognize the event. First aid equipment is located on site inside the Versar, Inc. vehicle. Immediately after emergency procedures are implemented, notify (1) the Site Safety Officer and (2) the Project Manager and the Health and Safety Manager about the situation.

3.1 Emergency Telephone Numbers

Immediate Emergencies:

Local Police:	911
Fire:	911
Ambulance:	911
Medical:	911

Medical Emergency:

Highland Hospital
1411 East 31th Street
Oakland, California
(415) 534-8055

Environmental Emergency:

Versar, Inc.	(916) 962-1612
OSHA	(800) 648-1003
Poison Control Center	(800) 532-2222
National Response Center	(800) 424-8802

3.2 Encountering Hazardous Situations (requiring evacuation)

Personnel encountering a hazardous situation shall **instruct others on site to evacuate the vicinity IMMEDIATELY** and call the (1) Site Safety Officer, (2) the Project Manager, and (3) the Health and Safety Manager for instructions.

The site must not be re-entered until the situation has been corrected (i.e. appropriate back-up help, monitoring equipment, personal protective equipment is at the site).

Usual Procedures for Injury

A. Call for ambulance/medical assistance if necessary. Notify the receiving hospital of the nature of the

physical injury or chemical overexposure. If a telephone is not available, transport the person to the nearest hospital.

B. Send/take this site safety plan with the attached Material Safety Data Sheet (MSDS) to medical facility with the injured person, if applicable.

C. If the injury is minor, proceed to administer first aid.

D. Notify the Site Safety Officer, Project Manager, and Health and Safety Manager of all accidents, incidents, or near miss situations.

3.3 Emergency Treatment

When transporting an injured person to a hospital, bring this site safety plan to assist medical personnel with diagnosis and treatment. In all cases of chemical overexposure, follow standard procedures as outlined below for poison management, first aid, and if applicable, cardiopulmonary resuscitation. Four different routes of exposure and their respective first aid/poison management procedures are outlined below:

A. Ingestion:

IMMEDIATELY transport the person to the nearest medical facility, or call the poison control center at **911**

B. Inhalation/Confined Space:

DO NOT ENTER A CONFINED SPACE TO RESCUE A PERSON WHO HAS BEEN OVERCOME UNLESS PROPERLY EQUIPPED AND A STANDBY PERSON IS PRESENT.

C. Inhalation/Other:

Move the person from the containment environment. Initiate CPR, if necessary. Call, or have someone call, for medical assistance. Refer to Material Safety Data Sheet for additional specific information. If necessary, transport the victim to the nearest hospital as soon as possible.

D. Skin Contact:

IMMEDIATELY wash off skin with a large amount of water. Remove any contaminated clothing and rewash skin. Transport person to a medical facility, if necessary.

E. Eyes:

Hold eyelids open and rinse the eyes IMMEDIATELY with copious amounts of water for 15 minutes. If possible, have the person remove his/her contact lenses (if worn). Never permit the eyes to be rubbed. Transport the person to a hospital as soon as possible.

4.0 CHEMICALS OF CONCERN

4.1 Chemical Hazards

Potential effects of any exposure are dependant on several factors such as: toxicity of substance, timeframe of exposure, concentration of substance producing the exposure, general health of person exposed, and individual use of hazardous reduction methods.

4.1.1 Gasoline

Gasoline is a complex mixture of hydrocarbons and additives. Chronic exposures or exposures to a high concentration of gasoline vapor may cause unconsciousness, coma and possibly death from respiratory failure. Exposure to low concentrations of gasoline vapor may produce flushing of the face, slurred speech, and mental confusion (see chart of properties, page 22 for further explanation).

Gasoline constituents can be divided into five major groups: alkanes, alkenes, cycloalkenes, aromatics, and additives. The aromatics are the constituents generally regarded to be of the greatest toxic concern. The major aromatics in gasoline ar benzene, toluene, and xylenes. Of these, benzene is considered to be the most potent. All of these chemicals can also irritate the skin if repeated or prolonged skin exposure occurs.

4.1.2 Benzene

Benzene can enter the body through inhalation, ingestion, and skin contact. Studies have noted that chronic exposure to benzene vapor can produce neurotoxic and hemopoietic (blood system) effects. Other effects can include headache, dizziness, nausea, convulsions, coma, and possible death if exposure is not reversed. The most significant chronic effect of benzene is bone marrow toxicity. Although the cause-effect relationship is not fully understood, it is believed that there might be a strong association between chronic exposures to benzene and the development of leukemia.

4.1.3 Toluene

Inhalation exposure to toluene vapor can produce effects such as central nervous system depression. Depending on exposure factors, signs and symptoms can include headache, dizziness, fatigue, muscular weakness, lack of coordination, drowsiness, collapse, and possible coma. Studies have noted anemia could be a possible effect of chronic exposure to toluene. Toluene can be a skin and mucous membrane irritant and has been shown to cause liver and kidney damage when overexposure is significant.

4.1.4 Xylenes

Depending on exposure factors, inhalation of xylenes vapor may produce central nervous system excitation followed by depression. Exposure to xylene vapor can produce dizziness, staggering, drowsiness, and unconsciousness. At very high concentrations, xylenes vapor may produce lung irritation, nausea, vomiting, and abdominal pain. Xylene is not known to possess the chronic bone marrow toxicity of benzene, but liver enlargement and nerve cell damage have been noted from chronic overexposure. Ingestion exposures to xylenes can produce temporary liver damage and should be avoided.

4.1.5 Ethylbenzene

Ethylbenzene is an eye, mucous membrane, respiratory tract, and skin irritant. High air levels can cause central nervous system depression, sense of chest constriction, headache and dizziness. Skin contact may cause irritation, inflammation and first or second degree burns.

4.2 Physical Hazard

The physical hazards are those typically associated with general construction. Slips, trips, and falls are of primary concern in accident prevention. The contractor will exercise care to maintain good housekeeping practices within the excavation area. Each excavation will be closed off with caution tape and barricades when work is not in progress.

4.2.1 Heavy Equipment

The more severe accidents will be related to the use of heavy equipment. During activities, excavators, backhoes, loaders, trucks, drilling, and steam cleaning equipment will be used. All heavy equipment used on this project will be in good working order and operated in accordance with recognized industry standard and Cal-OSHA Title 8, Subchapter 4, Construction Safety Orders. Safety maintenance checks of all equipment shall be

conducted just prior to the start of each work day. All chains, cables, grounding equipment, lifting machinery shall be of sufficient grade or rating to handle the weights and conditions at the site. Employers and workers at the site shall comply with all Cal OSHA requirements including personal protection, safety, training, and safety planning rules. Removal activities that pose imminent hazard to site personnel will not be permitted. All cables, slings, and locks will be inspected daily by the contractor to insure that they are in safe working order. All cranes and backhoes will use side bracing when in operation to secure against lateral movement. Bracing will have secure footing.

5.0 HEALTH AND SAFETY REQUIREMENTS

5.1 Work Zone Access

Access in the situation that significant contamination is encountered within a 30-foot radius of any on-site operation is prohibited to all but Versar, Inc. field personnel and subcontractors. Standard work practices, such as performing field activities in the upwind position, will be observed whenever possible. Personal protective equipment indicated in Section 5.4 will be worn by all onsite field personnel, including the subcontractor's personnel.

Exclusion Zones

Formal exclusion zones are not expected to be required. The site is fenced and will remain so throughout all field activities. Unauthorized personnel will not be permitted near the work zone area.

Decontamination Zone

A formal decontamination zone may be required. It would be sited in the upwind direction from the work zone area. Decontamination procedures are covered in Section 5.5. All site personnel will be required to follow the procedures.

Support Zones

No formal requirements will be necessary for the support zone area, although the general practice of locating the zone in the upwind direction will be followed.

5.2 Air/Gas/Vapor Monitoring Procedures

The greatest potential hazards to safety and health at this site include:

1) Exposure to chemical vapors - through inhalation

2) Exposure to chemical contamination - through skin contact and ingestion

In the situation that soil and/or ground water contamination is encountered, ongoing air monitoring during project tasks will be provide data to ensure that vapor concentrations are within acceptable ranges and will provide adequate selection criteria for respiratory and dermal protection.

- If PID/FID readings exceed 50 ppm, an air purifying respirator with organic cartridges must be worn by all site workers within any area where monitoring results exceed 50 units.

- If PID/FID readings exceed 500 ppm, Level B protection will be required. Personnel must leave the site immediately and contact the Site Safety Officer or the Health and Safety Manager for further instructions.

- Respirator cartridges will be changed once per day as a minimum. This can be accomplished at the end of the work day during respirator decontamination. If odor breakthrough is detected while wearing the respirator or breathing becomes difficult, change cartridges immediately.

5.3 Action Levels/Level of Personal Protection Equipment (PPE)

Air monitoring instrument	LEVEL D <50 ppm	LEVEL C 50-500 ppm	LEVEL B >500 ppm

5.4 Personal Protective Equipment

Modified Level D is the minimum acceptable level for this site. Modified Level D provides minimal dermal protection. Respiratory protection is optional unless air monitoring data indicates otherwise.

Modified Level D includes:

- coveralls/work uniform
- Tyvek (optional)
- Nitrile butyl-rubber or Viton gloves (optional)
- boots/shoes, leather or chemical resistant, with steel shank and approved toe protection
- approved safety glasses or chemical splash goggles if the potential for splash exists
- hard hat
- reflective traffic vest (if traffic, construction, or other related activities are present)
- hearing protection (as appropriate)

B. Additional equipment upgrade:

1. Protocols for upgrading

Once air monitoring data are complete and results are tabulated on the initial site entry, the Site Safety Officer and/or Health and Safety Manager will determine if changes in PPE are needed.

2. Upgraded equipment

a. Respirators

Respirators with organic vapor cartridges shall be worn by all personnel if photo-ionization detector readings exceed 50 units.

b. Other

Tyvek suits and appropriate gloves shall be worn if potential for dermal exposure exists while performing job tasks.

C. First Aid Equipment

Vehicles used for site work will be equipped with a first aid kit and safety equipment including:

- cones and flags
- barricades
- fire extinguisher
- water, suitable for drinking
- portable eye wash
- appropriate emergency bandage material

5.5 Decontamination Procedures

All operations conducted at this site have the potential to contaminate field equipment and personal protective equipment (PPE). To prevent the transfer of any contamination to vehicles, administrative areas, and other personnel, the following procedures must be followed:

1. Whenever possible, field equipment should be decontaminated with a solution of Alconox or Green Soap and thoroughly rinsed with water prior to leaving the site. This must be done outside of any work area or the hot zone.

2. Disposable PPE (for example, Tyvek suits, respirator cartridges) must be bagged and disposed of at the site.

Personal Decontamination

Level D: Segregated Equipment Drop
- wash/rinse outer boot (as appropriate)
- wash/rinse chemical resistant outer glove, then remove as appropriate
- remove and throw out inner disposable gloves in designated, lined receptacles

Level C: Segregated Equipment Drop
- wash/rinse outer boots
- wash/rinse chemical resistant outer gloves, then remove tape and gloves
- remove chemical resistant suit (remove by rolling down suit from the inside)
- remove outer boots
- remove first pair(s) of disposable gloves
- remove respirator, hard hat/faceshield and properly dispose of cartridges; wash respirator
- remove last pair of disposable gloves

Level B: Segregated Equipment Drop
- wash/rinse outer boots
- wash/rinse chemical resistant outer gloves
- cross hotline (into clean area) and change air tanks, then redress or
- cross hotline (into clean area)
- remove boots and gloves
- remove SCBA, if worn over chemical resistant suit
- if SCBA is worn under the suit, remove the chemical resistant suit, then the SCBA
- remove hard hat

5.6 Field Procedures

A digsafe number must be obtained from appropriate agency prior to drilling, excavation or trenching. To determine presence of subsurface metal utility lines, tanks and/or drums, a metal detector should be used before excavating on a site.

During the operation, two persons (one designated as "operator" and the other as the "helper") must be present at all times. The helper (whether Versar, Inc. personnel or subcontractors) must be instructed as to the whereabouts of the emergency shut-off switch. Every attempt must be made to keep unauthorized personnel from entering the work area. If this is not possible, the operation should be shut down until the area is cleared. The Site Safety Officer or the Field Team Leader has the authority and responsibility to shut down the excavating operations whenever a hazardous situation is deemed present.

The arm of the any equipment should maintain a preferred clearance of 20 feet from any overhead electrical cables, with 10 feet being the minimum. All operations will immediately cease during any hazardous weather conditions.

Hard hats and safety boots shall be worn at all times.

5.7 Electrical Equipment and Ground Fault Circuit Interrupters

All electrical equipment and power cables used in and around wells or structures containing chemical contamination must be explosion-proof and/or intrinsically-safe and equipped with a three-wire ground lead that has been rated as explosion-proof for hazardous atmospheres (Class 1 Div 1&2). In accordance with OSHA 29 CFR 1926.404, approved ground fault circuit interrupters (GFCI) must be utilized for all 120 vault, single-phase, 15 and 20 amp receptacle outlets on the site that are in use by employees and that are not part of the permanent wiring as defined by the NEC 1987. Receptacles on the ends of the extension cords are not part of the permanent wiring and therefore, must be protected by GFCI's whether or not the extension cord is plugged into permanent wiring.

The GFCI is a fast-acting circuit breaker that senses small imbalances in the circuit caused by current leakage to ground, and in a fraction of a second, shuts off the electricity. However, the GFCI will not protect the employee from line-to-line contact hazards such as a person holding two "hot" wires or a hot and neutral wire in each hand. The GFCI does provide protection against the most common form of electrical hazard - the ground fault. It also provides protection against fires, overheating, and destruction of wire insulation.

GFCI's can be used successfully to reduce electrical hazards on construction sites. Tripping of GFCI's interruption of current flow, is sometimes caused by wet connectors and tools. It is good practice to limit exposure of connectors and tools to excessive moisture by using watertight or sealable connectors. Providing more GFCI's on shorter circuits can prevent tripping caused by the cumulative leakage from several tools or by leakages from extremely long circuits. (Adapted from OSHA 3007; Ground-Faulting Protection on Construction Sites - 1987.)

5.8 Fire Protection

Only approved metal cans will be used to transport and store flammable liquids. All gasoline and diesel-driven engines requiring refueling must be shut down and allowed to cool before filling. No open flame or spark is allowed in any area containing petroleum products or other flammable liquids.

Smoking is not allowed during any operations within the work area in which petroleum products or solvents in free-floating, dissolved or vapor forms, or other flammable liquids may be present.

5.9 General Health

Medicine and alcohol can increase the effects of exposure to toxic chemicals. Unless specifically approved by a qualified physician, prescription drugs should not be taken by personnel assigned to operations where the potential for absorption, inhalation, or ingestion of toxic substances exists.

Drinking and driving is prohibited at any time. Driving at excessive speeds is always prohibited. Skin abrasions must be thoroughly protected to prevent chemicals from penetrating the abrasion.

It is recommended that contact lenses not be worn by persons working on the site.

6.0 EMPLOYEE TRAINING

All Versar employees with the potential for hazardous exposures are required to participate in an initial minimum of 40 hours of training to recognize, evaluate, and control site hazards. Three days of supervised field-training is also included within the initial training program. Project manager level and above must also participate in an additional eight-hour supervisory training course. Once employees have received the

above training, they receive a certificate of completion and are scheduled for an eight-hour refresher training session within one year of their initial training. Versar training includes specific details on the following:

- regulatory requirements
- confined space entry
- respiratory protection
- hazard communication
- decontamination procedures
- incident command system
- first aid/CPR
- air monitoring
- toxicology
- Prop. 65 (California)
- fire technology
- personal protective equipment

7.0 MEDICAL MONITORING PROGRAM

All Versar Inc. field personnel are required to have annual medical evaluations in accordance with the company's Health and Safety Program policy. Additional re-evaluation will be considered in the event of chemical over-exposure while working on this site.

The chemicals typical of this site can affect specific organ systems producing characteristic health effects. The medical evaluation will, therefore, focus on the liver, kidney, nervous system, blood systems, and skin and lung function. Laboratory testing will include complete blood count, and applicable kidney and liver function tests. Other tests include skin examination.

8.0 DOCUMENTATION

8.1 Site Safety Plan Agreement

In the situation that significant contamination is encountered which could come into contact with site development personnel, all details of this site safety plan will be implemented. Versar personnel have the authority to stop work performed by our subcontractors at this site if any work is not performed in accordance with the requirements of this Site Safety Plan.

All Versar Inc. project personnel and subcontractor personnel are required to sign the following agreement prior to conducting work at the site.

A. I have read and fully understand the Site Safety Plan and my individual responsibilities.

B. I agree to abide by the provisions of the Site Safety Plan.

Name	Company	Date	Signature

8.2 Site Safety Plan Amendment Sheet

Project Name: _____

Project Number: _____

Location: _____

Changes in field activities or hazards:

Proposed Amendment:

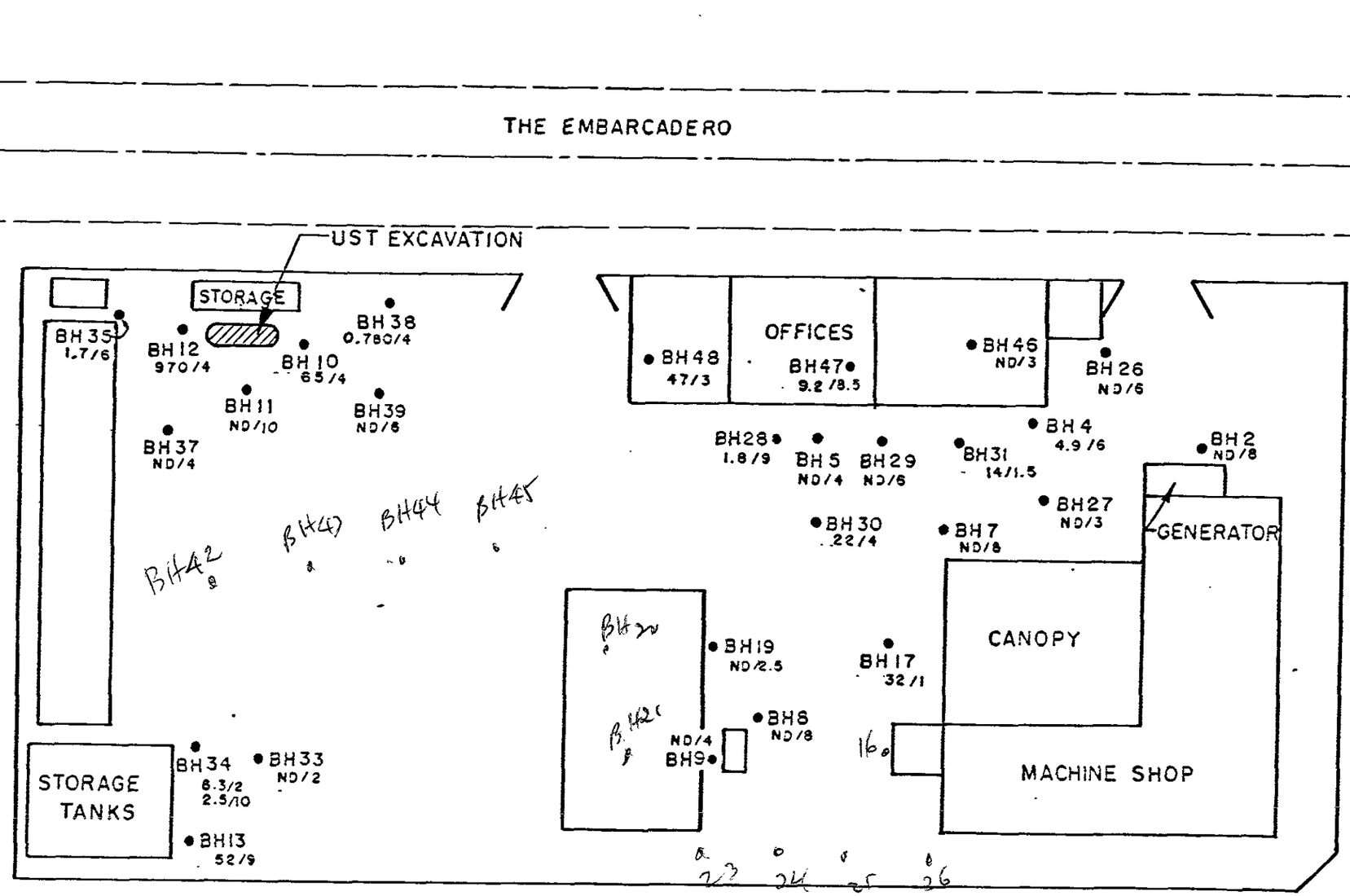
Proposed By: _____ Date _____

Approved By: _____ Date _____
Project Manager

_____ Date _____
Health & Safety Manager

Declined By: _____ Date _____

Amendment Effective Date _____



LEGEND:

4/1.5 = Milligrams per Kilogram/Depth in Feet.

ND = Not Detected

Samples Collected : October 25, 1991 and January 6, 7, and 8, 1992

REVISIONS				
ITEM	DATE	DESCRIPTION	BY	APPR.

Versar, INC.
ENVIRONMENTAL RISK MANAGEMENT
5330 PRIMROSE DRIVE, STE. 228
FAIR OAKS, CALIFORNIA, 95628
TELEPHONE: (916) 962-1612

DRAWN BY: B HAMILTON

SCALE: AS SHOWN

CHECKED/APPROVED:

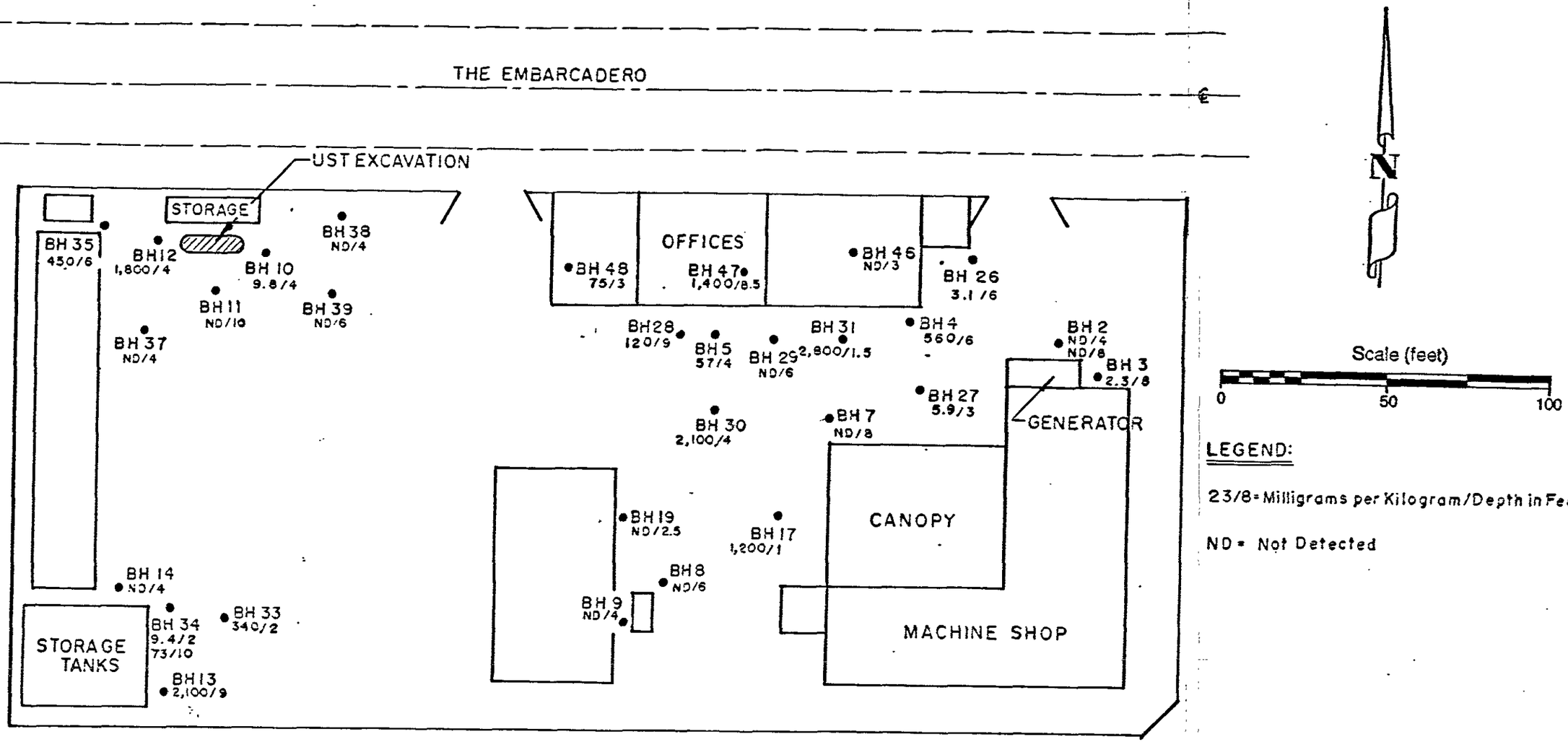
DATE: FEB 1992

PACIFIC DRY DOCK YARD 1
OAKLAND, CALIFORNIA

TITLE:
Total Petroleum Hydrocarbons (as gasoline) In Soils

JOB NO. 7703.26

FIGURE 5



LEGEND:

23/8 = Milligrams per Kilogram/Depth in Feet.

ND = Not Detected

Samples Collected : October 25,1991 and January 6, 7, and 8, 1992

REVISIONS				
ITEM	DATE	DESCRIPTION	BY	APPR.

Versar, INC.
ENVIRONMENTAL RISK MANAGEMENT
5330 PRIMROSE DRIVE, STE. 228
FAIR OAKS, CALIFORNIA, 95628
TELEPHONE: (916)962-1612

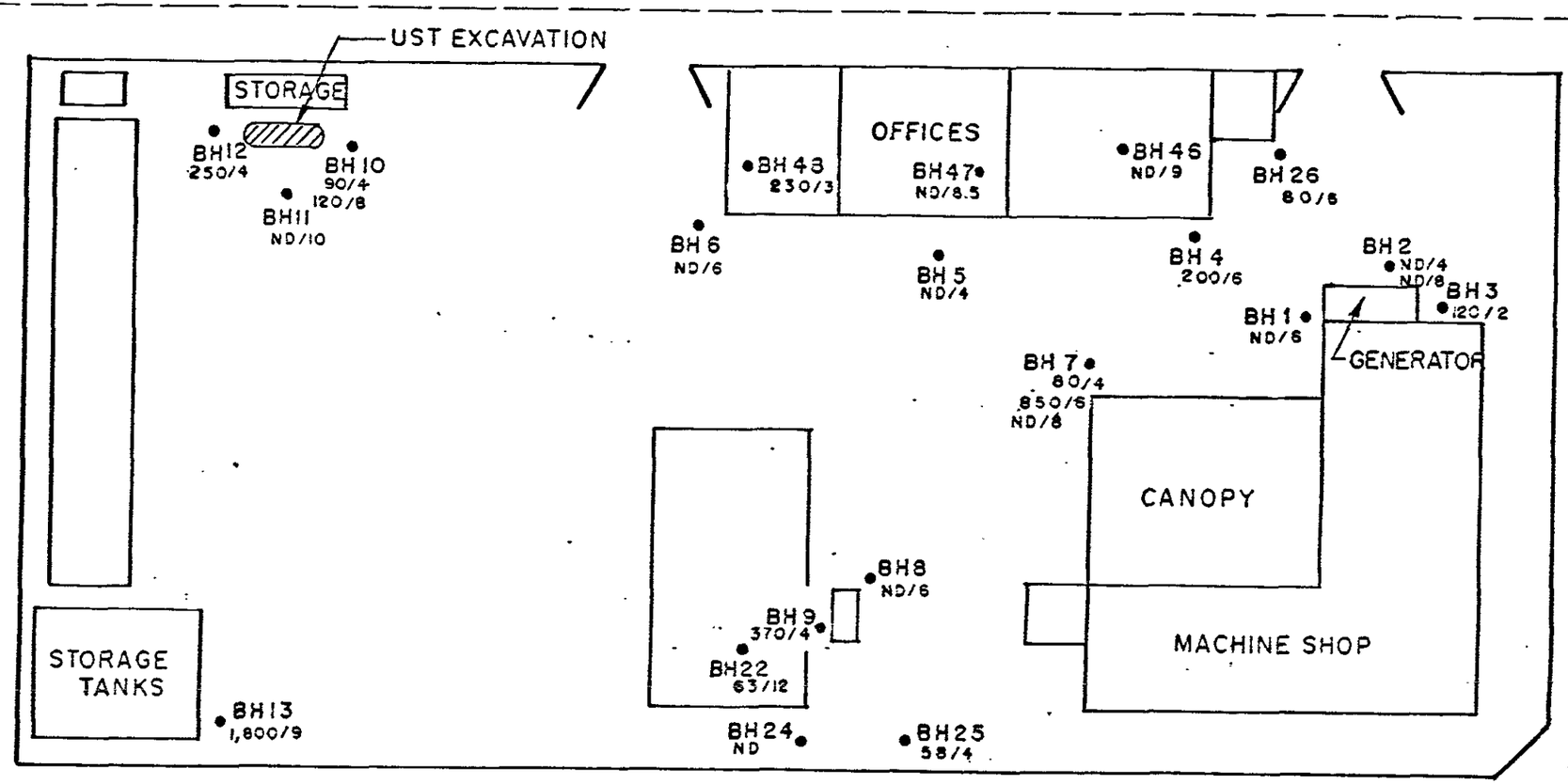
DRAWN BY: B HAMILTON
SCALE: AS SHOWN
CHECKED/APPROVED:
DATE: FEB 1992

PACIFIC DRY DOCK YARD 1
Oakland, California

TITLE:
Total Petroleum Hydrocarbons (as diesel) In Soils

JOB NO. 7703.26

FIGURE 6



LEGEND:

80/4 = Milligrams per Kilogram/Depth in Feet.

ND = Not Detected

Samples Collected : October 25,1991 and January 6, 7, and 8, 1992

REVISIONS				
ITEM	DATE	DESCRIPTION	BY	APPR.

Versar, INC.
ENVIRONMENTAL RISK MANAGEMENT

5330 PRIMROSE DRIVE, STE. 228
FAIR OAKS, CALIFORNIA, 95628
TELEPHONE: (916) 962-1612

DRAWN BY: B. HAMILTON

SCALE: AS SHOWN

CHECKED/APPROVED:

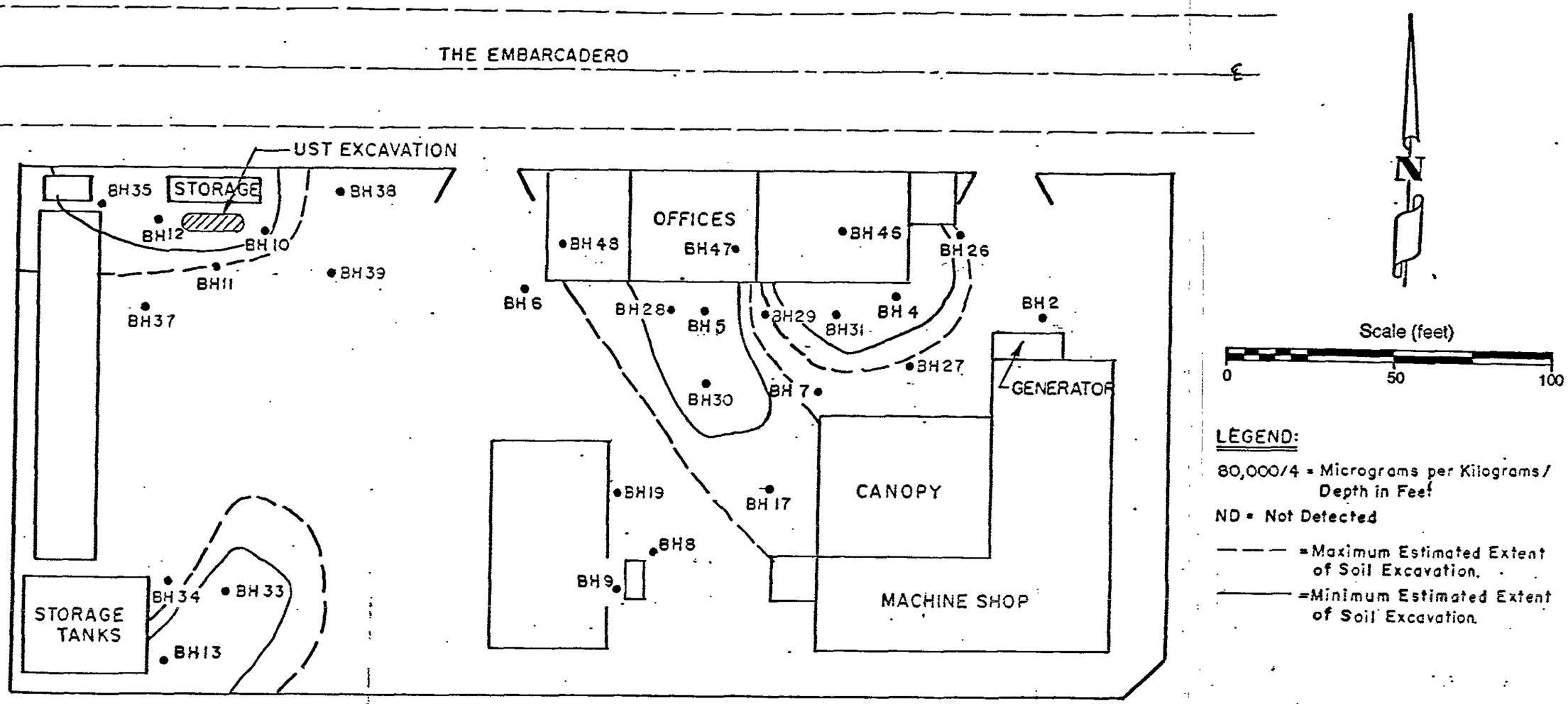
DATE: FEB 1991

PACIFIC DRY DOCK YARD 1
Oakland, California

TITLE:
Total Petroleum Hydrocarbons (as oil&grease) in Soils

JOB NO. 7703.26

FIGURE 7



REVISIONS				
ITEM	DATE	DESCRIPTION	BY	APPR.

Versar, INC.
ENVIRONMENTAL RISK MANAGEMENT
5330 PRIMROSE DRIVE, STE. 228
FAIR OAKS, CALIFORNIA, 95628
TELEPHONE: (916)962-1612

DRAWN BY: B HAMILTON
SCALE: AS SHOWN
CHECKED/APPROVED:
DATE: FEB. 1991

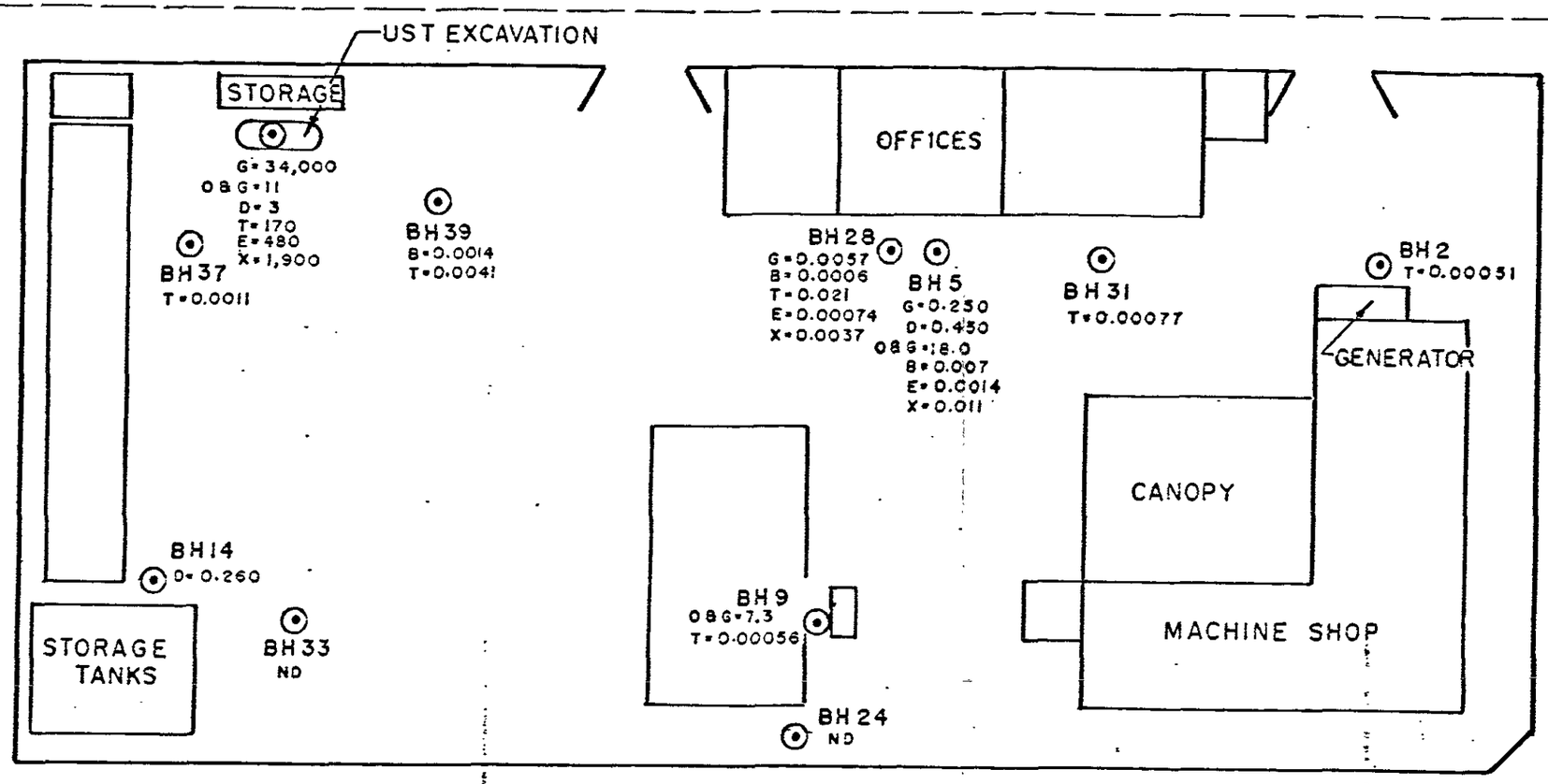
PACIFIC DRY DOCK YARD 1
Oakland, California

TITLE:
Estimated Extent of Soil Excavation

JOB NO. 7703.26

FIGURE 8

THE EMBARCADERO



Scale (feet)

0 50 100

LEGEND:

BH 1 ⊙ = Ground-Water Sampling Location
G = TPH-G
D = TPH-D
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
O & G = Oil and Grease
All results expressed in Milligrams per Liter. (ppm)
ND = Not Detected

Samples Collected : October 25, and 28, 1991 and January 8, 1992

REVISIONS				
ITEM	DATE	DESCRIPTION	BY	APPR.

Versar, INC.
ENVIRONMENTAL RISK MANAGEMENT
5330 PRIMROSE DRIVE, STE. 228
FAIR OAKS, CALIFORNIA, 95628
TELEPHONE: (916) 962-1612

DRAWN BY: B HAMILTON
SCALE: AS SHOWN
CHECKED/APPROVED:
DATE: FEB. 1992

PACIFIC DRY DOCK YARD 1
Oakland, California

TITLE:
Composite Analytical Results For Ground Water

JOB NO. 7703.26

FIGURE 9