SFUND RECORDS CTR
2255849

Comprehensive Long-Term Environmental Action Navy (CLEAN)

CA 7170023330

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

SITE INSPECTION REPORT
4/26/91

3128-2255849

Department of the Navy
Western Division
Naval Facilities Engineering Command
San Bruno, California 94066-0727

ED_002145A_00024696-00001

CLEAN

Contract No. N62474-88-D-5086

Contract Task Order No. 0047

Navy Engineers-in-Charge: Bella Dizon

PRC Project Manager: Randy Fish

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

SITE INSPECTION REPORT

4/26/91

3128-2255849

Prepared By

PRC ENVIRONMENTAL MANAGEMENT, INC.
120 Howard Street, Suite 700
San Francisco, CA 94105
415/543-4880

April 26, 1991

TABLE OF CONTENTS

Section		Page
1.0	INTRODUCTION	1
2.0	BACKGROUND	1
3.0	PURPOSE OF SITE INSPECTION	3
4.0	PROJECT APPROACH	3
5.0	REPORT ORGANIZATION	5
6.0	ENVIRONMENTAL SETTING	6
6.1	LOCATION	6
6.2	REGIONAL GEOLOGY	6
6.2.1	Treasure Island Geology	7
6.2.2	Yerba Buena Island Geology	7
6.3	HYDROGEOLOGY AND MIGRATION POTENTIAL	8
6.3.1	Treasure Island Hydrogeology and Migration Potential	8
6.3.2	Yerba Buena Island Hydrogeology and Migration Potential	9
6.4	SURFACE WATER	9
6.5	BIOLOGICAL RESOURCES	9
6.5.1	Rare, Threatened, and Endangered Species	11
6.6	CLIMATE	12
7.0	SITE DESCRIPTION	13
7.1	SITE 8 - ARMY POINT SLUDGE DISPOSAL AREA	13
7.2	SITE 19 - REFUSE TRANSFER AREA	15
7.3	SITE 25 - SEAPLANE MAINTENANCE AREA	15
8.0	FIELD ACTIVITIES	18
8.1	DESCRIPTION OF FIELD ACTIVITIES	18
8.2	DEVIATIONS FROM WORK PLAN	22
9.0	EXPOSURE STANDARDS, CRITERIA, AND GUIDELINES	22
10.0	RESULTS	25
10.1	SITE 8 - ARMY POINT SLUDGE DISPOSAL AREA	26

ED_002145A_00024696-00003

TABLE OF CONTENTS (cont'd)

Section		Page
	10.1.1 Soil Characteristics	26
	10.1.2 Contamination Characterization	26
	10.1.3 ARARs	26
10.2	SITE 19 - REFUSE TRANSFER AREA	28
	10.2.1 Soil Characteristics	28
	10.2.2 Contamination Characterization	28
	10.2.3 ARARs	30
10.3	SITE 25 - SEAPLANE MAINTENANCE AREA	30
	10.3.1 Soil Characteristics	30
	10.3.2 Contamination Characterization	30
	10.3.3 ARARs	32
11.0	QUALITY ASSURANCE/QUALITY CONTROL RESULTS	32
11.1	QA SAMPLING AND ANALYSIS	32
	11.1.1 TCL Volatile Organic Data Assessment	33
	11.1.2 TCL Semi-Volatile Organic Data Assessment	35
	11.1.3 TCL Pesticide/PCB Data Assessment	36
	11.1.4 TAL Metals Data Assessment	36
	11.1.5 Total Petroleum Hydrocarbons Data Assessment	37
11.2	DATA QUALITY OBJECTIVES	37
12.0	CONCLUSIONS AND RECOMMENDATIONS	37

ED_002145A_00024696-00004

LIST OF FIGURES

Figure		Page
1	FACILITY LOCATION MAP	2
2	SITE LOCATIONS MAP	4
3	SITE 8 VICINITY MAP	14
4	SITE 19 VICINITY MAP	16
5	SITE 25 VICINITY MAP	17
6	SITE 8 SOIL BORING LOCATIONS MAP	19
7	SITE 19 SOIL BORING LOCATIONS MAP	20
8	SITE 25 SOIL BORING LOCATIONS MAP	21

LIST OF TABLES

Table		Page
1	SOIL SAMPLING ACTIVITIES	23
2	APPLICABLE OR RELEVANT AND APPROPRIATE REGULATIONS	24
3	SITE 8 - RANGES OF DETECTED CONCENTRATIONS OF ANALYTES	27
4	SITE 19 - REFUSE TRANSFER AREA RANGES OF DETECTED CONCENTRATIONS OF ANALYTES	29
5	SITE 25 - SEAPLANE MAINTENANCE AREA RANGES OF DETECTED CONCENTRATIONS OF ANALYTES	31
6	FIELD QC SAMPLES	34

LIST OF APPENDICES

A LABORATORY ANALYTICAL REPORTS

B CHAIN-OF-CUSTODY FORMS

C FIELD DOCUMENTS

ED_002145A_00024696-00005

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC) received Contract Task Order (CTO) No. 0047 from the Department of the Navy, Western Division, Naval Facility Engineering Command (WESTDIV) to conduct a site investigation of the Naval Station Treasure Island (TI), San Francisco, California. The SI included soil borings and collecting soil samples for chemical analysis.

This report presents the results of the SI conducted at the TI. The SI addresses three sites at TI: (1) Site 8 - Army Point Sludge Disposal Area, (2) Site 19 - Refuse Transfer Area, and (3) Site 25 - Seaplane Maintenance Area.

2.0 BACKGROUND

The TI facility consists of two contiguous islands, TI and Yerba Buena Island (YBI), and is located in San Francisco Bay midway between the cities of San Francisco and Oakland (Figure 1). The Bay Bridge connects TI to San Francisco, approximately 2 miles west, and to Oakland, approximately four miles east. TI and YBI are surrounded by the waters of San Francisco Bay.

TI is a man-made island composed of dredged materials consisting of poorly-graded, fine sand placed over the Yerba Buena shoals. YBI is a natural rock island with minimal soil cover. Primary functions of TI include the Naval Technical Center; waterfront facilities; military and family housing; personnel support; Naval Readiness Command, Region 20; a Navy brig; and the Navy and Marine Corps Museum. YBI serves as residential suburb to TI, with 107 units for officer family housing, and accommodates a U. S. Coast Guard station.

The Naval Energy and Environmental Support Activity (NEESA) conducted a preliminary assessment (PA) at TI in 1987. The PA began with a records search at various government agencies, including Navy Engineering Field Divisions, national and regional archives and record centers, and U. S. Geological Survey offices. During the search, records were reviewed to collect information regarding TI's past missions, industrial processes, waste disposal records, and known environmental contamination.

After the records search, NEESA conducted an on-site survey to complete documentation of past operations and to identify potentially contaminated areas. With the assistance of a point of contact at TI, the team inspected TI during the survey and interviewed long-term employees and retired personnel. The on-site survey for TI was conducted from October 5 to October 9, 1987.

ED_002145A_00024696-00006

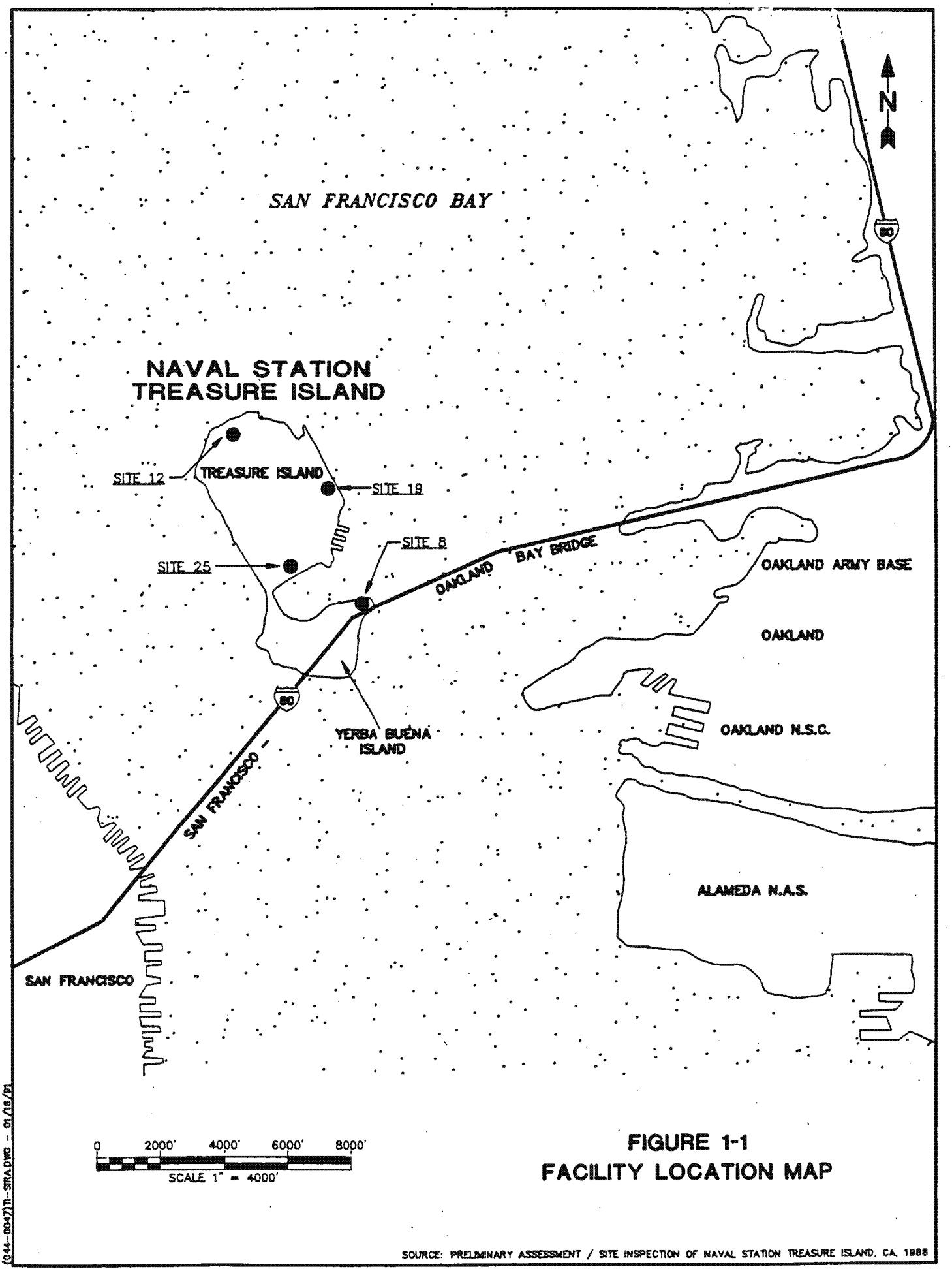

FIGURE 1-1
FACILITY LOCATION MAP

SOURCE: PRELIMINARY ASSESSMENT / SITE INSPECTION OF NAVAL STATION TREASURE ISLAND, CA. 1988

(044-0047)TI-SMA.DWG - 01/18/91

The information gathered during the PA was used to determine if past or present operations at TI threaten or potentially threaten human and environmental health. Sites identified as potential threats were then recommended for further study. The three sites listed below were identified during the PA and studied under this SI.

- Site 8 - Army Point Sludge Disposal Area (YBI)
- Site 19 - Refuse Transfer Area (TI)
- Site 25 - Seaplane Maintenance Area (TI)

The location of each site within TI is shown in Figure 2.

3.0 PURPOSE OF SITE INSPECTION

The purpose of the SI is to assess the sites identified during the PA as posing a potential threat to human and environmental health. Its design objectives are intended to confirm or deny the presence of soil contamination and the potential for ground-water contamination at each site. Data collected during the PA and SI will provide the necessary documentation to evaluate each site using the Hazard Ranking System (HRS). The HRS was developed by the U. S. Environmental Protection Agency (EPA) to systematically evaluate the severity of contamination at potential hazardous waste sites. Depending on the results of the HRS, the TI sites may require further study under a Remedial Investigation/Feasibility Study (RI/FS).

4.0 PROJECT APPROACH

The project approach of the SI includes the following three tasks: (1) background review, (2) field investigations, and (3) SI report preparation.

On March 27, 1990, a scoping meeting was held with PRC, WESTDIV, and TI representatives to initiate the SI. PRC was represented by Randolph Fish, project manager. WESTDIV representatives were Bella Dizon and Alan Nakamura, the Navy Engineers-in-Charge. Kam Tung, environmental coordinator; Edward Sarmiento, staff civil engineer; and Randolph Friedman, community relations specialist, represented TI. During the meeting, the scope and objectives of the SI were confirmed with Navy personnel. Additionally, a reconnaissance of each site was conducted to identify areas of concern and to determine site logistics and access, possible drilling locations, and the overall facility layout.

ED_002145A_00024696-00008

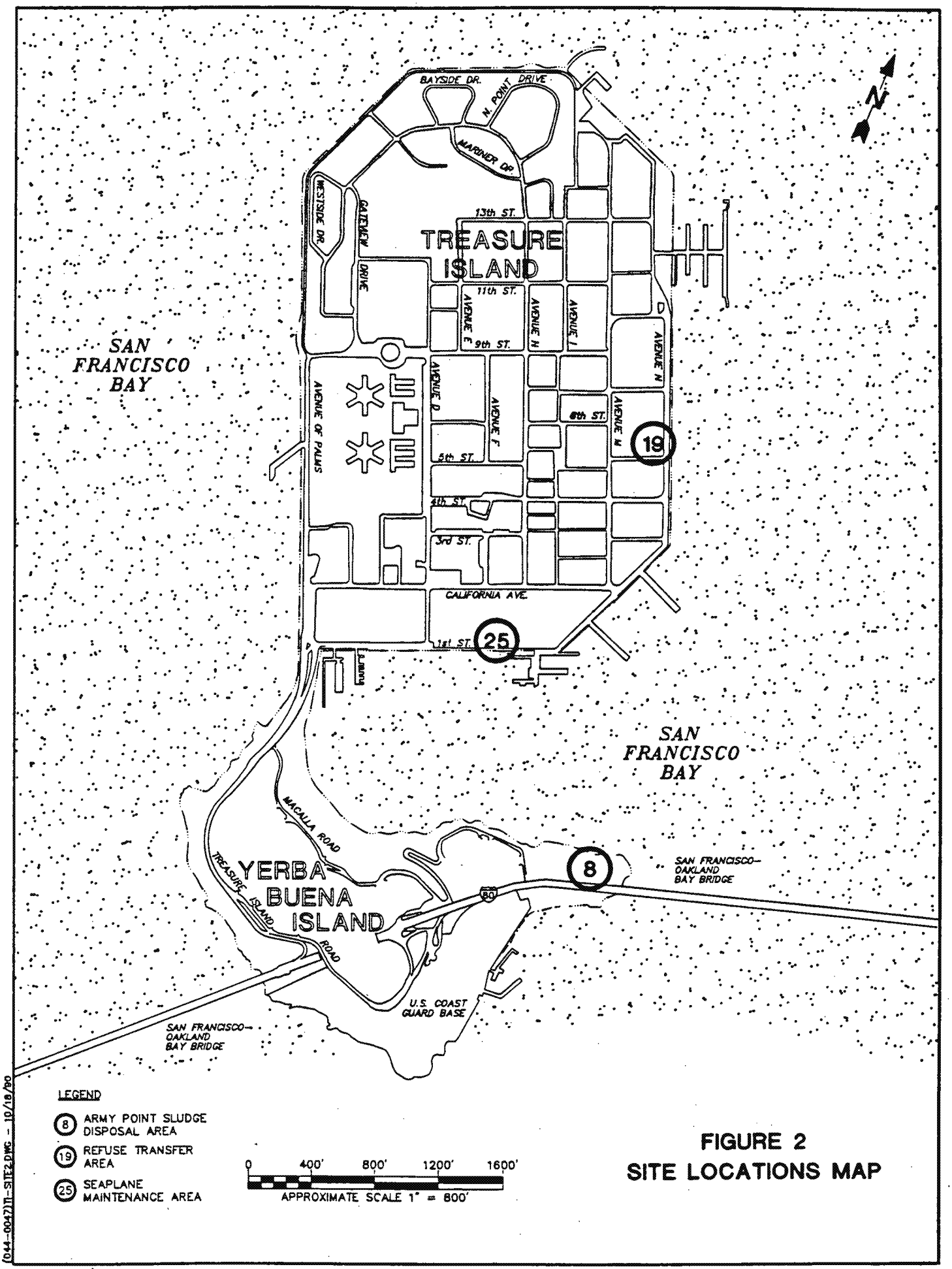

FIGURE 2
SITE LOCATIONS MAP

The following documents were reviewed as part of the SI background review:

- Preliminary Assessment Report, Naval Station Treasure Island, San Francisco, California, NEESA, April 1988.
- Geologic and Engineering Aspects of San Francisco Bay Fill, California Division of Mines and Geology, Special Report 97, 1967.
- As-built construction drawings for sites included in the SI.

The information obtained during the background review was used to prepare a detailed field work plan. The work plan, dated April 20, 1990, included: (1) a Sampling and Analysis Plan (SAP) describing field procedures and sampling locations; (2) a Quality Assurance Project Plan (QAPjP) describing field and laboratory quality assurance (QA) procedures; and (3) a Health and Safety Plan (HSP) describing personnel protection requirements and procedures.

Field work for the SI was performed from August 27 to September 5, 1990. Field activities included soil borings and soil sampling as described in the SAP. Samples were shipped to Pace Analytical Laboratory in Novato, California for chemical analyses. All data obtained from the SI were analyzed and this report presents the results.

5.0 REPORT ORGANIZATION

The remainder of this report presents the results of the SI performed at TI San Francisco, California. Chapter 6.0, Environmental Setting, provides a brief regional description of the San Francisco Bay Area. Chapter 7.0, Site Description, describes the past activities that are believed to have occurred at the TI sites and identifies the contaminants that may be present as a result of the activities. Chapter 8.0, Field Activities, describes the field activities performed to complete the SI and identifies deviations from the original work plan submitted to the Navy. Chapter 9.0, Exposure Standards Criteria, and Guidelines presents state and federal levels of risk for exposure to certain contaminants in certain media. Chapter 10.0, Results, discusses site conditions for each site, including soil characteristics and sample analytical results. Chapter 11.0, Quality Assurance/Quality Control (QA/QC), summarizes the field and laboratory QA/QC results. Chapter 12.0, Conclusions and Recommendations, presents a summary of findings for the SI conducted at TI and recommendations for future activities. The appendices to this report contain data obtained during the SI, including boring logs, chain-of-custody forms, field notes, and laboratory reports.

ED_002145A_00024696-00010

6.0 ENVIRONMENTAL SETTING

The TI environmental setting description provides information on the location, regional geology, ground water, surface water, climate, and biological resources associated with TI. This section is included to provide background information needed to perform the HRS. Unless otherwise noted, information in this section was obtained from the TI PA report prepared by NEESA, dated April 1988.

6.1 LOCATION

TI is located in San Francisco Bay, midway between the cities of San Francisco and Oakland, in San Francisco County, California. The station consists of two islands: TI, approximately 450 acres in size, and YBI, approximately 130 acres in size. The only means of vehicular access to TI is via Interstate 80, San Francisco-Oakland Bay Bridge, from San Francisco, approximately 2 miles to the west, or Oakland, approximately 2 miles to the east.

Primary facilities of TI include the Naval Technical Training Center; waterfront facilities; military and family housing; personnel support; Naval Readiness Command, Region 20; a Navy brig; and the Navy and Marine Corps Museum. YBI serves as a residential suburb to TI, with 107 units for officer family housing, and accommodates a U. S. Coast Guard station.

TI is surrounded by the waters of San Francisco Bay. The San Francisco Bay (Bay) Area is a major metropolitan center of business, industry, and government for Northern California. The Bay Area encompasses over 6,000 square miles of extensively developed, mixed use land with approximately 280 miles of shoreline. The population of the Bay Area exceeds 3 million people.

6.2 REGIONAL GEOLOGY

TI is located in the southern coast range geomorphic province of California. Basement rocks for the portion of this geologic region encompassed by the Bay Area consist primarily of the fractured and sheared rocks of the Franciscan Formation. San Francisco Bay is a drowned river valley developed within a southeast to northwest trending structural trough in the Franciscan Formation bedrock. Material eroded from the Berkeley/Oakland Hills form the broad, gently sloping coastal plain which borders the eastern shoreline of the bay. Extensive areas of Orthents (fill material) are found at point locations along the western shoreline of the bay, primarily along the San Francisco waterfront. These Orthents generally consist of variable amounts of soil, gravel, broken concrete and asphalt, rock, bay muds (alluvial and estuarian

ED_002145A_00024696-00011

sediments), and other solid material. These soils are highly variable due to differences in the kinds and amounts of fill material in the profile.

The Bay Area, located near the contact between the North American Plate and Pacific crustal plates, is a tectonically active region. This seismic regime is characterized by southeast to northwest trending faults exhibiting primarily right lateral strike-slip movement. The major active faults in the vicinity of the site are all part of the San Andreas fault system. These faults include the Hayward fault approximately 5 kilometers to the east; the San Andreas fault, approximately 15 kilometers west of the site; the San Gregorio-Seal Cove fault, approximately 40 kilometers to the west; and the Calaveras fault, approximately 85 kilometers to the southeast.

6.2.1 Treasure Island Geology

TI, as mentioned earlier, is a man-made island primarily consisting of fill material dredged from San Francisco Bay and emplaced upon the Yerba Buena shoals. The fill used for construction consists primarily of sand with lesser amounts of silt, clay, and gravel. The fill thickness throughout the site is reported to be approximately 50 feet.

This fill is situated on top of a thick body of clayey silt known as Bay Mud. The Bay Mud contains some fine-grained sand stringers and extends to a depth of approximately 100 to 120 feet below ground surface. Underlying the Bay Mud is a relatively consolidated body of interbedded clays and sands, approximately 30 feet thick, that overlie the shale and sandstone bedrock.

According to a U. S. Department of Agriculture (USDA) soil survey, the soils at TI consist primarily of Urban Land and Orthents. Urban Land comprises those areas which are more than 85 percent covered by asphalt, concrete, buildings, or other impervious man-made material. The soil under these structures is generally similar to the Orthents. In general, the soils found at TI are poorly-graded, fine sand with occasional discontinuous lenses of silt and clay.

6.2.2 Yerba Buena Island Geology

YBI, as stated earlier, is a natural island consisting of four geologic units: landslide debris, artificial fill, Colma Formation sands, and shale and sandstone bedrock of the Franciscan Formation. The most recent geologic unit at YBI is the landslide debris that results from the downslope movement of clayey, silty sand. A significant area of landslide debris is located at the north side of the island and smaller areas of landslide debris are found at other locations. The fill geologic unit is located along the eastern shoreline of YBI. The Colma Formation, a fine- to

ED_002145A_00024696-00012

medium-grained sand with minor amounts of sandy silt, clay, and gravel interbeds, is exposed over approximately 70 percent of the island. It unconformably overlies the bedrock, varying in thickness from a few inches to several feet. The resistant sandstone and shale of the Franciscan Formation bedrock underlies the landslide debris, artificial fill, and Colma Formation of YBI. Although the Franciscan Formation generally tends to be highly variable in composition and structure in the Bay Area, surficially it appears consistent in structure and composition at YBI. The Franciscan units exposed at YBI generally dip to the northeast and have a southeast to northwest trend.

The soils at YBI are classified as Candlestick, Kron, and Buriburi, and are found on 30 to 75 percent slopes. Additionally, there are areas of Urban Land and Orthents found on 5 to 75 percent slopes. Soils on YBI range from 10 to 40 inches deep over the sandstone and shale bedrock. Surface soils range from fine, sandy loam to gravelly loam. Subsurface soils range from gravelly loam to sandy, clay loam.

6.3 HYDROGEOLOGY AND MIGRATION POTENTIAL

There is limited potential for human contact with or consumption of ground water at TI. Ground water is impotable due to contact with saline to brackish Bay waters, and therefore is not used. Domestic water is supplied by pipeline from San Francisco, west of TI, or Emeryville, to the east. No information is available on the utilization of ground water by wildlife, but it is not suspected to be a significant water source.

6.3.1 Treasure Island Hydrogeology and Migration Potential

Depth to ground water at TI varies from approximately 30 to 72 inches below ground surface. Tidal influence on the water table at TI is approximately 0.3 feet. Recharge occurs from infiltration from precipitation, landscape irrigation and leaking storm drains, and from the San Francisco Bay waters. Perched ground water conditions above the shallow water table may exist due to the presence of relatively impermeable silt and clay lenses.

The fill materials at TI tend to have medium permeability, 1.0×10^{-3} to 1.0×10^{-4} cm/sec. The direction of ground water flow is generally toward the Bay. Soluble contaminants would tend to migrate vertically through the sand to the water table. Less soluble contaminants, however, might bind with the soils and become relatively immobile.

ED_002145A_00024696-00013

6.3.2 Yerba Buena Island Hydrogeology and Migration Potential

There is limited information on ground water at YBI; however, in similar sites in the Bay Area, ground water is commonly found in sandstone or fractured shale due to infiltration. Ground water would be recharged from infiltration of precipitation, landscape irrigation and leaking storm drains, and from Bay waters.

In the areas of artificial fill on the east side of YBI, soluble contaminants would migrate to the Bay waters. At other areas on the island, surface runoff would infiltrate into the Franciscan sandstones and shales, leaching soluble contaminants to the ground water. Less soluble contaminants would tend to bind with the soils and bedrock becoming relatively immobile or leaching small quantities to the surface runoff or ground water.

6.4 SURFACE WATER

San Francisco Bay is the only body of water located at TI. In general, all surface runoff from TI and YBI flows toward the Bay. There are water quality problems in the San Francisco Bay. The two main sources of water pollution are point and nonpoint sources. Point sources result from the improper disposal of wastes from a facility or structure, such as a municipal sewerage pipeline. The primary nonpoint source of water pollution to the Bay is surface runoff. Water quality in the San Francisco Bay is considered by the California Regional Water Quality Control Board to be critical.

6.5 BIOLOGICAL RESOURCES

TI provides an urban terrestrial habitat that is intensively developed, maintained, and landscaped with trees, shrubs, and lawns. Most of the vegetation was cultivated in landscaped areas as the island was developed. The more dominant species include perenial ryegrass, Kentucky bluegrass, star acacia, bottle brush, boxwood, oleander, English ivy, ice plant, blue gum eucalyptus, Monterey pine, coast live oak, Bishop pine, sycamore, and white fir.

YBI is mostly undeveloped land; however, there are approximately 55 acres of developed urban terrestrial habitat consisting primarily of residential housing areas. Vegetation in the developed areas is similar to the cultivated landscaping at TI. The undeveloped areas consist of grasslands, brushlands, woodlands, and a proposed wildlife area for Army Point. There is approximately 1 acre of grassland, 20 acres of brushland, 30 acres of eucalyptus woodland, 10 acres of mixed woodland, 10 acres of the proposed wildlife refuge, and 4 acres of parkland on

ED_002145A_00024696-00014

YBI. Vegetative species found in the undeveloped areas include brome, California oatgrass, blue gum eucalyptus, coyote brush, coastal sage, poison oak, California buckeye, and blackberry.

Wildlife known and expected to occur at TI mostly consists of species adapted to urban environments and landscape plantings. Birds typically associated with urban and residential environments and adapted to human disturbances are found at TI and YBI. These include the house finch, stellar jay, English sparrow, savannah sparrow, and robin. The areas of shrubs interspersed with grasslands and extensive eucalyptus woodlands provide cover for birds such as California quail, Lewis woodpecker, horned lark, cedar waxwing, and white-breasted nuthatch.

Additionally, the Bay Area is located within the Pacific Flyway, a corridor for migrating bird species that extends from South America to the Arctic Circle. The Bay Area provides vital resting places, feeding areas, and wintering grounds for large populations of many bird species. Seventy-five species of water birds visit the Bay Area annually, comprising a population that fluctuates between 600,000 and 800,000 waterfowl. The shoreline areas of TI and YBI are used by least terns and brown pelicans for foraging, and by herring gulls for roosting.

Pocket mice and the California ground squirrel are the primary mammals on both TI and YBI. Additionally, a small colony of harbor seals utilize the southwest shoreline of YBI. No information regarding the frequency of use of this area by the harbor seals is available. The harbor seal is protected from hunting, capture, killing, or harassment by the Marine Mammal Protection Act of 1972.

The San Francisco Bay-Delta is the largest estuary on the Pacific Coast of the United States. Although it is widely believed that pollution to the Bay has contributed and is currently contributing to changes in the biological resources of San Francisco Bay, incontrovertible evidence of such effects is rare, if any exists at all. The Bay is utilized for sport and commercial fishing; however, commercial fishing is uncommon near TI and YBI. Marine fauna occurring in the Bay and around TI and YBI include anadromous fish such as striped bass, king salmon, and sturgeon. Other fish common to the Bay waters surrounding TI and YBI include sole, flounder, shark, rays, croaker, and perch. Common bait and forage fish include sardine, anchovy, herring and smelt. Common shellfish include shrimp and crab. The sport fishing pier at TI is a popular, local fishing area.

The predominant marine habitat surrounding TI and YBI is subtidal with unconsolidated mud bottom substrate. A limited intertidal habitat comprising riprap and dock and pier pilings is also present. A rocky, intertidal shoreline with mudflats is present between TI and YBI. The most common benthic species in these habitats are amphipods, clams, and polychete worms.

ED_002145A_00024696-00015

Although marine flora occur throughout the Bay, there is no readily available information for the species occurring on or immediately adjacent to the shores of TI and YBI. Common species that may occur on the shores of TI and YBI include Zostera sp., Ulva sp., Enteromorpha sp., Ralfsia sp., and possibly several red alga (Rhodophyta).

6.5.1 Rare, Threatened, and Endangered Species

The Endangered Species Act of 1973 (Public Law 93-0205) requires that all Federal agencies carry out programs for the conservation of Federally listed endangered and threatened species. Federal agencies must ensure that actions authorized, funded, or carried out by them will not jeopardize the continued existence of any rare and endangered or threatened species or result in the destruction or adverse modification of critical habitats as determined by the Secretary of the Interior.

The list of rare and endangered and threatened animal and plant species is published in the Federal Register 50 CFR 17.11-17.12. The State of California listing of rare and endangered animals is contained in the California Administrative Code, Title 14, Section 670.2. The California Native Plant Protection Act of 1978 assigns primary responsibility to the State Department of Fish and Game for determining California plants to be listed as rare and endangered. The Department of Fish and Game uses the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California as their species-of-concern list.

According to the State of California Department of Fish and Game, a species is considered rare and endangered when its prospects of survival and reproduction are in immediate jeopardy. A species is threatened when, although not immediately facing extinction, it exists in such small numbers throughout its range that it may become endangered if its present environmental conditions deteriorate.

No rare and endangered or threatened plants designated by the California Department of Fish and Game or the U. S. Fish and Wildlife Service have been observed or are expected to occur at TI. Additionally, there are no habitats of special biological interest at TI.

Three species of wildlife classified as rare and endangered by both the state and federal governments are known to occur in the Bay Area and have been reported to hunt and forage at TI. These species include the peregrine falcon (Falco peregrinus anatum), California least tern (Sterna albifrons brownii), and California brown pelican (Pelicanus occidentalis californicus). It

ED_002145A_00024696-00016

is unlikely that these species would be adversely affected by contaminants on or from TI. These species feed throughout the Bay Area and are not specifically dependent on TI or YBI for food.

In addition, other than potential direct discharge of contaminants to the Bay from TI, no method for contaminants to enter the food chain from TI has been identified. All three species are carnivorous, with the peregrine falcon feeding primarily on small birds and the least tern and brown pelican feeding on fish.

The peregrine falcon is considered a rare transient or winter visitor along the California coast, foraging and resting in open country, river mouths, and near shore waters such as the San Francisco Bay. Although suitable nesting habitat is reportedly absent from both TI and YBI, one pair of peregrine falcons is reported to be nesting on the Bay Bridge.

The California least tern migrates along the Pacific Flyway to wintering grounds in Central and South America. From April to September, it is found in California nesting on sandy beaches and salt flats. Least terns primarily feed on small fish in near shore waters, including marshes, estuaries, bays, and along the surf line. Although the California least tern is expected to be an infrequent visitor to TI and YBI, it has been observed on occasion in near shore waters surrounding TI and YBI.

The California brown pelican is the endangered species expected most frequently near TI and YBI. Along the California coastline, it feeds in or rests on open waters outside the surf line and in near shore waters like the San Francisco Bay year-round. The brown pelican's diet consists primarily of fish.

6.6 CLIMATE

The climate at TI is dominated by the Pacific Ocean, producing a maritime climate characterized by little temperature variation. The average annual temperature is 56 to 58 degrees Fahrenheit, with an average annual frost-free period of 300 to 330 days.

The average annual precipitation is approximately 25 to 30 inches. Approximately 90 percent of the annual precipitation occurs from November to April. Localized showers are infrequent and storms are moderate in duration and intensity. Mean annual evaporation is 48 inches. The greatest evaporation occurs during July.

Relative humidity during the winter is approximately 50 to 60 percent during the day, increasing to approximately 80 to 90 percent at night. Humidity decreases in spring; however, by

ED_002145A_00024696-00017

summer, it increases, particularly at night or in the morning when frequent fogs occur. Humidity is lowest in the fall, ranging from approximately 50 percent during the day to 70 percent at night.

The prevailing wind direction for the Bay Area is from the northwest. Wind speed is less than 6 miles per hour for more than 50 percent of the time, and exceeds 12 miles per hour for only approximately 10 percent of the time. The strongest winds are associated with winter storms. In the winter, winds from the north and east sometimes bring low temperatures to the Bay Area. Westerly winds predominate during the summer when cool, marine air flows east toward the warm Central Valley region of California. These winds are strongest in the late afternoon and early evening.

7.0 SITE DESCRIPTION

This section describes the three sites of concern included in the SI: Site 8-Army Point Sludge Disposal Area, Site 19-Refuse Transfer Area, and the Site 25-Seaplane Maintenance Area. For each site, past operations are discussed and possible contamination that may have resulted from these operations are identified.

7.1 SITE 8 - ARMY POINT SLUDGE DISPOSAL AREA

The Army Point Sludge Disposal Area is located west of Building 262 at the extreme eastern end of YBI. The site occupies a large, open area, approximately 100 feet by 400 feet in size (Figure 3). Army Point was formerly occupied by personnel quarters; however, only the concrete foundations of these structures remain. No activities are currently performed at this site, and the site is overgrown with small trees and shrubs.

Suspected contamination at Site 8 is the result of waste sludge disposal from the waste water treatment facility at TI. Waste sludge was also disposed of at another site, Site 7 - Pesticide Storage Area. Disposal activities reportedly occurred at Sites 7 and 8 from 1968 to 1976. Waste sludge disposed of at Site 8 was transported from the wastewater treatment facility and spread on the ground between the remaining foundations. The area of known waste sludge disposal is depicted in Figure 3.

The volume of waste sludge disposed of at Sites 7 and 8 was approximately 10 to 15 cubic yards per month, totalling 960 to 1,440 cubic yards for the 8-year period that this activity occurred. Information regarding the volume of waste sludge disposed of at each site was not available.

ED_002145A_00024696-00018

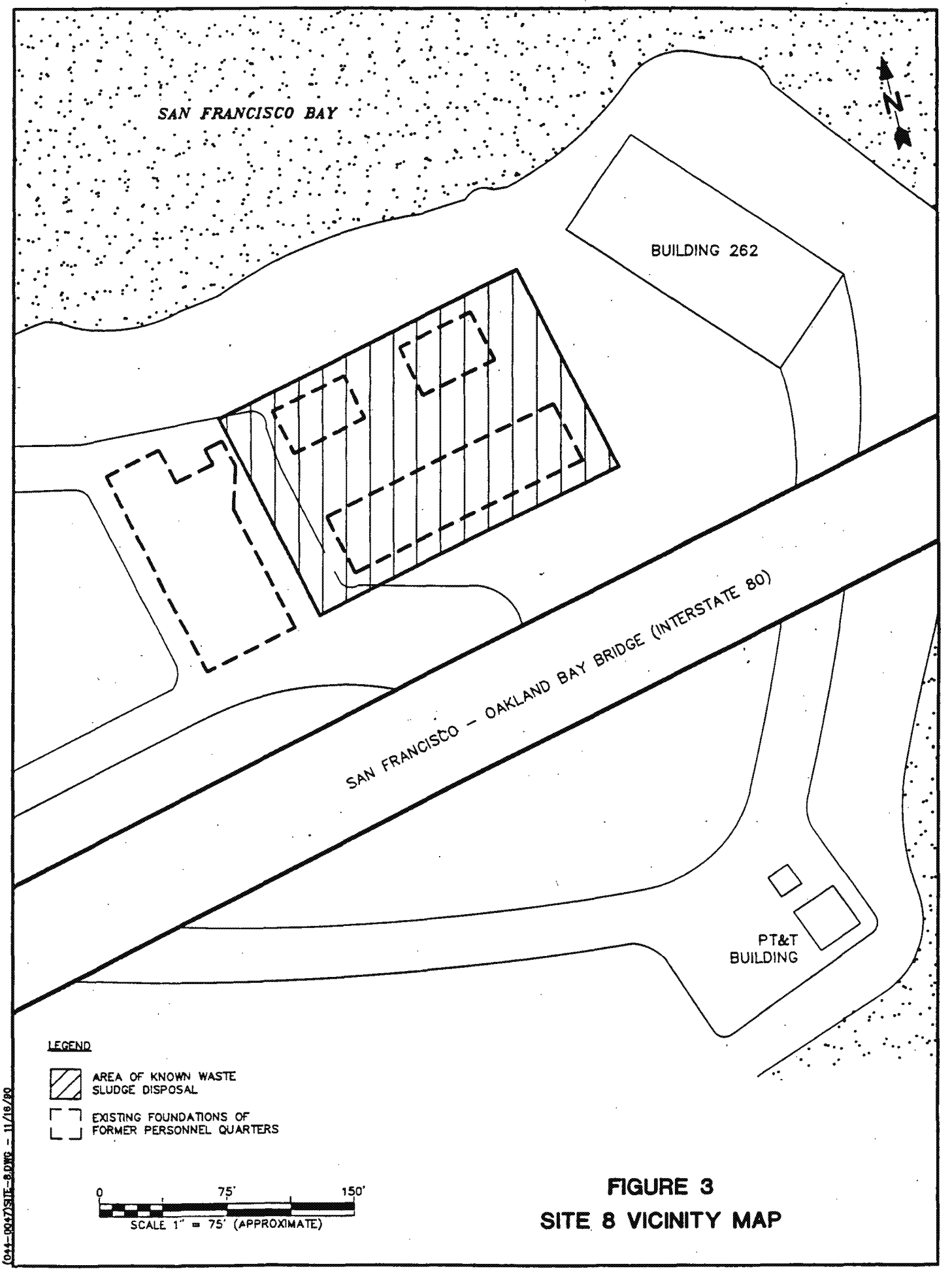

FIGURE 3
SITE 8 VICINITY MAP

The potential exists for organic compounds, such as phenolics, and heavy metals, including cyanide, arsenic, cadmium, chromium, copper, nickel, lead, silver, zinc, and mercury, to migrate into the subsurface soils from waste sludge at the site.

7.2 SITE 19 - REFUSE TRANSFER AREA

The Refuse Transfer Area is located at the east side of TI, adjacent to Avenue N and east of Buildings 342 and 343 (Figure 4). The unpaved, fenced site occupies an area approximately 130 feet by 200 feet in size, and has been used for refuse staging (transfer, holding, and disposal) from approximately 1953 to the present. Currently, trash is transferred from various small containers to large bins for disposal to off-site facilities. The site contains a large, paved ramp, constructed in 1970, from which trucks can end-dump trash into the bins. The site is open on the east side to provide access to the ramp. Signs prohibiting the disposal of acids, paints, oils, batteries, or any other kind of hazardous waste are posted at the site. During the site reconnaissance, small quantities of miscellaneous trash were spread throughout the site, and small areas of oil-stained soil were noted along the fence at the east side of the site. The soil was possibly stained by engine oil from trucks that brought trash to the site for disposal.

Little information exists regarding disposal practices prior to 1970. Based on the open and uncontrolled nature of Site 19, it is conceivable that a variety of hazardous wastes have possibly been disposed of at this site. Hazardous wastes most likely disposed of at the site may include batteries, paints, cleaning solvents, and engine oils. Soil, ground water, and surface water runoff may be potentially affected by past and/or present operations at this site.

7.3 SITE 25 - SEAPLANE MAINTENANCE AREA

The Seaplane Maintenance Area is located at the southern end of TI, adjacent to and south of Buildings 2, 3, and 180 (Figure 5). These three buildings, constructed in the late 1930s, functioned as hangars for seaplanes from approximately 1943 to 1958. During this period, seaplanes were stored and maintained in and around the buildings; however, little information exists regarding the exact locations of these operations. Hazardous materials generated by these operations may include aviation fuel, engine oil, lubricants, and cleaning solvents. These hazardous wastes may have been disposed of on the ground, thereby contaminating the soil and, possibly, the ground water. Based on other practices known to have occurred at TI, an investigation was necessary to determine whether soil and ground-water contamination is present at the site.

ED_002145A_00024696-00020

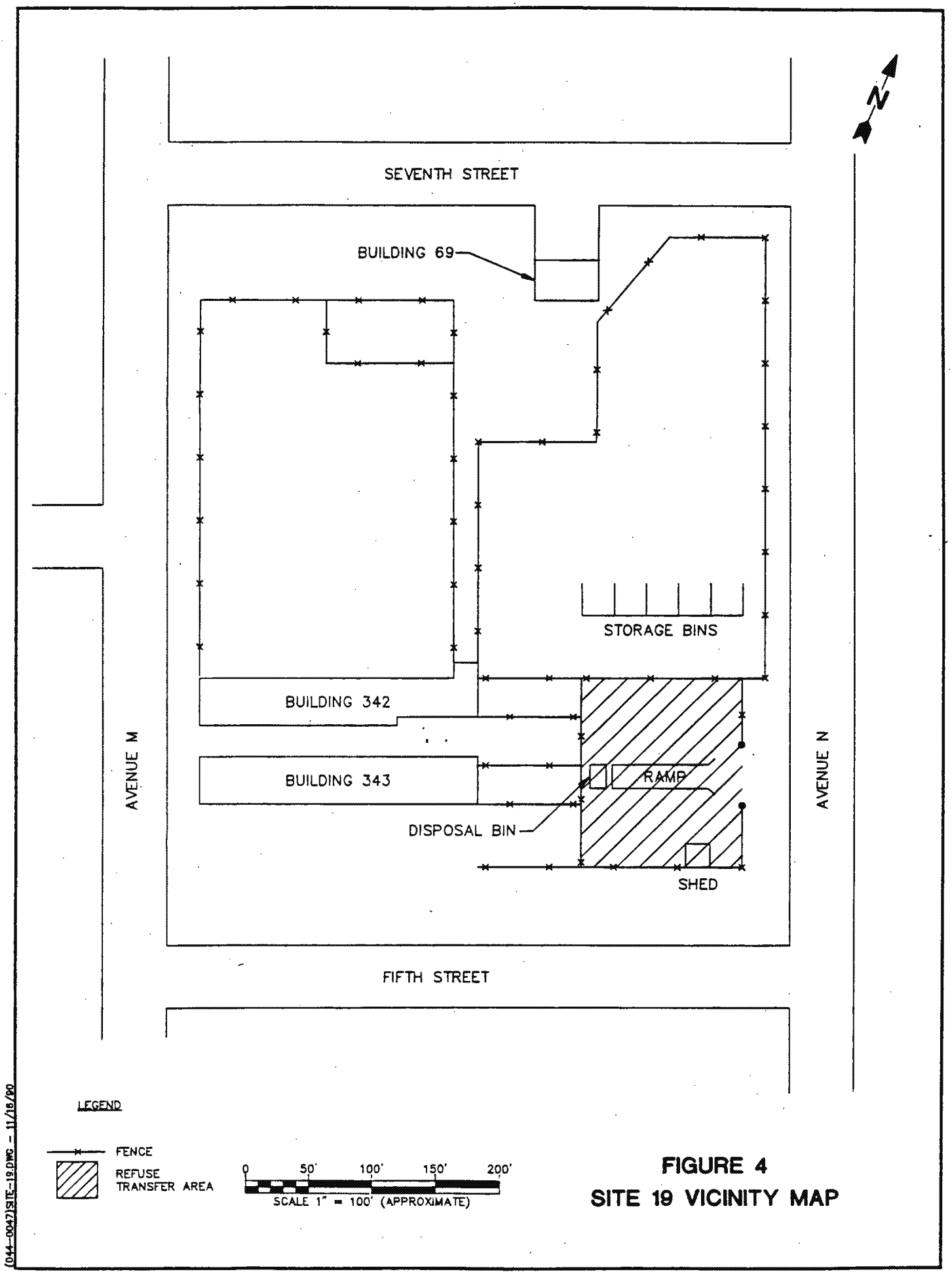

FIGURE 4
SITE 19 VICINITY MAP

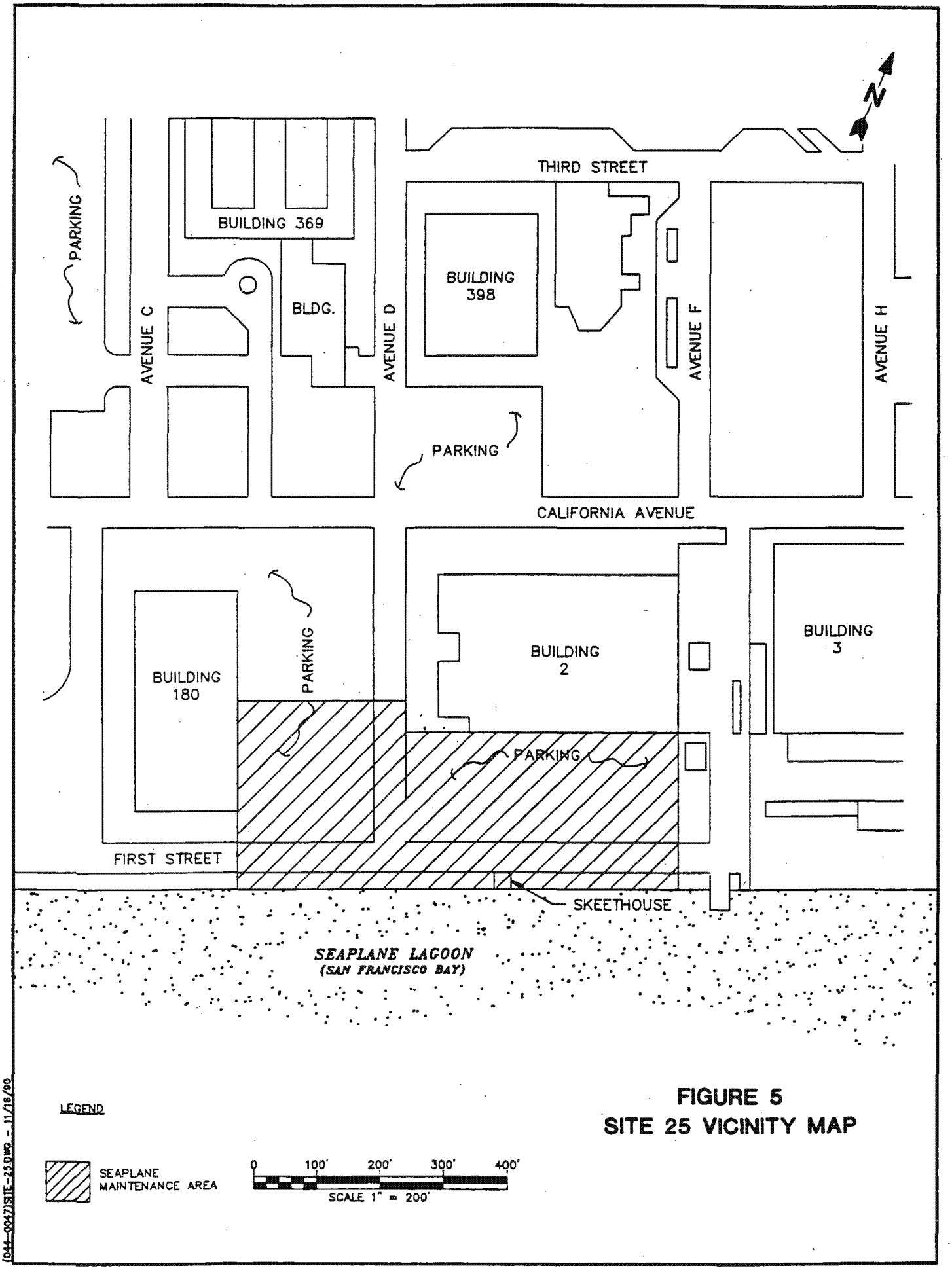

FIGURE 5
SITE 25 VICINITY MAP

Additionally, 10 underground storage tanks for aviation fuel are reported to be located in an unspecified area adjacent to Building 2. The exact locations of these tanks is unknown and there is no record of their abandonment. No records of leakage concerning these tanks were found in the records reviewed.

8.0 FIELD ACTIVITIES

Field activities were performed in accordance with the SAP that was included in the Volume I Site Inspection Work Plan for NAVSTA Treasure Island dated August 17, 1990. This section presents a summary of field activities conducted as part of the SI and identifies deviations from the SAP.

8.1 DESCRIPTION OF FIELD ACTIVITIES

Field activities at TI included the following tasks:

- Soil Boring and Sampling
- Field Documentation

Soil Boring and Sampling

Five soil borings were advanced to a depth of 10 feet at each site (Army Point Sludge Disposal Area, Refuse Transfer Area, and Seaplane Maintenance Area). All borings were drilled using 8-inch outside diameter, hollow stem auger flights. Soil boring locations at each site are depicted in Figures 6 through 8.

Soil samples were also used to log each of the soil borings. The Unified Soil Classification System and a Munsel Soil Color Chart were used to describe soil types. Field borelogs are included as Appendix C.

Upon completion of soil boring and sampling activities, all borings were grouted to the ground surface with a cement-bentonite slurry. The drill cuttings and decontamination water were containerized in 15 55-gallon drums and were transferred to the permanent hazardous waste storage facility on-site. Each drum was labelled as to the boring location and date of the cuttings and decontamination water.

ED_002145A_00024696-00023

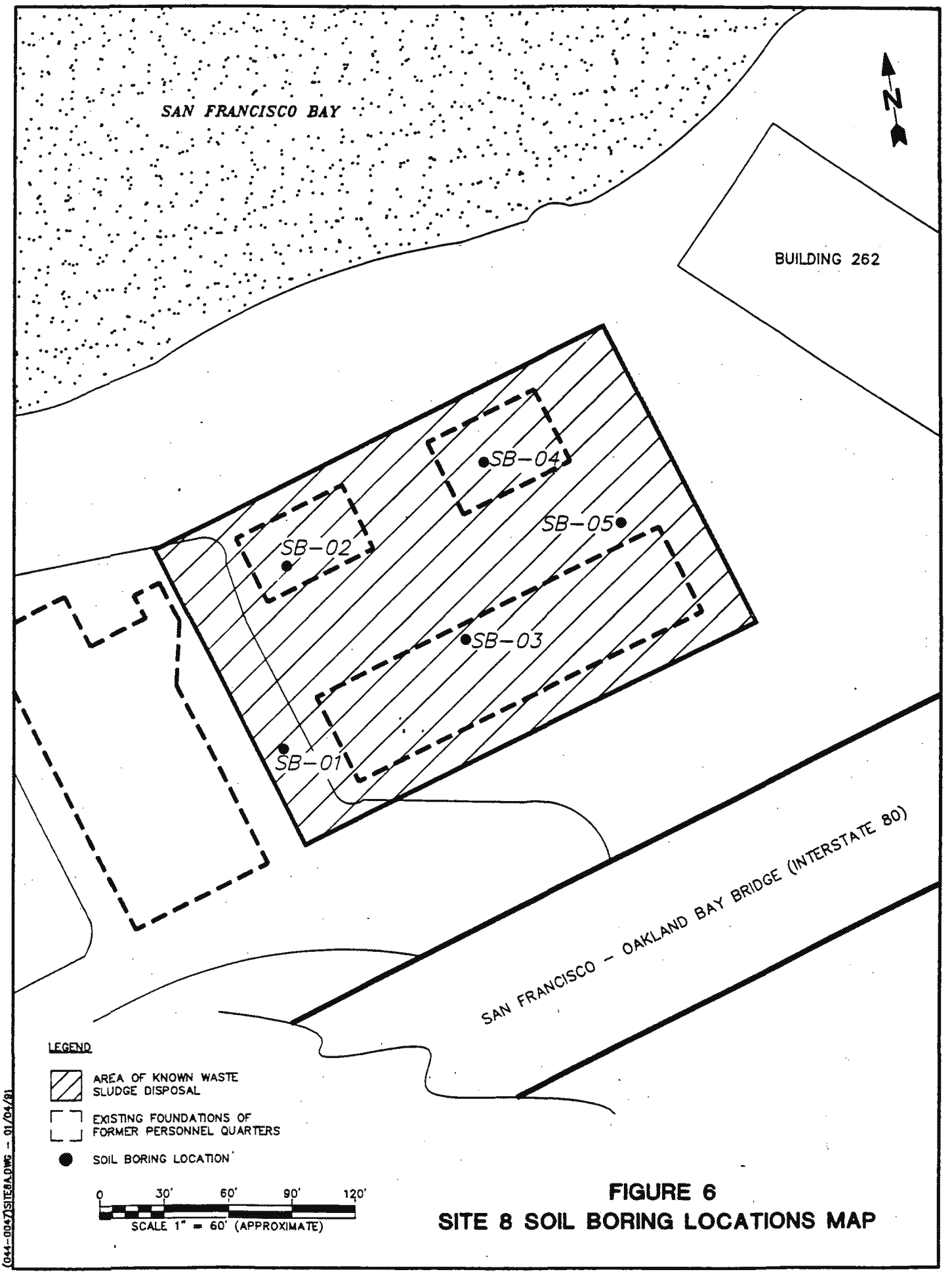

FIGURE 6
SITE 8 SOIL BORING LOCATIONS MAP

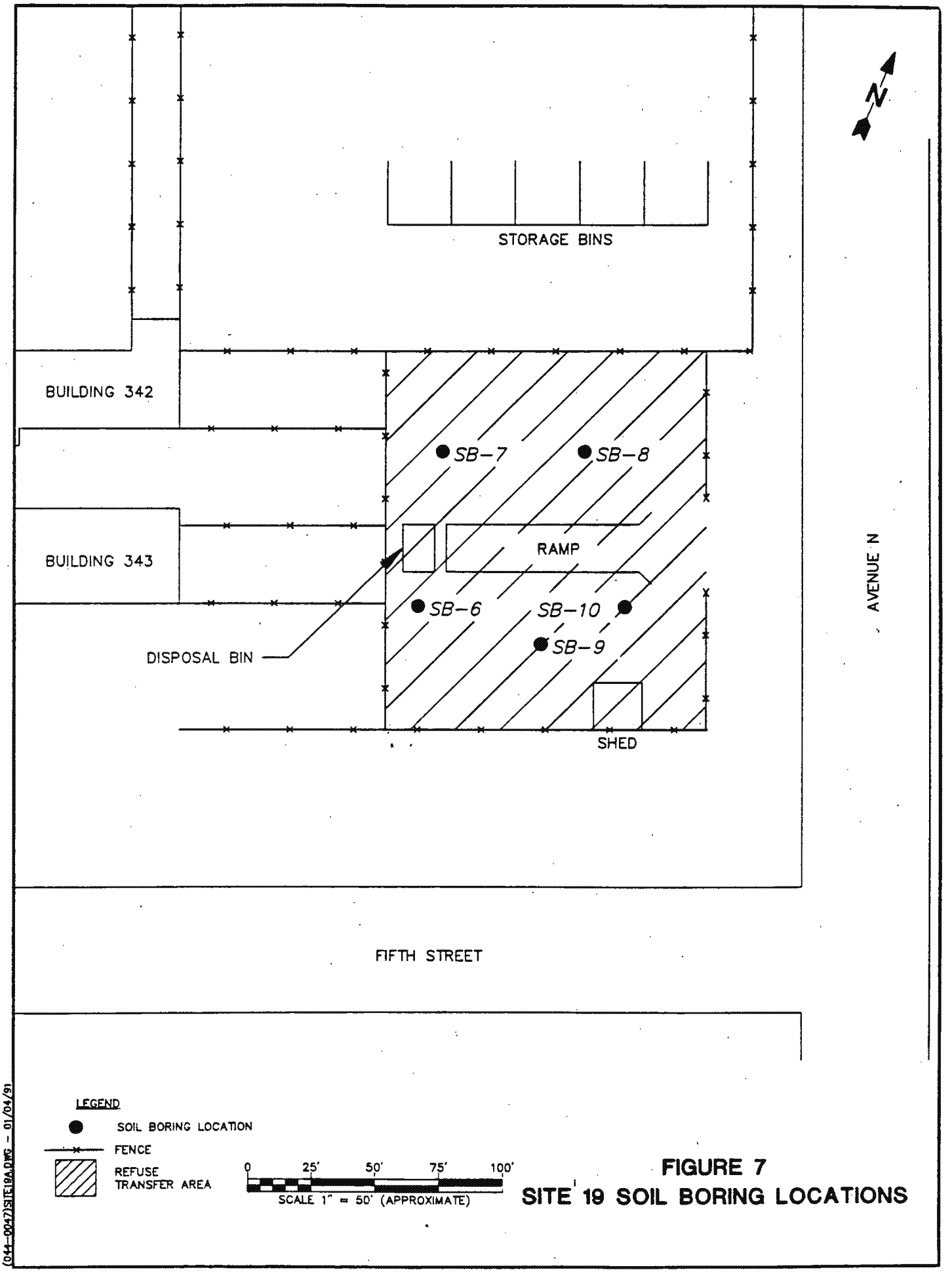

FIGURE 7
SITE 19 SOIL BORING LOCATIONS

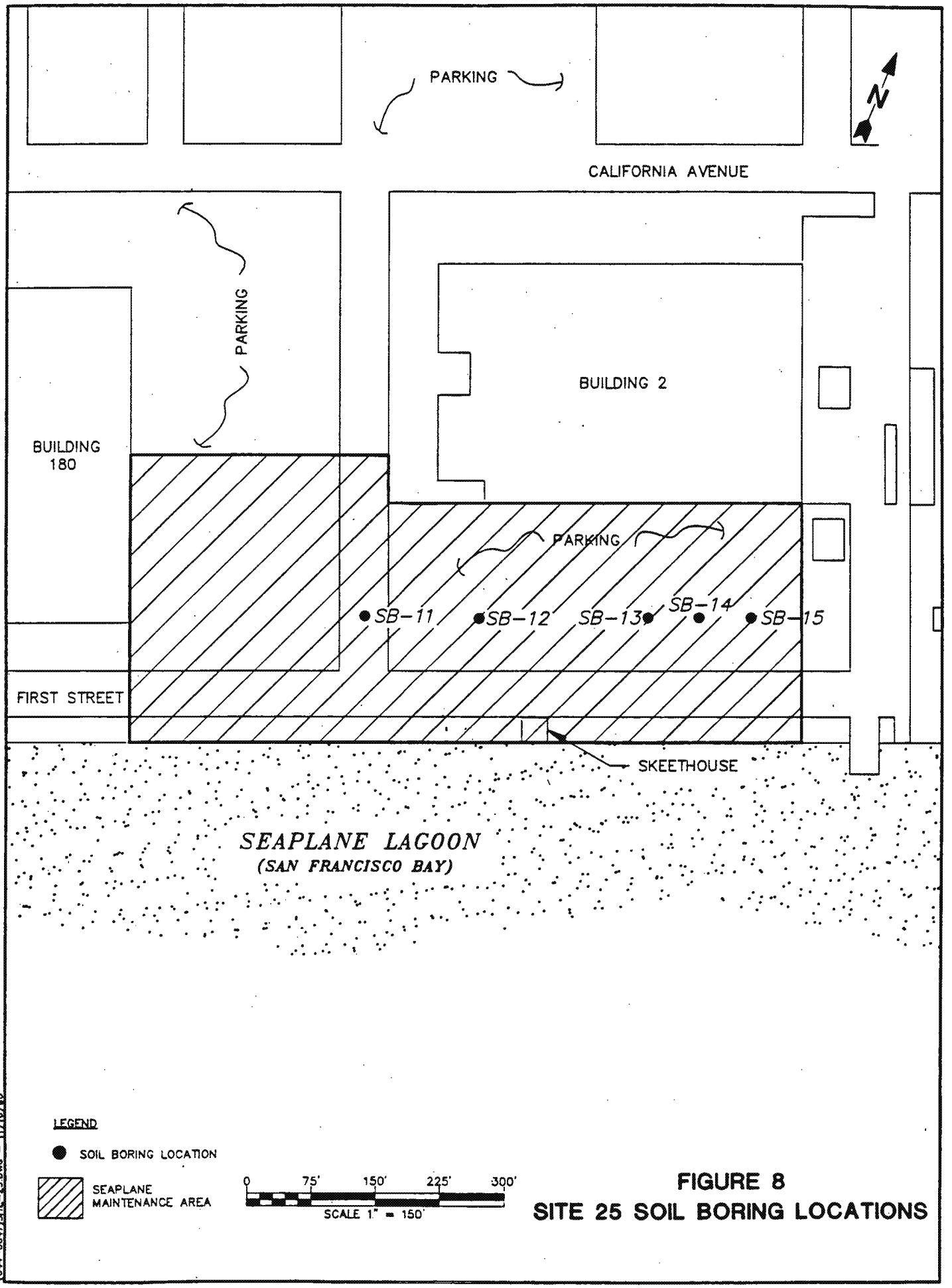

FIGURE 8
SITE 25 SOIL BORING LOCATIONS

Field Documentation

During the site inspection the following field documents were maintained to help ensure quality control of field activities:

- Field Log Book
- Soil Boring and Sample Collection Logs
- Chain-of-Custody Forms

All documents were written in ink and completed daily by the on-site geologist. Field documents are included in Appendices B and C.

8.2 DEVIATIONS FROM WORK PLAN

Due to field conditions and other unforeseen occurrences, some of the field activities were not performed as specifically described in the work plan. Sampling locations and depths were adjusted to reflect field conditions encountered in the field, including surface features, soil type, sample composition and sampling quality, and depth to ground water. This resulted in minor changes from the sample locations specified in the field work plan but did not affect the results of the site inspection. Actual sample depths are identified in Table 1.

9.0 EXPOSURE STANDARDS, CRITERIA, AND GUIDELINES

State and Federal government agencies have established levels to define acceptable or qualified levels of risk for exposure to certain contaminants in various media. Standards, guidelines, and criteria for various media are shown in Table 2. The rationale for this criteria is further discussed below.

Under the Safe Drinking Water Act (SDWA, 42 USCA 300), EPA established two types of standards for public water systems; maximum contaminant levels goals (MCLG) and maximum contaminant levels (MCL). MCLGs are nonenforceable health goals set at levels that result in no known adverse health effects, when considering an adequate margin of safety. MCLs are enforceable drinking water standards set as close to MCLGs as feasible, after accounting for analytical, technical, and economical considerations. MCLs and MCLGs are listed in 40 CFR Parts 141 and 143, respectively.

ED_002145A_00024696-00027

TABLE 1
SOIL SAMPLING ACTIVITIES

Location	Sample Depths (feet)			Total Samples
Army Point Sludge Disposal Area				
SB-01	0	5	10 - NR[1]	2
SB-02	0	3.5 - NR	10	2
SB-03	2	5 - NR	-	1
SB-04	0	-	-	1
SB-05	0	5.5 - NR	-	1
Refuse Transfer Area				
SB-06	0	5	-	2
SB-07	2	5	-	2
SB-08	2	5	-	2
SB-09	2	5	-	2
SB-10	2	5	-	2
Seaplane Maintenance Area				
SB-11	2	5	-	2
SB-12	2	5	-	2
SB-13	2	5	-	2
SB-14	2	5	-	2
SB-15	2	5	-	2
		Total Number of Soil Samples		27

[1]NR - No Recovery

ED_002145A_00024696-00028

TABLE 2
APPLICABLE OR RELEVANT AND APPROPRIATE REGULATIONS

Organics	STLC[1] mg/L	TTLC[1] mg/kg	EPA MCL[2] µg/L	DHS Appl'd Action Lvl. µg/L	State MCL µg/L
Methylene Chloride	-	-	5	40	0
4,4´ - DDE	0.1	1	-	-	-
4,4´ - DDD	-	0.1	1	-	-
4,4´ - DDT	0.1	1	-	-	-
Inorganics	**mg/L**	**mg/kg**	**mg/L**	**mg/L**	**mg/L**
Arsenic	5	500	0.05	-	0.05
Lead	5	1,000	0.05	0.05	-
Mercury	0.2	20	0.002	-	0.002
Selenium	1	100	0.01	-	-
Thallium	7	700	-	-	-
Aluminum	-	-	-	-	1
Antimony	15	500	-	-	-
Barium	100	10,000	-	1	-
Beryllium	0.75	75	-	-	-
Cadmium	1	100	0.01	-	0.01
Chromium	560	2,500	0.05	-	0.05
Cobalt	80	8,000	-	-	-
Copper	25	2,500	-	-	1
Iron	-	-	-	-	0.3
Manganese	-	-	-	-	0.05
Nickel	20	2,000	-	-	-
Silver	5	500	0.05	-	0.05
Vanadium	24	2,400	-	-	5
Zinc	250	5,000	-	-	5

[1]California Administrative Code Title 22

[2]40 CFR Part 141

ED_002145A_00024696-00029

The criteria for identifying hazardous and extremely hazardous wastes are contained in the California Administrative Code, Article 11 of Title 22. The criteria identify soil and other solid materials as being hazardous if the metals content exceeds the total threshold limit concentrations (TTLC) and soluble threshold limit concentrations (STLC). The TTLCs, pertaining to total metals content, and the STLCs, pertaining to soluble metals content, vary for individual metallic elements. A soil or other material is considered nonhazardous if the individual total metals concentrations are less than the corresponding STLC. If a material contains concentrations of a metal between the corresponding STLC and TTLC established for that metal, a Waste Extraction Test (WET) is required to quantify the soluble metal content before a hazardous/nonhazardous determination can be made. TTLCs and STLCs are Applicable of Relevant and Appropriate Requirements (ARAR) for California.

For further comparison, background metals concentrations for soil were researched. Detailed below are overall background metal concentrations for soils in the United States:

Background Metals Concentration In Soils*

Metal	Concentration
Arsenic	<0.1 - 4.1 ppm
Chromium	20 - 70 ppm
Copper	<1 - 20 ppm
Lead	<30 ppm
Zinc	45 - 120 ppm

* U.S. Geological Survey, Professional Paper 1970

A literature search was performed; however, no literature was located to document background metals concentrations for soils in the San Francisco Bay Area.

10.0 RESULTS

This section presents the results of the field work performed at TI. Results are presented separately for each site in terms of soil characteristics, the presence of contaminants, and ARARs for the compounds detected. Laboratory analytical reports for all soil samples are presented in Appendix A.

ED_002145A_00024696-00030

10.1 SITE 8 - ARMY POINT SLUDGE DISPOSAL AREA

Seven soil samples were collected from the five soil borings advanced at the Army Point Sludge Disposal Area. The soil samples were collected from each of the soil borings and submitted for chemical analyses. In addition, samples were used to classify soils and log each borehole.

10.1.1 Soil Characteristics

Four soil types were identified at this site: (1) pale, light, yellowish brown (Munsel color numbers 10 YR6/3 and 10YR4/4), loose and dry, silty sand; (2) dark, yellowish brown (10YR4/4), loose and dry gravelly silt; (3) brown (7.5YR5/4), loose and dry to loose and slightly moist, silty sand with some fine gravel; and (4) weak red (2.5YR5/2), shale bedrock. In SB-01, SB-03, and SB-04, silty sand represented the upper section of the borings, from 0 inches to approximately 18 inches below land surface (BLS) and was underlain by gravelly silt to the total depth of the borings, approximately 10 feet BLS. SB-05 also showed these soil characteristics; however, shale bedrock was encountered at approximately 5 feet BLS, the total depth of the boring. In SB-02, silty sand with some fine gravel, varying from loose and dry to loose and slightly moist, was present to the total depth of the boring, approximately 10 feet BLS.

10.1.2 Contamination Characterization

Soil samples collected at Site 8 were analyzed for CLP Metals using EPA Method 7000, and pesticides and PCBs using EPA Method 8080. Table 3 presents the range of concentrations for each analyte detected in these samples. The highest analyte concentrations were randomly distributed throughout the site, and not limited to a specific area as defined by a particular sample or set of samples.

10.1.3 ARARs

Currently, there are no applicable standards for defining maximum permissible contaminant levels in soil. Therefore, TTLCs were chosen as the appropriate and relevant standard for comparison with pesticide and metals concentrations detected in soil (Table 2). Analytical results for soil samples collected from Site 8 indicated concentrations of 4,4′ - DDT slightly above its respective TTLC. The analytical results also indicated concentrations of cadmium, lead, arsenic, mercury, antimony, barium, beryllium, copper, nickel, and vanadium above its respective STLC. No metals were detected above TTLC's at this location. A WET test

ED_002145A_00024696-00031

TABLE 3
SITE 8 - RANGES OF DETECTED CONCENTRATIONS OF ANALYTES

Metals	Range of Concentrations (mg/kg)
Arsenic	2U[1]-9
Lead	10.7 - 276
Mercury	0.04U - 0.57
Potassium	1,000U - 3,470
Selenuim	1.0U
Sodium	1,000U
Thallium	2.0U
Aluminum	7,800 - 126,000
Antimony	12U - 22
Barium	160 - 438
Beryllium	1.0U
Cadmium	3.17 - 6.90
Calcium	6,000 - 15,800
Chromium	26.6 - 44.8
Cobalt	12 - 21
Copper	26 - 85
Iron	19,900 - 13,600
Magnesium	5,000 - 8,000
Manganese	317 - 770
Nickel	27.4 - 60.1
Silver	2.0U
Vanadium	30.9 - 58.2
Zinc	65 - 108

Pesticides and PCBs	Range of Concentrations (µg/kg)
4,4´ - DDE	33U - 600
4,4´ - DDD	33U - 90
4,4´ - DDT	33U - 1,100

[1]U - Indicates compound was included in the analyses but not detected above the concentration listed. The value listed is the sample quantitation limit and is corrected for dilution and for percent moisture.

ED_002145A_00024696-00032

is required for samples containing concentrations of these metals above the respective STLCs. The results of the WET test analyses will help to determine if the soils in this area can be defined as hazardous for these metals. Contaminated soils from this area may be defined as hazardous waste if removed. Currently, the extent of contamination has not been assessed. Additional investigation is required to define the horizontal and vertical extent of soil contamination.

10.2 SITE 19 - REFUSE TRANSFER AREA

Ten soil samples were collected from the five soil borings advanced at the Refuse Transfer Area. The soil samples were collected from each of the soil borings and submitted chemical analyses. In addition, samples were used to classify soils and log each borehole.

10.2.1 Soil Characteristics

Three soil types were identified at this site: (1) dark, grayish brown (2.5Y4/2), loose and dry, gravelly silt; (2) light, olive brown (2.5Y5/4), loose and moist, coarse-grained arkosic sand; and (3) light brown (7.5Y6/3), silty, coarse-grained sand with some gravel. In SB-06, SB-07, and SB-09, gravelly silt represented the top layer, from 0 inches to approximately 18 inches BLS. In SB-08, silty, coarse-grained sand represented the top layer, from 0 inches to approximately 18 inches BLS. In all borings, the top layer was underlain by coarse-grained, arkosic sand to a depth of approximately 5.5 feet BLS. Coarse-grained, arkosic sand was present in SB-10 from the ground surface to approximately 5.5 feet BLS. SB-07 also exhibited 1/2-inch thick dark grey clay lenses interspersed with the coarse-grained, arkosic sands at depths from 4 feet to 5.5 feet BLS. Ground water was encountered at 10.5 feet BLS during the drilling of SB-09.

10.2.2 Contamination Characterization

Soil samples collected at Site 19 were analyzed for CLP Metals using EPA Method 7000, Volatile Organic Compounds (VOCs) using EPA Method 8240, Semi-Volatile Organic Compounds (SVOCs) using EPA Method 8270, and TPH (nonextractable) using EPA Method 8015. Table 4 presents the range of concentrations for each analyte detected in these samples. The highest analyte concentrations were detected in soil samples collected from SB-8 and SB-9, at 5 and 2 feet BLS, respectively. SB-8 and SB-9 were drilled at the north and south sides of the concrete ramp. There are insufficient data to establish a conclusion for the analyte concentrations detected in these samples. Analyte concentrations detected in the other samples collected at Site 19, for the most part, are considerably lower than the concentrations detected in the samples from SB-8 and SB-9. Analyte concentrations for these other samples were similar in range to each other.

ED_002145A_00024696-00033

TABLE 4
SITE 19 - REFUSE TRANSFER AREA
RANGES OF DETECTED CONCENTRATIONS OF ANALYTES

Metals	Range of Concentrations (mg/kg)	Volatiles	Range of Concentrations (µg/kg)
Arsenic	2U[1] - 7	Methylene Chloride	10U - 13U
Lead	1.1 - 37.5	Acetone	10U - 16U
Mercury	0.94U - 0.20		
Potassium	1,000U - 2,300	Semi-Volatiles	Range of Conc. (µg/kg)
Selenium	1U	Isophorone	340U - 560U
Sodium	1,000U	Phenanthrene	340U - 938U
Thallium	2U	Anthracene	340U - 3,010
Aluminum	3,650 - 25,900	Fluorathene	340U - 4,420
Antimony	12U - 4,820	Pyrene	340U - 1,110
Barium	40U - 106	Butylbenzylphthalate	340U - 727U
Beryllium	1U	Benzo(a)anthracene	340U - 761U
Cadmium	1U - 8.04	Crysene	340U - 450U
Calcium	3,900 - 38,600	bis(2-ethylhexyl)-phthalate	340U - 1,060
Chromium	25.3 - 87.9	Benzo(b)fluoranthene	340U - 450
Cobalt	10U - 18	Benzo(k)fluoranthene	350U - 450U
Copper	12 - 615	Benzo(a)pyrene	340U -450U
Iron	4,200 - 30,300	TPH	Range of Conc. (mg/kg)
Magnesium	2,000 - 13,000	Gasoline	1U - 110
Manganese	113 - 3,566		
Nickel	25 - 75.6		
Silver	2U - 61		
Vanadium	14.1 - 61.1		
Zinc	16 - 139		

[1]U - Indicates compound was included in the analyses but not detected above the concentration listed. The value listed is the sample quantitation limit and is corrected for dilution and for percent moisture.

ED_002145A_00024696-00034

10.2.3 ARARs

Currently, there are neither TTLCs for gasoline nor for the VOCs and SVOCs of concern at Site 19. The California Department of Health Services (DHS) has established an Applied Action Level and MCL for methylene chloride. The DHS Applied Action Level was chosen as the appropriate and relevant standard for comparison with methylene chloride concentrations detected in the soil (Table 2). Analytical results for soil samples collected from the Refuse Transfer Area indicated methylene chloride concentrations below the Applied Action Level. Analytical results for CLP Metals indicated concentrations of antimony above the respective TTLC. The analytical results also indicated concentrations of arsenic, lead, barium, beryllium, cadmium, copper, nickel, silver, and vanadium above its respective STLC. The results of a WET test analyses will help to determine if the soils in this area would be defined as hazardous for these metals. Contaminated soils from this area may be defined as hazardous waste if removed. Currently, the extent of contamination has not been assessed. Additional investigation is required to define the horizontal and vertical extent of the soil contamination.

10.3 SITE 25 - SEAPLANE MAINTENANCE AREA

Ten soil samples were collected from the five soil borings advanced at the Seaplane Maintenance Area. The soil samples were collected from each of the soil borings and submitted for chemical analyses. In addition, samples were used to classify soils and log each borehole.

10.3.1 Soil Characteristics

One soil type was identified at this site: light, olive brown (2.5Y5/4), loose and moist, coarse-grained, arkosic sand. One-inch thick dark grey clay lenses were interspersed with the coarse-grained, arkosic sand from approximately 1 foot to 2.5 feet BLS in soil boring SB-11.

10.3.2 Contamination Characterization

Soil samples collected at Site 25 were analyzed for CLP Metals using EPA Method 7000, VOCs using EPA Method 8240, SVOCs using EPA Method 8270, and TPH (nonextractable) using EPA Method 8015. Table 5 presents the range of concentrations for each analyte detected in these samples. The highest analyte concentrations were in a soil sample collected from SB-11, at 5 feet BLS. SB-11 was drilled at Avenue D at the west side of the site. There is insufficient data to establish a conclusion for the analyte concentrations detected in this sample. Analyte

ED_002145A_00024696-00035

TABLE 5
SITE 25 - SEAPLANE MAINTENANCE AREA
RANGES OF DETECTED CONCENTRATIONS OF ANALYTES

Metals	Range of Concentrations (mg/kg)	Volatiles	Range of Concentrations (µg/kg)
Arsenic	2U[1] - 3	Methylene Chloride	10U - 13U
Lead	1.7 - 22.5	Acetone	10U - 18U
Mercury	0.04U - 0.20		
Potassium	1,000U - 2,590	**Semi-Volatiles**	**Range of Conc. (µg/kg)**
Selenium	1U	Isophorone	330U - 610U
Sodium	1,000U	Phenanthrene	330U - 610U
Thallium	2U	Anthracene	330U - 610U
Aluminum	4,040 - 15,700	Fluoranthene	330U - 610U
Antimony	12U - 20	Pyrene	330U - 610U
Barium	40U - 47.8	Butylbenzylphthalate	330U - 610U
Beryllium	1U	Benzo(a)anthracene	330U - 610U
Cadmium	1U - 2.77	Crysene	330U - 610U
Calcium	2,190 - 8,980	bis(2-ethylehexyl) phthalate	330U - 610U
Chromium	28.2 - 68.6	Benzo(b)fluoranthene	330U - 610U
Cobalt	10U - 27	Benzo(k)fluoranthene	330U - 610U
Copper	7.8 - 55	Benzo(a)fluoranthene	330U - 610U
Iron	7,250 - 30,300	TPH	Range of conc. (mg/kg)
Magnesium	2,000 - 9,100	Gasoline	1.0U
Manganese	76 - 1,025		
Nickel	19.6 - 79.3		
Silver	2U		
Vanadium	14.4 - 47.3		
Zinc	17 - 72		

[1]U - Indicates compound was included in the analyses but not detected above the concentration listed. The value listed is the sample quantitation limit and is corrected for dilution and for percent moisture.

ED_002145A_00024696-00036

concentrations detected in the other samples collected from Site 25 were, for the most part, in the sample from SB-11. Analyte concentrations for these other samples were similar in range of detection to each other.

10.3.3 ARARs

There are currently neither TTLCs for the VOCs and SVOCs of concern at the Seaplane Maintenance Area, nor for gasoline. However, the Applied Action Level and MCL for methylene chloride can be used. The DHS Applied Action Level was chosen as the appropriate and relevant standard for comparison with methylene chloride concentrations detected in the soil (Table 2). TTLCs were chosen as the appropriate and relevant standard for comparison with metals concentrations detected in the soil (Table 2). Analytical results for soil samples collected from Site 25 indicated no concentrations of CLP Metals above the respective TTLCs or methylene chloride above the Applied Action Level. However, concentrations of lead, beryllium, thallium, cadmium, copper, nickel, and vanadium were indicated above its respective STLC. The results of a WET test analyses will help to determine if the soil in this area would be defined as hazardous waste if removed. Currently, the soil in this area has not been defined as hazardous.

11.0 QUALITY ASSURANCE/QUALITY CONTROL RESULTS

The NAVSTA Treasure Island SI was conducted in accordance with the QA requirements presented in the QAPjP. The QAPjP defines the data quality objectives (DQO) for measurement systems associated with field and laboratory analysis and presents the procedures to be followed to achieve those objectives. This section describes the results of field and laboratory QA activities associated with the NAVSTA Treasure Island SI. Section 11.1 summarizes the results of all QA sampling and analysis. Section 11.2 identifies whether the DQOs for the project were achieved. Apendix A presents laboratory reports for all QA analyses.

11.1 QA SAMPLING AND ANALYSIS

PRC reviewed the CLP analytical results according to EPA guidance documents "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1988. For non-CLP protocols, PRC reviewed the data according to the sample results and QC summaries recommended in the analytical methods used. The data reviews were based on the QA/AC forms only, not the raw data.

ED_002145A_00024696-00037

QA sampling and analysis activities included collecting and analyzing field and laboratory QC samples. Field QC samples included trip blanks and equipment blanks. Laboratory QC samples included laboratory blanks, matrix spikes and matrix spike duplicates, and blank spikes. Other QA procedures regularly performed by the laboratory included instrument tunings, calibrations checks and surrogate recovery monitoring.

Trip blanks were filled with deionized water, transported to the sampling location and returned to the laboratory in a manner identical to the handling procedures used for the samples. The trip banks were subjected to volatiles analysis only. The purpose of the trip blank was to assess volatile any contamination encountered during transport of the samples.

Equipment blanks consisted of rinse water samples taken from the Teflon® bailer and split-spoon sampler following decontamination. The purpose of the equipment blank was to assess cross-contamination associated with the sampling activities and to ensure that sampling devices had been effectively cleaned. Analytical results for the trip blank and equipment blank samples are discussed below for each analytical procedure. Sample identification numbers for rip blanks and equipment blanks are listed in Table 6. Analytical results for these samples are presented in Appendix A.

Laboratory blanks are prepared at the laboratory and are extracted and analyzed along with a group of samples. The laboratory blanks assessed any contamination and introduced in the laboratory. Each group of samples extracted or analyzed on a particular day should have an associated laboratory blank. Appendix A summarizes the laboratory blank results.

Matrix spikes and matrix spike duplicates (MS/MSD) were prepared by spiking samples with known concentrations of selected analytes. The MS/MSD were used to assess laboratory precision and accuracy on a particular matrix. Blank spikes were used to assess laboratory precision and accuracy, but used a blank water matrix and were not matrix specific.

11.1.1 TCL Volatile Organic Data Assessment

The volatile organic data are valid and substantially meet the QA/QC criteria with a few exceptions. There were no holding time, instrument tuning, or calibration problems for the volatile samples. The laboratory did not submit volatile internal standard data. PRC noted the following minor problems with blank contamination, surrogate recovery, and MS/MSD.

ED_002145A_00024696-00038

TABLE 6
FIELD QC SAMPLES

Location	Analyte/ Test Method	Equipment Blank Sample ID Numbers	Trip Blank Sample ID Numbers
Site 8	CLP Metals	SB-01-W-00-B SB-02-W-00-B	NA[1]
	CLP Volatiles	NA	SB-01-W-00-T SB-02-W-00-T
Site 19	CLP Metals	SB-09-W-00-B SB-15-W-00-B	NA
	TPH (Gas)	SB-09-W-00-B SB-15-W-00-B	NA
	CLP Volatiles	NA	SB-09-W-00-T
Site 25	NA	NA	NA

[1]NA: Not Applicable

ED_002145A_00024696-00039

Blank Contamination - Methylene chloride and acetone were found in some samples. These compounds are common laboratory and field contaminants. The concentrations found in the samples were 11-23 μg/kg. Although neither methylene chloride nor acetone were found in the laboratory or field blanks, the sample concentrations are low enough to be considered blank contamination. For these contaminants, all sample results which were originally detected are qualified non-detected and estimated (UJ).

Surrogate Recovery - The volatile surrogate recovery for dichloroethane-d_4 was 117 percent (76-114 percent acceptable range) in sample SB-01-0W-00-T. The sample was reanalyzed with similar results. This problem is not expected to affect the data since the limits were only marginally exceeded.

Matrix Spike and Matrix Spike Duplicate - The relative percent difference (RPD) for four of five matrix spike compounds marginally exceed (31 - 36 percent) the QC acceptance criteria in the matrix spike sample of SB-12-S-02-R. The reason for this is unclear, but the problem is not expected to affect the data.

11.1.2 TCL Semi-Volatile Organic Data Assessment

The semi-volatile organics data are valid and substantially meet the criteria set forth in the analytical protocol with some exceptions. There were no problems with the holding times, instrument tuning, or calibration. Internal standard data were not submitted by the laboratory. Problems were noted with blank contamination, surrogate recovery, and MS/MSD.

Blanks Contamination - The semi-volatile laboratory blanks contained bis(2-ethylhexyl)phthalate contamination at a concentration of 560 μg/kg. For this contaminant, all sample results originally found at less than 10 times the amount found in the laboratory blank are considered non-detected and estimated (UJ). In addition, butylbenzylphthalate is considered a common laboratory contaminant and all sample results which were originally detected are considered non-detected and estimated (UJ). The equipment blanks and trip blanks were not analyzed for semi-volatiles.

Surrogate Recovery - Due to surrogate recovery problems all results for the semi-volatile compounds in sample SB-12-S-02-R are considered as estimated (J) and usable for limited purposes only. The recover for all semi-volatile surrogates were below the QC acceptance limits (reported recoveries 7-13 percent). False negatives may exist for these samples because of the poor recovery observed. This sample is noted in the table of analytical results presented in Appendix A.

ED_002145A_00024696-00040

Matrix Spike and Matrix Spike Duplicate - The spike recoveries of eight matrix spike compounds were marginally below (1 - 17 percent) the acceptable range in the MS and MSD of sample SB-19-S-05-R. These problems are not expected to effect the data.

11.1.3 TCL Pesticide/PCB Data Assessment

The pesticide/PCB organic data are valid and substantially meet the QA/QC criteria with some exceptions. There were no holding time, instrument performance, or blank contamination for the pesticide/PCB samples. PRC noted the following problems with surrogate recovery, MS/MSD, and calibrations.

Surrogate Recovery - The pesticide/PCB surrogate recovery for decachlorobiphenyl exceeded the QC acceptance limits of 60-150 percent in sample SB-04-S-01-R (reported recovery 161 percent). This problem is not expected to affect the data since the recovery of the second surrogate, tetrachloro-m-xylene, was within QC acceptance limit for this sample.

Matrix Spike and Matrix Spike Duplicate - The spike recoveries marginally exceeded the QC acceptance criteria for gamma-BHC (11 percent), heptachlor (20 percent), aldrin (12 percent) and endrin (2 percent) in the matrix spike sample of SB-01-S-01-R. The reason for this is unclear, but marginally high recoveries are not expected to affect the data.

Calibration - Analytical problems were observed for the pesticide calibration verification sample in the pesticide/PCB analytical sequence. High RPD's for beta-BMC (36.7 percent) and methoxyclor (86.0 percent), and high percent breakdown for endrin (51.9 percnet) were observed for the calibration verification samples analyzed on 10-8-90. This problem should not affect the results, because no problems were observed on the dates the Treasure Island pesticide/PCB samples were analyzed, October 7 and October 10, 1990.

11.1.4 TAL Metals Data Assessment

The metals organic data are valid and substantially meet the criteria set forth in the analytical protocol with the exceptions described below. There were no problems with the holding times, calibration verifications, interference check samples, duplicate analyses, matrix spikes, and furnace QC injections.

ED_002145A_00024696-00041

Deficiencies were found for two equipment blanks. They contained zinc at concentrations of 12 and 16 μg/L. All detected samples results that are below 16 μg/kg are considered estimated (J) because the results are suspect.

11.1.5 Total Petroleum Hydrocarbons Data Assessment

The samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline. The data for this analysis are valid and substantially meet the criteria set forth in the analytical protocols. No problems were observed for the holding times, laboratory and field blanks, and calibration data. No surrogates or spikes were added to the samples. The following QC criteria were used in evaluating the samples.

Holding Times - All samples were extracted and analyzed within 14 days after sampling.

Laboratory and Field Blanks - Gasoline was not detected in the laboratory or field blank samples.

Calibration - The instrument sensitivity was good. The relative standard deviations were less than 15 percent for the response factors in the initial calibrations. The percent recoveries of the continuing calibration checks were within the acceptance limits of 80-120 percent for TPH.

11.2 DATA QUALITY OBJECTIVES

The data quality objectives for the NAVSTA Treasure Island SI are presented in the QAPjP. Review of the field and laboratory QA results indicates that the objectives were met. Analytical precision was good, as over 95 percent of the RPDs for spike recoveries were within the accepted QC limit. The accuracy of the analytical procedures was good for most samples as indicated by the surrogate and spike recoveries. The completeness objective was achieved, as over 90 percent of the data was usable. Finally all data are considered representative because the accepted and prescribed methods presented in the TI work plan were followed.

12.0 CONCLUSIONS AND RECOMMENDATIONS

This investigation indicated the presence of low-level contamination in soil at Sites 8, 19, and 25 at NAVSTA Treasure Island. At Site 8 - Army Point Sludge Disposal Area, chemical analyses of soil samples indicated the presence of 4, 4' - DDT slightly above the TTLC value established by DHS. Also, several metals were detected above their respective STLC values. Peak analyte concentrations for other chemical and metal constituents were randomly distributed

ED_002145A_00024696-00042

horizontally and vertically throughout the samples collected at the site and not limited to a specific area.

At Site 19 - Refuse Transfer Area, chemical analyses of soil samples indicated the presence of antimony above the TTLC value established by DHS. Several other metals were detected at concentrations exceeding their respective STLC values. Peak analyte concentrations were detected in samples from SB-8 and SB-9, at 5 and 2 feet BLS, respectively. These soil borings were located adjacent to and north and south of the concrete ramp. There are insufficient data to establish a conclusion for the analyte concentrations detected in these samples.

Chemical analyses of soil samples from Site 25 - Seaplane Maintenance Area did not indicate concentrations of CLP Metals above their respective TTLC values. However, several metals were detected at values exceeding their respective STLC values. Peak analyte concentrations were detected primarily from a sample collected from SB-11, at 5 feet BLS. There are insufficient data to establish a conclusion for the analyte concentrations detected in this sample.

Currently, there are no applicable standards for defining maximum permissible contaminant levels in soil. State of California TTLCs were chosen as the appropriate and relevant standard for comparison with pesticide and metals concentrations detected in soil. DHS, the lead agency for this investigation, should be contacted to determine site-specific ARARs for the three sites comprising this investigation. The results of the WET tests will determine if the soils from these sites may be defined as hazardous waste.

Further investigation and analyses are required to assess the horizontal and vertical extent of contamination. A more extensive, site-specific soil sampling and ground-water monitoring plan for each of the three sites should be prepared describing the investigation objectives and design. Soil borings should be advanced to the ground-water table and soil samples collected at the ground surface and at 5-foot intervals for chemical analyses.

ED_002145A_00024696-00043

APPENDIX A
LABORATORY ANALYTICAL REPORTS

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Inorganic Analyses

Concentration in mg/kg

Sample Location																							
Sample I.D.	SB-05-S-01-R			SB-03-S-01-R			SB-02-S-01-R			SB-04-S-01-R			SB-01-S-01-R			SB-01-S-07-R					
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
METALS																					
Arsenic	9			6			3			4			2 U			3					
Lead	276			72.8			116			214			13.5			10.7					
Mercury	0.57			0.18			0.04U			0.04U			0.35			0.04U					
Potassium	2930			3470			1700			1000 U			3100			3100					
Selenium	1 U			1 U			1 U			1 U			1 U			1 U					
Sodium	1000 U			1000 U			1000 U			1000 U			1000 U			1000 U					
Thallium	2 U			2 U			2 U			2 U			2 U			2 U					
Aluminum	15100			7800			126000			18200			21800			19200					
Antimony	22			12 U			18			12 U			12 U			15					
Barium	245			240			199			424			438			160					
Beryllium	1 U			1 U			1 U			1 U			1			1 U					
Cadmium	6.41			6.90			3.17			4.58			5.38			4.05					
Calcium	6000			8510			10300			10000 U			15800			11400					
Chromium	42.0			44.8			42.8			32.0			33.0			26.6					
Cobalt	20			17			12			21			15			16					
Copper	65			64			26			85			38			43					
Iron	35200			37100			19900			30200			136000			27000					
Magnesium	7300			8000			5000			7900			6900			7860					
Manganese	471			362			317			770			608			517					
Nickel	56.8			60.1			44.0			42.1			31.5			27.4					
Silver	2 U			2 U			2 U			2 U			2 U			2 U					
Vanadium	34.9			30.9			35.1			48.6			58.2			47.5					
Zinc	85			96			108			101			65			76					
Percent Solids	96 %			96 %			94 %			95 %			96 %			96 %					

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Inorganic Analyses

Concentration in mg/kg

Sample Location / Sample I.D.	SB-07-S-05-R			SB-08-S-02-R			SB-08-S-05-R			SB-11-S-02-R			SB-11-S-05-R			SB-12-S-02-R			SB-12-S-05-R		
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
METALS																					
Arsenic	4			7			7			2	U		3			2	U		2	U	
Lead	1.8			2.7			19.3			1.9			6.9			3.1			2.4		
Mercury	0.04	U		0.04	U		0.04	U		0.04	U		0.04	U		0.04	U		0.04	U	
Potassium	1000	U		1000	U		2300			1000	U		2590			1000	U		1000	U	
Selenium	1	U		1	U		1	U		1	U		1	U		1	U		1	U	
Sodium	1000	U		1000	U		1000	U		1000	U		1000	U		1000	U		1000	U	
Thallium	2	U		2	U		2	U		2	U		2	U		2	U		2	U	
Aluminum	4540			4730			25900			4550			15700			6590			5480		
Antimony	18			12	U		23			12	U		12	U		12	U		12	U	
Barium	40	U		40	U		40	U		40	U		40	U		40	U		40	U	
Beryllium	1	U		1	U		1	U		1	U		1	U		1	U		1	U	
Cadmium	1.74			3.61			8.04			1	U		2.55			1.68			1.64		
Calcium	10500			23500			7150			2480			8980			3800			2750		
Chromium	50.7			26.7			87.9			28.5			68.6			36.1			31.9		
Cobalt	10	U		10	U		18			10	U		27			10	U		10	U	
Copper	12			28			42			7.8			55			12			27		
Iron	13200			15500			4200			9270			30300			11500			9500		
Magnesium	4690			4900			13000			2300			9100			3300			2700		
Manganese	228			362			3566			108			467			107			87		
Nickel	42.8			33.5			75.6			21.7			79.3			27.3			24.1		
Silver	2	U		2	U		61			2	U		2	U		2	U		2	U	
Vanadium	19.5			19.8			61.1			17.4			47.3			22.6			18.9		
Zinc	20			35			104			17			72			24			26		
Percent Solids	95 %			97 %			74 %			95 %			54 %			95 %			96 %		

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Inorganic Analyses

Concentration in mg/kg

Sample Location / Sample I.D.	SB-13-S-02-R			SB-13-S-05-R			SB-14-S-02-R			SB-14-S-05-R			SB-15-S-02-R			SB-15-S-05-R			SB-06-S-02-R		
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
METALS																					
Arsenic	2	U		2	U		2	U		2	U		2	U		2	U		3		
Lead	6.1			22.5			2.1			11.8			1.7			2.9			25.1		
Mercury	0.04	U		0.04	U		0.04	U		0.04	U		0.04	U		0.04	U		0.04	U	
Potassium	1660			1000	U		1000	U		1450			1000	U		1000	U		1000	U	
Selenium	1	U		1	U		1	U		1	U		1	U		1	U		1	U	
Sodium	1000	U		1000	U		1000	U		1000	U		1000	U		1000	U		1000	U	
Thallium	2	U		2	U		2	U		2	U		2	U		2	U		2	U	
Aluminum	5480			7290			4410			7360			4040			4510			6730		
Antimony	14			14			12	U		17.5			12	U		20			12	U	
Barium	40	U		46			40	U		47.8			40	U		40	U		40	U	
Beryllium	1	U		1	U		1	U		1	U		1	U		1	U		1	U	
Cadmium	1.42			2.77			1	U		2.2			1	U		1	U		1.82		
Calcium	8400			6070			2190			4970			2190			2750			9040		
Chromium	31.9			30.9			28.2			33.9			35.2			31.6			35.9		
Cobalt	10	U		10	U		10	U		10	U		10	U		10	U		10	U	
Copper	19			48			19			49			22			18			31.4		
Iron	9200			12300			8140			12400			7250			8170			15400		
Magnesium	2900			3200			2300			3420			2000			2300			5100		
Manganese	1025			169			80			158			76			84			280		
Nickel	24.5			22.9			22.5			23.7			19.6			23.3			35.0		
Silver	2	U		2	U		2	U		2	U		2	U		2	U		2	U	
Vanadium	18.4			22.7			16.6			22.6			14.4			17.6			20		
Zinc	25			61			22			45			19			22			70		
Percent Solids	97 %			95 %			96 %			93 %			96 %			97 %			96 %		

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Inorganic Analyses

Concentration in mg/kg

Sample Location / Sample I.D.	SB-06-S-05-R			SB-09-S-02-R			SB-09-S-05-R			SB-10-S-02-R			SB-10-S-05-R			SB-07-S-02-R					
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
METALS																					
Arsenic	2	U		4			2	U		5			2			3					
Lead	2.0			77.8			1.1			3.6			1.6			37.5					
Mercury	0.09			0.09			0.09			0.13			0.04	U		0.20					
Potassium	1000	U		1470			1000	U		1000	U		1000	U		1000	U				
Selenium	1	U		1	U		1	U		1	U		1	U		1	U				
Sodium	1000	U		1000	U		1000	U		1000	U		1000	U		1000	U				
Thallium	2	U		2	U		2	U		2	U		2	U		2	U				
Aluminum	3680			7380			3650			6420			3700			7440					
Antimony	4820			12	U		12	U		13			12	U		9		J			
Barium	40	U		106			40	U		40	U		40	U		49					
Beryllium	1	U		1	U		1	U		1	U		1	U		1	U				
Cadmium	1.13			3.77			1	U		1.92			1.42			2.31					
Calcium	11300			15900			17000			3900			38600			8200					
Chromium	29.3			35.5			25.3			33.2			25.4			42.7					
Cobalt	10	U		10	U		10	U		10	U		10	U		10	U				
Copper	21			58			9			28			12			615					
Iron	7660			16800			6920			14500			8680			15300					
Magnesium	2000			5300			2000			4800			2610			8030					
Manganese	120			3375			113			256			202			283					
Nickel	28.7			37.5			25.0			40.3			25.7			65.3					
Silver	2	U		2	U		2	U		2	U		2	U		2	U				
Vanadium	17.8			23.2			16			20.5			14.1			24.0					
Zinc	20			139			16			56			30			103					
Percent Solids	95 %			96 %			95 %			95 %			96 %			96 %					

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Pesticides/PCBs

Concentration in ug/kg

Sample Location / Sample I.D.	SB-05-S-01-R			SB-03-S-01-R			SB-02-S-01-R			SB-04-S-01-R			SB-01-S-01-R			SB-01-S-07-R					
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
PESTICIDES/PCBs																					
4,4'-DDE	180			98			33	U		600			33	U		33	U				
4,4'-DDD	54			90			33	U		61			33	U		33	U				
4,4'-DDT	400			410			160			1100			66			33	U				

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Organic Analyses

Concentration in ug/Kg

Sample Location / Sample I.D.	SB-07-S-05-R			SB-08-S-02-R			SB-08-S-05-R			SB-11-S-02-R			SB-11-S-05-R			SB-12-S-02-R			SB-12-S-05-R		
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
VOLATILES																					
Methylene Chloride	10	U		10	U		13	U		10	U		18	U		23	U	J	11	U	J
Acetone	10	U		10	U		13	U		13	U	J	18	U		10	U		15	U	J
SEMI-VOLATILES *																					
Isophorone	350	U		350	U		560			350	U		610	U		350	U		340	U	
Phenanthrene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Anthracene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Fluoranthene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Pyrene	350	U		350	U		880			350	U		610	U		350	U		340	U	
Butylbenzylphthalate	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Benzo(a)anthracene	350	U		350	U		760			350	U		610	U		350	U		340	U	
Chrysene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
bis(2-ethylhexyl)phthalate	350	U		350	U		880	U	J	350	U		610	U		350	U		340	U	
Benzo(b)fluoranthene	350	U		350	U		450			350	U		610	U		350	U		340	U	
Benzo(k)fluoranthene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Benzo(a)pyrene	350	U		350	U		450	U		350	U		610	U		350	U		340	U	
Gasoline (mg/Kg)	1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U	

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

* All semi-volatile compound results for sample SB-12-S-02-R are qualified as estimates (J) due to low surrogate recovery.

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Organic Analyses

Concentration in ug/Kg

Sample Location																							
Sample I.D.	SB-13-S-02-R			SB-13-S-05-R			SB-14-S-02-R			SB-14-S-05-R			SB-15-S-02-R			SB-15-S-05-R			SB-06-S-02-R		
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
VOLATILES																					
Methylene Chloride	10	U		10	U		10	U		11	U		10	U		10	U		10	U	
Acetone	10	U		10	U		10	U		12	U	J	10	U		10	U		16	U	J
SEMI-VOLATILES																					
Isophorone	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Phenanthrene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Anthracene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Fluoranthene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Pyrene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Butylbenzylphthalate	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Benzo(a)anthracene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Chrysene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
bis(2-ethylhexyl)phthalate	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Benzo(b)fluoranthene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Benzo(k)fluoranthene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Benzo(a)pyrene	330	U		350	U		340	U		360	U		340	U		340	U		340	U	
Gasoline (mg/Kg)	1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		1.0	U		24		

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 1
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Soil Samples for Organic Analyses

Concentration in ug/Kg

Sample Location																								
Sample I.D.	SB-06-S-05-R			SB-09-S-02-R			SB-09-S-05-R			SB-10-S-02-R			SB-10-S-05-R			SB-07-S-02-R					
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
VOLATILES																					
Methylene Chloride	10	U		10	U		10	U		10	U		10	U		10	U				
Acetone	10	U		10	U		10	U		10	U		10	U		10	U				
SEMI-VOLATILES																					
Isophorone	350	U		340	U		350	U		350	U		350	U		340	U				
Phenanthrene	350	U		938			350	U		350	U		350	U		340	U				
Anthracene	350	U		3010			350	U		350	U		350	U		340	U				
Fluoranthene	350	U		4420			350	U		350	U		350	U		340	U				
Pyrene	350	U		1110			350	U		350	U		350	U		340	U				
Butylbenzylphthalate	634	U	J	727	U	J	350	U		350	U		350	U		340	U				
Benzo(a)anthracene	350	U		761			350	U		350	U		350	U		340	U				
Chrysene	350	U		412			350	U		350	U		350	U		340	U				
bis(2-ethylhexyl)phthalate	1060	U	J	340	U		350	U		350	U		350	U		340	U				
Benzo(b)fluoranthene	350	U		366			350	U		350	U		350	U		340	U				
Benzo(k)fluoranthene	350	U		374			350	U		350	U		350	U		340	U				
Benzo(a)pyrene	350	U		385			350	U		350	U		350	U		340	U				
Gasoline (mg/Kg)	1.0	U		110			1.0	U		1.0	U		1.0	U		1.0	U				

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

ND - None Detected
D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 2
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Field Blanks for Inorganic Analyses

Concentration in ug/L

Sample Location																							
Sample I.D.	SB-01-W-00-B EB			SB-02-W-00-B EB			SB-09-W-00-B EB			SB-15-W-00-B EB													
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
METALS																					
Arsenic	10	U		10	U		10	U		10	U										
Lead	3	U		3	U		3	U		3	U										
Mercury	0.2	U		0.2	U		0.2	U		0.2	U										
Potassium	5000	U		5000	U		5000	U		5000	U										
Selenium	5	U		5	U		5	U		5	U										
Sodium	5000	U		5000	U		5000	U		5000	U										
Thallium	10	U		10	U		10	U		10	U										
Aluminum	200	U		200	U		200	U		200	U										
Antimony	60	U		60	U		60	U		60	U										
Barium	200	U		200	U		200	U		200	U										
Beryllium	5	U		5	U		5	U		5	U										
Cadmium	5	U		5	U		5	U		5	U										
Calcium	5000	U		5000	U		5000	U		5000	U										
Chromium	10	U		10	U		10	U		10	U										
Cobalt	50	U		50	U		50	U		50	U										
Copper	25	U		25	U		25	U		25	U										
Iron	100	U		100	U		100	U		100	U										
Magnesium	5000	U		5000	U		5000	U		5000	U										
Manganese	15	U		15	U		15	U		15	U										
Nickel	40	U		40	U		40	U		40	U										
Silver	10	U		10	U		10	U		10	U										
Vanadium	50	U		50	U		50	U		50	U										
Zinc	10	U		10	U		12			16											

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions
Com. - Comments
NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 2
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Field Blanks for Organic Analyses

Concentration in ug/L

Sample Location																							
Sample I.D.	SB-01-W-00-T TB			SB-02-W-00-T TB			SB-09-W-00-T TB			SB-09-W-00-B EB			SB-15-W-00-B EB										
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
VOLATILES																							
Acetone	10	U		10	U		10	U		NA			NA										
Toluene	10	U		10	U		10	U		NA			NA										
Gasoline (ug/L)	NA			NA			NA			50	U		50	U									

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions.
Com. - Comments
NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

Table 3
ANALYTICAL RESULTS

Site : Treasure Island
Lab. : Pace Inc.
Reviewer : Thorsten Anderson, PRC
Date : November 8, 1990

Analysis Type : Method Blanks for Organic Analyses

Concentration in ug/kg

Sample I.D. / Date Analyzed	Lab Blank 09/05/90			Lab Blank 09/07/90			Lab Blank 09/10/90			Lab Blank 10/07/90			Lab Blank 10/10/90			Lab Blank 10/14/90					
Compound	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.	Result	Val	Com.
VOLATILES																					
Acetone	10	U		10	U		10	U		NA			NA			NA					
Toluene	10	U		10	U		10	U		NA			NA			NA					
SEMI-VOLATILES																					
bis(2-ethylhexyl)phthalate	NA			NA			NA			NA			NA			560					
PESTICIDES/PCBs																					
4,4'-DDT	NA			NA			NA			17	U		17	U		NA					
Gasoline (mg/kg)	1.0	U		1.0	U		1.0	U		NA			NA			NA					

Other analytes were analyzed for but were not detected/qualified.
Val - Validity Refer to data qualifier definitions.
Com. - Comments
NA - Not Analyzed

D1, D2, etc. - Field Duplicate Pairs
FB - Field Blank, EB - Equipment Blank, TB - Trip Blank
BG - Background Sample

APPENDIX B
CHAIN-OF-CUSTODY FORMS

pace INCORPORATED
THE ASSURANCE OF QUALITY

18024

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environmental Management
Address: 120 Howard St. Suite 700
San Francisco, CA 94105
Phone: 415-543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference
Project Name / No.

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): Steven MacNeill
Steven MacNeill 8/28/90
Sampler Signature Date Sampled

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	ANALYSES REQUEST: Metals (7000)	Fast/PCB (8080)	VOC (624)	REMARKS
1	SB-04-S-01-R-4,5	930	S		1	X				X	X		
2	SB-01-S-01-R-4,5	1120	S		1	X				X	X		
3	SB-01-S-07-R-4,5	1145	S		1	X				X	X		Lab QC
4	SB-01-W-00-T-1	1145	W		2	X						X	
5	SB-01-W-00-B-4,5	1205	W		4	X				X	X		
6													
7													
8													

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		8/28/90	

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Donald Howard	[illegible]/90	1730

Additional Comments

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17289

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environmental Management
Address: 120 Howard St. Suite 700
San Francisco, CA 94105
Phone: 415-543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.:

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Steve MacNeill
Sampler Signature: Steven MacNeill
Date Sampled: 8/27/90

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA			ANALYSES REQUEST: Metals (7000)	Pest/PCB (8080)	VOC (624)						REMARKS
1	SB-05-S-01-R-4,5	1253	S		1	X						X	X							
2	SB-03-S-01-R-4,5	1350	S		1	X						X	X							
3	SB-02-S-01-R-4,5	1409	S		1	X						X	X							Lab QC
4	SB-02-W-00-B-4,5	1545	W		4	X						X	X							
5	SB-02-W-00-T-1	1600	W		2	X								X						
6																				
7																				
8																				

COOLER NOS.	BAILERS	SHIPMENT METHOD: OUT. DATE	RETURNED DATE
		8/28/90	/

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Donald Thorshi Pace	8/28/90	1730

Additional Comments

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17292

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environ. Mgmt. Inc
Address: 120 Howard St. Suite 700
San Francisco CA 94105
Phone: 415-543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference
Project Name / No.: Treasure Island

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): Steven MacNeill
Sampler Signature: Steven MacNeill Date Sampled: 8/31/90

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA			ANALYSES REQUEST: VOC (8240)	SVOC (8270)	Metals (7000)	TPH (Non) Extract (8015)		VOC (624)		REMARKS
1	SB-06-S-02-R-1,2,3,4	733	S		2	X						X	X	X	X				
2	SB-06-S-05-R-1,2,3,4	740	S		2	X						X	X	X	X				
3	SB-09-W-00-T-1	815	W		2	X											X		
4	SB-09-S-02-R-1,2,3,4	830	S		2	X						X	X	X	X				
5	SB-09-S-05-R-1,2,3,4	840	S		2	X						X	X	X	X				
6	SB-10-S-02-R-1,2,3,4	850	S		1	X						X	X	X	X				
7	SB-10-S-05-R-1,2,3,4	905	S		2	X						X	X	X	X				
8	SB-07-S-02-R-1,2,3,4	921	S		2	X						X	X	X	X				

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT DATE	RETURNED DATE
		8/31/90	

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	[illegible]	8/31	1500

Additional Comments

SEE REVERSE SIDE FOR INSTRUCTIONS

ED_002145A_00024696-00059

pace INCORPORATED
THE ASSURANCE OF QUALITY

17290

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environ. Mgmt. Inc
Address: 120 Howard St Suite 700
San Francisco CA 94105
Phone: 415-543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.: Treasure Island

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Steven MacNeill
Steven MacNeill 8/31/90
Sampler Signature / Date Sampled

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA	HCl TPH only		VOC (8240)	SVOC (8270)	Metals (7000)	TPH Non-Extract (8015)					REMARKS
1	SB-07-S-05-R-1,2,3,4	935	S		2	X						X	X	X	X					
2	SB-08-S-02-R-1,2,3,4	950	S		2	X						X	X	X	X					
3	SB-08-S-05-R-1,2,3,4	955	S		2	X						X	X	X	X					
4	SB-09-W-00-D-3,4	1030	W		5					X				X						
5	SB-11-S-02-R-1,2,3,4	1109	S		2	X						X	X	X	X					
6	SB-11-S-05-R-1,2,3,4	1117	S		2	X						X	X	X	X					
7	SB-12-S-02-R-1,2,3,4	1135	S		2	X						X	X	X	X					Lab QC
8	SB-12-S-05-R-1,2,3,4	1150	S		2	X						X	X	X	X					

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT DATE	RETURNED DATE
		8/31/90	

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Edward Pace	8/31	1500

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17291

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environ. Mgmt. Inc
Address: 120 Howard St Suite 700
San Francisco, CA 94105
Phone: 415-543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.: Treasure Island

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Steven MacNeill
Steven MacNeill 8/31/90
Sampler Signature / Date Sampled

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA	TPH HCl ONLY	VOC (8240)	SVOC (8270)	Metals (7000)	TPH Non-Extract (8015)	REMARKS
1	SB-13-S-02-R-1,2,3,4	1155	S		2	X					X	X	X	X	
2	SB-13-S-05-R-1,2,3,4	1200	S		2	X					X	X	X	X	
3	SB-14-S-02-R-1,2,3,4	1210	S		2	X					X	X	X	X	
4	SB-14-S-05-R-1,2,3,4	1217	S		2	X					X	X	X	X	
5	SB-15-S-02-R-1,2,3,4	1225	S		2	X					X	X	X	X	
6	SB-15-S-05-R-1,2,3,4	1230	S		2	X					X	X	X	X	
7	SB-15-W-00-B-3,4	1400	W		5					X			X	X	
8															

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT DATE	RETURNED DATE
		8/31/90	

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Ed Hilly / Pace	8/31	1500

2

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17293

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environmental Mgmt. Inc.
Address: 120 Howard St Suite 700
San Francisco CA 94105
Phone: (415) 543-4820

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference
Project Name / No.: Treasure Island

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): Steve MacNeill
Steve MacNeill 9/4/90
Sampler Signature — Date Sampled

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA			VOC (8240)	SVOC (8270)	TPH Extract Non-Extract (8015)	Metals (7000)	Pest/PCB (4080)	VOC (624)			REMARKS
1	SD-19-S-01-R-1,2,3,4,5	905	S		2	X						X	X	X	X	X				
2	SD-19-S-05-R-1,2,3,4,5	910	S		2	X						X	X	X	X	X				
3	SB-20-S-01-R-1,2,3,4,5	925	S		2	X						X	X	X	X	X				
4	SD-20-S-05-R-1,2,3,4,5	930	S		2	X						X	X	X	X	X				
5	SB-20-S-10-R-1,2,3,4,5	935	S		2	X						X	X	X	X	X				
6	SB-21-S-01-R-1,2,3,4,5	1000	S		2	X						X	X	X	X	X				
7	SB-21-S-05-R-1,2,3,4,5	1006	S		2	X						X	X	X	X	X				
8	SB-21-S-10-R-1,2,3,4,5	1010	S		2	X						X	X	X	X	X				

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		9/4/90	

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steve MacNeill (PRC)	[illegible]		

Additional Comments

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17294

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environmental Mgmt. Inc
Address: 123 Howard St. Suite 200
San Francisco CA 94105
Phone: (415) 543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.: Treasure Island

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Steve Maxwell
Sampler Signature: Steve Maxwell
Date Sampled: 9/4/90

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA			VOC (8240)	SVOC (8270)	TPH Extract Non-Synth. (8015)	Metals (7000)	Pest/PCB (8080)	VOC (624)	REMARKS
1	SB-22-S-01-R-1,2,3,4,5	1115	S		2	X						X	X	X	X	X		
2	SB-22-S-05-R-1,2,3,4,5	1120	S		2	X						X	X	X	X	X		
3	SB-23-W-00-T-1	1200	W		2	X											X	
4	SB-23-S-01-R-1,2,3,4,5	1215	S		2	X						X	X	X	X	X		
5	SB-23-S-05-R-1,2,3,4,5	1220	S		2	X						X	X	X	X	X		
6	SB-24-S-02-R-1,2,3,4,5	1300	S		2	X						X	X	X	X	X		Lab QC
7	SB-24-S-05-R-1,2,3,4,5	1320	S		2	X						X	X	X	X	X		
8	SB-27-S-01-R-1,2,3,4,5	1430	S		2	X						X	X	X	X	X		

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		9/4/90	

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steve Maxwell (PRC)			

Additional Comments

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17295

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC Environmental Mgmt. Inc
Address: 120 Howard St. Suite 700
San Francisco, CA 94105
Phone: (415) 543-4880

Report To: Randy Fish
Bill To: PRC
P.O. # / Billing Reference
Project Name / No.: Treasure Island

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): Steven MacNeill
Steven MacNeill 9/4/90
Sampler Signature — Date Sampled

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA	HCl (TPH only)	VOC (8240)	SVOC (8270)	TPH Extract Non-Extract (8015)	Metals (7000)	Pest/PCB (8080)	VOC (624)	REMARKS
1	SB-27-S-10-R-1,2,3,4,5	1450	S		2	X					X	X	X	X	X		
2	SB-25-W-00-D-3,4,5	1400	W		7					X			X	X	X		
3																	
4																	
5																	
6																	
7																	
8																	

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		9/4/90	

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	[illegible] PRC	9/4	

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17296

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC ENVIRONMENTAL MANAGEMENT, INC.
Address: 120 HOWARD STREET, SUITE 700
SAN FRANCISCO, CA 94105
Phone: 415/543-4880

Report To: RANDY FISH
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.: Treasure Island

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): Steve MacNeill
Sampler Signature: Steven MacNeill
Date Sampled: 9/5/90 — 9/5/90

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA			ANALYSES REQUEST: VOC 8240	SVOC 8270	TPH Extract/Unextracted Solids	Metals 7000	Pest/PCB 8080		VOC 624		REMARKS
1	SB-25-S-01-R-1,2,3,4,5	840	S		2	X						X	X	X	X	X				
2	SB-25-S-05-R-1,2,3,4,5	850	S		2	X						X	X	X	X	X				Lab QC
3	SB-25-S-10-R-1,2,3,4,5	856	S		2	X						X	X	X	X	X				
4	SB-26-S-01-R-1,2,3,4,5	920	S		1	X						X	X	X	X	X				
5	SB-26-S-10-R-1,2,3,4,5	930	S		2	X						X	X	X	X	X				
6	SB-18-S-01-R-1,2,3,4,5	1030	S		2	X						X	X	X	X	X				
7	SB-18-S-05-R-1,2,3,4,5	1035	S		2	X						X	X	X	X	X				
8	SB-18-S-10-R-1,2,3,4,5	1040	S		2	X						X	X	X	X	X				

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		9/5/90	

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Donald [illegible]	9/5/90	1350

SEE REVERSE SIDE FOR INSTRUCTIONS

pace INCORPORATED
THE ASSURANCE OF QUALITY

17297

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: PRC ENVIRONMENTAL MANAGEMENT, INC
Address: 120 HOWARD STREET
SAN FRANCISCO, CA 94105
Phone: 415/543-4880

Report To: RANDY FISH
Bill To: PRC
P.O. # / Billing Reference:
Project Name / No.: TREASURE ISLAND

Pace Client No.:
Pace Project Manager:
Pace Project No.:
*Requested Due Date:

Sampled By (PRINT): STEVE MACNEILL
Sampler Signature: Steven MacNeill
Date Sampled: 9/5/90 9/5/90

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	VOA	HCL		VOC 8240	SVOC 8270	PRI EXTRACT/Nonfiltered Metals	METALS 7000	PCBs/Pest 8080		VOC 624	REMARKS
1	SB-18-W-00-T-1	1050	W		2					X								X	
2	SB-17-S-01-R-1,2,3,4,5	1059	S		2	X						X	X	X	X	X			
3	SB-17-S-05-R-1,2,3,4,5	1103	S		2	X						X	X	X	X	X			
4	SB-17-S-10-R-1,2,3,4,5	1109	S		2	X						X	X	X	X	X			
5	SB-16-S-01-R-1,2,3,4,5	1128	S		2	X						X	X	X	X	X			
6	SB-16-S-05-R-1,2,3,4,5	1134	S		1	X						X	X	X	X	X			
7	SB-16-S-10-R-1,2,3,4,5	1145	S		2	X						X	X	X	X	X			
8																			

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT / DATE	RETURNED / DATE
		9/5/90	

Additional Comments

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Steven MacNeill (PRC)	Daniel Zebarski Pace	9/5/90	1350

2

SEE REVERSE SIDE FOR INSTRUCTIONS

APPENDIX C
FIELD DOCUMENTS

PROJECT [illegible] 044-0047[illegible] Continued From Page

1252 [illegible] up over SB-05 - site safety meeting has been held [illegible] will obtain a sample from 0-18 inches.

1253 [illegible] taken via split spoon
[illegible] sample = 80 blows
[illegible] = 70 blows
[illegible] recovery 1 tube used for chemical analysis
[illegible] background reading = 0 ppm
[illegible] 6 Nu reading = 0 ppm
1318 [illegible] at 6' - there was no recovery at 5' sample [illegible]. Borehole is complete - will now abandon.
1338 [illegible] up at SB-03 - collecting sample from 2-3½ feet [illegible] 0 ppm - did not collect sample at 2-3½ feet - collecte[illegible] of boring from 0-18 inches - 6 Nu reading = 0 ppm [illegible] time of collection 1350
1409 [illegible] up at SB-04 collecting sample from surface to 18".
1447 [illegible] readings from cuttings are ranging from 2-3 ppm [illegible] at sampling at 2 and 5 feet resulted in no recovery - at approx six feet clean sand was encountered
1502 [illegible] above references to SB-04 should be SB-02 [illegible] will be drilled next
1524 [illegible] have last bit down the hole - drilling done for [illegible] day
1545 [illegible] collect rinsate blank from equipment at SB-0[illegible]
1600 [illegible] collect trip blank for the day

Sample Summary	Time
[illegible]-05-S-01-R-4.5	1253
[illegible]-03-S-01-R-4.5	1350
[illegible]-02-S-01-R-4.5	1409
[illegible]-02-W-00-B-4.5	1545
[illegible]-02-W-00-T-1	1600

1630 [illegible] and I leave the site for the day

Continued on Page

Read and Understood By

[illegible] 8/27/90

Date Signed

PROJECT I.I 8/28/90

Continued From Page

800 Sue and arrive on site
810 Drillers arrive on site
905 hNu calibrated - background reading = 0 ppm
1012 I have spent the past hour at Staff Cont Eng discussing utility clearance - sample SB-04 was collected from 0-18" at 930 - hNu reading = 0 ppm hNu readings at 4-5½' = 0.5, hNu readings at 9½-11½ feet = 10 ppm
1113 Drillers have been grouting holes since 1030
Rig now set up over SB-01
1120 Sample taken at 0-12" at SB-01
1145 I collect trip blank for the day
Drillers trying to obtain a sample from approx 7 feet at S.
1200 Drillers got a sample from SB-01 at approx 7 ft - will submit for chemical analysis - drillers tried to sample at 9' but did not get any recovery 5" ≈ approx 100 hammer blows

1205 Sue collects rinsate blank from equipment at SB-01
1300 Pacific Bell and ATT representatives arrive
1415 All sites are clean with the exception of Site 25 where Pacific Bell has indicated several lines
1800 Samples have been picked up by PACE - Sue and I leave site for the day.

Continued on Page

Read and Understood By

Steven MacNell — Signed
8/28/90 — Date
Signed
Di

PROJECT T. I 8/31/90

Notebook No. _____

Continued From Page _____

700 Sue and I arrive on site - drillers ready to go

730 Rig set up over SB-06 - 8/29-8/30 was spent gaining underground utility clearance - no drilling took place

733 Sample from SB-06 taken from 1-2½ ft hNu: 0ppm

740 Sample from SB-06 taken from 4-5½ ft hNu: 0ppm
Have not yet encountered ground water

755 Ground water was encountered in SD-06 at 10½'

815 I collect trip blank for today (SD-09-W-00-T-1)

830 Sample from SB-09 taken from 1-2½ ft

840 Sample from SB-09 taken from 4-5½ ft

912 Sample from SB-11 taken from 5ft at 1117

934 Sample from SD-15 taken from 5ft as collected - no end caps were available so sample was double wrapped in foil and sealed with electrical tape. hNu readings were recorded at SD-11 but were likely due to diesel fumes or moisture - no odor was noted

00 Pace labs pick up samples

-30 Sue and I leave site for the weekend - a total of 23 samples (20 soil and 3 water) were sent in for analysis.

Continued on Page

Read and Understood By

ED_002145A_00024696-00070

PROJECT T I 9/4/90

Continued From Page

730 Sue and I arrive on site - will proceed to housing area
830 Rig set up over SB-19
905 Sample taken from SB-19 at 1 foot
910 Sample taken from SB-19 at 5 feet - ground water at 5
1101 Arrive at site where SB-22, 23, and 24 are located
1115 Sample taken from SB-22 at 1 foot - water encountered at 2 ft.
1135 We break for lunch
1200 I collect trip blank for the day (SB-23-W-00-T-1)
1325 Currently sampling SB-24, have been unable to collect soil for chemical analyses at 10' due to saturated state of the soil and therefore have only logged borings 23, 24 at the 10 ft depth based on drill cuttings and any material in split spoon sampler.
1420 Rig setting up over SB-27
1430 Sample taken at SB-27 from 1 foot
1435 No recovery from sampler at 5 feet - will try again at ten feet.
1533 Rig over SB-25 - currently is down
1600 Rig still under repair
1730 I deliver samples to courier - Sue and I leave site

Continued on Page

Read and Understood By

Steven MacNeill — Signed
9/4/90 — Date
Signed

PROJECT 1.1 9/5/90

800 Sue and arrive on site will head back to SB-25 and start drilling.

920 Sample from 1 foot in SB-26 only recovered approx 8" - will submit one sample tube for chemical analyses.

925 Drillers got zero recovery from sample collected at 5-6' feet due to saturated conditions - water was encountered at approx 2½-3 feet.

1145 Sample from 5 feet in SB-16 on recovered approx 8" - will submit one sample tube to lab for chemical analysis.

1530 All samples have been collected - holes have been grouted - Sue and I leave site.

Continued on Page

Read and Understood By

Steven MacNeill — Signed

9/5/90 — Date

Signed

Date

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. D44-0047 IRS(FW)	Client West Div
Drilling Contractor	DATUM EXPLORATION
Drilling Method	HOLLOW STEM AUGER (ROTARY)
Surface Conditions	Heavily vegetated w/ fennel and grass
Logged By 1.	SUSAN ERIKSON 2.
Site/Subsite	Site 8, Treasure Island
Borehole/Location Code	SB-02
Surface Elevation	
Sheet	1 of 1
Date	8/27/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	SPLIT SPOON			19 / 40	18 / 17	14:10				1		SILT w/ cobbles and gravel, loose, dry, 7.5 YR 5/4 contained white flecks possibly gypsum HNu = 2.5 (likely to be fill material)
				90						2		
										3		
	SPLIT SPOON			150	24 / no recovery					4		
										5		
				150	4 / 3	14:30				6		Silty SAND, some fine gravel, loose, slightly moist 7.5 YR 5/4 (likely to be fill material)
										7		
										8		
										9		
	SPLIT SPOON			120	4 / 2	14:45				10		Sandy SILT, loose, slightly moist - 7.5 YR 5/4 Bang terminated @ 10/4 Bedrock not encountered

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 IRSIFW	Client West Div
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions HEAVILY VEGETATED W/ FENNEL AND GRASS	
Logged By 1. SUSAN ERIKSON 2.	

Site/Subsite	Site 8, Treasure Island
Borehole/Location Code	SB-03
Surface Elevation	
Sheet	1 of 1
Date	8/27/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	Split Spoon			35	24 / 18	13:44				1		Gravelly silt, dry, loose, 10YR 4/3 (likely to be fill material)
										2		
										3		
										4		
				150	2 / no recovery					5		
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 IRSIFW | Client West Div

Drilling Contractor DATUM EXPLORATION

Drilling Method HOLLOW STEM ROTARY AUGER

Surface Conditions SPARSELY VEGETATED W/ FENNEL AND GRASS

Logged By 1. SUSAN ERIKSON 2.

Site/Subsite Site 8, Treasure Island

Borehole/Location Code SB-05

Surface Elevation

Sheet 1 of 1

Date 8/27/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	Split Spoon			10	18							2 inches of humus, moist
				25	14	12:53				1		Gravelly SILT, loose, dry, 10 YR 5/3
				45								last ½ inch of sample was hard clay/shale 2.5Y 5/2
										2		(likely to be fill material)
										3		
										4		
										5		
	Split Spoon			300	1							Shale taken from auger bit 2.5Y 5/2
					no recovery					6		Bedrock encountered.
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No.	044-00471RS1FW
Client	WEST DIV
Drilling Contractor	DATUM EXPLORATION
Drilling Method	HOLLOW STEM ROTARY AUGER
Surface Conditions	SPARSELY VEGETATED W/FENNEL + GRASS
Logged By	1. SUSAN ERIKSON 2.
Site/Subsite	Site 8, Treasure Island
Borehole/Location Code	SB-01
Surface Elevation	
Sheet	1 of 1
Date	8/28/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	SAMPLE DEPTH(FT) BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	ANALY Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	SPLIT SPOON			19 / 100	24 / 18	11:30						
										1		Silty SAND, Loose and dry 10 YR 6/3 (likely fill material)
										2		Concrete chips with SILT? (powdered concrete) 10 YR 6/3
												(Auger sounded like it encountered concrete slab at 18"
										3		
										4		
	SPLIT SPOON				18 / 6	11:39						Fine-grained silty SAND w/ sharp angular gravel
										5		10 YR 6/2
										6		
										7		
					18 / 8							Gravelly SILT; gravel is angular - may be crushed concrete
										8		10 YR 5/3
										9		
	SPLIT SPOON			120	18 / no recovery					0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047/RS1FW	Client West Div
Drilling Contractor DATUM EXPLORATION	Site/Subsite Site 8, Treasure Island
Drilling Method HOLLOW STEM ROTARY AUGER	Borehole/Location Code SB-04
	Surface Elevation
Surface Conditions HEAVILY VEGETATED W/ FENNEL AND GRASS	Sheet 1 of 1
Logged By 1. SUSAN ERIKSON 2.	Date 8/28/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	SPLIT SPOON			24 / 33	24 / 24	9:35						1/2 inch dry grass, Silty SAND, loose, dry 10 YR 4/4 (likely fill material)
										1		
				50 / 35								Silty SAND w/ gravel + chunk of concrete 10 YR 4/4 (likely fill material)
										2		
										3		Auger sounded like it encountered concrete slab
										4		Silty SAND 10 YR 4/4 dry, loose
										5		Gravel and SILT 10YR 4/4 dry, loose. HNu = 2.5 ppm
										6		
										7		
										8		Auger cuttings: Well-sorted gravel w/ some SILT, GRAVEL IS ROUNDED
										9		
				50	6 / 6	10:03						SILT, dry, loose w/ fine grained sand 10 YR 6/3 HNu 10 ppm - Boring terminated @ 10 ft, bedrock not encountered
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No.	044-0047 IRSI FW
Client	WEST DIV
Drilling Contractor	DATUM EXPLORATION
Drilling Method	HOLLOW STEM ROTARY AUGER
Surface Conditions	Bare - scattered debris (domestic)
Logged By	1. SUSAN ERIKSON 2.
Site/Subsite	SITE 19, Treasure Island
Borehole/Location Code	SB - 06
Surface Elevation	
Sheet	1 of 1
Date	8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	SAMPLE DEPTH(FT) BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	ANALY Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	Grab			1								
				17	18 / 18	7:40				1		Dry Gravelly silt w/ some coarse sand 2.5Y 4/2 Loose
				15								Moist coarse-grained arkosic sand, loose
				14						2		2.5Y 5/4
										3		
										4		
	Grab			7	18 / 18	7.45				5		Moist coarse-grained arkosic sand, loose
				11								2.5Y 5/4
				14						6		
										7		
										8		
										9		Water table encountered @ 10.5 ft. Low tide @ approx 6 AM
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047(RSIFW)	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions Bare w/scattered debris (domestic)	
Logged By 1. S. ERIKSON 2.	

Site/Subsite SITE 19, Treasure Island	
Borehole/Location Code SB-07	
Surface Elevation	
Sheet 1 of 1	
Date 8/31/90	

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	SAMPLE DEPTH(FT) BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	ANALY Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		
	SPLIT SPOON			16 18	18 / 18	9:21				2		Dry Gravelly SILT 2.5Y 4/2, loose Dry Gravelly SILT 2.5Y 4/2 with some pink gravel 7.5Y
				12						3		Coarse-grained SAND, Moist, loose 2.5Y 5/4 Arkosic
										4		
				6 8	18 / 18	9:35				5		Moist, coarse grained SAND Arkosic, 2.5Y 5/4 w/ thin dark gray clay lenses
				10						6		clay lenses ≥ ½ inch thick
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047/RSIEW	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method Hollow Stem Rotary Auger	
Surface Conditions BARE WITH SCATTERED DOMESTIC DEBRIS	
Logged By 1. S ERIKSON 2.	

Site/Subsite SITE 19, Treasure Island	
Borehole/Location Code SB-08	
Surface Elevation	
Sheet 1 of 1	
Date 8/31/90	

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
				4	18					1		Silty COARSE-GRAINED SAND W/ SOME GRAVEL 7.5Y
				7	18	9:45				2		MOIST COARSE-GRAINED SAND, ARKOSIC, LOOSE
				8								2.5Y 5/4
										3		
										4		
				4	18							Moist coarse-grained SAND arkosic, loose
				7	18	9:50				5		2.5Y 5/4
				12								
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 IRS/FW	Client WEST DIVI
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions Bare w/scattered debris (domestic)	
Logged By 1. SUSAN ERIKSON 2.	

Site/Subsite	Site 19, Treasure Island
Borehole/Location Code	SB-9
Surface Elevation	
Sheet	1 of 1
Date	8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	SAMPLE DEPTH(FT) BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	ANALY Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	SPLIT SPOON											
				12	18 / 18	8:15				1		Dry loose gravelly SILT 2.5Y 4/2
				17								
				13						2		Moist, coarse-grained arkosic SAND, loose 2.5Y 5/4
										3		
										4		
	SPLIT SPOON			10	18 / 18	8:23						Moist, coarse-grained arkosic SAND, loose 2.5Y 5/4
				9								
				11						5		
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 (RS/PW)	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions Bare, surface covered with scattered debris (domestic)	
Logged By 1. S. ERIKSON 2.	

Site/Subsite SITE 19, Treasure Island	
Borehole/Location Code SB-10	
Surface Elevation	
Sheet 1 of 1	
Date 8/31/90	

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH (FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		
	Split Spoon			4 / 8	18 / 6	8:50						Moist, coarse-grained arkosic SAND, loose 2.5Y 5/4
				11						2		
										3		
										4		
	Split Spoon			8 / 9	18 / 18	9:05						Moist, coarse-grained arkosic SAND, loose 2.5Y 5/4
				11						5		
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-00471RS1FW	Client West Div
Drilling Contractor	DATUM EXPLORATION
Drilling Method	HOLLOW STEM ROTARY AUGER
Surface Conditions	REINFORCED CONCRETE 6-8" thick
Logged By 1.	SUSAN ERIKSEN 2.
Site/Subsite	SITE 25, Treasure Island
Borehole/Location Code	SB-11
Surface Elevation	
Sheet	1 of 1
Date	8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		
				4 7	18 / 18	11:00				2		Moist, coarse-grained arkosic SAND, loose 2.5Y 5/4 - dark gray clay lenses ≈ 1 inch thick
				8						3		
										4		
				7 11	18 / 18	11:15				5		Moist coarse-grained arkosic SAND, loose 2.5Y 5/4
				15						6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047/RSI FW	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions ASPHALT COVER.	
Logged By 1. SUE ERIKSON 2.	

Site/Subsite SITE 25, Treasure Island	
Borehole/Location Code SB-12	
Surface Elevation	
Sheet 1 of 1	
Date 8/31/90	

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		
	Split Spoon			4 / 8	18/18	11:36						Moist, coarse-grained arkosic SAND, loose 2.5 Y 5/4
										2		
				10								
										3		
										4		
	Split Spoon			8 / 10	18/18	11:43						Moist, coarse-grained arkosic SAND, loose 2.5 Y 5/4
				23						5		
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 IRSIFW	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions Bare	
Logged By 1. S. ERIKSON 2.	

Site/Subsite	SITE 25, Treasure Island
Borehole/Location Code	SB-13
Surface Elevation	
Sheet	1 of 1
Date	8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
	Split Spoon			6 / 7	18 / 18	11:50				1		Gravelly sand, dry, loose, arkosic 2.5 Y 5/4
				14						2		Coarse-grained arkosic sand slightly moist 2.5 Y 5/4
										3		
	Split Spoon			5 / 10	18 / 18	11:55				4		Moist coarse-grained arkosic SAND, loose 2.5 Y 5/4
				25						5		
										6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-00471RS1FW | Client WEST DIV

Drilling Contractor DATUM EXPLORATION

Drilling Method HOLLOW STEM ROTARY AUGER

Surface Conditions BARE.

Logged By 1. S. ERIKSON 2.

Site/Subsite SITE 25, Treasure Island

Borehole/Location Code SB-14

Surface Elevation

Sheet 1 of 1

Date 8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		
	Split spoon			5 / 4	18 / 18	12:06				2		Dry coarse grained arkosic SAND, loose 2.5Y 5/4. Moist coarse-grained arkosic SAND, loose 2.5Y 5/4
				9						3		
										4		
	Split spoon			7 / 12	18 / 18	12:11				5		Moist coarse-grained arkosic SAND, loose 2.5Y 5/4
				13						6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borelog.grf PRC 12/1/88

FIELD BORELOG

PRC Environmental Management, Inc.

Location of Borehole

Job No. 044-0047 IRS1FW	Client WEST DIV
Drilling Contractor DATUM EXPLORATION	
Drilling Method HOLLOW STEM ROTARY AUGER	
Surface Conditions BARE	
Logged By 1. S. ERIKSON 2.	

Site/Subsite	SITE 25, Treasure Island
Borehole/Location Code	SB-15
Surface Elevation	
Sheet	1 of 1
Date	8/31/90

MEDIA G/S/W	SAMPLER TYPE	SAMPLE DEPTH(FT) TOP	BOT.	BLOWS/6" SAMPLER	INCHES DRIVEN / INCHES RECOVERED	TIME	SAMPLE TAG NUMBER	ANALY Phy	Chm	DEPTH IN FEET	USCS SOIL TYPE	SOIL DESCRIPTION
										1		Dry coarse-grained arkosic SAND, loose 2.5Y 5/4
	SPLIT SPOON			5 / 7	18 / 18	12:15				2		Moist coarse-grained Arkosic SAND, loose 2.5Y 5/4
				11						3		" " " "
										4		Moist coarse-grained arkosic SAND, loose 2.5Y 5/4
	SPLIT SPOON			10 / 18	18 / 18	12:20				5		
				32						6		
										7		
										8		
										9		
										0		

G = Gas S = Soil W = Water

Instructions on back.

White = Main Office File Yellow = Field Office File Pink = Field Personnel

Borel[redacted]RC 12/[redacted]