CLEAN

Contract No. N62474-88-D-5086

Contract Task Order 0262

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NAVAL AIR STATION, ALAMEDA
ALAMEDA, CALIFORNIA

REMEDIAL INVESTIGATION/FEASIBILITY STUDY
INTERIM REMOVAL ACTION, SITE 7A
BUILDING 459, NAVY EXCHANGE FUEL STATION

FIELD INVESTIGATION WORK PLAN
FINAL

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NAS ALAMEDA
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
INTERIM REMOVAL ACTION, SITE 7A
FIELD INVESTIGATION WORK PLAN

CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC), was awarded Contract Task Order No. (CTO) 0262 from the Department of the Navy, Western Division, Naval Facilities Engineering Command (WESTDIV), under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62474-88-D-5086 on November 19, 1993. The Navy statement of work (SOW) dated April 29, 1993 (revised August 20, 1993), calls for PRC to perform the following activities as part of an interim removal action (IRA) to remove the underground tanks and associated contaminated soils and groundwater at Installation Restoration Program (IRP) Site 7A at Naval Air Station (NAS) Alameda in California: (1) prepare a field investigation work plan, (2) collect and analyze soil and groundwater samples, (3) develop and evaluate potential disposal and treatment alternatives, (4) prepare an engineering evaluation and cost analysis report, (5) prepare a public notice, (6) address investigation-derived waste (IDW) management and disposal, and (7) attend project meetings and provide project management.

PRC and its CLEAN team subcontractor, Montgomery Watson (hereafter referred together as the PRC team), prepared this field investigation work plan based on the draft final field sampling plan (FSP) prepared for the follow-on work at the Phase 2B and 3 IRP sites (PRC and Montgomery Watson 1993a). Site 7A is included in the Phases 2B and 3 follow-on FSP. This field investigation work plan describes the protocol for conducting field sampling and analyses to characterize the concentrations and extent of petroleum hydrocarbons, fuel constituents benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, and metals in soils and groundwater at Site 7A. The field investigation work plan describes a sampling program to provide additional information for the evaluation and selection of an interim removal action at this site. Other sampling activities as described in the follow-on FSP for this site that are not related to this interim removal action (that is, sample collection in the vicinity of the former transformer pad, borings near well M07A-02, cone penetrometer tests, deep well installation, quarterly groundwater sampling, and nonpoint source sampling) are not included in the scope of this CTO. Work described in the follow-on FSP for Phases 2B and 3 that is not included in this CTO will be performed under another CTO.

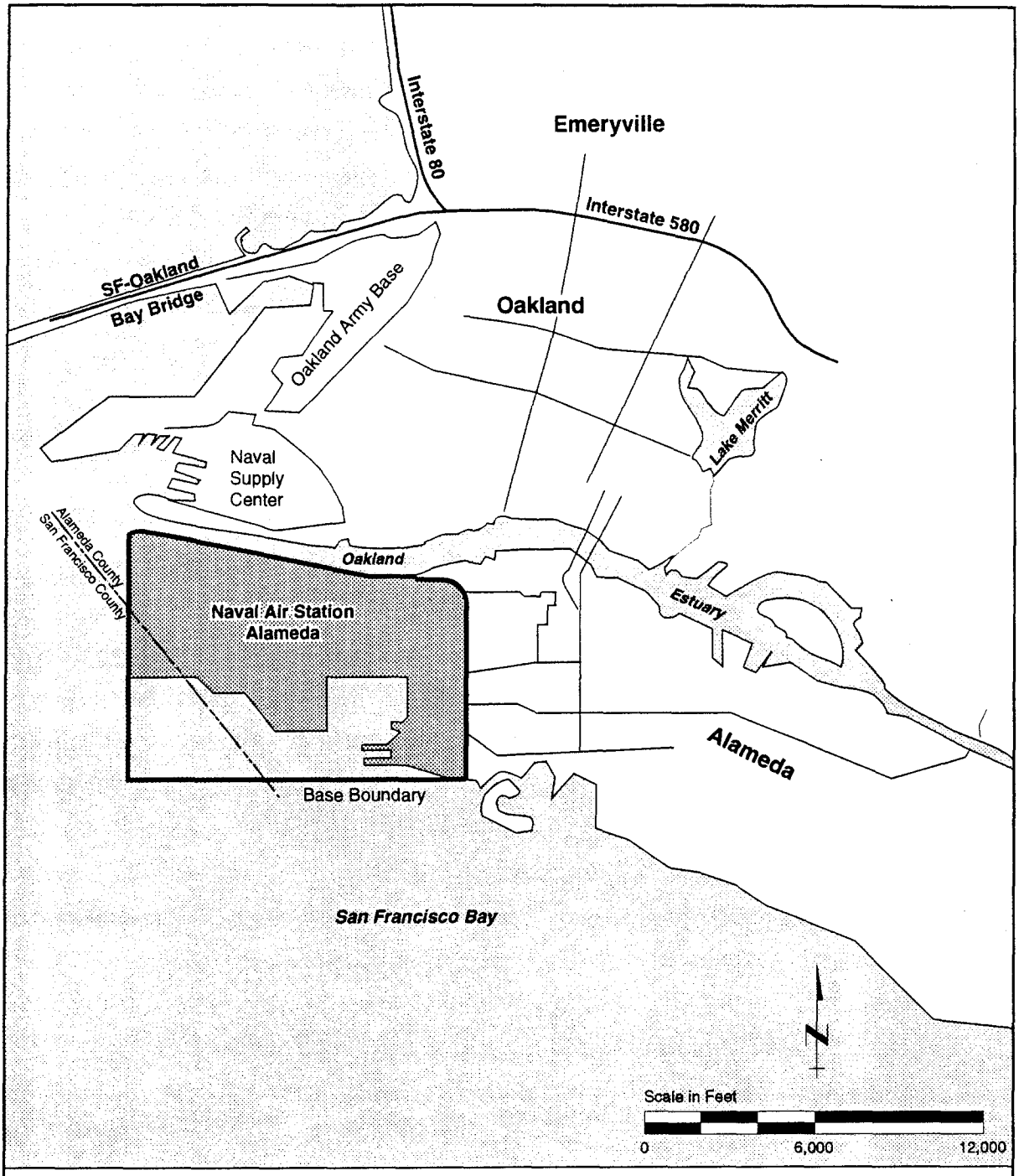
1.1 PHYSICAL DESCRIPTION AND SITE HISTORY

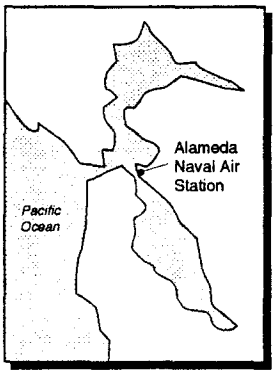
NAS Alameda is located in northern California in the counties of Alameda and San Francisco (Figure 1). IRP Site 7A, which consists of Building 459, has served as the NAS Alameda motor vehicle fuel station since 1966. The fuel station is located at the corner of Main Street and Avenue F, near the East Gate (Figure 2). An auto repair shop and a small convenience store are also part of the station facilities. The site is bordered to the north by an unpaved vacant lot and to the south and west by base housing or light industrial naval facilities. A former transformer pad is located at the northern boundary of the site (Figure 3). No information on the history of transformer use at the site or leak documentation is available. A storm drainage culvert influenced by changes in the tides is east of the site, adjacent to Main Street.

There are eight underground storage tanks (UST) at Site 7A. Two gasoline USTs, with 10,000- and 8,000-gallon capacities, were abandoned in place, reportedly due to leakage (Canonie Environmental [Canonie] 1990). These two tanks are scheduled for removal in 1993 (NAS Alameda 1992). Three gasoline USTs are currently in operation. Three USTs, formerly containing gasoline, waste oil, and solvent are out of service.

1.2 CURRENT OPERATIONS

As noted previously, there are eight USTs at the site, two of which are abandoned. The remaining six USTs consist of four 10,000-gallon tanks, one 500-gallon waste oil tank, and one 500-gallon underground solvent tank (NAS Alameda 1992). Three of the four 10,000-gallon USTs contain gasoline (two contain unleaded gasoline, and one contains premium gasoline); the fourth was taken out of service because of a suspected leak. No information is available on the date the fourth 10,000-gallon UST was removed from service. The three tanks currently in use reportedly failed tank precision tightness tests in 1987 (Canonie 1990; Environmental Resources Management- West [ERM-West] 1987). Records of repairs made to the fuel tanks or piping or of the construction of the fuel tanks (that is, steel or fiberglass) are not available. However, it is assumed that repairs were made because the three tanks reportedly passed leak detection tests in 1991 (NAS Alameda 1992). The waste oil tank failed a vacuum tightness test on December 5, 1991 (Balch 1992; NAS Alameda 1992). After failing the leak test, the waste oil tank was taken out of service but remained in place





Source: Modified from CA State Automobile Assoc. map, Oakland/Berkeley/Alameda. Copyright 1980, revised 1989.

A-1

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

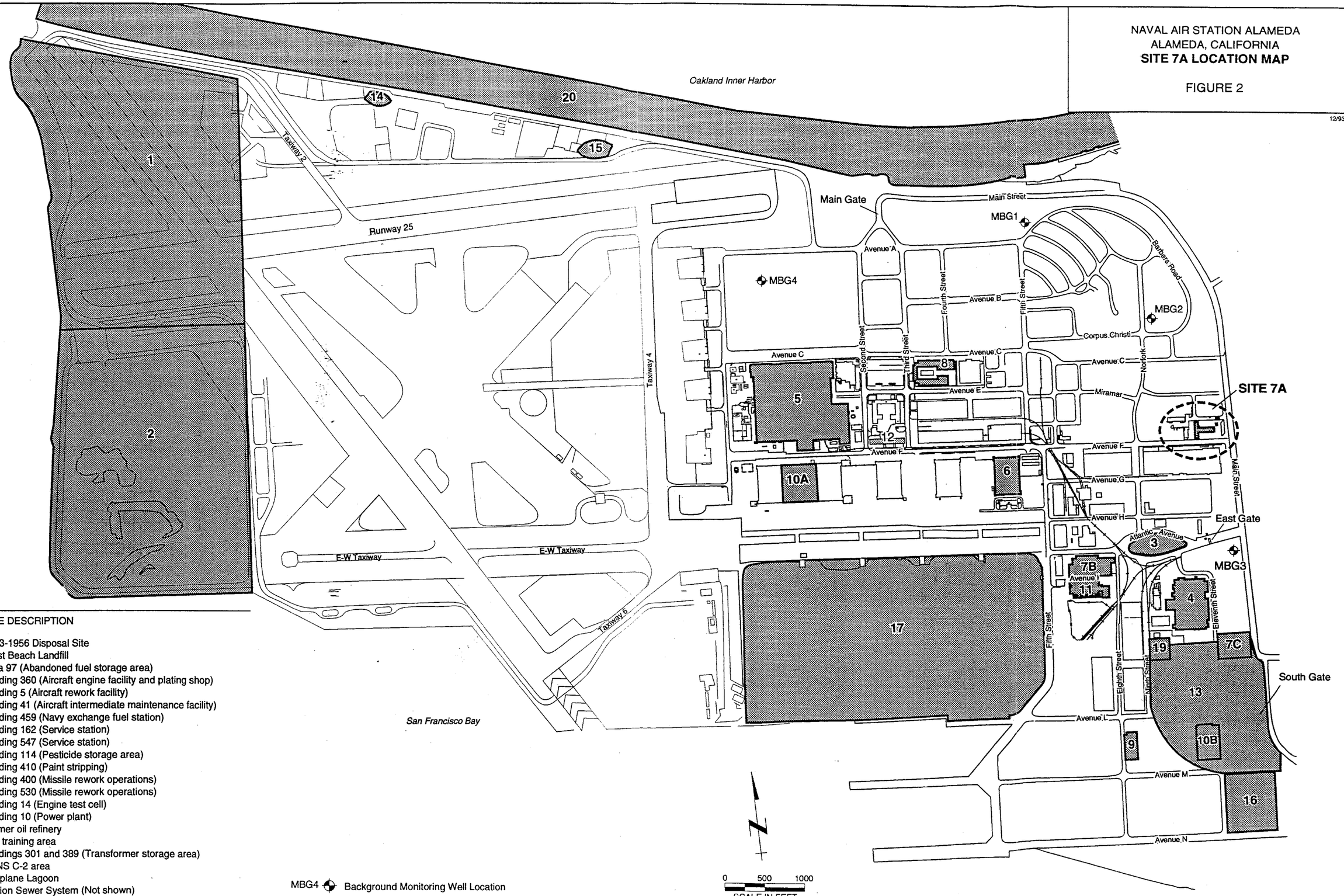
REGIONAL LOCATION OF NAS ALAMEDA

FIGURE 1

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A LOCATION MAP

FIGURE 2

12/93.AL



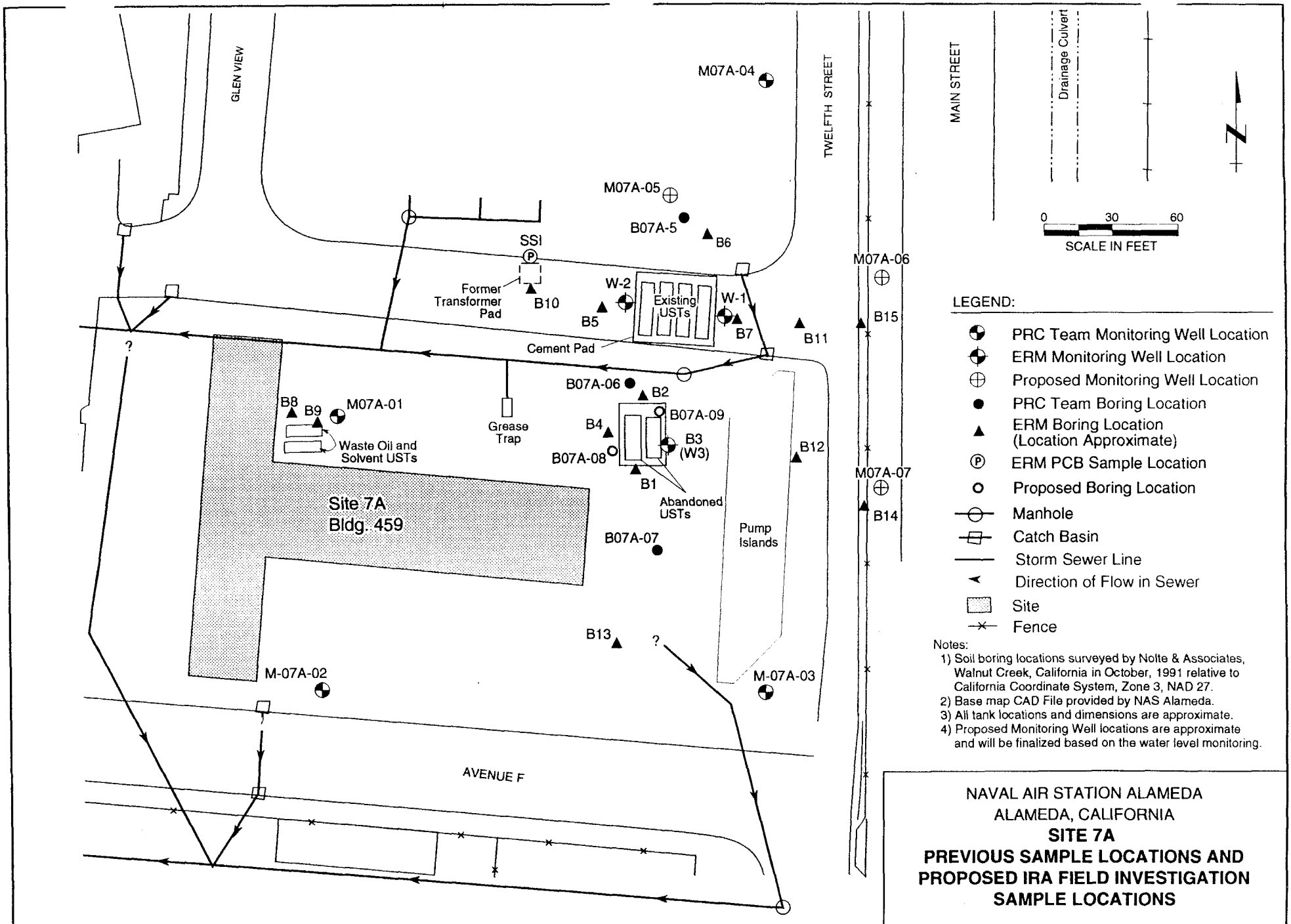
LEGEND:

SITE NO.	SITE DESCRIPTION
1	1943-1956 Disposal Site
2	West Beach Landfill
3	Area 97 (Abandoned fuel storage area)
4	Building 360 (Aircraft engine facility and plating shop)
5	Building 5 (Aircraft rework facility)
6	Building 41 (Aircraft intermediate maintenance facility)
*7A	Building 459 (Navy exchange fuel station)
7B	Building 162 (Service station)
7C	Building 547 (Service station)
8	Building 114 (Pesticide storage area)
9	Building 410 (Paint stripping)
10A	Building 400 (Missile rework operations)
10B	Building 530 (Missile rework operations)
11	Building 14 (Engine test cell)
12	Building 10 (Power plant)
13	Former oil refinery
14	Fire training area
15	Buildings 301 and 389 (Transformer storage area)
16	CANS C-2 area
17	Seaplane Lagoon
18	Station Sewer System (Not shown)
19	Yard D-13 (Hazardous waste storage)
20	Estuary (Oakland Inner Harbor)

MBG4 Background Monitoring Well Location

* Site addressed in this Interim Removal Action Field Investigation Work Plan

Source: Base CAD file provided by NAS Alameda.



Notes:
1) Soil boring locations surveyed by Nolte & Associates, Walnut Creek, California in October, 1991 relative to California Coordinate System, Zone 3, NAD 27.
2) Base map CAD File provided by NAS Alameda.
3) All tank locations and dimensions are approximate.
4) Proposed Monitoring Well locations are approximate and will be finalized based on the water level monitoring.

Source: Follow-on Field Sampling Plan, RI/FS, Phases 2B and 3, Draft Final. Prepared by PRC and Montgomery Watson (Sept. 1993).

12/93.AL

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

SITE 7A
PREVIOUS SAMPLE LOCATIONS AND PROPOSED IRA FIELD INVESTIGATION SAMPLE LOCATIONS

FIGURE 3

(NAS Alameda 1992). No information on the type(s) of solvent stored in the underground solvent tank is available. The solvent tank is currently out of service, empty, and in place (NAS Alameda 1992). Figure 3 illustrates the known or suspected locations of all tanks currently or formerly used at the site.

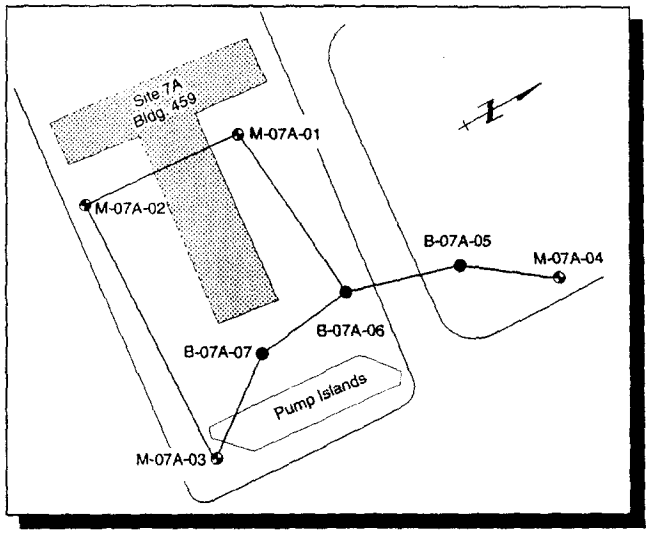
1.3 SITE GEOLOGY AND HYDROGEOLOGY

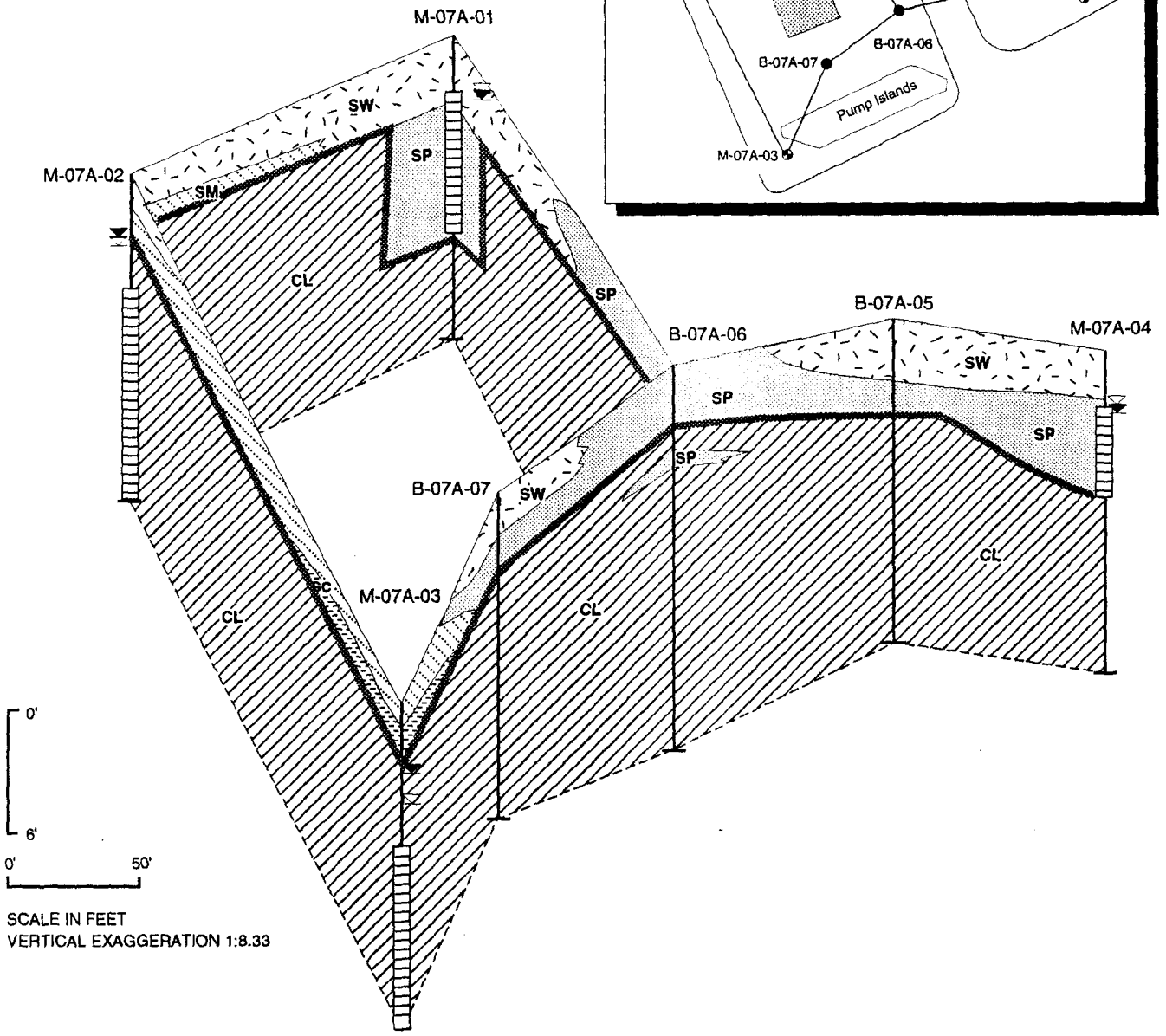
Drilling at the site during initial remedial investigation (RI) activities penetrated 1 to 2 feet of gravel and sand (road base) underneath the asphalt parking surface, which overlies sandy fill material (PRC and James M. Montgomery Consulting Engineers [JMM] 1992). The sandy fill material varied from 1 to 4 feet thick and was thickest in the northeastern portion of the site, at well M07A-04 (Figure 3). Sandy material, believed to be backfill material for the waste oil and solvent tanks, was present to a depth of 10 feet at well M07A-01. The tank backfill material, which was classified as poorly graded sand to silty sand, was similar in composition to the shallow fill material present throughout the site.

The sandy fill material is underlain by a native silty clay to clay that contains abundant plant remains. The plant material was found in varying states of decay and was often associated with a strong hydrogen sulfide odor. The clay was present to the total depth of all borings (14.5 to 18.5 feet). Figure 4 is a fence diagram illustrating the lateral and vertical relationships of materials encountered during drilling.

Groundwater was first encountered at depths ranging from 3.0 to 3.5 feet below ground surface (bgs). At wells M07A-01 and M07A-04 and boring B07A-05, groundwater was present within the sandy fill material. At all other drilling locations, groundwater was first encountered immediately above the native clay unit.

During initial RI field activities, a tidal influence study was conducted at Site 7A. The groundwater elevations were monitored in each of the wells installed as part of the Phases 2B and 3 investigation as well as in the estuary. Results indicated that fluctuations in water levels measured at Site 7A during the 5-day study are not diurnal or correlative with diurnal tidal cycles measured in the Inner Oakland Harbor. However, water levels in wells M07A-02 and M07A-03 varied over the 5-day period in an apparently noncyclical fashion. The elevation in well M07A-03 varied sufficiently to





LEGEND:

- SW Gravelly Sand
- SP Sand
- SC Clayey Sand
- CL Clay
- SM Silty Sand
- Approximate Fill/Native Sediment Interface
- First Water During Drilling
- Water Level During Water Sampling
- Monitoring Well
- Screened Interval

Source: Data Summary Report, RI/FS Phases 2B and 3. Prepared by PRC and James M. Montgomery (Oct. 1992).

NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A
FENCE DIAGRAM

FIGURE 4

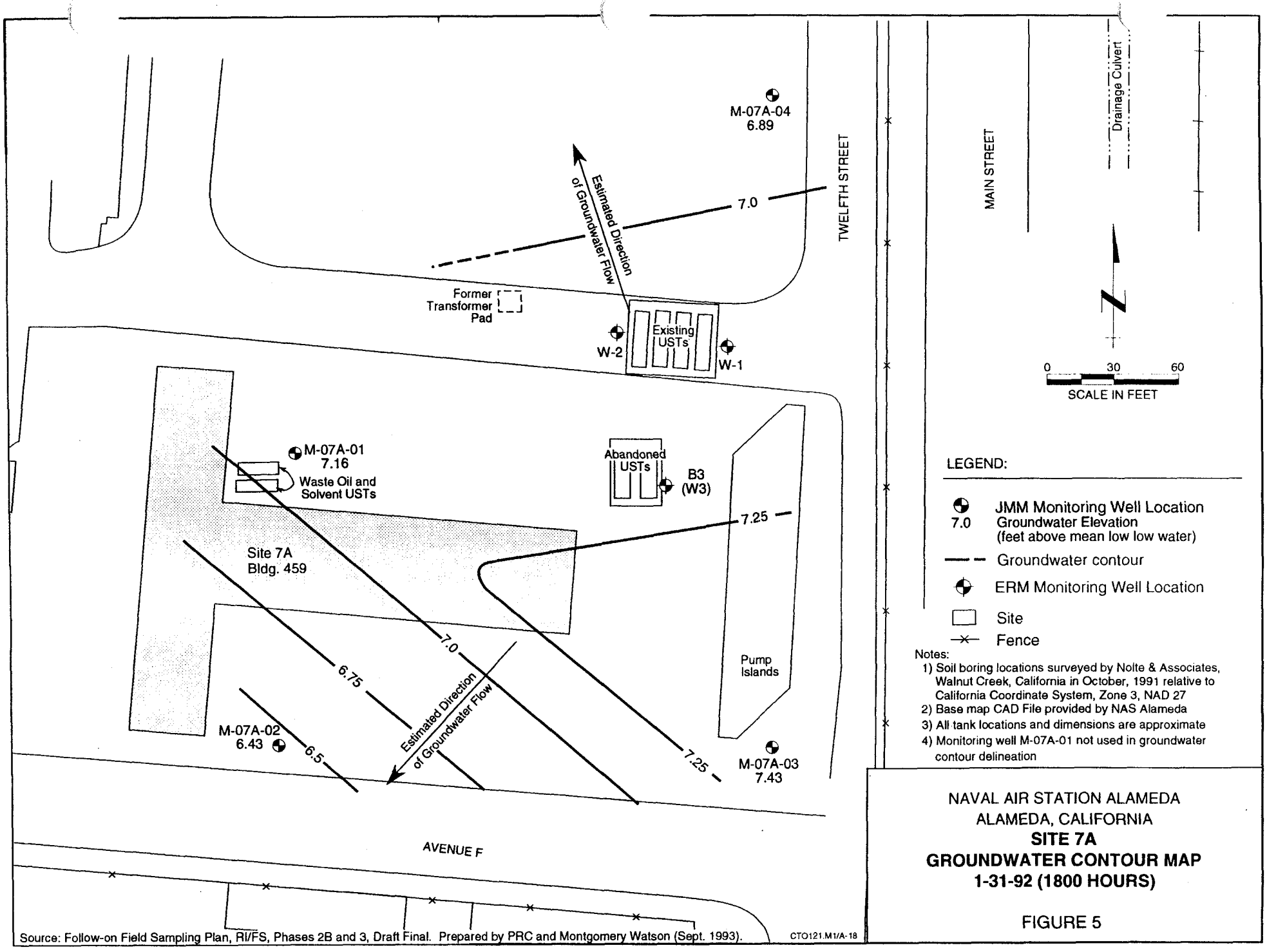
reverse the groundwater gradient at the site. The mechanism driving the fluctuations and the nature of the fluctuations (that is, cyclical over a period longer than 5 days, or always noncyclical) in wells M07A-02 and M07A-03 will be investigated as part of the IRA field investigation to assess the gradient and flow direction over time. Figures 5 and 6 present a groundwater potentiometric surfaces for January 31, 1992 and September 17, 1991, respectively.

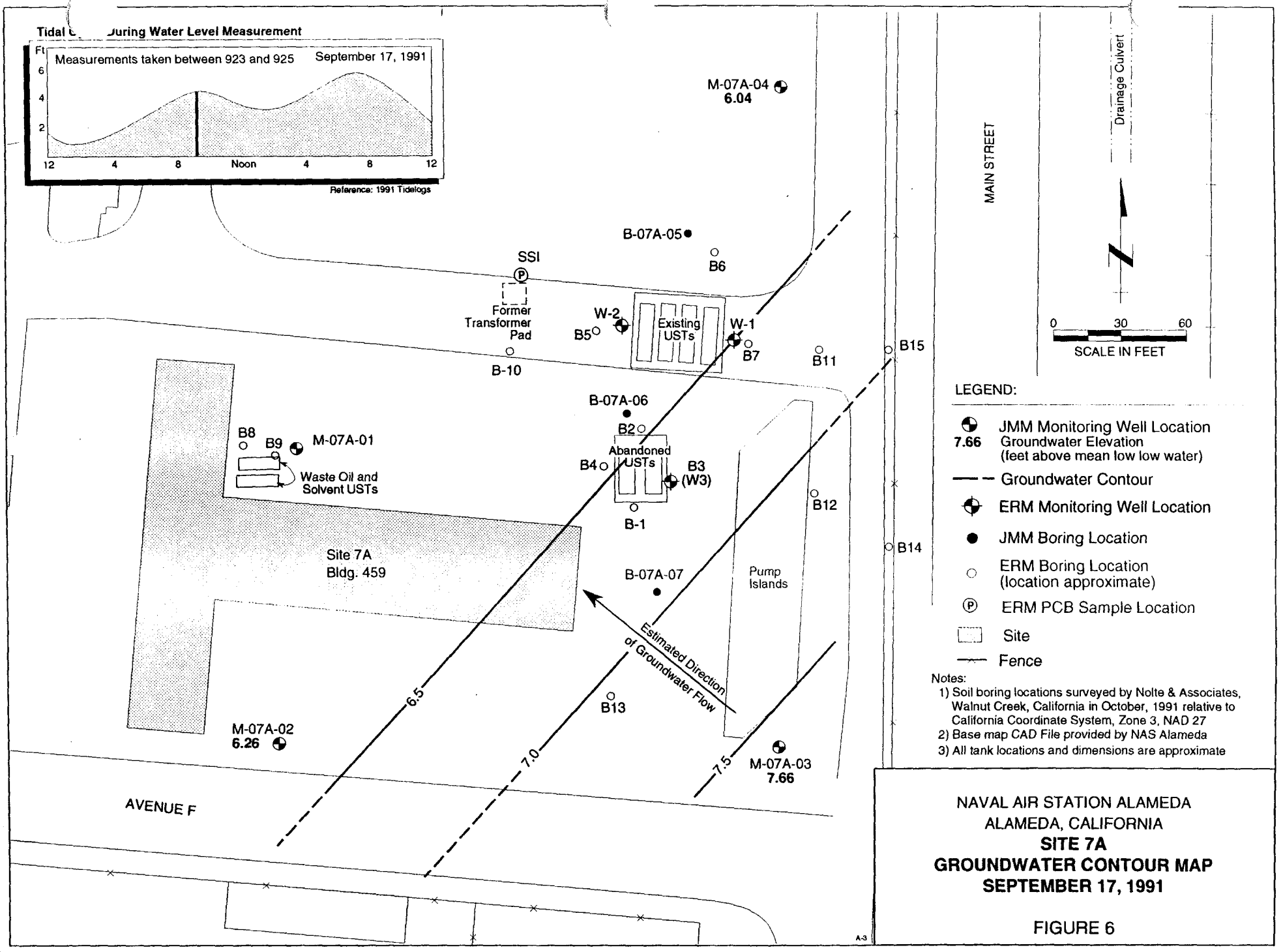
2.0 RESULTS OF PREVIOUS INVESTIGATIONS

Previous investigations performed at Site 7A include (1) an investigation by ERM-West in 1987 and (2) the initial RI conducted by PRC and JMM under the IRP. These investigations are summarized below.

2.1 ERM-WEST INVESTIGATION

The 1987 investigation by ERM-West was initiated by WESTDIV after petroleum product was detected in an excavation adjacent to the fuel station (ERM-West 1987). The investigation included drilling 17 borings and constructing three monitoring wells within three of the borings. The boring and well locations are shown on Figure 3. The investigation identified subsurface lithology as sandy fill material overlying clays with high organic content. Free product was noted on groundwater seeping into borings B-2 and B-3, located adjacent to the abandoned UST location. The free product appeared to be present underneath the concrete slab that overlies the abandoned tanks. The maximum reported thickness of free product was 2 inches. Total recoverable petroleum hydrocarbons (TRPH) and/or benzene, toluene, and xylenes (BTX) were detected in soil samples collected from the borings. ERM-West did not analyze for ethylbenzene. Generally, the concentrations of hydrocarbons were higher in shallow samples and decreased with depth. ERM-West reported that the clays appeared to be attenuating the downward migration of hydrocarbons. The extent of hydrocarbons in soils was not delineated in an eastern or northern direction. Polychlorinated biphenyls (PCB) were detected in two soil samples collected from north of the former transformer pad at concentrations ranging from 0.02 milligrams/kilogram (mg/kg) to 1.9 mg/kg. The PCB Aroclor-1260 was detected at 1.9 mg/kg at the surface and at 0.02 mg/kg at a depth of 1.5 feet bgs. The PCB Aroclor-1254 was detected at 1.6 mg/kg at the surface. ERM-West recommended that no further work be undertaken in the vicinity of the former transformer pad.


M-07A-04
6.89
7.0
Estimated Direction of Groundwater Flow
TWELFTH STREET
MAIN STREET
Drainage Culvert
Former Transformer Pad
W-2
Existing USTs
W-1
0
30
60
SCALE IN FEET
M-07A-01
7.16
Waste Oil and Solvent USTs
Abandoned USTs
B3
(W3)
7.25
Site 7A
Bldg. 459
7.0
6.75
Pump Islands
M-07A-02
6.43
6.5
Estimated Direction of Groundwater Flow
7.25
M-07A-03
7.43
AVENUE F
LEGEND:
JMM Monitoring Well Location
7.0 Groundwater Elevation
(feet above mean low low water)
Groundwater contour
ERM Monitoring Well Location
Site
Fence
Notes:
1) Soil boring locations surveyed by Nolte & Associates, Walnut Creek, California in October, 1991 relative to California Coordinate System, Zone 3, NAD 27
2) Base map CAD File provided by NAS Alameda
3) All tank locations and dimensions are approximate
4) Monitoring well M-07A-01 not used in groundwater contour delineation
NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A
GROUNDWATER CONTOUR MAP
1-31-92 (1800 HOURS)
FIGURE 5
Source: Follow-on Field Sampling Plan, RI/FS, Phases 2B and 3, Draft Final. Prepared by PRC and Montgomery Watson (Sept. 1993).
CTO121.M1/A-18



NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA

SITE 7A
GROUNDWATER CONTOUR MAP
SEPTEMBER 17, 1991

FIGURE 6

Groundwater was encountered at depths of 2.5 to 4 feet bgs. BTX were identified in the groundwater samples collected from the three monitoring wells. ERM-West reported that shallow groundwater flowed east under a gradient of 0.008 feet per foot (ft/ft) and that the elevation of the water table at the site varying over time, presumably because of tidal influences. No free product was reported in the wells installed by ERM-West.

2.2 INSTALLATION RESTORATION PROGRAM INVESTIGATION

The initial RI field activities at Site 7A included a soil gas survey, borehole drilling, monitoring well construction, and groundwater sampling. The soil gas survey included 72 sampling points on a grid with an approximately 25-foot spacing. Seven soil borings were drilled; groundwater monitoring wells were constructed in four of the borings. Locations of the soil borings and monitoring wells are shown on Figure 3. The results of the RI are presented in the Phases 2B and 3 data summary report (PRC and JMM 1992).

The soil gas survey indicated that vapor phase hydrocarbons (BTEX) were present primarily in the vicinity of the existing and abandoned fuel USTs, the existing fuel islands, and east of the fence marking the eastern boundary of the base. The 1991 benzene soil gas concentration isocontours are shown on Figure 7. Soil samples collected from borings B07A-06 and B07A-07 contained fuel constituents (ethylbenzene, toluene, and xylenes) with concentrations generally decreasing with depth. Acetone, methyl ethyl ketone, and methylene chloride were detected at low levels in on-site soils; the acetone is believed to be a laboratory artifact.

TRPH were present in soils at concentrations up to 1,490 mg/kg. Pesticides were present in surface soils at three locations. These compounds were probably related to past weed and pest control practices. During this investigation, soil samples were collected from areas away from the former transformer pad; PCBs were not detected. Elevated concentrations of metals were detected in soil samples collected in both the vadose and saturated zones during drilling activities for well M07A-02.

Water level measurements taken on two separate occasions indicate groundwater elevation differences are sufficient to reverse the groundwater gradient at the site, although the mechanism driving the elevation fluctuations has not been defined. Groundwater samples collected from monitoring wells


833
834
836
837
118
GLEN VIEW
MAIN STREET
AVENUE F
Drainage Culvert
Waste Oil and Solvent USTs
Site 7A Bldg. 459
Existing USTs
Abandoned USTs
Pump Islands
SG-07A-39 0.0
SG-07A-53 0.0
SG-07A-52 0.0
SG-07A-51 0.0
SG-07A-50 0.0
SG-07A-49 0.0
SG-07A-48 0.0
SG-07A-47 0.0
SG-07A-54 0.0
SG-07A-38 0.0
SG-07A-40 0.0
SG-07A-41 0.0
SG-07A-42 0.0
SG-07A-43 0.0
SG-07A-44 0.0
SG-07A-45 0.0
SG-07A-46 0.0
SG-07A-55 0.0
SG-07A-37 0.0
SG-07A-36 0.0
SG-07A-35 0.0
SG-07A-34 0.0
SG-07A-33 0.0
SG-07A-15 0.0
SG-07A-65 0.0
SG-07A-0 0.13
SG-07A-06 53.0
SG-07A-56 130.0
SG-07A-66 0.4
SG-07A-29 0.0
SG-07A-30 0.0
SG-07A-31 0.0
SG-07A-32 0.0
SG-07A-04 7.1
SG-07A-14 93.0
SG-07A-57 11.0
SG-07A-16 9.8
SG-07A-07 85.0
SG-07A-67 0.4
SG-07A-28 0.0
SG-07A-03 0.5
SG-07A-13 250
SG-07A-17 9.5
SG-07A-58 130.0
SG-07A-08 10.0
SG-07A-27 0.0
SG-07A-68 0.0
SG-07A-23 0.0
SG-07A-24 0.0
SG-07A-25 0.0
SG-07A-09 6.9
284
SG-07A-18 15.0
SG-07A-59 6.0
SG-07A-02 0.8
SG-07A-12 10.0
SG-07A-26 0.0
SG-07A-69 0.0
SG-07A-22 0.0
SG-07A-21 0.0
SG-07A-20 0.0
SG-07A-01 0.0
SG-07A-10 39.0
SG-07A-11 3.3
SG-07A-60 8.6
SG-07A-19 47.0
SG-07A-70 61.0
SG-07A-64 0.0
SG-07A-63 0.0
SG-07A-62 2.6
SG-07A-61 0.0
SG-07A-71 0.0
0
50
100
150
200
250
?
N
0 25 50
SCALE IN FEET
LEGEND:
Soil Gas Survey Point
6.0 Concentration of benzene in µg/L
Isoconcentration contour
66 Structure
Site
Fence
Notes:
1) Soil boring locations surveyed by Nolte & Associates, Walnut Creek, California in October, 1991 relative to California Coordinate System, Zone 3, NAD 27
2) Base map CAD File provided by NAS Alameda
3) All tank locations and dimentions are approximate
NAVAL AIR STATION ALAMEDA
ALAMEDA, CALIFORNIA
SITE 7A
BENZENE CONCENTRATION IN SOIL GAS
FIGURE 7
A-4

located within UST backfill areas contained TRPH. TRPH were not identified in groundwater samples from monitoring wells located outside of tank backfill areas. Fuel constituents (BTEX) were identified in existing ERM-West monitoring wells located within the backfill material around the existing and abandoned fuel tanks.

3.0 SAMPLING PLAN

This section describes the objective, sampling locations, analyses, and decontamination procedures for the interim removal action field investigation at Site 7A.

3.1 SAMPLING OBJECTIVE AND APPROACH

The objective of the IRA field investigation at Site 7A is to collect additional soil and groundwater data to (1) characterize the groundwater flow directions and gradients in the first water-bearing zone to assess whether compounds are migrating in the groundwater off site and (2) further assess the concentrations and extent of petroleum hydrocarbons, VOCs, SVOCs, pesticides, and metals in soil and groundwater. These data will be used in conjunction with IRP data and other existing data to evaluate the removal and closure requirements of the waste oil and solvent tanks and the two abandoned USTs, the feasibility of removing the three USTs now in service and the one UST out of service, the feasibility of removal of contaminated soil around these USTs, and finally the ramifications of leaving the tanks in place.

Based on the field sampling approach described in the Phase 2B and 3 follow-on FSP, the PRC team will drill and install two borings and three shallow monitoring wells, monitor water levels, and collect soil and groundwater samples. The two borings will be installed in the backfill around the abandoned USTS to supplement existing data and assess the presence of floating product. Soil samples will be collected at the surface and from 2.5 and 5 feet bgs. A temporary piezometer will be placed in each boring, and a dual-phase probe will be used to test for floating product.

The shallow monitoring wells will be installed to (1) characterize the eastern lateral extent of both VOCs and TRPH detected in the groundwater and (2) further characterize groundwater flow directions and gradients in the first water-bearing zone. There will be two field efforts for the

installation of the monitoring wells. During the first field effort, a single monitoring well will be installed within the clay zone. Water levels in the new well and two existing wells installed in the clay zone will be used to assess the groundwater flow direction. The water levels in the new and existing wells constructed in the clay as well as in existing wells screened in backfill material will be monitored for a 3-week period, using dataloggers measuring barometric pressure and tidal cycle simultaneously. During the second field effort, the remaining two wells will be installed at locations selected based on the results of the water level study.

The revised health and safety plan (HSP) from the draft NAS Alameda RI/feasibility study (FS) work plan addendum, dated September 29, 1993, will be followed for the field activities at Site 7A (PRC and Montgomery Watson, 1993b). All field activities will be performed in Level D personal protective equipment (PPE) with provisions for upgrading to Level C based on dust and benzene monitoring as described in the HSP. Benzene, which is the Level C governing compound, will be monitored using a photoionization detector (PID).

3.2 SAMPLE LOCATIONS AND COLLECTION

The soil and groundwater sample locations are shown on Figure 3. All new boring and well locations will be surveyed by a California-certified surveyor. The horizontal coordinates of each monitoring well and boring location will be determined to the nearest 0.1 foot; the locations will be submitted in the State Plane Coordinate System in electronic format. The elevation of the ground surface adjacent to each monitoring well and boring will be measured to the nearest 0.1 foot. Elevation measurement of the northernmost point of the top of the well casing will be to within 0.01 foot. Soil and groundwater sample collection procedures to be followed are described in the draft final Phase 2B and 3 follow-on FSP (PRC and Montgomery Watson, 1993a). The sample collection methods are summarized below for the IRA field investigation at Site 7A. Table 1 provides a summary of soil and groundwater samples and sample identification, including the field quality control samples.

Soil Sampling. The PRC team will collect a total of 15 original and 2 duplicate samples from the two borings located in the UST backfill and the 3 monitoring well borings. Samples for chemical analysis will be collected at the surface and from 2.5 and 5 feet bgs. Three stainless steel liners will be used inside split-spoon samplers to collect samples. Once the sample is retrieved, the split-spoon

NAS ALAMEDA RI/FS
SITE 7A INTERIM REMOVAL ACTION FIELD INVESTIGATION
SAMPLE IDENTIFICATION NUMBERS

			Analyte:	VOC	SVOC	PEST/PCB	TPH-Purgeable	TPH-Extractable	Metals	Gen Chem
Matrix	Laboratory ID	Field ID	Method:	CLP	CLP	CLP	MOD 8015	MOD 8015	CLP	
Soil	262-S07A-001	B07A-08-0					X	X	X	X
	262-S07A-002	B07A-08-2.5		X			X	X	X	X
	262-S07A-003	B07A-08-5		X			X	X	X	X
	262-S07A-004	B07A-09-0					X	X	X	X
	262-S07A-005	B07A-09-2.5		X			X	X	X	X
	262-S07A-006	B07A-09-5		X			X	X	X	X
	262-S07A-007	B07A-09-5 Dup		X			X	X	X	X
	262-S07A-008	M07A-05-0					X	X	X	X
	262-S07A-009	M07A-05-2.5		X			X	X	X	X
	262-S07A-010	M07A-05-2.5 Dup		X			X	X	X	X
	262-S07A-011	M07A-05-5		X			X	X	X	X
	262-S07A-012	M07A-06-0					X	X	X	X
	262-S07A-013	M07A-06-2.5		X			X	X	X	X
	262-S07A-014	M07A-06-5		X			X	X	X	X
	262-S07A-015	M07A-07-0					X	X	X	X
	262-S07A-016	M07A-07-2.5		X			X	X	X	X
	262-S07A-017	M07A-07-5		X			X	X	X	X
Water	262-S07A-018	M07A-01-Q1		X	X	X	X	X	X	X
	262-S07A-019	M07A-01-Q1 Dup		X	X	X	X	X	X	X
	262-S07A-020	M07A-02-Q1		X	X	X	X	X	X	X
	262-S07A-021	M07A-03-Q1		X	X	X	X	X	X	X
	262-S07A-022	M07A-04-Q1		X	X	X	X	X	X	X
	262-S07A-023	M07A-05-Q1		X	X	X	X	X	X	X
	262-S07A-024	M07A-06-Q1		X	X	X	X	X	X	X
	262-S07A-025	M07A-07-Q1		X	X	X	X	X	X	X
	262-S07A-026	W1-Q1		X	X	X	X	X	X	X
	262-S07A-027	W1-Q1 Dup		X	X	X	X	X	X	X
	262-S07A-028	W2-Q1		X	X	X	X	X	X	X
	262-S07A-029	W3-Q1		X	X	X	X	X	X	X

NAS ALAMEDA RI/FS
SITE 7A INTERIM REMOVAL ACTION FIELD INVESTIGATION
SAMPLE IDENTIFICATION NUMBERS
(Continued)

			Analyte:	VOC	SVOC	PEST/PCB	TPH-Purgeable	TPH-Extractable	Metals	Gen Chem
Matrix	Laboratory ID	Field ID	Method:	CLP	CLP	CLP	MOD 8015	MOD 8015	CLP	
Soil	262-S07A-001	B07A-08-0					X	X	X	X
Equipment Rinsate	* 262-S07A-030	S07A-ER-01		X	X	X	X	X	X	X
	* 262-S07A-031	S07A-ER-02		X	X	X	X	X	X	X
	* 262-S07A-032	S07A-ER-03		X	X	X	X	X	X	X
	* 262-S07A-033	S07A-ER-04		X	X	X	X	X	X	X

Notes:
* The quantity and analyses for equipment rinsates will be determined at the time of collection.
CLP - Contract Laboratory Program
Dup - Duplicate
Gen Chem - General Chemicals
MOD 8015 - Modified EPA Method 8015
PEST/PCB - Pesticides and Polychlorinated Biphenyls
SVOC - Semivolatile Organic Compound
TPH - Total Petroleum Hydrocarbons
VOC - Volatile Organic Compound
General chemicals for water samples include:

Total Dissolved Solids	pH
Alkalinity	Total Organic Carbon
Acidity	Chloride
Chemical Oxygen Demand	Fluoride
Sulfate	Hardness
Sulfide	
Nitrate/Nitrite	

General chemicals for soil samples include:
Total Organic Carbon
pH
% moisture

sampler will be opened, and Teflon® swatches and plastic caps will be secured to each end of the middle stainless steel liner before the sample is submitted for chemical analysis. Sample containers will be properly labeled and placed in ice chests cooled with "Blue Ice". Soil samples will be collected from the bottom or top stainless steel liners for field screening with a portable organic vapor analyzer (OVA) or a PID for VOCs. The field screening method is described in Section 14.1.5 of the Phase 2B and 3 follow-on FSP (PRC and Montgomery Watson, 1993a).

Groundwater Sampling. Ten original and 2 duplicate groundwater samples will be collected from both new and existing shallow monitoring wells at Site 7A. The shallow monitoring wells will be sampled no sooner than 2 days after development. The following sampling procedure will be used to acquire all samples from monitoring wells:

- **Step One:** At each site, the monitoring wells will be ranked according to the expected degree of contamination. During the first round of sampling, it will be assumed that the upgradient wells are clean, and expected contamination levels will be assigned to each well. As noted earlier in the work plan, the upgradient direction will be determined after the groundwater gradient study, prior to sampling. Sampling at each site will begin with the wells with the lowest expected degree of contamination and end with the well with the highest expected degree of contamination.

- **Step Two:** The waterproof expanding well cap on the well casing will be removed, and the well will be checked for organic vapors at the wellhead with an OVA or PID.

- **Step Three:** The water level and the depth of the well will be measured. These values will be used to calculate the required purge volume.

- **Step Four:** A minimum of three submerged well volumes (casing and filter pack) will be removed during purging of the monitoring well using a bailer or a pump. At a minimum of six times during the purging process, the electrical conductivity (EC), pH, and temperature of the water will be measured and recorded on the groundwater sampling log. The turbidity will be measured at the conclusion of the purging along with the last recorded temperature, pH, and EC values. Once the well is sufficiently purged and the measured parameters are stabilized, the well will be considered ready for sampling. Stabilization of the field parameters constitutes less than a 10 percent change in conductivity and pH, and less than 1°C change in temperature between well volumes. If the well does not recharge to within 80 percent within 1 hour, it will be considered impractical to purge the well of three well volumes, and the well will be bailed dry and sampled as soon as 80 percent recharge has occurred. The containment of the purged water is discussed in Section 4.0.

- **Step Five:** After the well is purged, a groundwater sample will be collected using a decontaminated stainless steel or Teflon® bailer with a bottom-emptying device. Care

will be taken when lowering and raising the bailer to minimize the turbulence of the water within the well.

Samples for VOCs and total petroleum hydrocarbons (TPH)-purgeable analysis will be collected first from each monitoring well, and care will be exercised to ensure no headspace exists in the samples. If air bubbles form, the sample and container will be discarded, and a new sample will be obtained. Samples for dissolved metals and dissolved SVOC analyses will be filtered in the field with a disposable 0.45-micron micropore membrane filter apparatus. The sample containers will be filled from the water flowing through the filter. All sample containers will be kept on ice before they are filled with the groundwater sample and will be returned to the ice after they are filled.

3.3 SAMPLE ANALYSIS

Soil samples collected from the borings drilled in the tank backfill will be analyzed for VOCs, TPH-purgeable, TPH-extractable, and metals. Groundwater collected from both the new and existing shallow monitoring wells at Site 7A will be analyzed for VOCs, ethylene dibromide, SVOCs, TPH-purgeable, TPH-extractable, pesticides, PCBs, metals, and general chemical characteristics including total dissolved solids. All laboratory analyses will be conducted by a Navy-approved state-certified laboratory using Contract Laboratory Program protocol.

3.4 DECONTAMINATION

The purpose of decontamination and cleaning procedures during drilling, well installation, and sampling tasks is to prevent foreign contamination of the samples and cross-contamination between borings and wells. All sampling and drilling equipment will be decontaminated by steam cleaning or alternatively by washing with a nonphosphate detergent such as Liquinox or its equivalent. A tap water rinse and a double deionized water rinse will follow the washing with the detergent. The following item-specific decontamination procedures will be observed:

- Drill Rig - Steam clean before drilling each day.
- Auger Flights and Tools - Steam clean before drilling each hole.

- Samplers and Hand Auger - Steam clean or detergent wash between each use.
- Well Casing and Screen - Steam clean before installing unless it is sealed in plastic from the manufacturer.
- Water Level Sensor - Steam clean or detergent wash between each use.
- Mixing Bowl and Utensils - Steam clean or detergent wash between each use.
- Bailer - Steam clean or detergent wash between each use.
- Bailer Cable - Steam clean or, if disposable, discard between uses.
- Development Equipment - Steam clean between wells.
- Sampling Equipment - Steam clean or wash with detergent between wells. Sampling pump tubing will be replaced between samples.

Decontamination fluids will be containerized. Section 4.0 further addresses the disposal of decontamination fluids. Sample containers will normally not require decontamination at the site since they are sent precleaned from the analytical laboratory. An area for decontamination activities will be organized before drilling activities begin.

4.0 INVESTIGATION-DERIVED WASTE MANAGEMENT AND DISPOSAL

The PRC team will plan and coordinate the disposal of all IDW generated during the field effort in accordance with federal, state, and local regulations. IDW will consist of soil, groundwater, decontamination water, miscellaneous debris, and PPE and will be collected in separate 55-gallon drums. Results of the chemical analyses performed on samples collected from the decontamination water and the groundwater will be submitted to the Navy Public Works Center to obtain approval for discharging the wastewater to the Building 5 industrial wastewater treatment plant. Composite soil samples will be collected from the soil drums and will be submitted along with the analytical results from the borehole soil samples to a Class I facility for waste profiling. The number of composite soil

samples submitted will be determined by the profiling facility. Soil and PPE waste will be disposed of in a Class I landfill.

5.0 RESPONSE TO PUBLIC REVIEW AND REGULATORY AGENCY COMMENTS

Presented below are the Navy's responses to public comments, dated January 12, 1994, on the field investigation work plan for field investigation activities at Site 7A. The responses are incorporated in the text of the final field investigation work plan. The public comments are presented verbatim in bold typeface. The Navy responses follow in normal typeface.

OVERALL COMMENTS

Comment No. 1: **Please explain how this interim action fits into the overall IR. Does the off-base hydrocarbon migration provide the rationale for increased priority or the sites relatively isolated location from adjacent sources of contamination?**

Response: The removal action (RA), as described in the field investigation work plan, is a part of the overall IR. The present field investigation is designed to assess whether off-site contamination is occurring at Site 7A and to provide data for evaluating potential alternatives for this removal action. Results of this field investigation and removal action will be used for the remedial investigation to assess whether additional site remediation is required.

Comment No. 2: **Please clarify the level of prior decisions and objectives. The introduction implies a prior decision not only for tank removal but also "associated contaminated soils and groundwater". Yet the sampling objectives on page 6 describe evaluating the feasibility of removing contaminated soil. One might expect a more challenging objective, e.g., the appropriateness or desirability of a specific insitu treatment technology. Please comment on the phase partition of the contaminants and justification for this assumed remediation step.**

Response: No decision has been made regarding the cleanup of the soils and groundwater impacted by the tanks. Prior to identifying and evaluating potential alternatives for this removal action, the site must be sufficiently characterized to understand the extent and magnitude of contaminants in soil and groundwater which may require remediation. As noted on page 6 of the work plan, the objective of the RA field investigation at Site 7A is to collect additional soil and groundwater data to characterize groundwater flow gradients in the first

water-bearing zone, and to further assess the extent of contaminants in the soil and groundwater.

The engineering evaluation cost analysis (EE/CA) is performed after the completion of the proposed field sampling plan. The EE/CA is the next step in the process, and will identify and evaluate potential technologies that are applicable for the removal action. The data obtained as part of this field program will be utilized for the EE/CA. The evaluation will consider the physical and chemical properties of the petroleum compounds found at the site.

Comment No. 3: **Please comment on plans for disposition after removal of contaminated soil and groundwater.**

Response: The preferred alternative for site cleanup has not yet been selected. The preferred alternative will be selected after the completion of the EE/CA. The draft EE/CA report will be transmitted to the public for review and comment, and public comments will be considered during final selection of the removal action alternative. If the potential alternatives include soil disposal, the disposal methods for the soil will be described in the alternatives. During the field investigation, a small quantity of soil cuttings will be generated. Potential disposal options will be identified and evaluated based on the results of the chemical analyses performed on the soil samples.

Comment No. 4: **Please comment on how the feasibility of removing the north group of UST's depends on this sampling data.**

Response: The data from the proposed field work is designed to provide information to assess the necessity of removing the north group of USTs at this time. The assessment will be based on the level of contamination found in the UST's vicinity.

Comment No. 5: **Please identify what "additional information" will be provided by this Interim Removal Action sampling beyond that included in the Follow on Sampling Plan of 9/28/93.**

Response: The "Follow On Field Sampling Plan Remedial Investigation/Feasibility Study Phases 2B and 3" (FSP) report describes an overall sampling plan for Site 7A and the remaining sites in Phases 2B and 3. The "additional work", as described on page one of the present work plan for Site 7A, is a portion of the overall work proposed for Site 7A in the FSP. Remaining proposed field work for this site that is not part of this field investigation will be conducted when funding becomes available in 1994.

Comment No. 6: **If the "abandoned" tanks "are scheduled for removal in 1993", what constrains this action?**

Response: The abandoned tanks were originally scheduled for removal in 1993. Due to budget constraints, the removal was rescheduled for 1994. In addition, the four abandoned tanks will now be removed under a RCRA project and not under this removal action.

SECTION 1 COMMENTS

Comment No. 7: **What is the project time and cost schedule?**

Response: At the present time, we anticipate installing the first set of test borings, monitoring wells and well points in early May. The second set of monitoring wells will be installed approximately three weeks later.

The budget for this work includes the development of the work plan, field work, sampling and analyses, development and evaluation of alternatives, an evaluation of treatment and disposal options, preparation of the EE/CA, preparation of public notice, waste disposal (soil and groundwater), and overall project management costs.

Comment No. 8: **Please define any physical implications of "abandoned" vs. "out of service" underground storage tanks. Is this distinction solely for location, installation date and removal planning? Which of the four north gasoline UST's is not in use?**

Response: At this time the Navy is using the terms "abandoned" and "out of service" synonymously. Of the four northern gasoline tanks, the tank which is furthest to east is not in use.

Comment No. 9: **What is the leak test history of the solvent tank?**

Response: Records dating back to 1987 do not indicate that the solvent tank was tightness tested. Tank test results have been kept as far back as 1987; the solvent tank was apparently abandoned before that.

Comment No. 10: **The solvent tank is described as empty. Are contents of the other unused tanks known?**

Response: Navy records indicate that all of the tanks are presently empty except for the abandoned northern tank, which appears to be partially filled with water.

Comment No. 11: **Given the uncertainty in groundwater flow direction, please include the figure showing eastward flow as well: Figure 8-6 of the Data Summary Report of 10/27/92, which displays data of 9/17/91.**

Response: Figure 8-6 will be included as Figure 6 in this field investigation work plan.

Comment No. 12: **Please confirm that asphalt overlies the waste oil and solvent tanks where no pad is shown. What are its possible dispositions?**

Response: As noted in the Response to general comment #3, this investigation does not include the actual removal action. Evaluation of potential removal actions will be evaluated as part of the EE/CA, which is to be completed after the field work.

SECTION 2 COMMENTS

Comment No. 13: **Please make PCB's plural (on page 4) as both Aroclor 1260 and Aroclor 1254 were found above 1 mg/kg.**

Response: Navy CLEAN format requires that first usage of an abbreviation not be plural. Please note that the second use of the abbreviation, PCB, is plural (page 5).

Comment No. 14: **Please include action levels when discussing results, e.g. 1 mg/kg PCB's in soil for comparison with the ERM-West findings.**

Response: As an interim removal action, this work plan addresses only fuel-based contaminants. PCBs will be addressed later in the RI/FS, and action levels will be developed.

SECTION 3 COMMENTS

Comment No. 15: **Please confirm that suspected causes of phthalate contamination will be addressed, e.g., storage of decontamination water in plastic bottles (presumably without pre treatment FSP p 9-2).**

Response: One of the suspected sources of phthalate contamination is from the plastic containers in which the decontamination water is stored. Samples obtained from this source water will be analyzed for phthalates. Another potential sources include rubber gloves, sample tubing (if used) and bailer cable. In order to screen for these possibilities, a rinsate will be obtained using the same materials and techniques which will be utilized while sampling.

Comment No. 16: **Please indicate why USDA soil characterizations are not considered helpful data for evaluating remediation techniques?**

Response: The USDA soil characterization is a method of characterizing surficial soil horizons for agricultural purposes. The USDA method is a general characterization scheme which does not provide as much descriptive detail as the Unified Soil Classification System (USCS), which is the system being used at Alameda NAS. Subsurface environmental field investigations very often extend beyond the

surficial soil horizons and require a more detailed soil descriptor. For this reason, the (USCS) is the preferred soil descriptor. The USCS includes a range of soil descriptions which indicate percentages of fine and coarse particles, as well as other information necessary for evaluating soil conditions for evaluating remediation techniques.

SECTION 5 COMMENTS

Comment No. 17: **The referenced ERM-West 1987 report should be made available to the public as requested in FSP comments dated 11/2/93.**

Response: Navy records indicate that this document, entitled "Site Investigation Naval Exchange Gas Station", is on record as document number 193 in the NAS repository at the City of Alameda Library. The document is dated March 31, 1987.

OTHER COMMENTS

Comment No. 18: **In reviewing this sampling plan, I found myself referring to eight other documents. Please consider making documents available on diskette, compiling and displaying more relevant data on figures, and using page numbers when cross-referencing documents to improve communication.**

Response: Future documents will attempt to cross reference other documents in more detail, including using page numbers. Text figures are typically designed to include as much information as possible, without being too detailed. The relevance of the information which is included in the figures is dependent on the focus and breadth of the report. The possibility of supplying documents on diskette will be considered.

Comment No. 19: **I believe that draft versions of the appendices for the RA and RI/FS should be generated for distribution to avoid yet another round of sampling due to poorly defined data requirements. A representative sample of such reports from another site could be made available to the public for reference with some benefit.**

Response: It is unclear what the term "poorly defined data requirements" refers to. The phased approach of conducting an environmental assessment is an acceptable approach. The phased approach allows use of existing data to coordinate an efficient site investigation. All samples collected in earlier phases of this investigation were collected according to data quality requirements, as outlined in the quality assurance project plan (QAPP), which was approved by the DTSC. All data are presently summarized in the data summary reports. These data are considered useful for the future remedial investigation/feasibility study evaluation.

Presented below are the Navy's responses to comments received from the Department of Toxic Substances Control (DTSC) and Regional Water Quality Control Board (RWQCB), dated March 29, 1994, on the field investigation work plan (work plan) for field investigation activities at Site 7A. The regulatory comments are presented verbatim in bold typeface. The Navy responses follow in standard typeface.

General Comments:

Comment No. 1: **There needs to be an additional monitoring well directly west of the Existing Underground Storage Tanks (UST's). Both Total Petroleum Hydrocarbons (TPH), and Benzene, Toluene, Xylene, and Ethylbenzene (BTEX) have been detected in the groundwater at well point W-2. Another well is needed to the west of point W-2 (in the assumed upgradient direction) to see how far the plume extends in this direction.**

Response: Although a well will be needed west of the existing USTs for closure at a later time, a well for the purpose of defining the extent of the plume (in effect, finding a "zero line") is not part of the scope of work of CTO 0262. The primary purpose of CTO 0262 is the collection of soil and groundwater information in preparation for source removal at the site. In addition, the upgradient direction cannot be assumed to be to the west of the existing USTs. Part of the purpose of CTO 0262 is to gather more water level information from the seven existing wells and one new well so that the groundwater gradient at the site may be better evaluated for the placement of two downgradient wells. Also, Site 7A is part of the basewide remedial investigation; future work at the site includes cone penetrometer testing and HydroPunch water sampling, which will generate additional information on the hydrologic characteristics of Site 7A.

Comment No. 2: **Please provide a map of the benzene soil gas survey, like Figure 8-3 in the Phases 2B and 3 in the Data Summary Report, October 27, 1992, in this work plan, in this work plan. Also, please provide some explanation of how the soil gas survey results contributed to the placement of additional wells and borings, depicted on Figure 3. If possible, please explain if the presence of storm sewer lines causes the peaks on the soil gas survey map, Figure 8-3.**

Response: A map of benzene concentrations in soil gas (same as Figure 8-3 in the October 1992 Data Summary Report) will be included with the work plan Section 2.2 discussion of the soil gas survey.

The soil gas survey results did not directly contribute to the placement of additional wells and borings shown on Figure 3 in the work plan. The soil gas data primarily provided information on contaminants in the vadose zone on the site; the data indicated possible hot spots in the areas of the existing and abandoned USTs and the existing fuel islands, and low concentrations on the eastern portion of the site. Soil borings (B07A-08 and B07A-09) proposed in the work plan are located within the backfill of the abandoned USTs to provide additional information on contaminants and to assess the presence of floating product. (Temporary piezometers will be installed in the borings to monitor potential floating product.) Well M07A-05 proposed in the work plan is located north of the existing USTs to provide hydraulic gradient data in the clay layer beneath the fill. Wells M07A-06 and M07A-07 proposed in the work plan are located tentatively on the eastern portion of the site to monitor the eastern lateral extent of contaminants; final well locations will be determined pending evaluation of groundwater gradient at the site.

The presence of (undocumented) storm sewer lines on the eastern portion of the site may influence the migration of contaminants in the soil (as possibly shown by low concentrations of benzene in the soil gas survey). The presence of storm sewer lines in this location will be investigated during the field investigation.

Specific Comments:

Comment No. 1:

Figure 3, Previous Sample Locations and Proposed IRA Field Investigation Sample Locations, An extra monitoring well is needed directly west of the four Existing UST's and the two Abandoned UST's (Please see General Comment #1). *Note: the text in the comment stating "...and the two Abandoned UST's" was later deleted by James Nusrala of RWQCB during a phone call on April 11, 1994.*

Response:

Please see response to General Comment No. 1.

Comment No. 2:

Section 2.2 Installation Restoration Program Investigation, page 5, last paragraph, The concentrations of TPH detected in the soil at Site 7A do not generally tend to increase with depth. Table 8-5, Soil Analytical Results for Organic Compounds, Site 7A in the Phases 2B and 3 Data Summary Report, dated October 27, 1992, shows many soil borings where the concentration of TPH increases with depth. Please amend this paragraph to state that TPH in soil does not dissipate with depth, and that the clay does not in fact attenuate the downward migration of fuel hydrocarbons at this site.

Response:

The text in this paragraph on page 5, Section 2.2 of the work plan will be amended to delete any discussion of the concentrations of TRPH

decreasing with depth or that the clay appears to attenuate the downward migration of fuel hydrocarbons in soils.

Comment No. 3: **Section 3.1, Sampling Objective and Approach, page 7, second paragraph, Please state that the monitoring wells will be installed to characterize the lateral extent of both VOC's and TPH in the groundwater at Site 7a. It should be the purpose of these additional wells to investigate all contaminants detected initially at this site, i.e. both TPH and VOC's.**

Response: The text in this paragraph on page 7, Section 3.1 of the work plan will be amended to include the analyses for TPH.

Comment No. 4: **Section 3.2, Sample Locations and Collection, Step One, Please clarify in what direction the upgradient wells are located. This sentence is ambiguous.**

Response: The upgradient direction at Site 7A is not known at this time. Reported upgradient directions are to the northeast, northwest and southeast (in the work plan and in the October 27, 1992 Data Summary Report). These tentative upgradient directions can be included in the work plan in the groundwater sampling procedures for the sampling order of monitoring wells during the Site 7A field investigation.

Comment No. 5: **Table 1, Site 7A Interim Removal Action Field Investigation, Sample Identification Numbers, The method for analyzing metals should be changed from the Contract Laboratory Procedure (CLP) to a method which would be more congruent with State and U.S. EPA's Maximum Contaminant Levels, and the Regional Water Quality Control Board's Basin Plan's Shallow Water Effluent Limits. Please reference the December 20, 1993 letter on this matter from the California Environmental Protection Agency, in this Table.**

Response: CLP methods will be used to analyze Site 7A data, but the laboratories will be required to make modifications as necessary (i.e. sample preparation or instrument type) to achieve Maximum Contaminant Levels and RWQCB limits, as discussed in the January 26, 1994 letter on quantitation limits requirements for NAS Alameda, which was written in response to the DTSC's December 20, 1993 letter. Under PRC's Statement of Work for NEESA laboratories, the laboratories will be required to provide documentation of method detection limits and information documenting any problems encountered with achievement of the lower limits (including sample matrix interference and instrument detection limits). In addition, the site investigation report for Site 7A will include a quality control summary report documenting the results of analytical data validation.

6.0 REFERENCES

California State Automobile Association. 1989. Map of Oakland/Berkeley/Alameda.

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Balch, D. 1992. Personal communication. From Duane Balch of PRC Environmental Management, Inc. (PRC), Rancho Cordova, California. To Donna Courington of JMM. February.

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PRC and Montgomery Watson. 1993b. Remedial Investigation/Feasibility Study Work Plan Addendum, Draft, Naval Air Station Alameda. Prepared for Navy WESTDIV. September 29.