

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0040

FINAL
REMOVAL ACTION WORK PLAN
Revision 0
November 26, 2001

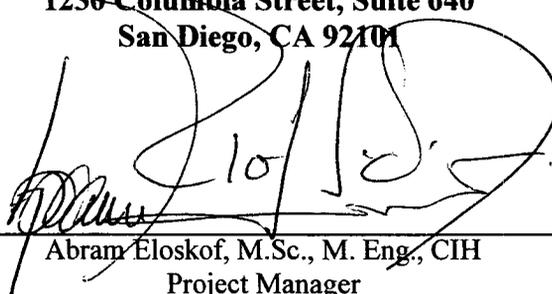
CERCLA TIME-CRITICAL REMOVAL ACTION
AT INSTALLATION RESTORATION SITE 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

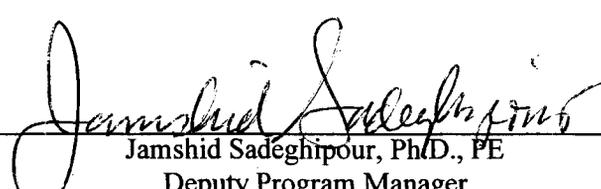
DCN: FWSD-RAC-02-0206



FOSTER WHEELER ENVIRONMENTAL CORPORATION

1230 Columbia Street, Suite 640
San Diego, CA 92101


Abram Eloskof, M.Sc., M. Eng., CIH
Project Manager


Jamshid Sadeghipour, Ph.D., PE
Deputy Program Manager

FOSTER WHEELER

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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Contract No. N68711-98-D-5713 (RAC III)

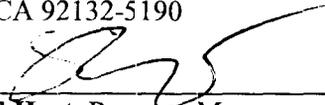
Document Control No. 02-0206

File Code: 5.0

TO: Contracting Officer
 Naval Facilities Engineering Command
 Southwest Division
 Mr. Richard Selby, 02R1
 1220 Pacific Highway
 San Diego, CA 92132-5190

DATE: 11/26/01
 CTO: 0040
 LOCATION: NAS Alameda

FROM:


 Neil Hart, Program Manager

DESCRIPTION: Final Removal Action Work Plan, CERCLA Time-Critical Removal
Action at Installation Restoration Site 25, Rev. 0, 11/26/01

TYPE: Contract/Deliverable CTO Deliverable Notification
 Other

VERSION: Final REVISION #: 0
 (e.g. Draft, Draft Final, Final, etc.)

ADMIN RECORD: Yes No Category Confidential
 (PM to Identify)

SCHEDULED DELIVERY DATE: 11/26/01 ACTUAL DELIVERY DATE: 12/04/01

NUMBER OF COPIES SUBMITTED: 0/4C/8E

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R. Weissenborn (06CARW)

M. Schneider

S. Edde - Env. Liaison

O/5E

A. Eloskof

D. Murphy - DTSC

D. Silva (05GDS) 3C/3E

J. Baldwin

A. Cook - USEPA

Basic Contract File (02R1)

D. Mishek - RWQCB

1C

Date/Time Received

EXECUTIVE SUMMARY

This Removal Action Work Plan (RAWP) has been prepared to describe the scope of a time-critical removal action (TCRA) at Operable Unit-5 [synonymous with Installation Restoration (IR) Site 25] located within the boundary of the former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California. Alameda Point is located at the west end of Alameda Island. The purpose of the action is to remove contaminated soil located in a portion of IR Site 25. The U.S. Department of the Navy (DON), Southwest Division Naval Facility Engineering Command has retained the services of Foster Wheeler Environmental Corporation as the general contractor to conduct the removal action at this site.

IR Site 25 is comprised of approximately 42 acres and is divided into three Environmental Baseline Survey (EBS) parcels, Parcel 181 (Coast Guard Housing Area), 182 (Estuary Park), and 183 (Coast Guard Housing Management Office). IR Site 25 is located within the National Priority List's listed portion of the former NAS Alameda. The TCRA site is approximately 14 acres and completely contained within EBS Parcel 181. U.S. Coast Guard employees and their families are currently occupying approximately 21 multiunit housing structures within the TCRA boundary under lease from the DON.

Previous IR Site 25 investigations have revealed the presence of polynuclear aromatic hydrocarbons (PAHs) in the soil. It is believed that the fill material used to create additional land for Alameda Island was contaminated with PAHs. These PAHs are believed to have originated from historical industrial activities in adjacent areas and are ubiquitous in the fill material. Several historical industrial operations that are likely to have released petroleum hydrocarbons were located in the vicinity of present-day Alameda Point. In particular, a manufactured gas plant that used oil (most active from 1903 through 1930) existed on the waterfront in Oakland and an oil refinery (Pacific Coast Oil Works) operated from about 1864 to 1899 at the western tip of pre-fill Alameda. Releases of oil and byproducts are believed to have resulted in widespread contamination of the former Oakland Inner Harbor shoreline and tidal channels. Subsequent fill events in IR Site 25 are believed to have (1) contaminated the fill materials and (2) trapped contamination in a buried zone of elevated PAHs and petroleum hydrocarbons described as the marsh crust. The marsh crust is defined as the remnant of the tidal marsh that existed along the shoreline of Alameda before filling to create additional dry land.

The proposed TCRA at IR Site 25 will reduce soil contaminant concentrations to acceptable levels and be protective of human health by preventing exposure to the contaminated soil. This will be accomplished through excavation and off-site disposal of the contaminated soil at an appropriate disposal facility approved by the U.S. Environmental Protection Agency to accept Comprehensive Environmental Response, Compensation, and Liability Act off-site waste. Thus, the removal action will substantially eliminate the identified pathways of exposure to hazardous

substances [the primary chemicals of concern (COCs)] for current and future users of the site. The human health COCs in the soil, addressed by the TCRA, are the seven carcinogenic PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene]. The removal action at the TCRA site focuses only on potentially unacceptable human health risk concerns in soils. Groundwater is not included within the scope of this removal action.

The DON has prepared an Action Memorandum recommending the remediation of the TCRA area be completed by means of excavation and off-site disposal of contaminated soils at an appropriate landfill facility. This RAWP provides detailed descriptions of the proposed removal action including pre-construction, construction, and post-construction activities. Project-specific plans and specifications will be referenced, as appropriate, to provide further detailed support to the RAWP and are included as appendices. These plans include a Field Sampling Plan, a Quality Assurance Project Plan, a Site-Specific Health and Safety Plan, an Air Monitoring Plan, a Project Contractor Quality Control Plan, a Traffic Control Plan, a Waste Management Plan, a Demolition Plan, an Environmental Protection Plan, an Environmental Conditions Report, and a Stormwater Management Plan.

Pre-construction activities include pre-construction surveys, pre-construction sampling, pre-mobilization conference, subcontracting, and procurement. Site work will initiate upon completion of the pre-construction site activities. Construction activities include site mobilization and preparation, concrete swales demolition, contaminated soil excavation, backfilling/ compaction, transport and off-site disposal of construction debris and contaminated soil at appropriate landfill facilities, site restoration, and demobilization. The remediation of the site will be performed using several construction teams to excavate approximately 34,000 bank cubic yards of PAH-contaminated soils from approximately 10 acres. The anticipated time to complete the field activities associated with the removal action is 4 months.

Post-construction activities involve preparing a project closeout report to provide a record of activities conducted during the project, to document decisions made regarding work options, and to address any residual contaminants (if any) that may have actual or potential impact on nearby human populations, animals, or the food chain.

DRAFT ADDENDUM
TO THE REMOVAL ACTION WORK PLAN
CERCLA TIME-CRITICAL REMOVAL ACTION AT
INSTALLATION RESTORATION SITE 25

DATED 29 MARCH 2002

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. N00236.000360

FINAL ADDENDUM
TO THE REMOVAL ACTION WORK PLAN
CERCLA TIME-CRITICAL REMOVAL ACTION AT
INSTALLATION RESTORATION SITE 25

DATED 19 APRIL 2002

IS ENTERED IN THE DATABASE AND FILED AT
ADMINISTRATIVE RECORD NO. N00236.000363

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ABBREVIATIONS AND ACRONYMS

Alameda Annex	Fleet and Industrial Supply Center, Oakland Alameda Annex Facility
AM	Action Memorandum
AMP	Air Monitoring Plan
ARAR	applicable or relevant and appropriate requirement
BaP	benzo(a)pyrene
bgs	below ground surface
BMP	Best Management Practice
Cal-EPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
COC	chemical of concern
°F	degrees Fahrenheit
DON	U.S. Department of the Navy
DOT	U.S. Department of Transportation
DP	Demolition Plan
DTSC	Department of Toxic Substances Control
EBS	Environmental Baseline Survey
ECR	Environmental Condition Report
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
FCZMA	Federal Coastal Zone Management Act
FSP	Field Sampling Plan
FWENC	Foster Wheeler Environmental Corporation
IR	Installation Restoration
IRP	Installation Restoration Program
LDR	land disposal restriction
mg/kg	milligrams per kilogram

ABBREVIATIONS AND ACRONYMS

(Continued)

mil	millimeter
NAS	Naval Air Station
NPDES	National Pollution Discharge Elimination System
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ORR	Operational Readiness Review
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCQC	Project Contractor Quality Control
PM ₁₀	particulate matter less than 10 microns
PPE	personal protective equipment
PQCM	Project Quality Control Manager
PRG	Preliminary Remediation Goal
PVC	polyvinyl chloride
PWC	Public Works Center
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCM	Quality Control Program Manager
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RTM	Remedial Technical Manager
RWQCB	Regional Water Quality Control Board
SHSS	Site Health and Safety Specialist
SHSP	Site-Specific Health and Safety Plan
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command

ABBREVIATIONS AND ACRONYMS

(Continued)

SWMP	Stormwater Management Plan
SWRCB	State Water Resources Control Board
TBC	to be considered
TCLP	Toxicity Characteristic Leaching Procedure
TCRA	Time-Critical Removal Action
TPH	total petroleum hydrocarbons
TSP	total suspended particulates
USC	United States Code
VOC	volatile organic compound
WMP	Waste Management Plan

1.0 INTRODUCTION

This Removal Action Work Plan (RAWP) describes the proposed procedures and field activities for the implementation of a time-critical removal action (TCRA) at Operable Unit-5 [synonymous with Installation Restoration (IR) Site 25] located on former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California (Figure 1-1). Alameda Point is located at the west end of Alameda Island. The U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV) is directing this TCRA in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Under the DON's directive, Foster Wheeler Environmental Corporation (FWENC) will be responsible for planning and implementing the subject TCRA.

The project is being performed as Contract Task Order No. 0040 through the contracting mechanism of SWDIV, Remedial Action Contract N68711-98-D-5713. Regulatory oversight and guidance for the removal action will be provided by the U. S. Environmental Protection Agency (EPA), the California Environmental Protection Agency (Cal-EPA), Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB).

Neptune and Company, Inc., summarized previous site investigations in the *Final Remedial Investigation Work Plan for Operable Unit-5, Alameda Point, Alameda, California* dated June 2001 (Neptune and Company Inc., 2001). Based on the results from the IR Site 25 sampling in June 2001, the DON prepared an Action Memorandum (AM) recommending excavation and disposal of the impacted soil that had contaminant concentrations exceeding cleanup goals. The AM provides justification for conducting the subject TCRA and includes a description of the site and the results of investigations conducted during June 2001. The investigation confirmed the presence of polynuclear aromatic hydrocarbons (PAHs) and metals in the soil.

The removal action at the TCRA site focuses only on potentially unacceptable human health risk concerns in soil. A final risk assessment will be included in the Remedial Investigation (RI) Report currently being prepared for IR Site 25. A preliminary assessment of the potential human health threats or risks associated with the soil at the site were determined by compiling and reviewing analytical results from the previous sampling events and comparing them to residential Preliminary Remediation Goals (PRGs) established by the EPA, Region 9. PRGs are health-based levels of chemical concentrations in soil that represent an acceptable cancer risk to humans of 1 in 1 million (1×10^{-6}) or a chronic hazard quotient of 1.0, whichever is lower, for an individual located on a site for 350 days per year over 30 years. As stated above, the final risk assessment for the site is incomplete and a detailed analysis of the residential usage and exposure potential remain unclear. Therefore, to mitigate immediate exposure pathways to human receptors, the DON determined that the 2-foot excavation within the delineated boundary

provided an acceptable risk level for the interim removal action. The excavation equates to an Action Level of 1.8 milligrams per kilogram (mg/kg) with a risk factor of 3×10^{-5} .

1.1 SCOPE OF WORK

The remediation of the TCRA area will be performed in a residential neighborhood and will be restricted to the removal of the top 2 feet of soil in all unpaved areas. Certain permanent features that include, but are not limited to, selective trees, fences, one playground area, limited landscaped areas, and so forth, will be removed prior to excavation. The Coast Guard will be responsible for replacement, upon completion of backfilling operations, of fences and trees.

This RAWP presents the procedures for pre-construction, construction, and post-construction activities including:

- Pre-construction surveys, sampling, and permitting
- Mobilization and site preparation
- Excavation of contaminated soil
- Off-site treatment (stabilization) and/or disposal of contaminated soil
- Backfilling and compaction of the excavation with appropriate import soils approved by the DON
- Site restoration and demobilization
- Preparation of a post-construction closeout report

The contaminated soil slated for removal, extends from near-surface to a depth of 2 feet below ground surface (bgs) and encompasses an area of approximately 10 acres as depicted on Figure 1-2. The excavation will not exceed depths of 2 feet or extend beyond the site boundary. Confirmation sampling will not occur. Following excavation, the remediation area will be regraded and sod will be placed over bare ground. A closeout report will be prepared to document the removal activities conducted at the site.

1.2 REPORT ORGANIZATION

The RAWP has been structured to provide details on the major aspects of the removal action. The remainder of the RAWP has been organized in 9 sections and 11 appendices (Appendices A through K). Section 2 provides background information on the site (summarized from previous investigations) and a summary of the risk-screening evaluation. Section 3 identifies the regulatory process associated with this removal action, applicable regulatory requirements, removal action objectives, and target cleanup goals. Pre-construction activities including permitting and investigative methods to be implemented for refinement of excavation boundaries prior to the removal action are outlined in Section 4. Project requirements, plans, and specifications are outlined in Section 5. Section 6 describes project management and identifies

key project personnel from the DON, regulatory agencies, and FWENC. A project schedule and miscellaneous management functions are also presented. Detailed descriptions of all on-site removal activities, including pre-construction soil sampling, contaminated soil removal, off-site treatment and disposal, excavation backfilling and compaction, and site restoration are included in Section 7. The contents to be included in the post-construction closeout report are summarized in Section 8. References are included in Section 9.

2.0 SITE CONDITIONS

Several investigations have been performed to assess the environmental conditions at IR Site 25. Detailed descriptions of these investigations are provided in the *Final Remedial Investigation Work Plan for Operable Unit-5, Alameda Point, Alameda, California*, (Neptune and Company Inc., 2001). Background information pertinent to the TCRA removal action includes the site-specific features, history of land usage, site geology and hydrogeology, climatic conditions, previous investigations, and the extent of soil contamination and risk-screening evaluation. The general background information has been summarized from the above-referenced document.

2.1 FACILITY DESCRIPTION AND BACKGROUND

The work area defined by the DON as the TCRA area is contained within the limits of the 42-acre IR Site 25 area located in the San Francisco Bay Area and lies in the northeastern corner of Alameda Point (Figures 1-1). IR Site 25 consists of three Alameda Point Environmental Baseline Survey (EBS) parcels (Parcels 181 through 183). U.S. Coast Guard employees and their families are currently occupying a portion of the multiunit housing structures within Parcel 181, under lease from the DON. IR Site 25 is bordered by the Fleet and Industrial Supply Center, Oakland Alameda Annex Facility (Alameda Annex) to the north and east, EBS Parcels 178 through 180 to the south, and privately held property to the west. A set of railroad tracks is immediately north of the site. Todd Shipyard borders the site to the northwest.

During the course of environmental investigations at former NAS Alameda and at IR Site 25, organic chemical analyses have revealed the presence of PAHs in the soil and groundwater. It is believed that the fill material used to create additional land for Alameda Island was contaminated with PAHs. These PAHs are believed to have originated from historical industrial activities in adjacent areas and are ubiquitous in the fill material.

The area encompassing IR Site 25 existed as marshland and tidal flat prior to development in the early 1900s at which time these areas were filled with dredged material of uncertain origin to create usable land for development. Several fill events have occurred in the IR Site 25 area between 1887 and 1939.

Several historical industrial operations that are likely to have released petroleum hydrocarbons to the environment were located in the vicinity of present-day Alameda Point. In particular, a manufactured gas plant that used oil (most active from 1903 through 1930) existed on the waterfront in Oakland and an oil refinery (Pacific Coast Oil Works) operated from about 1864 to 1899 at the western tip of pre-fill Alameda. Releases of oil and byproducts associated with manufacturing operations from these large industries are believed to have resulted in widespread contamination of the former Oakland Inner Harbor shoreline and tidal channels. Subsequent fill events are believed to have (1) contaminated the fill material and (2) trapped contamination in

place resulting in a buried zone of elevated PAHs and petroleum hydrocarbons described as the marsh crust. The marsh crust is defined as the remnant of the tidal marsh that existed along the shoreline of Alameda before filling to create additional dry land.

The presence of PAHs in the marsh crust and fill reflects their environmental persistence. Other organic chemicals present in petroleum products such as single-ring aromatic compounds and light aliphatics are largely lost over time due to volatilization, dissolution, and breakdown by a variety of biotically mediated degradation mechanisms.

2.1.1 Site Location

The TCRA area is approximately a 14-acre area contained within the limits of EBS Parcel 181 and consisting of approximately 21 multiunit structures and open-space park areas (Figure 2-1). Structures and cement or asphalt paving occupies approximately 4 acres of the site area. The remaining 10 acres of the site is open space covered with vegetation and soil that is proposed for excavation. The TCRA area is bordered by EBS Parcel 182 to the north and west, EBS parcels 178 through 180 to the south and the remaining area of EBS Parcel 181 to the east.

2.1.2 Type of Facility and Operational Status

EBS parcels 181, 182, and 183 comprise the IR Site 25 area. EBS parcels 181, 182, and 183 have somewhat different histories of usage. Fifty-one residential buildings constructed in 1969 and nine open-space areas presently occupy EBS Parcel 181. A sanitary sewage pump station (Facility 591) is also presently located in EBS Parcel 181 near the southeast corner of EBS Parcel 182.

EBS Parcel 182 comprises the area currently defined as Estuary Park. Between 1947 and 1966 the area was used for residential purposes and contained barrack-type housing. These buildings were reportedly demolished sometime between 1966 and 1970 (Neptune and Company, Inc., 2001). A housing office (Building 534) was constructed sometime between 1990 and 1992 in the southernmost portion of Estuary Park.

EBS Parcel 183 is less than 1 acre in size and contains Building 545, which was constructed between 1970 and 1979 (Neptune and Company, Inc., 2001). Building 545 is presently used as the Coast Guard Housing Maintenance Office. EBS Parcel 183 was historically used to house barracks and shares a similar history in this regard as EBS Parcel 182.

2.1.3 Structures/Topography

The topography of the area is relatively flat without any natural gradient. There are not any areas of undisturbed land, as dredging, construction, and other man-made disturbances have altered most of the area. The elevation of the land surface at the TCRA area is approximately 10 to 15 feet above sea level.

2.2 PHYSICAL CHARACTERISTICS

Alameda Point is located on Alameda Island, at the base of a gently sloping plain that extends from the Berkley Hills on the east to the shore of the San Francisco Bay on the west. Originally a peninsula, Alameda Island was detached from the mainland in 1902 when a channel linking San Leandro Bay to San Francisco Bay was cut. The western portion of Alameda Island was formerly marshlands, tidelands, and sloughs adjacent to the historical San Antonio Channel now known as the Oakland Inner Harbor. Filling the natural tidelands, marshlands, and sloughs with dredge materials from the San Francisco Bay, Seaplane Lagoon, and the Oakland Inner Harbor created the majority of the land that is now the installation. Surficial soil at IR Site 25 and surrounding areas consist primarily of compacted artificial fill. Geologic and hydrogeologic conditions at IR Site 25 are briefly discussed below.

2.2.1 Geology

Alameda Point is located along the eastern San Francisco Bay (East Bay Margin). San Francisco Bay occupies a depression between two uplifted areas, the Berkeley Hills to the east and the Montara and other mountains to the west. The depression and the uplifted areas were formed by two subparallel, active faults, the San Andreas Fault west of San Francisco Bay and the Hayward Fault east of San Francisco Bay. The San Andreas and Hayward faults are located approximately 12 miles west and 5 miles east of Alameda Point, respectively. Alameda Point and the San Francisco Bay are underlain by metamorphosed sandstone, siltstone, shale, greywacke, and igneous bedrock of Jurassic-Age Franciscan Formation. Alameda Island is underlain by 400 to 500 feet of unconsolidated sediments overlying consolidated Franciscan bedrock (Neptune and Company Inc., 2001).

The sedimentary deposits represented along the East San Francisco Bay include (from youngest to oldest) the bay mud, Temescal Formation, the Posey Formation, the San Antonio Formation, and the Alameda Formation.

The fill above the bay mud is a heterogeneous, laterally discontinuous mixture of sand, silt, and clay with some construction debris and organic material. The fill material is characterized as dredged sediments from the Oakland Inner Harbor and San Francisco Bay mixed with material from the bay mud and Merritt Sand Formation. The thickness of the fill varies from approximately 10 to 20 feet across the facility. The thickness of the fill is probably most influenced by the presence of historical tidal channels that once transected the tidal flats.

The marshland layer underneath the fill material is an organic-rich peat and grass layer about 6 inches to 2 feet thick at depths ranging from 15 to 20 feet bgs. This peat and grass layer was first recognized during previous geotechnical investigations and the term marsh crust was used to signify this lithologic-time stratigraphic unit. Investigations conducted at IR Site 25 indicate that material deposited upon the pre-existing marsh crust contains constituents that resulted from local historical industrial waste disposal activities.

Borings located near the center of former NAS Alameda indicate that native sediment beneath the fill is bay mud, which consists primarily of gray to black, medium to high plasticity silty clay with occasional thin lenses of fine sand. Extensive sand layers were not observed within the bay mud. The bay mud ranges in thickness from 25 to 80 feet. The Merritt Sand Formation is found below the bay mud and is found up to depths as great as 135 feet bgs. However, maximum depths are unknown.

2.2.2 Hydrogeologic Setting

The shallow water-bearing zone within the fill forms the upper unconfined aquifer at the site. The lateral extent of the fill and the shallow water-bearing zone are undefined. Groundwater wells have not been installed in the TCRA area, however groundwater data from 1994 to 1996 in areas east and north recorded groundwater levels ranging from 2 to 12 feet bgs. Elevation data indicate that the shallow groundwater flows approximately to the northwest. Groundwater elevations below sea level occur near the Oakland Inner Channel where groundwater appears to have a significant tidal influence.

The horizontal gradient in the shallow water-bearing zone ranges from 0.002 feet/feet to 0.011 feet/feet. Localized groundwater mounds and depressions occur at isolated locations. Variations in groundwater permeability of the soil are largely the result of grain-size differences within the shallow saturated soils, and groundwater flow patterns are probably greatly influenced by this permeability. The shallow water-bearing zone in the fill at the facility is not considered a regional aquifer.

Two primary deep aquifers have been identified beneath the site, the Merritt Sand Aquifer, which includes the Merritt and Posey Sand Formations that are considered a single hydrostratigraphic unit, and the deeper Alameda Aquifer. The groundwater management subarea containing the Merritt Sand Formation and the Alameda Aquifer is called the Oakland Upland and Alluvial Plain Management Subarea.

The TCRA at IR Site 25 does not have an impact on the shallow or deep groundwater units and will not be discussed further.

2.2.3 Surface-Water Hydrology

The TCRA area is partially urbanized consisting of impermeable materials (roofs and paving) with landscaped yards. The soil cover allows for partial absorption and percolation of precipitation. Collection of surface-water runoff from the TCRA area occurs via the storm drain system on the island and discharges into the Oakland Inner Harbor.

2.2.4 Climatic Conditions

The climatic conditions of the site have been described based on information reported by the Western Regional Climate Center. Based on records from the nearest weather station, Oakland Museum, precipitation records indicate that the mean annual precipitation is 23.41 inches. Most rainfall occurs between the months of November and April. Mean low and high temperatures are 52 degrees Fahrenheit (°F) and 67°F, respectively. The wind direction is predominately from the northwest and southeast.

2.3 PREVIOUS INVESTIGATIONS

Several investigations have been performed in the vicinity of the site from 1994 to the present. In 1994 and 1995, the DON conducted an EBS that included the collection of surface soil samples and soil gas samples in EBS Parcel 181 (the Coast Guard North Housing Area). Phase 2A of the EBS involved the collection of 15 surface soil samples, one subsurface soil sample, and 17 soil gas samples from three parcel-specific target areas, and two zone-wide target areas. Soil samples did not reveal any significantly elevated concentrations of Contract Laboratory Program (CLP) Metals, CLP pesticides/polychlorinated biphenyls (PCBs), or total petroleum hydrocarbons (TPH) (purgeable and extractable). Volatile organic compounds (VOCs) were not detected in soil gas samples. PAHs were sampled at only one location in this EBS study because they were not expected to be of concern in this area. Additional sampling was not conducted in EBS Parcel 181.

In February 1999, soil and groundwater samples were collected within EBS Parcel 181. Thirty-six soil samples (21 surface and 15 subsurface) were collected. Groundwater HydroPunch® samples and samples from the three existing monitoring wells were also collected. In April of 1999, 33 additional surface soil samples were collected (nine from backyards). Elevated PAH concentrations were detected in the northern portion of EBS Parcel 181. However, concentrations decreased in samples in the southern and eastern portion of the area (Neptune and Company Inc., 2001).

In June 2001, to support further evaluation of the PAH contamination, over 168 additional soil samples were collected within EBS Parcel 181 at the locations indicated on Figure 2-2. Composite samples were collected over intervals between 0 to 4 feet and 0 to 8 feet bgs. The analytical data is currently under review and evaluation.

2.4 NATURE AND EXTENT OF CONTAMINATION

According to the investigators, the data collected between 1994 through 1999 were adequate to determine that the PAH concentrations decreased from northeast to southwest across the TCRA site and are higher in the subsurface from 0 to 8 feet than 0 to 2 feet. However, additional studies on the variability of the PAH concentrations were needed to support the risk evaluation for exposure pathways to residents and future construction workers. Based on the data collected in

June 2001, the DON is in the process of preparing the RI Report for IR Site 25. However, due to the time constraints of the TCRA, the DON established a 1.8 mg/kg benzo(a)pyrene (BaP)-equivalent action level and delineated the TCRA area as depicted on Figure 2-1.

2.5 RISK-SCREENING EVALUATION

A major portion of IR Site 25 currently contains housing complexes that are occupied by Coast Guard personnel and their families. The complexes also contain common areas including play areas and lawns. Previous investigations have shown that PAHs are present in soil and groundwater at IR Site 25. This is believed to have resulted from historical releases from industrial activities in adjacent areas leading to widespread distribution of PAHs in fill used to create the new portions of Alameda Island, including the area encompassing IR Site 25. Other DON contractors are presently preparing the RI Report for IR Site 25 in which the final baseline human health risk assessment will be presented.

In the interim, a risk-based Action Level was developed for PAHs to identify areas requiring cleanup based on currently available soils data. This process involved identification of relevant site-specific exposure scenarios and calculation of an appropriate Action Level that would be protective of current on-site residents.

For this TCRA, the exposure medium of concern is surface soils (0 to 24 inches). This was selected to address exposure of current on-site residents through ingestion of surface soil, dermal contact with surface soil, and inhalation of windblown soil particulates. Exposure via plant uptake was not considered because restrictions are in place that prohibits the planting of vegetable gardens. In addition, groundwater was not considered, because there is no current use of shallow groundwater, and therefore no exposure pathway exists. It is noted that groundwater is being characterized as part of the RI, and the cumulative groundwater and soils risk at IR Site 25 will be assessed in the RI report. Because much of the site has already undergone residential development, the residential use scenario has served as the exposure scenario.

Region 9 of the EPA has developed PRGs for residential soil (EPA, 2000). These PRGs combine current EPA toxicity values with standard default exposure assumptions to estimate concentrations in soil that are considered protective of humans, including sensitive groups, over a lifetime. These are conservative values that take into account potential exposure via ingestion of surface soil, dermal contact with surface soil, and inhalation of windblown soil particulates. The PRGs correspond to carcinogenic risk of one-in-one-million (1×10^{-6}), and a non-cancer hazard index of one.

For PAHs, BaP is the only carcinogenic PAH for which EPA publishes a cancer slope factor. All PAHs are evaluated according to their toxicity relative to BaP (EPA, 2001). Because individual PAH concentrations are normalized according to their toxicity relative to BaP to create a single

BaP-equivalent concentration, selection of the Action Level for IR Site 25 focused on the PRG for BaP, which is 0.062 mg/kg (EPA, 2000).

PRGs for the residential use scenario assume that an individual is present on a site for 350 days a year for 30 years. An exposure duration of 30 years was also assumed during development of the Action Level for the site. The residential use scenario (30-year exposure duration) was used to establish the BaP-equivalent associated with a target cancer risk of 3×10^{-5} , which is within the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) acceptable cancer risk range (1×10^{-6} to 1×10^{-4}) [40 CFR, Part 300.430(e)(2)], and is expected to provide adequate interim protection of public health prior to completion of the CERCLA process at the site.

Based on the assumptions described above, the DON has established the Action Level (and hence the site cleanup level for the action described in this RAWP) for BaP-equivalent PAHs in surface soil at TCRA area at 1.8 mg/kg. This value is within the NCP target risk range.

For the purposes of this TCRA, it is assumed that actions taken to mitigate risks to public health or welfare can reasonably be expected to be protective of ecological receptors at the site as well. It is also noted that results of future risk assessments may indicate that further actions are necessary. If this is the case, additional removal actions will be evaluated if appropriate.

The TCRA will thus involve removal of 2 feet of surface soils containing PAHs, the only compounds driving potential risk at the site. It is noted that the effectiveness of the removal action may require re-evaluation during completion of the IR Site 25 RI Report currently being prepared. It is believed that this removal action will significantly reduce potential risks at the site.

3.0 REGULATORY FRAMEWORK

Environmental investigation and remediation of former NAS Alameda is being conducted under the Department of Defense Installation Restoration Program (IRP). Activities conducted under the IRP are to be performed in accordance with CERCLA and the NCP. Under Executive Order 12580, the DON is the lead agency responsible for the cleanup effort, but the EPA, DTSC, and the California RWQCB are involved in IRP oversight. A RI Report is currently being prepared by the DON, and this TCRA is being planned based on initial sampling results and findings of the RI investigation activities.

3.1 REGULATORY PROCESS

Section 121(d) of CERCLA 1980 [CERCLA, 42 United States Code (USC), Section 9621(d)], as amended, states that remedial actions at CERCLA sites must attain (or the decision document must justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations determined to be legally applicable or relevant and appropriate. Although Section 121 of CERCLA does not itself expressly require that CERCLA removal actions comply with applicable or relevant and appropriate requirements (ARARs), the EPA has promulgated a requirement in the NCP mandating that CERCLA removal actions “. . . shall, to the extent practicable considering the exigencies of the situation, attain ARARs under federal environmental or state environmental or facility siting laws” [Title 40 Code of Federal Regulations (CFR), Section 300.415(j)] [40 CFR, Section 300.415(j)]. It is DON policy to follow this requirement. Certain specified waivers may be used for removal actions as is the case with remedial actions.

3.2 REGULATED SITE ACTIVITIES

3.2.1 Anticipated Waste Streams

Generation of several potential waste streams is anticipated from the TCRA soil excavation activities at IR Site 25. These potential waste streams are categorized as follows:

- Contaminated soil [Resource Conservation and Recovery Act (RCRA) hazardous, non-RCRA hazardous, and non-hazardous waste] excavated during the removal action
- Oversized contaminated debris – rock, wood, piping, concrete, and scrap metal
- Wastewater, including: impacted stormwater runoff and fluids from equipment and personnel decontamination
- Non-hazardous solid waste, such as trash, and inert construction debris
- Decontamination pad solids/sludges

- Used polyethylene liners from soil stockpiles and/or waste storage areas
- Used personal protective equipment (PPE)

Waste management activities are described in Section 5.5 of this RAWP. A separate waste management plan (WMP) (Appendix G) has been prepared to address management, transportation, and disposal of the aforementioned waste streams.

3.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address the situation at a CERCLA site. The requirement is applicable if the jurisdictional prerequisites of the standard show a direct correspondence when objectively compared to the conditions at the site. An applicable federal requirement is an ARAR. An applicable state requirement is an ARAR only if it is more stringent than federal ARARs. If the requirement is not legally applicable, then the requirement is evaluated to determine whether it is relevant and appropriate. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed response action and are well suited to the conditions of the site (EPA, 1988). A requirement must be determined to be both relevant and appropriate in order to be considered an ARAR.

The criteria for determining relevance and appropriateness are listed in 40 CFR Section 300.400(g)(2) and include the following:

- The purpose of the requirement and the purpose of the CERCLA action
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site
- The substances regulated by the requirement and the substances found at the CERCLA site
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site
- The type of place regulated and the type of place affected by the release or CERCLA action
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site

According to CERCLA ARARs guidance (EPA, 1988), a requirement may be “applicable” or “relevant and appropriate,” but not both. Identification of ARARs must be done on a site-specific basis and involve a two-part analysis: first, a determination whether a given requirement is applicable; then, if it is not applicable, a determination is made as to whether it is nevertheless both relevant and appropriate. It is important to explain that some regulations may be applicable or, if not applicable, may still be relevant and appropriate. When the analysis determines that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable (EPA, 1988).

This section provides a brief description of potential ARARs with a determination of ARAR status (that is, applicable, relevant and appropriate, or not an ARAR). For the determination of relevance and appropriateness, the pertinent criteria were examined to determine whether the requirements addressed problems or situations sufficiently similar to the circumstances of the release or response action contemplated and whether the requirement was well suited to the site. A negative determination of relevance and appropriateness indicates that the requirement did not meet the pertinent criteria.

To qualify as a state ARAR under CERCLA and the NCP, a state requirement must be:

- A state law
- An environmental or facility siting law
- Promulgated (of general applicability and legally enforceable)
- Substantive (not procedural or administrative)
- More stringent than the federal requirement
- Identified in a timely manner
- Consistently applied

To constitute an ARAR, a requirement must be substantive. Therefore, only the substantive provisions of requirements identified as ARARs in this analysis are considered to be ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or non-environmental, including permit requirements, are not considered to be ARARs. CERCLA 121(e)(1), 42 USC, Section 9621(e)(1), states that “No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on site, where such remedial action is selected and carried out in compliance with this section.” The term “on-site” is defined for purposes of this ARARs discussion as “the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action” (40 CFR, Section 300.5).

Non-promulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. Such requirements may however, be useful and are “to be considered” (TBC). TBC [40 CFR Section 300.400(g)(3)] requirements complement ARARs but do not override them. They are useful for guiding decisions regarding cleanup levels or methodologies when regulatory standards are not available.

Pursuant to EPA guidance (EPA, 1988), ARARs are generally divided into three categories: chemical-specific, location-specific, and action-specific requirements. This classification was developed to aid in the identification of ARARs; some ARARs do not fall precisely into one group or another. ARARs are identified on a site basis for removal actions where CERCLA authority is the basis for cleanup. As the lead federal agency, the DON has primary responsibility for identification of potential ARARs for IR Site 25. In preparing this ARAR analysis, the DON undertook the following measures consistent with CERCLA and the NCP:

- identified federal ARARs for the proposed removal action addressed in the AM, taking into account site-specific information for the site
- reviewed potential state ARARs to determine whether they satisfy CERCLA and NCP criteria that must be met in order to constitute state ARARs
- evaluated and compared federal ARARs and their state counterparts to determine whether state ARARs are more stringent than the federal ARARs or are in addition to the federally required actions
- reached a conclusion as to which federal and state ARARs are the most stringent and/or “controlling” ARARs for the proposed removal action

3.3.1 Potential Location-Specific ARARs

Coastal Resource ARARs

Federal Coastal Zone Management Act (FCZMA) – The FCZMA (16 USC, Sections 1451–1464) requires that all federal activities that affect the coastal zone shall be conducted in a manner consistent, to the maximum extent practicable, with approved state management programs. California’s approved coastal management programs include the San Francisco Bay Plan developed by the San Francisco Bay Conservation and Development Commission. The Bay Plan’s policies include limiting bay filling and maintaining marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the bay. The FCZMA is not an ARAR since the TCRA does not impact marshes, mudflats, or wildlife nor does it affect beneficial uses of the bay.

California Coastal Act of 1976 – The Public Resources Code (California Public Resources Code Sections 30000–30900) – and 14 California Code of Regulations (CCR), Sections 13001 through 13666.4 regulate activities associated with development to control direct significant impacts on coastal waters and to protect state and national interests in California coastal

resources. The California Coastal Act policies set forth in the act constitute the standards used by the California Coastal Commission in its coastal development permit decisions and for the review of local coastal programs. These policies contain the following substantive requirements: protection and expansion of public access to the shoreline and recreation opportunities (California Public Resources Code, Sections 30210 through 30224), protection, enhancement, and restoration of environmentally sensitive habitats including intertidal and nearshore waters, wetlands, bays and estuaries, riparian habitat, grasslands, streams, lakes, and habitat for rare or endangered plants or animals (California Public Resources Code, Sections 30230 through 30240), protection of productive agricultural lands, commercial fisheries, and archaeological resources (California Public Resources Code, Sections 30234, 30241 through 30244), protection of the scenic beauty of coastal landscapes (California Public Resources Code, Section 30251), and provisions for expansion, in an environmentally sound manner, of existing industrial ports and electricity-generating power plants (California Public Resources Code, Section 30264).

It is noted that the Oakland Inner Harbor, which connects to the San Francisco Bay, is located approximately 500 feet north of the site. Since the site is near a coastal area, a check with the California Coastal Commission was made to determine if the site was within a coastal zone. Since the TCRA area is greater than 100 feet from the coast high tide line, the site is not affected by any coastal zoning restrictions. However, implementing the TCRA at IR Site 25 should be consistent with these goals and will conform to the substantive requirements of the state management program. While the removal action will involve short-term and temporary excavation and staging of contaminated soils, the excavation activities will be conducted in a manner that will protect the adjacent coastal zone. The selected removal action will also reduce COCs in the surface soils and thus reduce potential exposure of coastal fauna to contaminants through erosion. By reducing contamination in the area, contaminants will be less bioavailable to food chains through flora as well.

Cultural Resources ARARs

The National Historic Preservation Act requires federally funded projects to identify and mitigate impacts of project activities on properties included in or eligible for the National Register of Historic Places. Historic buildings or landmarks are not present in the area that could be impacted by the removal action or at the site. Therefore, the National Historic Preservation Act is not a potential ARAR.

The Archaeological and Historic Preservation Act requires that for federally funded or approved projects that may cause irreparable loss to significant scientific, prehistoric, historic, or archaeological data, the data must be preserved by the agency undertaking the project or the agency undertaking the project may request the Department of Interior to do so. The site is located on an area of engineered fill material so prehistoric or historic sites do not exist for the area that potentially could be impacted by the removal action. Therefore, the Archaeological and Historic Preservation Act is not a potential ARAR.

Wetlands Protection and Floodplains Management ARARs

IR Site 25 is not within a known floodplain nor is it located adjacent to any wetland areas or surface water bodies. Therefore Executive Order No. 11990, Protection of Wetlands [40 CFR, Section 6.302(a)], Executive Order No. 11988, Floodplain Management [40 CFR, Section 6.302(b)], and the Clean Water Act, Section 404, 33 USC, Section 1344, are not ARARs for this response action. It is noted that the San Francisco Bay is located approximately 500 feet north of the site, and Best Management Practices (BMPs) will be established in accordance with a written Stormwater Management Plan (SWMP) to prevent runoff from the site from affecting the bay.

Biological Resources ARARs

As supported by previous biological assessment activities on the Base, due to the disturbed and developed nature of the area, the site does not contain threatened or endangered species, or habitat that may support special-status species. Therefore, none of the following biological resources are applicable or relevant and appropriate ARARs for the IR Site 25 removal action: Endangered Species Act of 1973 (substantive provisions of 16 USC, Sections 1531 through 1543), Migratory Bird Treaty Act of 1972 (substantive provisions of 16 USC, Sections 703 through 712), Marine Mammal Protection Act (substantive provisions of 16 USC, Sections 1361 through 1421h), Magnuson-Stevens Fishery Conservation and Management Act (16 USC, Sections 1801 through 1882), National Wildlife Refuge System Administration Act of 1996 (16 USC, Sections 668dd through 668ee, substantive provisions of 50 CFR Sections 27.11 through 27.97), Wilderness Act (16 USC, Sections 1131 through 1136, 50 CFR Sections 35.1 through 35.14), and/or California Endangered Species Act (California Fish & Game Code, Chapter 1.5, Sections 2050 through 2116).

3.3.2 Potential Action-Specific ARARs

Federal Hazardous Waste Storage ARARs

Although the contaminated soil to be excavated during the TCRA is not anticipated to be hazardous, storage of hazardous waste in stockpiles during a response action is subject to stringent RCRA and/or state requirements. However, certain ARARs may be relaxed if the temporary storage time is in accordance with the requirements and waste meets the characteristics of the requirements listed below.

- Federal accumulation time (22 CCR, Section 66262.34) – Waste accumulated on site for 90 days or less is subject to limited storage requirements. The requirements include labeling, containers, drip pads, and other storage requirements.
- Container storage (22 CCR, Section 66264.171–66264.178).
- Staging piles (40 CFR, Part 264.554) – This regulation allows relief from land disposal restrictions (LDRs) for temporary storage of remediation waste on

contiguous property. Placing hazardous remediation wastes in a staging pile does not trigger LDRs or minimum technology requirements. The substantive provisions of Section 264.554(d), (e), (f), (h), (i), (j), and (k) are ARARs for design and operating criteria for the staging pile if the soil removed during the TCRA is hazardous.

- Temporary units (22 CCR, Section 66264.553) – Alternative requirements that are protective of human health or the environment may replace design, operating, or closure standards for temporary tanks and container storage areas used for treatment or storage of hazardous remediation wastes during corrective action activities. These units are not subject to RCRA LDRs. The substantive requirements at 22 CCR, Section 66264.553(b), (d), (e), and (f) are ARARs for a temporary unit. Temporary units are not anticipated to be utilized for the TCRA.
- If, based on the hazardous waste determination described under the federal chemical-specific ARARs discussion, wastes are determined to be hazardous, substantive requirements of 22 CCR, Section 66262.34 (pertaining to hazardous waste accumulation) will be applicable. Waste profiling of the soil to be removed will be conducted as a pre-removal activity. The TCRA involves the stockpiling of excavated materials while waste transportation is coordinated. In addition, if the soil is determined to be RCRA hazardous waste, the substantive requirements of 49 CFR, Parts 171.2(f), 172.300, 172.302, 172.303, 172.304, 172.400, and 172.504 [pertaining to the Department of Transportation (DOT) requirements for transport of hazardous materials] would be relevant and appropriate for transport of the excavated soil on site.
- If the contaminated soil is determined to be a hazardous waste, it must be disposed in a landfill that meets the design and operating requirements of 22 CCR, Sections 66264.300 through 66264.310. Additionally, if it is classified as an RCRA hazardous waste, the soil will be subject to the LDRs established in 22 CCR, Section 66268.40 (for RCRA hazardous waste) or 22 CCR, Section 66268.105 (for non-RCRA hazardous waste). These standards are considered applicable and must be attained prior to land disposal of the waste.

State Waste Storage ARARs

- Waste piles in 23 CCR, Division 3, Chapter 15 – Substantive general construction requirements under 23 CCR, Section 2540(a) and (f), Section 2541, liner requirements at Section 2542, leachate collection and removal system requirements at Section 2543, seismic controls at Section 2547, and groundwater and vadose zone monitoring under 23 CCR, Chapter 15, Article 5 may be applicable for waste piles. However, under Section 2510:
 - Alternatives to construction or prescriptive standards shall be approved where the discharger demonstrates that: (1) the construction or prescriptive standard is not feasible as provided in subsection (c) of this section, and (2) there is a specific engineered alternative that is consistent with the performance goal addressed by the particular construction or prescriptive standard and affords equivalent protection against water quality impairment.

- To establish that compliance with prescriptive standards in this chapter is not feasible for the purposes of subsection (b) of this section, the discharger shall demonstrate that compliance with a prescriptive standard is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives that meet the criteria in subsection (b) of this section, or is impractical and will not promote attainment of applicable performance standards.
- Under Section 2511(d), actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment are exempt from the requirements of 23 CCR, Division 3, Chapter 15, provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to Article 2 of this chapter, and further provided that remedial actions intended to contain such wastes at the place of release shall implement applicable provisions of this chapter to the extent feasible.
- Division 2, Subdivision 1 – Substantive general construction requirements under 27 CCR, Section 20310(a), (b), and (f), Section 20320, liner requirements at Section 20330, leachate collection and removal system requirements at Section 20340, precipitation and drainage controls at Section 20365, seismic controls at Section 20375, and groundwater and vadose zone monitoring at 27 CCR, Division 2, Subdivision 1, Chapter 3, Subchapter 3 may be applicable for waste piles. These requirements are applicable for California waste classified as designated waste (Section 20210) or non-hazardous solid waste (Section 20220).
 - However, under Section 20080(b), engineered alternatives are allowed to follow construction or prescriptive standards contained in the State Water Resources Control Board (SWRCB)-promulgated regulations of this subdivision. Alternatives shall only be approved where the discharger demonstrates that the construction or prescriptive standard is not feasible, and there is a specific engineered alternative that is consistent with the performance goal addressed by the particular construction or prescriptive standard, and affords equivalent protection against water quality impairment.
 - To establish that compliance with prescriptive standards in this subdivision is not feasible, the discharger shall demonstrate that compliance with a prescriptive standard either is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives which meet the criteria in (b), or is impractical and will not promote attainment of applicable performance standards.
 - Under Section 20090(d), actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment are exempt from the Title 27 requirements listed above, provided that wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections of Article 2, Subchapter 2, Chapter 3, Subdivision 1 of this division, and further provided that remedial actions intended to contain such wastes at the place of release shall

implement applicable SWRCB-promulgated provisions of this division to the extent feasible.

- If the excavated soil is determined to be neither RCRA nor non-RCRA hazardous waste, a designated waste determination must be made prior to disposal in accordance with the substantive provisions of 27 CCR, Section 20200.
- Fugitive dust may be generated during the excavation and handling of the contaminated soil. The pertinent substantive provisions of the Bay Area Air Quality Management District Regulations are considered applicable for these activities. In accordance with the regulations, reasonably available control measures will be applied during the TCRA to prevent fugitive dust emissions.

Institutional Controls

Section 1471 of the California Civil Code regulates the use of land to protect present and future human health and the environment. This would be relevant and appropriate to the adoption of institutional controls due to the presence of hazardous materials on the site.

Sections 25202.5 and 25222.1 of the California Health and Safety Code pertain to restrictions on specific property uses and are relevant and appropriate to the adoption of institutional controls.

3.3.3 Potential Chemical-Specific ARARs

RCRA Hazardous Waste Standards – The federal RCRA requirements at 40 CFR, Part 261 does not apply in California because the state RCRA program is authorized by the EPA. The authorized state RCRA requirements are therefore considered potential federal ARARs. The applicability of RCRA requirements depends on whether the waste is RCRA hazardous waste, whether the waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement, and whether the activity at the site constitutes treatment, storage, or disposal as defined by RCRA. However, RCRA requirements may be relevant and appropriate even if they are not applicable. The determination of whether a waste is RCRA hazardous waste can be made by comparing the site waste to the definition of RCRA hazardous waste. The RCRA requirements at 22 CCR, Sections 66261.21, 66261.22(a)(1), 66261.23, 66261.24(a)(1), and 66261.100 are potential ARARs because they define RCRA hazardous waste. A waste can meet the definition of hazardous waste if it has the toxicity characteristic of hazardous waste. This determination is made by using the Toxicity Characteristic Leaching Procedure (TCLP). The maximum concentrations allowable for the TCLP listed in Section 66261.24(a)(1)(B) are potential federal ARARs for determining whether the site has hazardous waste. If the site waste has concentrations exceeding these values, it is determined to be a characteristic RCRA hazardous waste.

State RCRA requirements included within the EPA-authorized RCRA program for California are considered to be potential federal ARARs and are discussed above. When state regulations are either broader in scope or more stringent than their federal counterparts, they are considered

potential state ARARs. State requirements such as the non-RCRA, state-regulated hazardous waste requirements may be potential state ARARs because they are not within the scope of the federal ARARs (57 Federal Register 60848). The 22 CCR, Division 4.5 requirements that are part of the state-approved RCRA program would be applicable state ARARs for non-RCRA, state-regulated hazardous wastes.

The site waste characteristics need to be compared to the definition of non-RCRA, state-regulated hazardous waste. The non-RCRA, state-regulated waste definition requirements at 22 CCR, Section 66261.24(a)(2) are state ARARs for determining whether other RCRA requirements are state ARARs. This section lists the total threshold limit concentrations and soluble threshold limit concentration. The site waste may be compared to these thresholds to determine whether it meets the characteristics for a non-RCRA, state-regulated hazardous waste.

Title 27, Sections 20210 and 20220 are state definitions for designated waste and non-hazardous waste, respectively. These may be ARARs for soil that meets the definitions. These soil classifications determine state classification and siting requirements for discharging waste to land.

3.4 REMOVAL ACTION OBJECTIVES

The removal action objective for this TCRA is to protect residential occupants in the area by removing the top 2 feet of soil that may present a potential exposure risk

3.5 COMMUNITY RELATIONS ACTIVITIES

As the lead agency for the environmental IRP activities at the former NAS Alameda, the DON is responsible for conducting community relation activities for the TCRA at IR Site 25.

In accordance with 40 CFR, Part 300.415(n)(2) for CERCLA actions where, based on the site evaluation, the lead agency determines that a removal is appropriate and that less than 6 months exist before on-site removal activity must begin, the lead agency shall (1) publish a notice of availability of the administrative record file established in a major local newspaper of general circulation within 60 days of the initiation of on-site removal activity, (2) provide a public comment period as appropriate and not less than 30 days from the time the administrative record file is made available for public inspection, and (3) prepare a written response to significant comments. In addition to these actions, the proposed project activities will be discussed with the Base Restoration Advisory Board that consists of interested community members and various responsible agencies.

Several community relation activities will be conducted to inform the public about the ongoing activities, and to encourage involvement in the review of relevant documents and discussions regarding the proposed removal action.

3.5.1 Public Information

For a complete record of activities associated with this TCRA, documents are contained in information repositories that are located at:

- 1) Alameda Main Public Library (Historic Alameda High School)
2220 Central Avenue
Alameda, California
- 2) Alameda Point Former NAS Alameda
950 West Mall Square, Suite 141
Alameda, California

The complete administrative record is located at 1220 Pacific Highway, San Diego, California, and is maintained by Ms. Diana Silva, SWDIV Administration Record Manager, (619) 532 - 3676.

3.5.2 Public Participation

The proposed TCRA will be discussed during community meetings and through the Restoration Advisory Board. In addition, a public notice will be issued that describes the proposed TCRA and the availability for review of the project administrative record.

4.0 PRE-CONSTRUCTION ACTIVITIES

Pre-construction activities will be completed prior to mobilization and are presented in the following sections:

- Pre-Construction Surveys
- Pre-Construction Sampling
- Pre-Mobilization Conference
- Subcontracting/Procurement

4.1 PRE-CONSTRUCTION SURVEY

Prior to excavation activities at the TCRA area, FWENC will conduct a land survey and an underground utility search at the site. The survey activities will be implemented prior to initiation of the field sampling activities to create: (1) an accurate topographic map of the site, (2) a map containing a northing and easting grid coordinate system overlay with 50-foot interval indicators for waste profiling sampling and site restoration, and (3) an underground utilities map. The topographic survey will document existing surface features and conditions, such as buildings, curbs, gutters, sidewalks, utilities, manholes, and other points in sufficient detail to generate the topographic map with 1-foot contour elevation lines.

AutoCAD will be used to generate the topographic base map. The topographic map will be used for plotting sample locations, locating excavation boundaries, and preparing a final grading design. A California-registered land surveyor (FWENC subcontractor) will perform the survey using third-order, Class I accuracy. Horizontal control (northings and eastings) will be tied to the State Plane Coordinate System, based on the North American Datum of 1983, and vertical control (elevations) will be tied to North American Vertical Datum of 1987, mean sea level.

The underground utility search will utilize the Base's Public Works Center (PWC) maps and subsurface geophysical surveys in order to prepare a map showing the locations of the subsurface utilities at the site. The utilities location map will be overlaid on the topographic map of the site to create a composite map indicating all the necessary information to be used during the field sampling and excavation activities. The geophysical survey will be conducted using both electromagnetic and ground penetrating radar methods to:

- Confirm utility clearance in TCRA area.
- Locate additional utilities not included on PWC utility maps within the site boundary.
- Physically mark utility locations on the ground surface with flags.

4.2 PRE-CONSTRUCTION SAMPLING

The purpose of pre-construction sampling activities is to characterize the material to be excavated for waste disposal purposes only. Characterization of the material to be excavated prior to fieldwork allows for the immediate off-site transportation of the impacted soil to the approved site thereby minimizing stockpile areas.

The COCs for the site are PAHs. The areal extent and concentration of the PAH contamination has been determined by other investigators and are based on approximately 168 shallow soil samples at locations within the proposed excavation. The majority of the samples were analyzed for PAHs and metals. FWENC proposes to present to the disposal facility the extensive existing soil data from the previous investigations in addition to supplemental random sampling from the grid area.

The details of the sampling and analysis protocols and procedures are provided in the Field Sampling Plan (FSP) (Appendix A); and the applicable analytical quality assurance requirements are provided in the Quality Assurance Project Plan (QAPP) (Appendix B). Health and Safety procedures are addressed in the Site-Specific Health and Safety Plan (SHSP) (Appendix C).

4.2.1 Sampling Procedure

A 50-foot grid area was imposed over the work area for the purpose of locating sample points. Approximately 180 grids fall within the subject site. FWENC proposes to randomly sample 10 percent of the grids (18 samples) and to collect four additional samples located within the area exhibiting the highest concentrations of PAHs detected during previous investigations. Based on the assumption that the PAH concentrations are already characterized, the grid samples will be analyzed for VOCs, pesticides, PCBs, metals, cyanide, and fish toxicity. This sampling scheme will result in the collection of 22 samples, 11 of which will be used for fish toxicity. Figure 4-1 presents the grid layout and the location of the 18 randomly selected samples and the location of the four samples to be collected in areas where high concentrations of PAHs were previously detected.

4.3 PERMITTING

Pursuant to CERCLA, only the substantive permitting requirements need to be met. Prior to obtaining permits, the appropriate regulatory agency representative will be contacted to clarify what portion of the permit process is exempted under CERCLA.

FWENC maintains a current annual excavation permit from the California Occupational Safety and Health Administration (Cal-OSHA) (No. 99-903457). The required 5-day notification will be provided before excavation begins. Dig Alert will also be notified a minimum of 72 hours prior to any excavation activities. All excavations will be conducted in accordance with CCR Title 8, Sections 1539 through 1541 and CFR 1910 and 1926 requirements.

Permits for temporary stockpiling of hazardous waste will not be necessary. The excavated soils and waste material will not be stored on site for greater than 90 days. The DON, as the generator, will sign any necessary waste manifests for off-site transportation.

The excavation area involves 10 acres. To meet the substantive requirements of a National Pollution Discharge Elimination System (NPDES) permit, a SWMP has been prepared and is found in Appendix K of this report. Stormwater management activities are described in Section 7.7.1 of this RAWP.

FWENC will coordinate with the SWDIV Remedial Project Manager (RPM) to obtain necessary station approvals for the excavation and removal of impacted soil at the TCRA area. Possible approvals may include:

- Requesting, prior to conducting any excavation activities, that the DON's PWC Underground Service Alert mark all underground utilities
- Verification from the Resident Officer in Charge of Construction (ROICC) or another DON representative that will sign the waste manifest.

4.4 PRE-MOBILIZATION CONFERENCE AND OPERATIONAL READINESS REVIEW

Prior to commencing field activities, a pre-mobilization conference will be held on site with the FWENC Project Manager, Project Superintendent, Site Health and Safety Specialist (SHSS), Project Quality Control Manager (PQCM); the SWDIV RPM, and the ROICC to discuss and develop a mutual understanding of the following activities:

- Scope of construction/removal activities
- Site Health and Safety requirements
- Contractor quality control details and submittals
- Approach and execution of the work order
- Coordination between FWENC, SWDIV, and the DON

DON site-specific protocol, as applicable to work to be performed at the site, will also be discussed. Minutes of the meetings will be prepared by FWENC and submitted to the DON.

4.5 SUBCONTRACTING/PROCUREMENT

Subcontracting and procurement will be performed primarily at the home office prior to initiating the on-site activities. However, if needed, staff at the field office may also perform field subcontracting and procurement. The activities that may involve field subcontracted services include site trailer setup, analytical laboratory, land and geophysical survey, fencing removal/installation, transportation and disposal, and landscaping (sod installation). Materials

that will be procured from the field office include daily expendables, construction and support materials, piping, tools, and other items that do not require the home office's engineering involvement.

5.0 PROJECT REQUIREMENTS

Requirements for this project such as health and safety, air quality monitoring, construction quality control, traffic control, waste management, environmental protection, and facility design are discussed in this section.

5.1 HEALTH AND SAFETY REQUIREMENTS

A SHSP has been developed for the project which discusses health and safety procedures to be followed while conducting activities in association with the removal action. The SHSP addresses worker health and safety, chemical and physical hazards, training requirements, and spill prevention and response procedures associated with the proposed removal action at the TCRA area. A copy of the SHSP will be present on site at all times during the removal action. The SHSP is included in this RAWP as Appendix C. All field personnel, including subcontractors, will be required to review the plan and provide written acknowledgment of their review. In addition, a tailgate safety meeting will be held at the beginning of each workday to discuss relevant or task-specific safety issues. A brief description of major health and safety requirements is provided in the following subsections.

5.1.1 Worker Health and Safety

The SHSP provides requirements and guidelines that will be utilized in the field to protect the health and safety of workers. A SHSS will provide full-time oversight of on-site activities associated with the TCRA to ensure conformance with the SHSP.

The SHSS will prepare daily site safety reports on all activities. A loss control weekly inspection checklist will be prepared and will be acted upon, if necessary.

Specific components of the SHSP that reflect the daily activities of workers and will be under the authority of the SHSS and supporting personnel include the following:

- A hazard assessment has been prepared for the major field activities associated with the planned removal action. The pertinent chemical, physical, and biological hazards have been identified. Activity hazard analyses have been prepared to define the specific risks and means of mitigation that will accompany daily construction activities.
- Control measures to reduce the risk of exposure to chemical, physical, and biological hazards have been defined.
- Specific training requirements that will enable workers to operate at the site and improve their awareness of health and safety have been presented in the SHSP.
- Control of site operations, use of PPE, site safety equipment, and on-site communications have been described.

- Real-time air monitoring and medical surveillance procedures have been described.
- Decontamination procedures, including contamination prevention, personnel decontamination, equipment decontamination, and disposal procedures, have been described for site work.
- General site safety procedures related to site operations to ensure that all aspects associated with accident prevention have been covered.
- Disposal procedures for hazardous and non-hazardous solid and liquid wastes have been described.

5.1.2 Training Requirements

Training requirements for supervisors and construction workers associated with IR Site 25 removal action include:

- Occupational Safety and Health Administration (OSHA) 40-hour hazardous site operations safety training
- OSHA 8-hour annual refresher training for hazardous site operations
- OSHA site supervisor training
- Pre-construction safety meeting prior to the start of removal activities
- Daily safety briefings prior to initiation of work activities
- Site-specific training (ergonomic training) prior to start of construction activities
- First aid and CPR training
- Loss control/near miss incident reporting and investigation training

5.1.3 Emergency Response Plan

The SHSP addresses the following aspects of the Emergency Response Plan at the TCRA area:

- Chain-of-command and responsibilities during emergencies
- Evacuation signals and routes
- Responding to potential or actual fires or explosions
- Responding to personnel overexposure to contaminants
- Responding to injuries
- Decontamination during emergencies
- Adverse weather conditions
- Reporting accidents and incidents

5.2 AIR QUALITY MONITORING REQUIREMENTS

Ambient air monitoring will be performed during earthmoving activities associated with the TCRA. A detailed description of the air monitoring program is provided in the site-specific Air Monitoring Plan (AMP). A copy of the AMP is included in this RAWP as Appendix D. A summary of major components of the AMP is provided in this section.

5.2.1 Air Quality Concerns

Airborne contaminants may be generated during the excavation and earthmoving activities. The contaminants of concern in different areas at IR Site 25 have already been described in detail in Section 2.4. The potential airborne contaminants of specific concern with respect to the TCRA area include PAHs and metals.

Ambient air monitoring is planned during the removal activities to detect any off-site migration of the above contaminants. The purpose of this air monitoring is to minimize potential off-site human health impacts of the activities conducted at the site. Personnel monitoring will also be performed as discussed in the SHSP (Appendix C) for protection of the on-site workers.

5.2.2 Sampling Methods

Air monitoring is planned for the construction activity area. A background air monitoring sample will be collected before construction activities begin. During construction activities, air samples will be collected downwind of the site near the elementary school south of the TCRA area. The following are major features or components of the proposed air monitoring program.

- Install high-volume and medium-volume samplers downwind of the construction area.
- Install wind monitoring equipment to determine wind speed and direction.
- Collect air samples for particulate and semivolatile organic compound (SVOC) analyses according to the AMP.
- Perform laboratory analyses of airborne contaminants and depending on the results and make adjustments or modifications to the removal activities.

All monitoring equipment will be calibrated and maintained as needed. Daily reports will be prepared to document the results of all monitoring activities.

5.3 CONTRACTOR QUALITY CONTROL REQUIREMENTS

A site-specific Project Contractor Quality Control (PCQC) Plan has been developed for the IR Site 25 TCRA. The PCQC Plan for this project is presented in Appendix E and provides project specific quality assurance/quality control information (QA/QC). The PCQC Plan discusses the QA/QC organization and management system, the requirements for handling and

managing all project-related QC records, requirements for testing laboratory certification, and QC inspection and testing, reporting, and documentation. A brief description of major PCQC requirements and activities is presented in this section.

5.3.1 Field Quality Control

Field inspections and control tests will be performed to ensure that each definable work element of the removal action conforms to the contract specifications. Field inspections will be conducted daily or more frequently. Construction materials and workmanship will be tested as specified by the contract documents. All field inspections and control tests will be documented as described in the PCQC Plan. The removal activities requiring field inspections and control tests include:

- Construction of equipment decontamination pad, soil stockpile, and wastewater storage tank containment areas. They will be inspected to ensure materials and workmanship meet industry standards.
- Backfilling of the excavated areas. Inspections and confirmation testing will be conducted to ensure that fill material, fill placement, and fill compaction meet the requirements of the contract specifications.
- Replacement fence installation. It will be inspected for materials and workmanship.

5.3.2 Field Inspections

A minimum of four control inspections will be performed for each definable feature of work. Control inspections will be conducted and documented by the site PQCM. The four control inspections are:

- Preparatory inspections which will be performed prior to the beginning any definable feature of work. The preparatory inspection will include reviewing contract requirements, documenting pre-remediation site conditions, providing for any required testing, establishing that all preparatory work has been completed and all required materials are on hand.
- Initial inspections which will be performed as soon as a representative portion of the particular feature of work has been accomplished and shall include examination of workmanship and review of control testing, use of defective or damaged material, and omissions.
- Followup inspections which will be performed daily to assure continuing compliance with the contract requirements until completion of the particular feature of work.
- Completion inspections which will be performed at the completion of a particular feature of work to document any deficiencies that must be corrected before final approval.

5.3.3 Control Tests

The PQCM will schedule all the tests specified or required to verify that control measures are adequate to provide a product that conforms to the contract requirements. The following control tests will be performed during the removal action:

- Sieve analysis for proposed fill, base, and aggregate materials
- In-place soil density for backfilled areas (including base coarse and surface coarse)

5.4 TRAFFIC CONTROL

Traffic controls will be utilized to provide for the efficient completion of the work activities in a safe working environment while minimizing the impact on the normal traffic flow. Traffic controls will be required during removal activities in the excavation and stockpile areas to provide for equipment operation and truck loading. All traffic control activities will conform to the applicable specifications of the *Manual of Traffic Controls for Construction and Maintenance Work Zones* (Caltrans, 1996) and will be approved by the DON. In addition, a copy of the Traffic Control Plan, attached to this RAWP as Appendix F, will be kept in the site office trailer.

Vehicles will enter the site from C Avenue. A truck route will be established such that trucks will enter via C Avenue from Mariner Square Loop and exit the work site using this same route, as outlined in Figure F.4-1, Traffic Route Map, of Appendix F.

During the approximately 17-week construction fieldwork period, the site will generate an average of 24 one-way passenger vehicle trips per day. Approximately 2,312 one-way commercial truck trips will be required during the entire project. This number includes mobilization and demobilization of heavy equipment (20 loads), transportation and delivery of soil fill material to the site (1,125 one-way commercial truck trips), off-site transportation of contaminated soil (1,125 one-way commercial truck trips), and transportation and delivery of sod material to the site (42 loads).

Based on this data, an average of 49 commercial vehicles per day over the life of the project will be associated with the removal activities at the facility. It is estimated that the project will not negatively impact the exiting traffic conditions in the area.

5.5 WASTE MANAGEMENT

A WMP has been prepared for the IR Site 25 TCRA. The WMP is included as Appendix G to this RAWP. The purpose of the WMP is to identify the types and amounts of waste expected to be generated during the IR Site 25 TCRA. Waste management activities from generation through storage (including waste characterization, packaging, storage, and management while in storage)

are identified in the WMP. The transportation and disposition of waste materials at appropriate disposal and recycling facilities is also included in the WMP.

The WMP provides information on how wastes, including potentially hazardous wastes such as PPE and decontamination water associated with project activities will be managed and disposed. A secondary goal of the WMP is to ensure that waste minimization and recycling practices are followed, to the extent practical, to reduce the volume of waste that will be generated, stored, and removed from the site for disposal.

The WMP is also a primary component of FWENC's Corporate Compliance Program, which includes on-site environmental compliance inspections. The WMP will be revised if the scope of this project or the applicable regulations change.

There are several potential waste streams that may result from the removal action activities at IR Site 25. Potential waste streams associated with the project activities can be categorized as follows:

- Contaminated soil (RCRA hazardous, non-RCRA hazardous, and non-hazardous waste) excavated during the removal action
- Oversized debris, rock, concrete, asphalt, and miscellaneous debris
- Wastewater, including impacted stormwater runoff and fluids from equipment and personnel decontamination
- Non-hazardous solid waste such as trash, empty calibration gas canisters, and inert construction debris [polyvinyl chloride (PVC) irrigation piping, and so forth]
- Scrap metal from concrete rebar and from oversize material
- Soil/drill cuttings from site prior to removal activities
- Decontamination pad solids
- Used PPE
- Contaminated polyethylene liners from soil stockpiles

The WMP discusses applicable waste management, transportation, and disposal requirements for each of the aforementioned waste streams.

5.6 DEMOLITION PLAN

A Demolition Plan (DP) has been prepared for the IR Site 25 TCRA. The DP is included in this RAWP as Appendix H. The DP further details the TCRA and summarizes the types of material to be encountered during the work. It also provides more detail about the disposition of the material.

5.7 ENVIRONMENTAL PROTECTION PLAN/ENVIRONMENTAL CONDITION PLAN

An Environmental Protection Plan (EPP) and an Environmental Condition Report (ECR) have been prepared for the IR Site 25 removal action. The EPP and ECR are included in this RAWP as Appendix I and J, respectively. This section summarizes the applicable environmental considerations, regulatory requirements, and site conditions prior to work.

5.7.1 Environmental Considerations

Major environmental considerations associated with the IR Site 25 TCRA are as follows:

- The San Francisco Bay and the Oakland Inner Harbor proximate to the site have significant beneficial uses that must be protected.
- The San Francisco Bay supports a significant biological community; however, there is no ecological risk associated with TCRA activities.
- Airborne contaminants generated during earthmoving activities have potential health hazards that will be addressed through air monitoring.

6.0 PROJECT MANAGEMENT

The project management team will be responsible for all technical and administrative aspects of the TCRA. Included among the team's responsibilities are the project schedule, staffing, document control, project meetings, and reporting.

6.1 PROJECT RESPONSIBILITIES

The SWDIV RPM for this project is Mr. Rick Weissenborn who is responsible for project management, budget control, and schedule maintenance. Mr. Doug DeLong, the Environmental Compliance Manager, is responsible for regulatory agency contacts and community relations. Mr. DeLong will coordinate the field activities with different DON departments and personnel and will also ensure that the field and removal activities are in compliance with the applicable rules and regulations. Ms. Shirley Ng is the ROICC and is responsible for the technical oversight of field activities and quality control. Mr. Chris Leadon is the DON Remedial Technical Manager (RTM) responsible for the technical oversight and review of the project documents.

FWENC's Project Manager, Mr. Abram Eloskof, will be responsible for general project administration. Mr. Eloskof oversees budget, schedule, document preparation, and will ensure the quality of all project activities and deliverables. The Project Superintendent, Mr. Jim Baldwin, will manage fieldwork and provide oversight to the subcontractors. Mr. Baldwin will coordinate the field activities with the senior technical staff and the Quality Control Program Manager (QCM), Ms. Mary Schneider, to ensure that all field activities are in compliance with the project specifications. Mr. Baldwin will also coordinate these activities with the SHSS, interact with DON's personnel, and coordinate efforts among all subcontractors. A project organization chart is outlined in Figure 6-1.

The following is a list of the key contacts:

Agency	Contact	Project Title
Naval Facilities Engineering Command Southwest Division BRAC Operations 1230 Columbia St., Suite 1100 San Diego, CA 92101	Mr. Rick Weissenborn (619) 532-0952	RPM
Naval Facilities Engineering Command Southwest Division Caretaker Site Office – San Francisco Bay Area 410 Palm Ave., Building 1, Suite 161 San Francisco, CA 94130-1802	Mr. Doug DeLong (510) 749-5961 (510) 772-8832 (cellular)	Environmental Compliance Manager

Agency	Contact	Project Title
Naval Facilities Engineering Command Southwest Division 1230 Columbia St., Suite 1100 San Diego, CA 92101	Mr. Rick Lovering	Contracting Officer
Naval Facilities Engineering Command Southwest Division 1220 Pacific Highway San Diego, CA 92132-5187	Ms. Joyce Howell-Payne (619) 532-0978	Contract Specialist
Naval Facilities Engineering Command Southwest Division 2450 Saratoga Street, Building 110, Suite 200 Alameda Point, Alameda, CA 94501	Ms. Shirley Ng (510) 749-5939	ROICC
U.S. Environmental Protection Agency 75 Hawthorne Street (SFD-8-2) San Francisco, CA 94105-3901	Ms. Anna-Marie Cook (415) 744-2367	EPA-RPM
California Environmental Protection Agency Department of Toxic Substances Control 700 Heinz Avenue, Suite 200 Berkeley, CA 94710	Mr. Daniel Murphy (510) 540-3772	DTSC-RPM
California Regional Water Quality Control Board 1515 Clay Street, Suite 400 Oakland, CA 94612,	Mr. Dennis Misher (510) 622-22390	RWQCB-RPM
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Mr. Jamshid Sadeghipour (562) 936-5880	Deputy Program Manager (DPM)
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Mr. Abram Eloskof (562) 936-5886 (714) 620-5530 (cellular)	PjM
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Ms. Mary Schneider (562) 936-5881	QCM
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Mr. Jim Baldwin (510) 393-7511 (cellular)	Project Superintendent

Agency	Contact	Project Title
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Mr. Matt Litany (510) 393-7517 (cellular)	SHSS
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Mr. Craig Rice (510) 393-7477 (cellular)	PQCM

6.2 PROJECT SCHEDULE

The schedule for implementation of the TCRA is included in Figure 6-2. The schedule is presented in a critical-path method format. The schedule has been prepared using a PC-based cost, scheduling, and control system known as Primavera. Primavera has many features, including the identification of the critical path and the ability to compare the initial DON work plan to current project schedule.

The schedule includes project startup, pre-construction, construction, and post-construction activities. Construction activities have been planned to start after approval of this RAWP and procurement of the necessary equipment, materials, and subcontracting services.

A total of four main stages will be followed during the course of this project:

- **STAGE 1 – PROJECT STARTUP.** This stage includes preparation of project submittals that include this RAWP. The RAWP includes as appendices a FSP, a QAPP, a SHSP, an AMP, a PCQC Plan, a Traffic Control Plan, a WMP, a DP, an EPP, an ECR, and a SWMP.
- **STAGE 2 – PRE-CONSTRUCTION ACTIVITIES.** This stage includes activities associated with the pre-construction surveys and conducting pre-construction sampling at the site, along with permitting, subcontracting, and procurement activities.
- **STAGE 3 – CONSTRUCTION ACTIVITIES.** This stage includes the demolition and removal of concrete drainage swales, soil excavation, transportation and off-site disposal of contaminated soil and demolition waste material, confirmation sampling and analysis, backfilling of the excavated areas, and restoration of the site, including reconstruction of the concrete swales and placement of sod.
- **STAGE 4 -- POST-CONSTRUCTION ACTIVITIES.** This stage includes demobilization of all equipment, utilities reconnection, and preparation of a final report that documents the results of all TCRA activities performed at IR Site 25.

6.3 DATA MANAGEMENT

The following is a summary of the data management tools that will be employed for the duration of this project:

- Primavera and Harper Shuman accounting software will be utilized for all schedule and project cost tracking.
- Microsoft Excel spreadsheets will be utilized by home and field office staff for technical data management. Microsoft Word will be employed for word processing.

6.4 DOCUMENT CONTROL

In general, FWENC's internal document control procedures will be adhered to for the duration of the project. Additional guidance provided by the DON will be utilized for document control, particularly for matters relating to regulatory compliance. Management of internal and external correspondence will be administered at the San Diego (home) office. The contract administrator will oversee coordination of home office document control. Document control will include assigning an alphanumeric coding to each piece of documentation that is logged in. The generator(s), recipient(s), date, and subject matter will be entered into a computer database. The database will be stored for the duration of the project. A central home office file will be established. However, complete project files will also be maintained in a secure, dry area at the field office. Document control routing sheets will be utilized to maintain the flow of documentation between the field and home offices. At project completion, the project files will be delivered to the DON.

6.5 MEETINGS AND REPORTS

Weekly project meetings will be held at the field office during the field construction activities. The Project Manager, Project Superintendent, PQCM, SHSS, and other selected individuals will be required to attend the weekly meetings with the DON RPM, ROICC, and the Environmental Compliance Manager. The agenda of the weekly progress meeting will include the following:

- Review and approval of minutes of previous meeting
- Review of work progress
- Review of field observations, problems, and conflicts
- Resolution of problems that impede construction schedule and proposed corrective actions
- Review of off-site delivery schedules
- Survey of corrective measures and procedures to regain projected schedule
- Revisions to construction schedule
- Forecast of progress for next succeeding work period

- Coordination of schedules
- Review of submittal schedules, if any
- Review of quality/health and safety programs
- Acknowledgment of pending changes and substitutions
- Review of proposed changes for effects of construction, completion date, and other aspects of the project
- Discussion of other business

Minutes of the weekly meeting will be prepared by FWENC and submitted to the DON. Daily Production and Daily Quality Control reports will be prepared by the Project Superintendent and the PQCM respectively, and submitted to the DON.

7.0 SITE WORK

Removal activities at the IR Site 25 TCRA area are discussed in the following sections. These sections provide the details of the work that will occur from pre-construction through site restoration.

7.1 PRE-CONSTRUCTION ACTIVITY

Site work will be initiated after the pre-construction activities have been completed, including:

- Permitting
- DON approval of the RAWP
- Pre-mobilization conference and Operational Readiness Review (ORR)
- Pre-construction sampling and analysis
- Completion of geophysical and land surveys

Issues or concerns identified during the pre-mobilization conference and the ORR will be addressed prior to mobilization. The activities associated with the TCRA at IR Site 25 are as follows:

- Mobilize construction equipment and support facilities.
- Obtain all necessary permits and/or notifications, if any, and provide documentation of the required personnel training and certifications.
- Perform pre-construction sampling and analysis.
- Conduct pre-construction meeting, site-specific training, and weekly progress meetings.
- Install temporary fencing to establish work areas around each housing complex and install windscreen around the staging area located north of Mosley Avenue.
- Prepare contaminated soil and debris staging areas.
- Construct an equipment decontamination pad and install a wastewater holding tank and associated secondary containment system capable of handling 110 percent of the tank's capacity.
- Install run-on and runoff control features around soil stockpile area, installation of silt fence and sandbags around storm drains and implement other measures identified in the SWMP.
- Perform site clearing/grading/grubbing.
- Demolish concrete swales prior to removal of subsurface contaminated soil.

- Conduct personnel and area air monitoring during contaminated soil excavation, handling, and loading.
- Excavate contaminated soils to a depth of 2 feet bgs.
- Establish and obtain approval of waste profiles for non-hazardous waste, non-hazardous debris, and clean construction debris from the appropriate landfills.
- Survey the excavation limits of each phase to provide appropriate documentation.
- Backfill and compact excavated areas to at least 90 percent of maximum dry density.
- Install sod around each housing complex and other areas within the TCRA areas upon completion of removal activities. (The ROICC will coordinate with the Coast Guard personnel and their landscaping contractor to maintain the new sod once it is installed as the site is not equipped with an irrigation system.)
- Initiate pre-final and final inspection of completed construction activities at each housing complex by the ROICC.
- Continue with excavation of contaminated soils within the TCRA area boundaries.
- Load and transport contaminated soils and other waste streams (demolished fence, fence posts, trees, and so forth) to the appropriate pre-approved landfills.
- Perform decontamination of heavy construction equipment and site restoration.

To document these construction activities, a PCQC Plan has been prepared and is presented in Appendix E. In addition, photographs will be taken to document the progress of the work.

7.2 MOBILIZATION

All mobilization activities will be coordinated with the DON. These activities will include arranging for access for FWENC and their subcontractors' personnel and mobilizing support facilities, construction equipment, and miscellaneous materials. Prior to mobilization, the appropriate DON personnel, the city of Alameda, and the local community will be notified about the planned schedule of mobilization and removal activities.

The support facilities will include an office trailer with electric and phone services, restroom facilities, an equipment storage area, drum and contaminated soil staging areas, a temporary decontamination pad, a tarping station, and workers' parking area (Figure 7-1). The construction trailer will be mobilized approximately 1 week prior to site construction activities to set up electric and phone service. Equipment mobilization will be initiated with site preparation activities. Equipment and materials will be mobilized to the site on an as-needed basis to minimize storage requirements. An additional laydown area will be utilized for short-term storage of equipment and materials after they have been delivered directly from vendors. A secure storage trailer will be mobilized to the site for short- and long-term storage of materials that will be required throughout the project. The official project storage and staging area will be located to the north of Mosley Avenue in the open field area approximately 500 feet by 250 feet

in dimension. This facility will have a perimeter fence with screening and security during non-work hours.

FWENC and its subcontractors will provide the materials, labor, and equipment necessary to accomplish the work and complete the construction tasks as identified in this RAWP. Equipment will be selected and sized to perform the designated tasks associated with soil removal, transportation/disposal, backfill, compaction, and sod placement. The following equipment will be mobilized to the site: two backhoes, one rubber-tired loader, three to four dump trucks, one water truck, one excavator, one dozer, one rubber-tired backhoe/dozer, one rubber-tired compactor roller, one storage unit (conex), one office trailer, and four portable toilets.

FWENC will utilize the existing water supply fire hydrants that are within close proximity to the planned operations at the site during field activities. This will be coordinated through the City of Alameda Fire and Building Departments. Back-flow prevention devices and water meters will be installed and inspected by the City of Alameda as necessary.

7.3 SITE CONTROL AND SECURITY

All excavation and work areas will be properly barricaded for non-worker safety. Barricades will include caution tape or other appropriate barriers depending on the location and surrounding uses of each site.

All excavation areas will be secured with the use of 6-foot high, chain-link temporary fencing and windscreens. Signs stating "No Entry", and appropriate safety instructions will be placed on the temporary fence. Each housing unit will be secured prior to field activities when working within 12 feet of the unit. Located within a fenced area are the Exclusion Zone (excavation area), Contamination Reduction Zone (decontamination area), and Support Zone (support area).

A 6-foot high, chain-link fence will be partially installed around the staging area. FWENC will complete the fence around the area and install a windscreen. Signs identifying the project, Proposition 65 notices, and appropriate safety instructions will be placed appropriately. Figure 7-1 shows the proposed temporary fence and gate locations in the staging area.

During all non-work hours, a site security person will be on site patrolling the site support facilities area and the office compound.

7.4 SITE SUPPORT AREA PREPARATION

The site support facilities required during construction are identified in Figure 7-1 and include the following:

- Equipment decontamination pad
- Decontamination water tank

- Equipment staging area
- Contaminated soil stockpile area
- Clean backfill stockpile area
- Temporary facilities (office trailer, portable toilets, dumpster)
- Temporary fencing

Decontamination Area

The equipment decontamination area will be located within the staging area north of Mosley Avenue and will include a temporary decontamination asphalt concrete pad and a rinsate collection system. The exact location and orientation of the decontamination pad will be determined in the field prior to its construction. The decontamination pad will be rectangular in shape. The pad will be 20 feet wide by 40 feet long. The area inside the rectangle shall be paved with a minimum of 4-inch thick asphalt concrete and graded to drain to a corner concrete sump as shown in Figure 7-2. Ingress and egress ramps will be constructed at the ends of the rectangular pad. The width of the ramps shall be a minimum of 6 feet. The ramps shall be sloped with a minimum slope of 6 horizontal to 1 vertical (6H:1V). A minimum, 6-inch high and 6-inch wide asphalt berm shall be constructed along the two longer sides of the rectangular pad.

The existing ground on which the pad will be constructed is unpaved and covered with some sparse vegetation. The area will be cleared of any vegetation and graded, and the existing ground surface compacted prior to the placement of the asphalt pavement. In addition, a 4-inch thick layer of subsurface soil in the area over which the pad will be constructed will be scraped and removed. The area beneath the pad shall then be graded to provide the necessary slope for drainage. Afterwards, the subgrade in this area will be prepared for asphalt placement by re-compacting and smooth finishing. In addition, prior to the placement of the asphalt pavement, the subgrade surface shall be sprayed and sealed with a generous application of bituminous coating.

In addition, a 2-foot wide by 2-foot long and 2-foot deep precast concrete sump box will be installed at the outside of the lowest of the pad corners. The sump will include an iron frame and grate with Zebron polyurethane lining or equivalent.

Following the completion of the decontamination containment pad, two coats of water-repellent coating will be applied over the asphalt pad, berms, and ramps. The repellent shall be applied in 2 days allowing the first coat to dry completely. The decontamination pad will be used for rinsing and decontaminating all equipment, machinery, and trucks containing contaminated soil.

Decontamination Water Tank and Drum Storage Area

A 6,500-gallon poly tank equipped with a secondary containment system capable of retaining 110 percent of the holding tank volume will be staged at the support area. A lined drum storage

area will also be provided for storage of PPE or soils impacted by minor spills or releases from equipment.

Equipment Staging Area

Conex Boxes – The support area will contain two lockable conex boxes for the purpose of storing small equipment used on site. Heavy equipment and site vehicles will be locked and staged in the support area during non-work hours. Forty-yard and 20-yard bins used for debris will also be stored in the area.

Stockpiles

Backfill Material – Import backfill soil and topsoil required for the excavations will be stockpiled in the support area. BMPs will be in place to prevent any material from entering storm drains.

Contaminated Soil – A lined stockpile area will be prepared for the possibility of contaminated soil needing to be staged temporarily at the site prior to off-site disposal. The stockpile will be placed on a 150 foot by 200 foot, 20-millimeter (mil) plastic liner and bermed with sandbags or soil. The soil will be covered at the end of each work day or within 1 hour after work has stopped, in addition to other BMPs, to prevent uncontrolled migration of materials away from the site. Contaminated soil will not remain in the stockpile area for more than 2 days, based on the storage capacity of the area.

Temporary Facilities

Temporary facilities include a site trailer that will be connected to a power source and equipped with phone lines. Sanitary facilities with hand washing stations will be located adjacent to the trailer. A 3-yard dumpster provided by a local disposal operator and picked up on a regular basis will also be staged in the area.

7.5 MONITORING WELL PROTECTION

Monitoring wells may exist within the TCRA excavation area boundaries. The DON has directed FWENC to protect any monitoring wells during the excavation of contaminated soils within the TCRA area boundaries.

7.6 EXPOSING UNDERGROUND UTILITIES

The locations of all underground utilities within the excavation area will be identified and marked physically during the pre-construction geophysical survey and compared with existing utilities drawings from the DON archives. During daily excavation, the utilities will be exposed for visual identification by pot-holing with a backhoe, as necessary, to confirm utility locations

identified in utility maps and geophysical survey. The potholes will be backfilled, and the confirmed utility locations will be marked with stakes and flagging.

Utilities will not be re-routed or removed as part of on-site removal activities. The excavation will be performed around existing utilities.

7.7 ENVIRONMENTAL PROTECTION MEASURES

The following measures will be implemented to control environmental conditions at the project site:

- Stormwater and erosion control
- Fugitive dust control
- Wastewater collection and disposal

7.7.1 Stormwater and Erosion Control

Since the area of demolition and excavation exceeds 5 acres, a SWMP will be required for this project and the substantive requirements of a NPDES permit will be followed. Excavation, stockpiling, backfilling, and related soil handling activities are scheduled to be completed within 120 days starting approximately mid-November 2001. Therefore, the removal action activities will be completed during the upcoming rainy season. Storm drain inlets in the vicinity of the excavation will be protected with heavy rubber mats. Storm water run-on and runoff at the contaminated soil stockpile areas will be controlled by the containment system described in the Section 7.9.2. BMPs will be implemented to control stormwater and erosion during removal activities. Additional stormwater management concerns are addressed in the SWMP (Appendix K).

7.7.2 Fugitive Dust Control

Dust control measures will be implemented, as appropriate and necessary, beginning with site mobilization and continuing through all phases of the construction activities. FWENC will comply with of the Bay Area Air Pollution Control District as described in the AMP (Appendix D). Visual observation and real time MiniRam dust meters, or equivalent, operated by FWENC personnel will monitor the dust emissions. Control measures will be implemented if the monitoring devices detect a reading of 1 milligram per cubic meter or when FWENC or the ROICC determine it is necessary. These control measures may include the following:

- Excavation will be performed in small sections in order to minimize the extent of disturbed surface area.
- Dust suppressants will be used to reduce fugitive dust emissions from excavations and stockpile areas.

- Real-time monitoring of air-borne contaminants will be performed using instruments such as flame ionization detectors for VOCs, combustible gas indicators for explosive atmospheres, and real-time dust monitoring.
- Excavated soils will be temporary stored on site on an impermeable 20 mil polyethylene liner and covered with 10-mil liner until the time of loading.
- All unpaved roads will be watered, and vehicular traffic on these roads will be restricted to a speed of 15 miles per hour.
- Excavations and soil handling activities will cease during high wind episodes (above 25 miles per hour).

Loading of contaminated soils will be scheduled during the period of low-to-moderate winds. In addition, all trucks transporting contaminated soils will be covered with tarps to prevent fugitive dust emissions.

During demolition activities, surfaces will be kept wet using sprayers, surfaces will be covered, or work areas enclosed with plastic to control fugitive dust. Dust will be controlled during non-work periods by using dust suppressants. Dry power brooming will not be used. FWENC will provide an on-site street sweeper and water truck throughout the project duration.

7.7.3 Perimeter Air Monitoring

In addition to on-site monitoring, three downwind high-volume and medium-volume air samplers will be installed at the school/day care center to monitor fugitive dust [total suspended particulates (TSP), particulate matter with aerodynamic diameter less than 10 micron (PM₁₀)] and PAH emissions during all contaminated soil handling activities, including excavation, stockpiling, and loading operations. The samplers will be located near a 110-volt power source; otherwise, portable generators will be used to power the samplers' pumps. The samplers will be mobilized, tested, and calibrated prior to excavation. In addition, three high-volume and medium-volume air samplers will also be used around daily work areas to monitor for TSP, PM₁₀ and PAHs. Portable generators will power work area samplers. QA and QC requirements, stipulated in the applicable regulations for monitoring of TSP, PM₁₀, and PAH, will be followed. These methods include Appendix B of 40 CFR, Part 50, Reference Method for the Determination of suspended Particulate Matter in the Atmosphere (High-Volume Method), and Appendix G of 40 CFR, Part 60 for PM₁₀, TO-9A for PAHs.

The meteorological monitoring program includes determining the wind speed, wind direction, barometric pressure, and temperature. The meteorological monitoring procedures and equipment specifications that will be consistent with the regulatory agency guidelines as outlined in Ambient Air Quality Monitoring Methodology, Appendix C of 40 CFR, 58. The meteorological monitoring instrumentation will be mounted on a 10-foot tower at the staging area since the location will allow adequate atmospheric exposure. The tower location will be selected to ensure that representative measurements of meteorological conditions for the entire site will be

obtained. The wind speed and wind direction system will be a battery-powered system mounted on the tower. The system will operate continuously during removal activities.

Wind speed will be measured using a photocell chopper-type wind sensor with a three-cup rotating anemometer assembly, or equivalent. In this type of sensor, the rotating sensor shaft turns a photocell chopper assembly. The frequency of the interrupted light pulse is output by the transmitter in the form of a variable-frequency square wave that is proportional to the wind speed. Wind direction will be measured using a potentiometer-type sensor wind vane, or equivalent. In this type of sensor, the vane motion is coupled to a low-torque potentiometer by a high-precision shaft and bearing assembly. The potentiometer's output is proportional to the position of the wind vane and, hence, wind direction.

Both the wind speed and wind direction sensors will be mounted on a cross arm that will be mounted at the top of the 10-foot tower with attached sensors. The wind speed and direction sensor components will share a common signal conditioner. The specified monitoring range for wind speed and wind direction will be approximately 0 to 100 miles per hour and from 0 to 540 degrees, respectively. Detailed air monitoring procedures are provided in the AMP included in Appendix D.

7.7.4 Wastewater Collection and Disposal

All rinse water generated during the decontamination and dust control activities will be collected and stored in tanks on site using portable trash pumps. Catch basins within the work area will be plugged to prevent discharge. When a storage tank is full, the contents will be characterized and transported to an appropriate treatment, storage, and disposal facility.

A secondary containment system that is capable of collecting accumulated liquid and preventing this liquid from migrating out of the containment system will be provided. The secondary containment area will be designed to contain the tank volume plus the 25-year, 24-hour rainfall event. Any rainwater that collects in the secondary containment will be collected and stored in the storage tanks.

7.8 DEMOLITION OF SITE STRUCTURES

Field work will require the removal of selected site features which include, but are not limited to trees, fences, concrete swales and ancillary structures. The following describes proposed demolition activities. A DP, which summarizes the work and provides additional disposal options, has been prepared for this project and is contained in Appendix H.

7.8.1 Trees

It is anticipated there will be approximately ten large trees, and ten medium-sized trees which will require removal during the project. A professional tree removal subcontractor will remove

these trees at ground level prior to excavation within the area. The root structure and associated soil will be removed with the excavator. The root structure and soil will be transported to a CERCLA-approved Class II landfill.

7.8.2 Fences

Wooden fences separating housing units will be cut where the fence post meets ground surface and dismantled. The aboveground debris will be placed in 40-yard bins for off-site disposal. The portion of the fence will be removed with the excavator along with the other soil. The excavated below grade fence post bottom and soil will be transported to a CERCLA-approved Class II landfill.

7.8.3 Concrete Swales

Concrete surfaces located within the TCRA excavation boundary area will be removed for disposal prior to the excavation of contaminated soil. Approximately 450 feet of 18-inch wide and 4-inch thick concrete swales will be demolished (Figure 7-3). An excavator, loader, and other required equipment would be used to break up and remove the pavement and load the debris into trucks for disposal. Concrete debris will be segregated from the soil to be excavated, if required, and transported as non-hazardous waste to a CERCLA-approved Class II landfill. Demolished concrete will not be recycled since it is in contact with PAH-contaminated soils.

7.8.4 Site Structures

The only existing site structure that will be demolished is the sand play area within the TCRA boundaries between 2002 Monterey Circle and 2001 Annapolis Circle. The structure will be removed and materials disposed. Upon completion of the removal action, this area will be covered with sod as per DON direction.

The sand play area in Clover Park, that had been previously remediated by others, will be covered with polyethylene liner during soil excavation activities to minimize any cross contamination.

7.9 EXCAVATION

This section describes the procedures to be used during the excavation of the contaminated soil within each phase and the management of the excavated soils. Impacted soils will be either transported directly off site or temporarily stockpiled in the support area.

7.9.1 Excavation of Contaminated Soil

Excavation of contaminated soil will begin following site preparation as described in the previous section.

The site will be excavated in phases as shown in Figure 7-4 as follows:

- Phase I – The area east and west of Monterey Circle to 12 feet behind units 2008 and 2010
- Phase II – The area east and west of Lakehurst Circle to approximately 12 feet behind the units to west of Lakehurst Circle
- Phase III – The areas located south of Monterey Circle and includes Unit 2002
- Phase IV – The area north and south of Annapolis Circle to approximately 12 feet behind each unit
- Phase V – The areas along Singleton Avenue to include Unit 201
- Phase VI – The common area around the playground which has been excavated under another contract

Each phase boundary will be marked on the ground surface and will identify the areas where contaminated soils will be removed. Preparation of the contaminated soil stockpile area is described in Section 7.9.2, Contaminated Soil Stockpile Management.

Each phase boundary will be marked on the ground surface with flags or paint and will identify the areas where contaminated soils will be removed. Prior to the start of any excavation, a complete geophysical survey and a topographic survey will be performed. The residents of each unit will be required to remove all personal belongings, and any garden plants prior to the removal of the back fence of each housing unit. In addition to personal belongings, temporary parking will need to be secured for the residents of each unit during the hours of 0800 to 1700 each day when excavation, backfill, and the restoration of the sod activities are in progress.

Excavation will begin around Unit 202 between Monterey Circle and Mosley Avenue. The existing wood fence will be removed and transported off site for disposal. Two small backhoe excavators will begin in front of the unit and a larger excavator (Hitachi 220 or equivalent) will begin along the east-side and working around the unit. All material will be loaded directly to 12- or 14-cubic yard end dump trucks and hauled to the stockpile staging area for reloading into 23-ton semi-end dump trucks for transport to and disposal at an approved landfill. Each truck will be covered when traveling from the excavation to the stockpile staging area north of Mosley Avenue. Each excavator and backhoe will have a laborer (spotter) to make sure utilities are not damaged, and the spotter will spot the semi-end dump truck for loading.

As soon as an area (approximately 500 square feet) has been excavated to the required 2-foot depth, an orange safety fence will be placed along the entire bottom of the excavation. Clean backfill material will be delivered and placed in loose 9-inch lifts with a small dozer. Each lift will be compacted to 90 percent using a compactor roller, and 4 to 6 inches of topsoil will be placed and graded for sod placement. Excavation will continue around the back of the unit

completing 12 feet next to the unit each day. Backfill will follow the excavation so that exposed excavations will not remain open upon completion of each day's activities.

The quantity of soil in the Phase I through VI of the TCRA excavation area is estimated to be approximately 34,000 bank (in place) cubic yards. The land survey data will be utilized to verify the final quantity.

7.9.2 Contaminated Soil Stockpile Management

Soil stockpiles will be created during excavation activities to expedite and facilitate the loading of excavated soil. A temporary contaminated soil stockpile area will be constructed at the support area north of Mosley Avenue. The temporary stockpile area will consist of the placement of 20-mil polyethylene sheeting over the ground surface and bermed with imported soil or sandbags to contain loose soil and any potential runoff from rain. Care will be taken to ensure that the 20-mil polyethylene sheeting will protect both the ground surface and the bermed imported soil from coming into direct contact with the contaminated soil. The proposed soil stockpile location is shown on Figure 7-1. The actual location will be cleared with the DON RPM and the City of Alameda contact prior to starting site preparation activities. All stockpiled material will be covered each night with 10-mil polyethylene liners. The impacted soil will be disposed within 90 days of the date of accumulation in accordance with the WMP (Appendix G).

7.9.3 Decontamination Procedures

On-site construction activities associated with IR Site 25 removal action will involve using various types of earthmoving equipment (loaders, dozers, excavator, flat beds, and so forth). Construction equipment, flat bed trucks, and so forth, will be decontaminated each time they leave the Exclusion Zone (encompasses the TCRA area and site support area) to prevent contaminants from being carried outside of the Exclusion Zone. A decontamination station will be set up in the site support area as described in Section 7.4. All construction equipment and site vehicles that come in contact with contaminated soil or liquid will undergo decontamination prior to exiting the TCRA and site support area. Dry brushing or wiping will be used to eliminate or minimize the volume of water requiring treatment or disposal. Decontamination will be continued until soil and staining is removed from the vehicle or equipment. Transporters who drive directly from the excavation site to the disposal facility will have their vehicles decontaminated by dry brushing or wiping as they exit the work area.

Decontamination of heavy equipment will consist of high-pressure water and/or steam cleaning supplemented by detergents, as appropriate. Special attention will be paid to the removal of material on and within the undercarriage, tires, and axles of trucks and rubber tire-mounted equipment. Tools and items for which decontamination is difficult or impossible to verify will remain on site, until completion of the work, for subsequent packing and off-site disposal at an

approved disposal facility. Examples of such items are wire, rope, and lumber. Decontamination of temporary facilities will be limited to exterior cleaning.

Wastewater will be collected via a trash pump and transferred to a nearby temporary decontamination water storage tank. The wastewater will be sampled, characterized, and disposed within 90 days of the date of accumulation in accordance with the WMP (Appendix G).

7.10 BACKFILLING AND COMPACTION

After 2 feet of soil is removed, the excavation area will be backfilled using engineering fill material. The impact backfill material will consist of sand, silty sand, clayey sand or sandy silt. The import material will be pre-approved by the DON prior to being allowed for use on site.

The fill material will be placed in the excavation area in approximately 9-inch losses lifts compacted to a 6-inch thickness. The backfill material will be compacted to 90 percent of the maximum dry density as measured by the modified Proctor test (American Society for Testing and Materials D 1557). A minimum of one in-place density tests will be performed for each excavation area around each housing complex or 1,000 cubic yards of placed fill.

To prepare the subgrade for sod placement upon completion of soil compaction activities, a 6-inch lift of topsoil will be placed. Placement of topsoil will be performed using heavy construction equipment or hand-operated small equipment in limited access areas. The construction engineer will document the backfilling and compaction activities. The proposed backfilling cross section is illustrated in Figure 7-5.

After backfilling and compaction is completed, a field topography survey will be conducted to determine the final extent of the excavated area and the total amount of material excavated. This information will also be used to verify the amount of backfill used by the subcontractor.

7.11 SOD PLACEMENT

As directed by the DON, the entire excavation area will be covered with sod that is suitable for the Alameda Point geographic area. Sod placement will occur at the end of each day's activity by a qualified landscaping contractor. Initial watering will occur with the use of water trucks, however, the Coast Guard will be responsible to either continue manual watering or to install an irrigation system.

7.12 DEMOBILIZATION

Demobilization consists of decontamination and removal of all equipment, cleaning the project site, inspection, and certification of completion. The activities will include collection and disposal of all contaminated material, including decontamination water and disposable equipment for which decontamination is inappropriate.

Prior to removal from site, all decontaminated equipment and material will be inspected and accepted by the SHSS and the Project Superintendent. These individuals will certify that decontamination was performed for all equipment and materials.

Site cleaning work will include repair of any erosion or runoff-related damage, grading and landscaping of all areas used for construction, removal of all materials such as excess construction material, wood, debris, and other foreign material, and removal of all construction equipment. The site office will be disconnected from electrical and telephone services. All office and storage trailers will be removed and returned to the rental company. A pre-final inspection will be conducted by the ROICC and SWDIV RPM, during demobilization activities. Any outstanding items will be noted in the punch list and will be addressed.

7.13 SITE RESTORATION

Site restoration will occur following the completion of demobilization activities. Restoration activities will be coordinated with the ROICC. A final survey of the site will be performed to document as-built grades and conditions.

All temporary storage and sanitary facilities, fencing, barricades, and other temporary structures used for this removal action will be removed from the site. Disturbed areas will be resurfaced or restored to conform to existing conditions prior to the TCRA. Concrete swales demolished within the TCRA area boundaries during the removal action will be repaired or replaced to pre-removal conditions.

Fences removed during construction activities will be replaced by the Coast Guard around each housing complex upon completion of soil excavation, backfilling, compaction, and sod installation.

Remaining wastes generated during construction activities will be transported off site and disposed in accordance with the WMP (Appendix G). The decontamination and soil stockpile areas will be dismantled and removed.

8.0 POST CONSTRUCTION CLOSEOUT REPORT

A project closeout report will be prepared following the completion of the fieldwork and demobilization. The report will provide a record of activities conducted under the project, document decisions made regarding work options, and describe the basis for considering the work as completed. The report will include the results of field testing, sampling records, and certificates of waste disposal. The report will also provide copies of drawings generated to specify construction activities, a final survey map prepared by a licensed land surveyor, and final as-built drawings.

9.0 REFERENCES

Caltrans. 1996. *Manual of Traffic Controls for Construction and Maintenance Work Zones*.

Neptune and Company, Inc. 2001. *Final Remedial Investigation Work Plan for Operable Unit-5, Alameda Point, Alameda, California*. June.

U.S. Environmental Protection Agency (EPA). 2001. *Region 4 Human Health Risk Assessment Bulletins – Supplement to Risk Assessment Guidelines for Superfund (RAGS)*. U.S. EPA Region 4, Atlanta, Georgia.

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FIGURES

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CHECKED BY: VR
REVISION: 0

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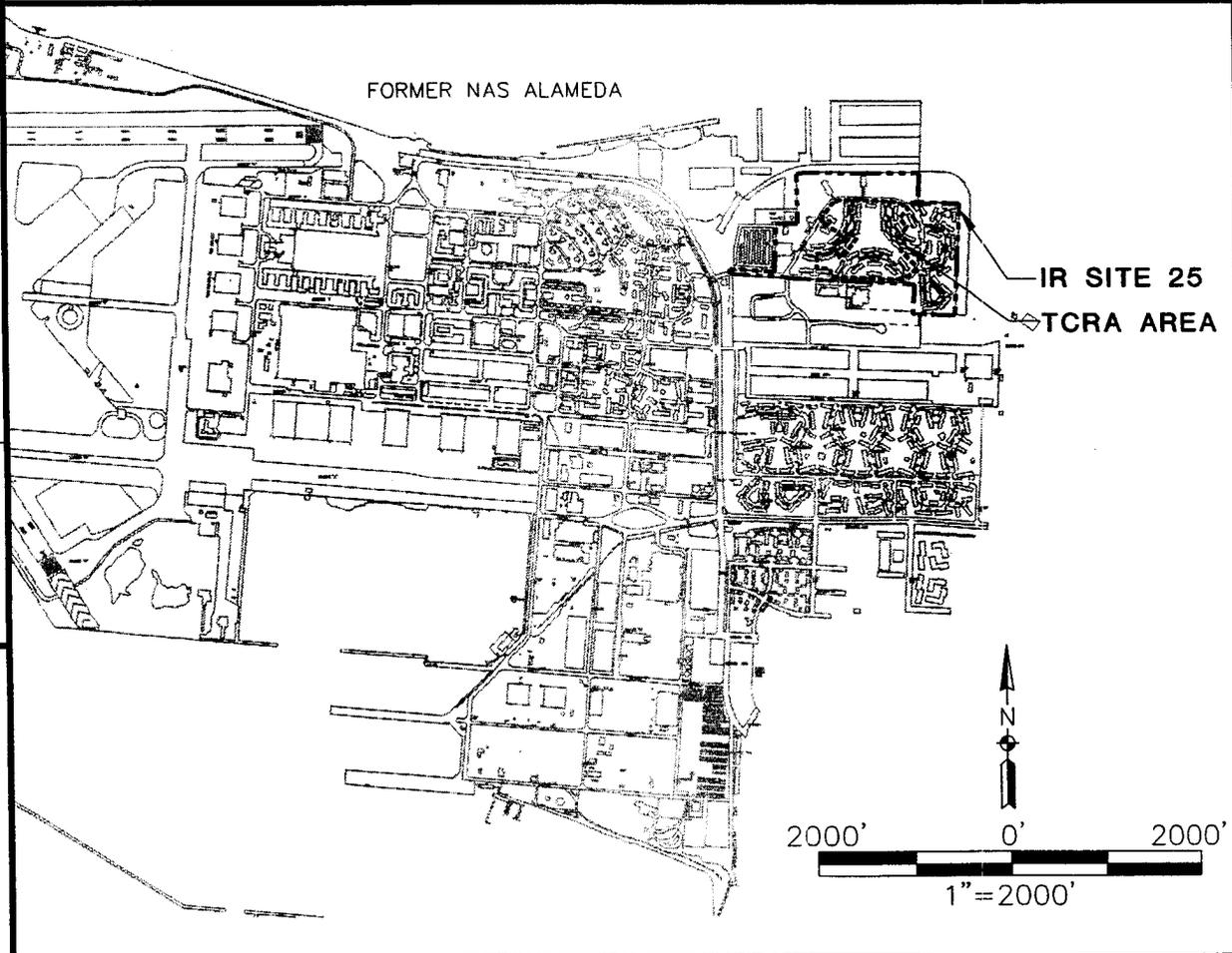
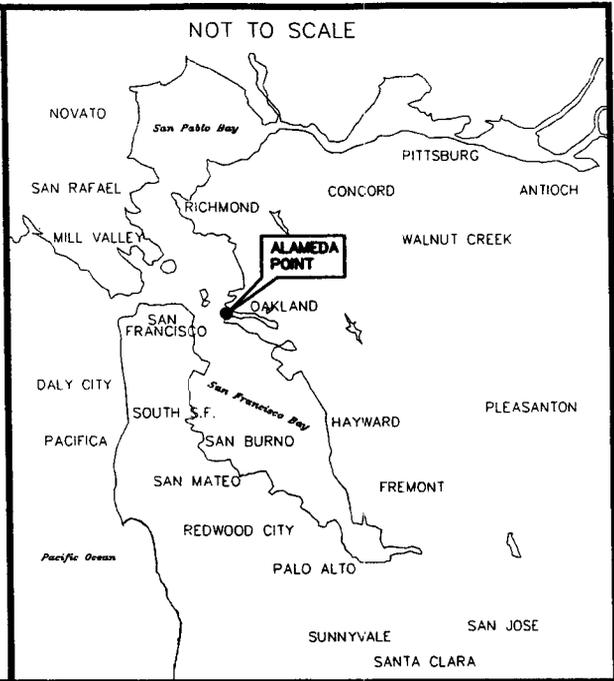
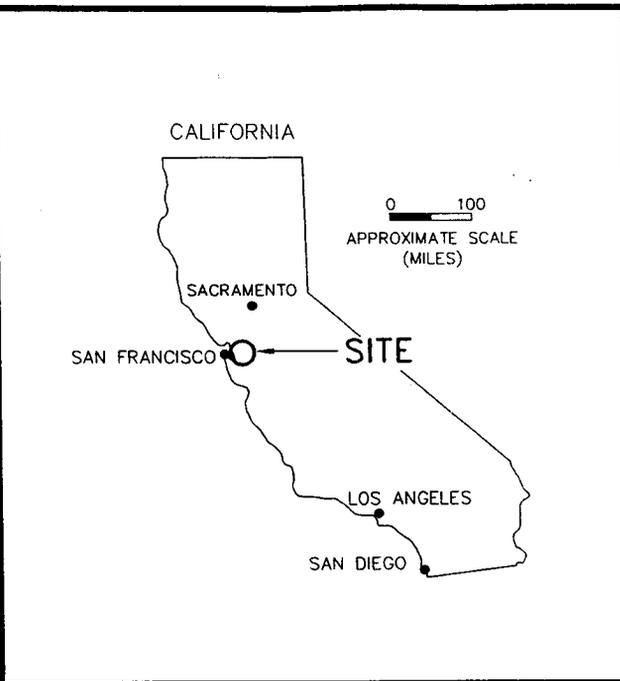


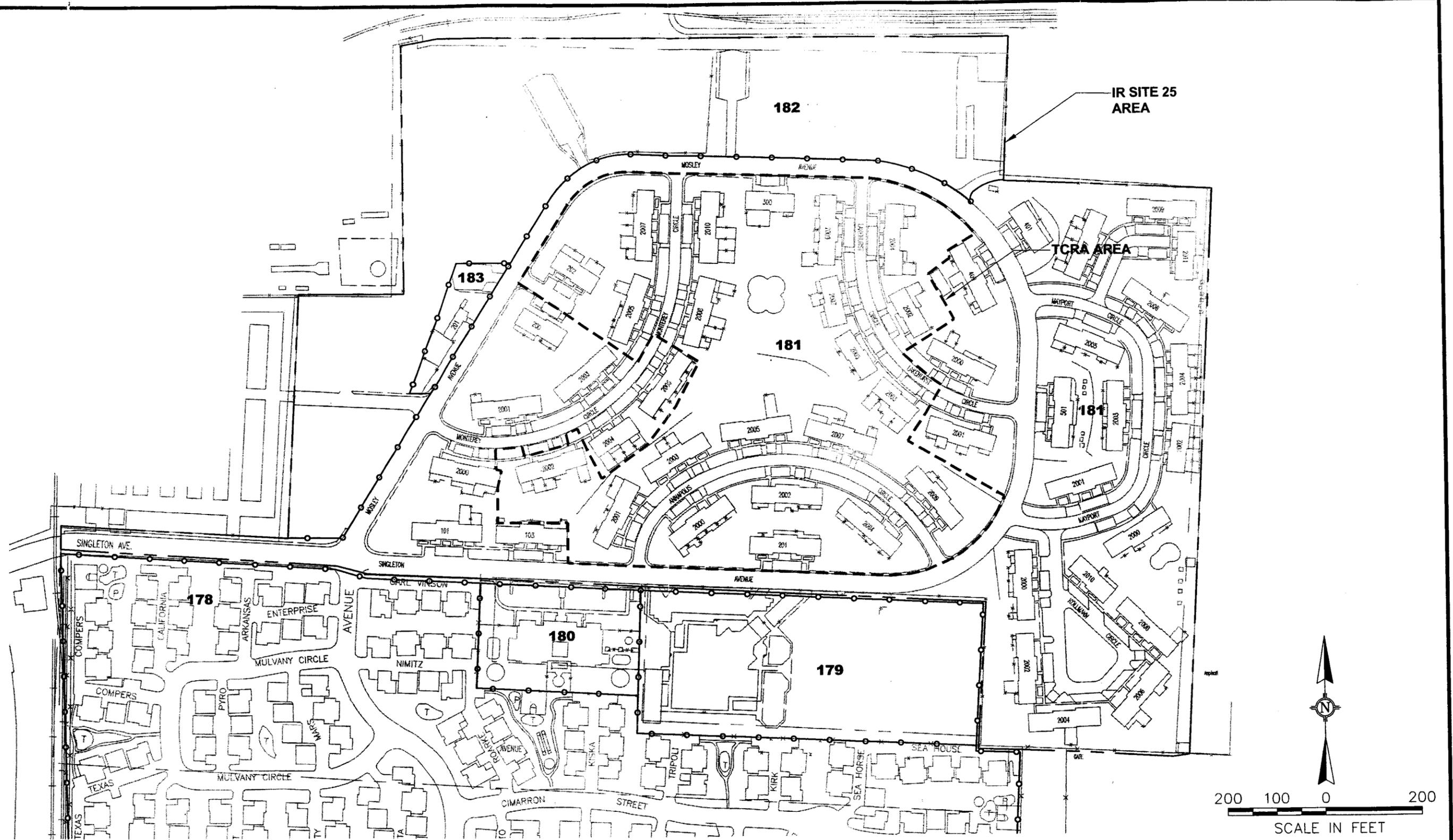
Figure 1-1
SITE VICINITY MAP

ALAMEDA POINT - IR SITE 25

FOSTER  WHEELER
ENVIRONMENTAL CORPORATION

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- LEGEND:**
- TIME-CRITICAL REMOVAL ACTION (TCRA) BOUNDARY
 - IR 25 SITE BOUNDARY
 - ENVIRONMENTAL BASELINE SURVEY (EBS) PARCEL BOUNDARY
 - 181** EBS PARCEL NUMBER

Figure 2-1
 SITE LOCATION MAP
 ALAMEDA POINT - IR SITE 25
FOSTER WHEELER
 ENVIRONMENTAL CORPORATION

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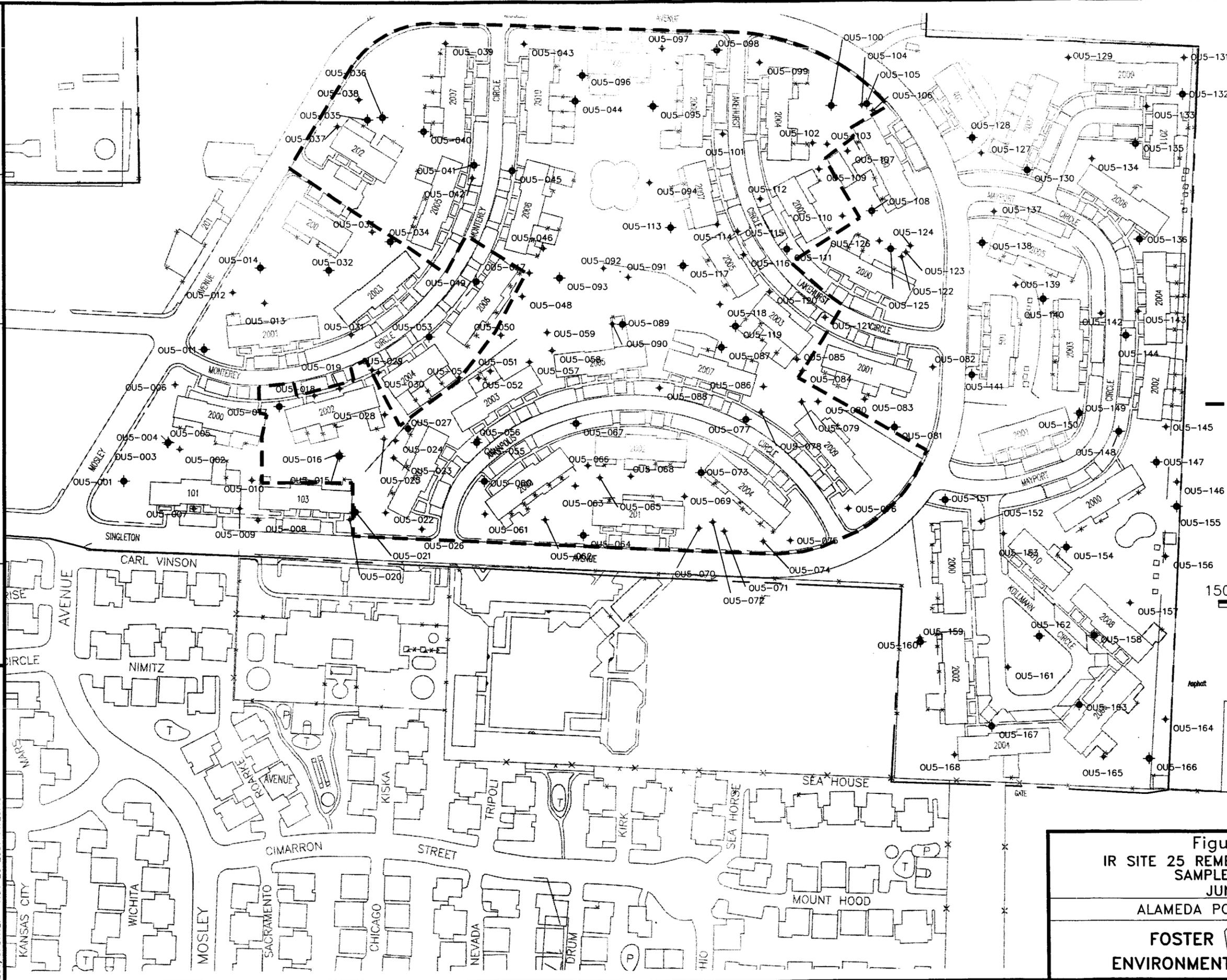
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LEGEND:

- + SOIL SAMPLING LOCATION (0-4 ft.)
- ◆ SOIL SAMPLING LOCATION (0-8 ft.)
- TCRA BOUNDARY

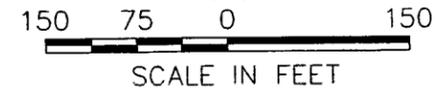
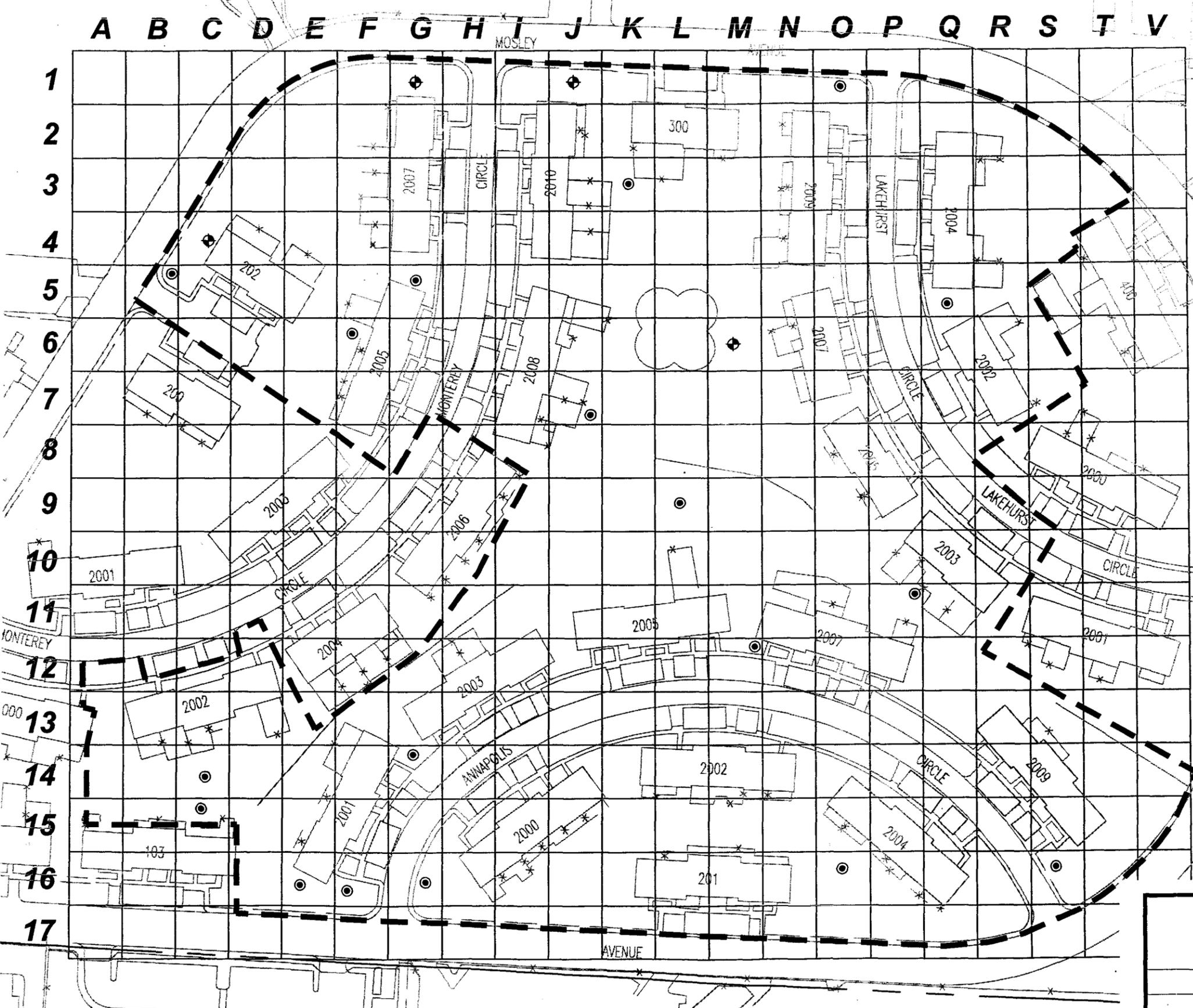


Figure 2-2
IR SITE 25 REMEDIAL INVESTIGATION
SAMPLE LOCATIONS
JUNE 2001
ALAMEDA POINT - IR SITE 25
FOSTER WHEELER
ENVIRONMENTAL CORPORATION

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LEGEND:
 - - - TCRA BOUNDARY
 ⊕ SELECTIVE SAMPLE LOCATIONS FOR WASTE CHARACTERIZATION
 ⊙ RANDOM SAMPLE LOCATIONS FOR WASTE CHARACTERIZATION

GRID	NORTHING	EASTING
B5	N 474147.74	E 1483751.54
C4	N 474178.47	E 1483786.17
C14	N 473676.04	E 1483784.99
C15	N 473646.17	E 1483781.25
E16	N 473575.23	E 1483874.65
F6	N 474091.22	E 1483922.64
F16	N 473570.25	E 1483919.48
G1	N 474326.15	E 1483981.19
G5	N 474141.06	E 1483981.95
G14	N 473696.94	E 1483980.12
G16	N 473577.71	E 1483991.70
J1	N 474326.15	E 1484130.98
J7	N 474014.67	E 1484146.83
K3	N 474231.29	E 1484182.26
L9	N 473932.25	E 1484231.26
M6	N 474080.91	E 1484281.12
M12	N 473798.06	E 1484300.61
O16	N 473590.16	E 1484381.46
Q5	N 474118.03	E 1484482.29
Q8	N 473985.53	E 1484482.29
P11	N 473846.21	E 1484450.20
S16	N 473591.41	E 1484580.69

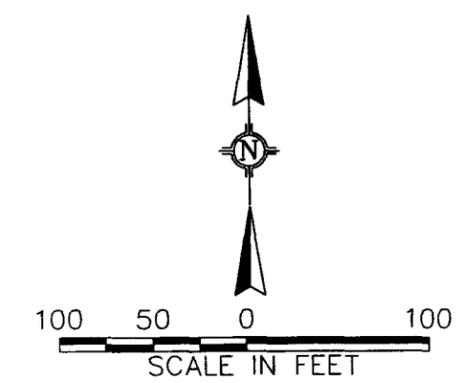
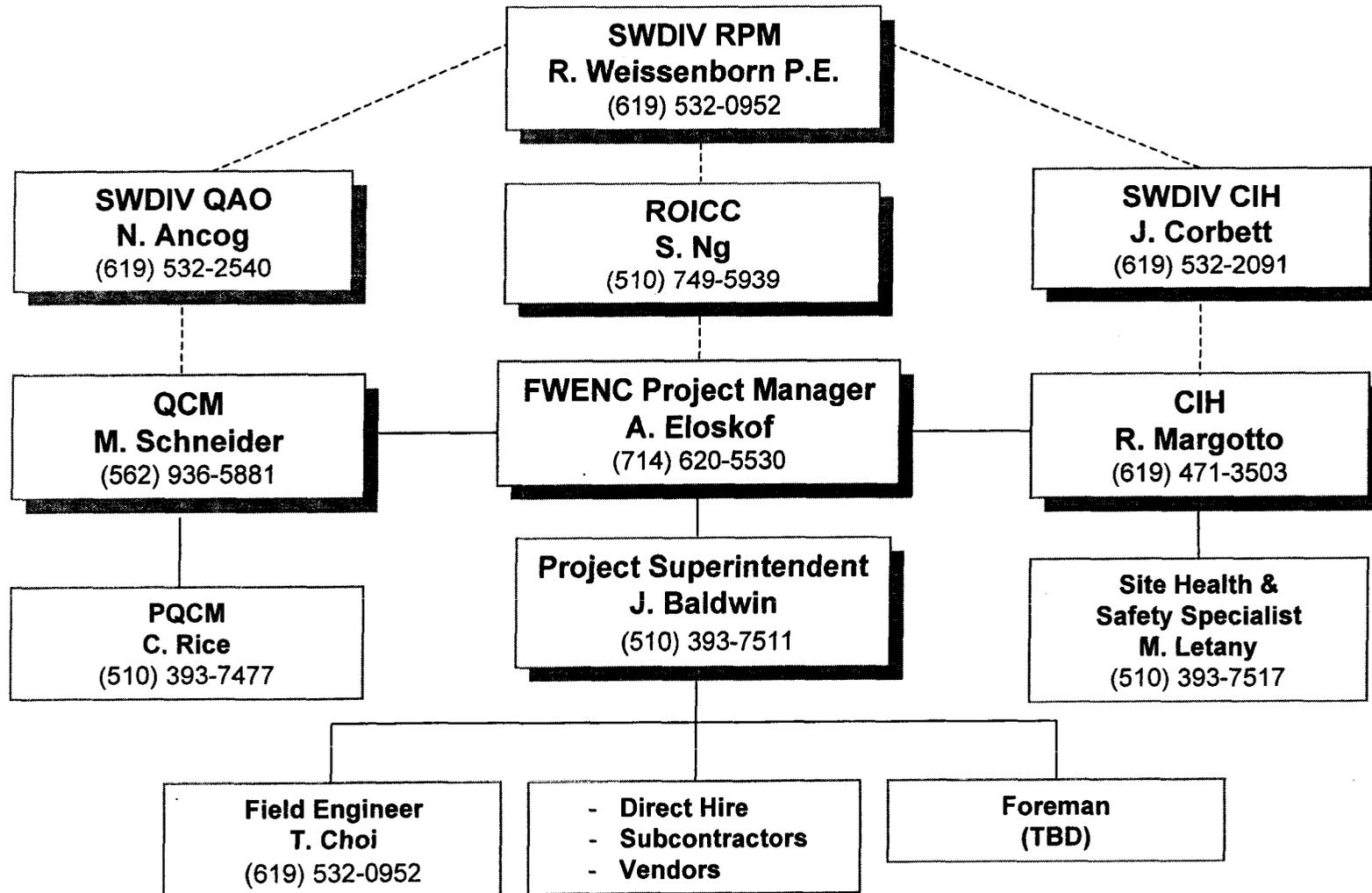
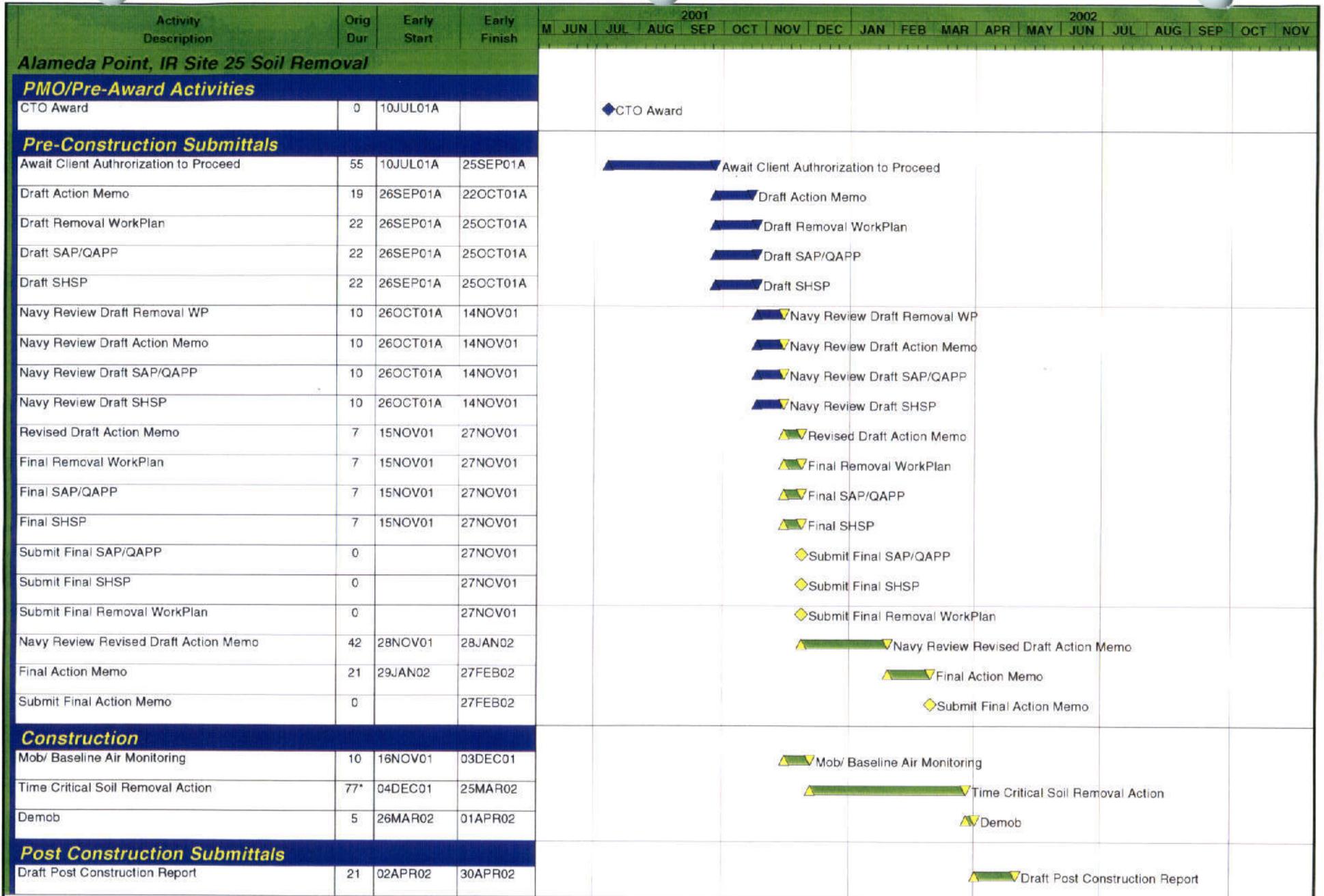


Figure 4-1
 GRID LAYOUT AND WASTE CHARACTERIZATION SAMPLE LOCATIONS
 ALAMEDA POINT - IR SITE 25
 FOSTER WHEELER ENVIRONMENTAL CORPORATION

**Figure 6-1
Project Organization Chart**





Start Date	10JUL01		Early Bar
Finish Date	30JUL02		Progress Bar
Data Date	12NOV01		Critical Activity
Run Date	16NOV01 13:40		
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Foster Wheeler Environmental Corp.
Southwest Division RAC III
CTO 0040 - Alameda Point,
IR Site 25 Time Critical Soil Removal

Sheet 1 of 2

Figure 6-2



DRAWING NO:
02020671.DWG

DCN: FWS-D-RAC-02-0206
CTO #0040

APPROVED BY: AE

CHECKED BY: VR
REV: REVISION 0

DRAWN BY: MD
DATE: 11/16/01

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LEGEND:

- TCRA BOUNDARY
- TEMPORARY FENCE

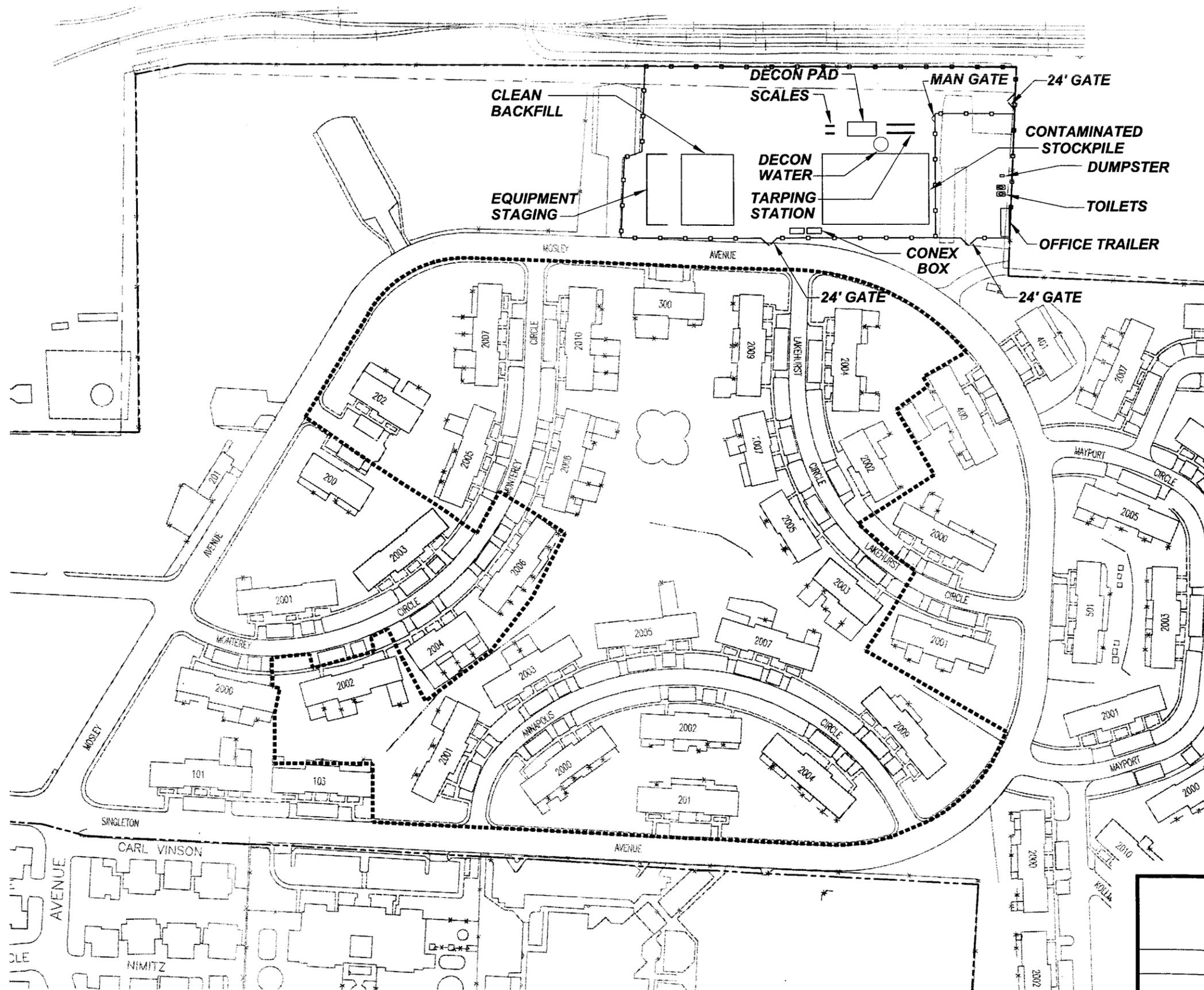
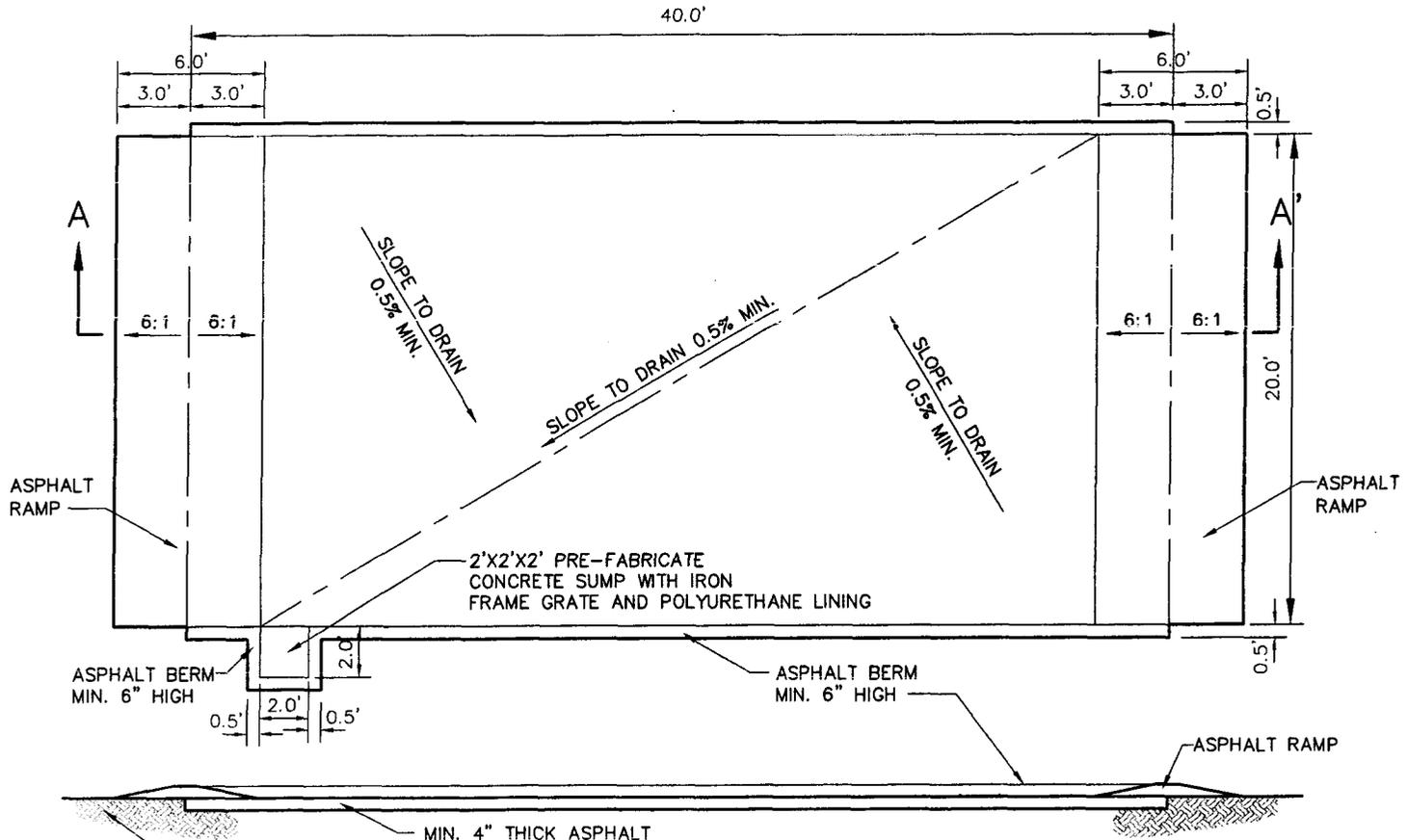


Figure 7-1
SITE SUPPORT FACILITIES
ALAMEDA POINT - IR SITE 25
FOSTER  WHEELER
ENVIRONMENTAL CORPORATION

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DATE: 11/16/01	REV: REVISION 0	CTO #0040	02020672.DWG	



ASPHALT BERM
MIN. 6" HIGH

ASPHALT BERM
MIN. 6" HIGH

MIN. 4" THICK ASPHALT
 SCRAPE 4" DEEP,
 BELOW EXISTING GROUND.
 COMPACT SMOOTH FINISH.
 SPRAY BITUMINOUS TAC
 COAT BEFORE LAYING
 ASPHALT LAYER.

EXISTING
GROUND

NOT TO SCALE

Figure 7-2
 DECONTAMINATION PAD DETAILS

ALAMEDA POINT - IR SITE 25

FOSTER WHEELER
 ENVIRONMENTAL CORPORATION

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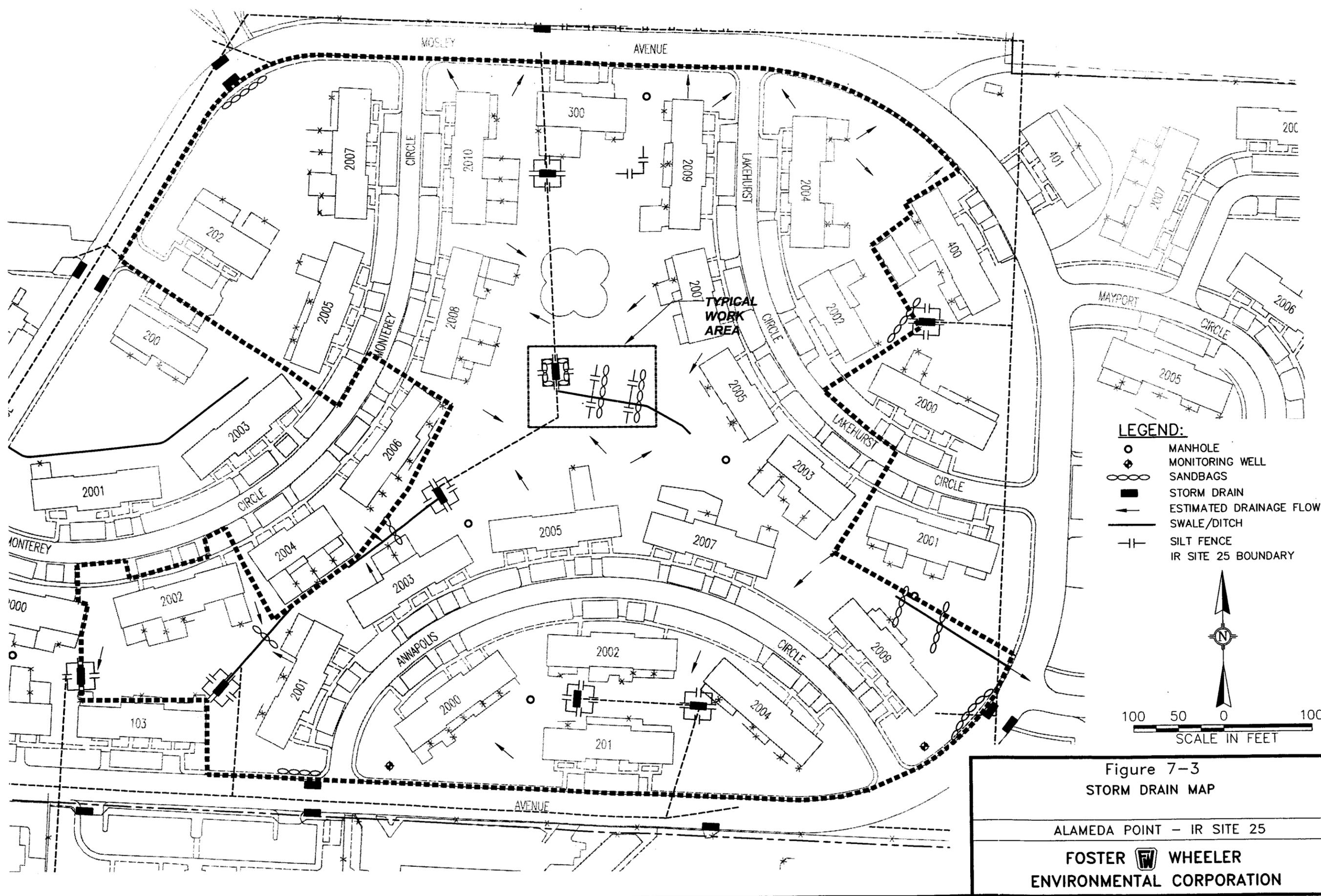
DCN: FMSD-RAC-02-0206
CTO #0040

APPROVED BY: AE

CHECKED BY: VR
REV: REVISION 0

DRAWN BY: MD
DATE: 11/16/01

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- LEGEND:**
- MANHOLE
 - ◊ MONITORING WELL
 - ∞ SANDBAGS
 - ▬ STORM DRAIN
 - ESTIMATED DRAINAGE FLOW
 - SWALE/DITCH
 - |- SILT FENCE
 - - - IR SITE 25 BOUNDARY

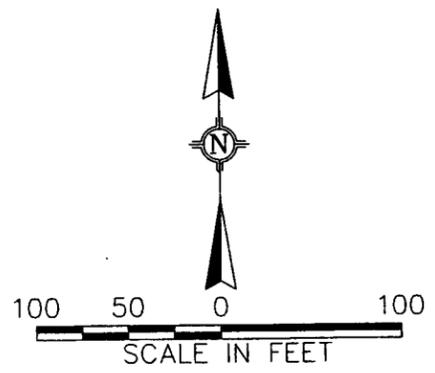
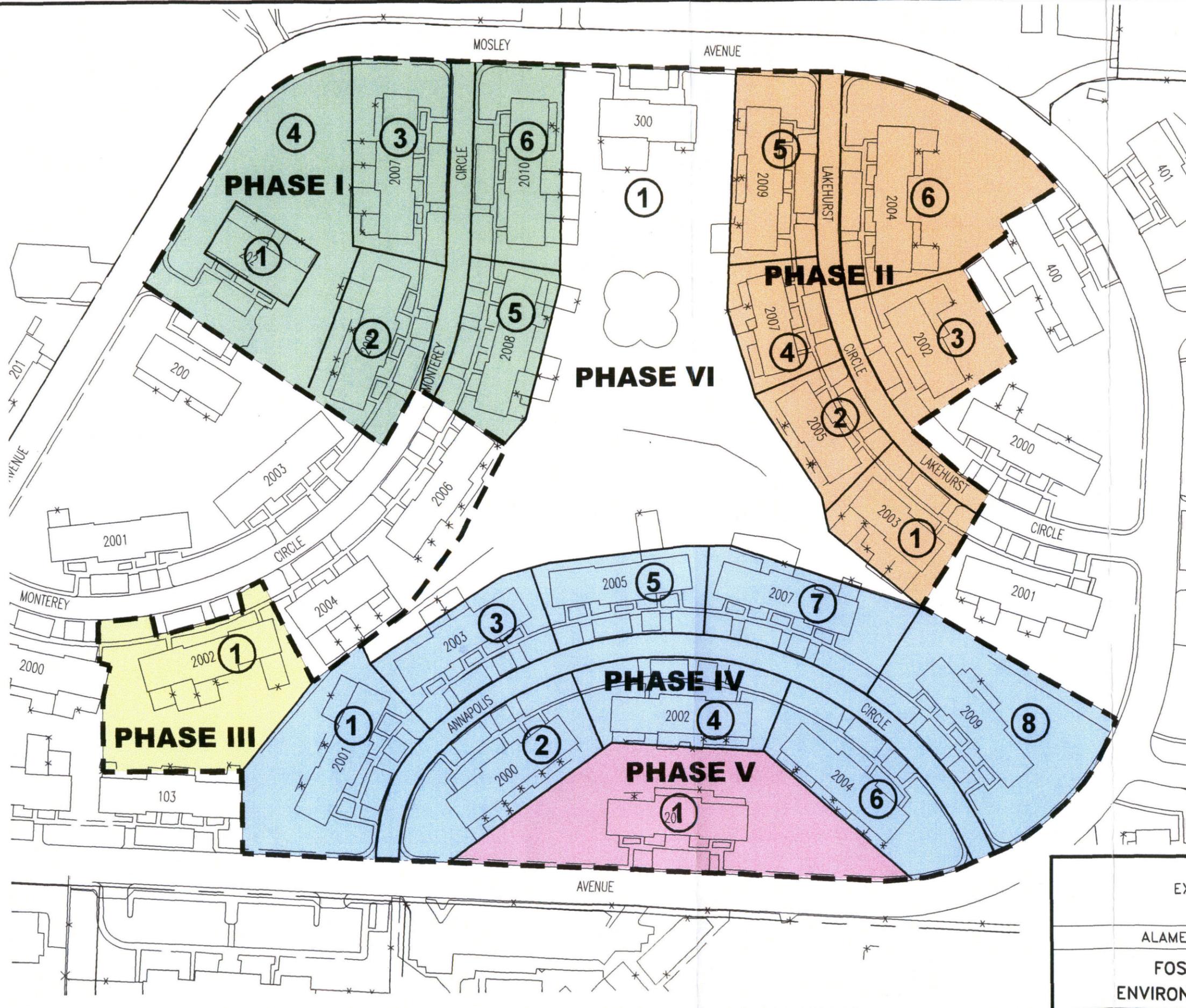


Figure 7-3
STORM DRAIN MAP
ALAMEDA POINT - IR SITE 25
FOSTER WHEELER
ENVIRONMENTAL CORPORATION

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 APPROVED BY: AE
 CTO #0040
 CHECKED BY: VR
 REV: REVISION 0
 DRAWN BY: MD
 DATE: 11/16/01

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LEGEND:
 - - - - - TCRA BOUNDARY
 6 HOUSING NUMBER WITH EACH PHASE

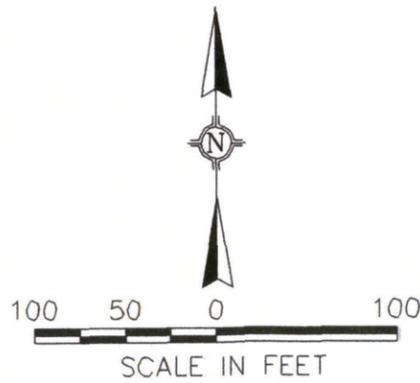
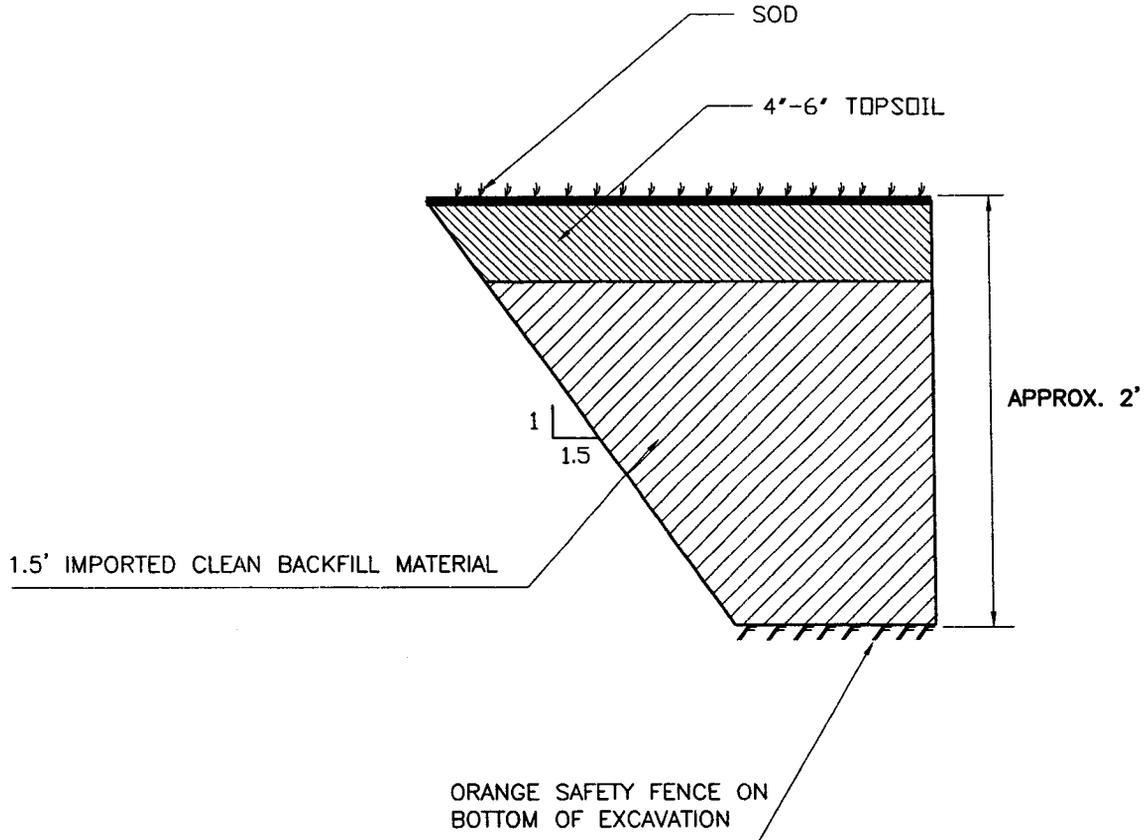


Figure 7-4
 EXCAVATION PHASES
 ALAMEDA POINT - IR SITE 25
 FOSTER WHEELER ENVIRONMENTAL CORPORATION

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BACKFILLING CROSS SECTION
TCRA AREA, IR SITE 25
NOT TO SCALE

Figure 7-5 BACKFILLING CROSS-SECTION
ALAMEDA POINT - IR SITE 25
FOSTER  WHEELER ENVIRONMENTAL CORPORATION

APPENDIX A
FIELD SAMPLING PLAN

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0040

APPENDIX A
FINAL
FIELD SAMPLING PLAN
Revision 0
November 26, 2001

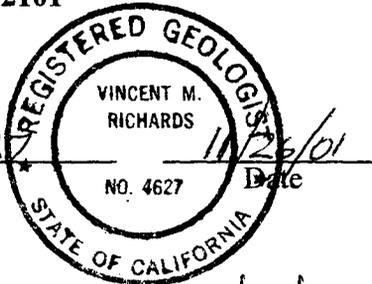
CERCLA TIME-CRITICAL REMOVAL ACTION
AT INSTALLATION RESTORATION SITE 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DCN: FWSD-RAC-02-0206



FOSTER WHEELER ENVIRONMENTAL CORPORATION
1230 Columbia Street, Suite 640
San Diego, CA 92101

Vince Richards RG. 4627
Reviewed by: Vince Richards, RG
Registered Geologist



Mary Schneider
Reviewed by: Mary Schneider
Quality Control Program Manager

11/26/01
Date

Narciso A. Ancog
Approved by: Narciso A. Ancog
SWDIV Quality Assurance Officer

11/26/01
Date

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ABBREVIATIONS AND ACRONYMS

°C	degrees Celsius
COC	Chain-of-Custody
CTO	Contract Task Order
DoN	U.S. Department of the Navy
EPA	U.S. Environmental Protection Agency
EWI	Environmental Work Instruction
FSP	Field Sampling Plan
FWENC	Foster Wheeler Environmental Corporation
HCl	hydrochloric acid
HDPE	high-density polyethylene
HNO ₃	nitric acid
IR	Installation Restoration
LC ₅₀	lethal concentration 50 percent
mL	milliliter
MS/MSD	matrix spike/matrix spike duplicate
NaOH	sodium hydroxide
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
QAPP	Quality Assurance Project Plan
QC	quality control
RAC	Remedial Action Contract
RAWP	Remedial Action Work Plan
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
TCRA	time-critical removal action
VOA	volatile organic analysis
VOC	volatile organic compound

1.0 INTRODUCTION

This Field Sampling Plan (FSP) was prepared by Foster Wheeler Environmental Corporation (FWENC) to support sampling activities for time-critical removal action (TCRA) at Operable Unit-5 [synonymous with Installation Restoration (IR) Site 25] located on former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California (Figure A.1-1). This FSP was prepared on behalf of the United States Department of the Navy (DoN), Southwest Division Naval Facilities Engineering Command (SWDIV) Contract Task Order (CTO) No. 0040, issued under Remedial Action Contract (RAC) No. N68711-98-D-5713. This FSP and the Quality Assurance Project Plan (QAPP) complete the project-specific Sampling and Analysis Plan required for this project.

The purpose of this FSP is to provide field sampling procedures and data gathering methods that will be used to support sampling activities. This FSP will be used as a reference by field personnel during sampling activities.

The Regional Water Control Board and Department of Toxic Substances Control are the lead regulatory agencies.

1.1 OBJECTIVE

The proposed TCRA at IR Site 25 will reduce soil contaminant concentrations to acceptable levels and be protective of human health by preventing exposure to the contaminated soil. This will be accomplished through excavation and off-site disposal of the contaminated soil at an appropriate disposal facility. By doing this, the removal action will substantially eliminate the identified pathways of exposure to hazardous substances (that is, the primary chemicals of concern) for current and future users of the site. The chemicals of concern addressed by the TCRA are various polynuclear aromatic hydrocarbons (PAHs) [anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene]. The removal action at IR Site 25 focuses only on potentially unacceptable human health risk concerns in soils. Groundwater is not included within the scope of this removal action.

Sampling activities in support of the removal action will be as follows:

- Pre-excavation waste characterization sampling
- Characterization of the wastewater, collected in a tank from equipment decontamination, for disposal purposes

Confirmation sampling will not be collected during the interim removal action. The DoN is currently preparing a risk assessment for IR Site 25 based on the latest round of soil sampling results. The final risk assessment report will be used to determine if additional removal action is warranted.

2.0 BACKGROUND

Site location and background, including site descriptions, are presented in Section 2.0 of the Remedial Action Work Plan (RAWP). Information presented in the RAWP will not be duplicated in this FSP.

3.0 MAPS

The RAWP contains numerous figures that assist the reader in understanding the work. Figures included in this FSP are:

Figure A.1-1 Site Vicinity Map

Figure A.4-1 Grid Lay-Out and Waste Characterization Sample Locations

4.0 SAMPLING STRATEGY

This section discusses the collection and analysis of samples to meet the project objectives during field activities.

4.1 PRE-CONSTRUCTION SAMPLING

The purpose of pre-construction sampling activities is to characterize the excavation material for waste disposal purposes only. Approximately 22 samples will be collected during this phase of the project. The TCRA area was divided into 50-foot grids as presented in Figure A.4-1. One soil sample will be collected within the selected 50-foot grid area. The location of each sample point has been determined using a random number generation of X and Y coordinates.

The samples will also be analyzed for volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) Method 5035/8260B, organochlorine pesticides by EPA Method 8081A, polychlorinated biphenyls (PCBs) by EPA Method 8082, metals by EPA Method 6010B/7000, and cyanide by EPA Method 9010A. Also, 50 percent of the samples collected will be analyzed for Title 22 Fish Bioassay [96 Hour lethal concentration 50 percent (LC₅₀)]. Previous PAH analytical data will be used for waste profiling, but semivolatile organic compounds (SVOCs) maybe analyzed by EPA Method 8270C if required by the disposal facility.

4.2 WASTEWATER CHARACTERIZATION SAMPLING

The types of wastes generated during field activities will be as follows:

- decontamination water from sample equipment
- decontamination water from excavation equipment and soil transportation trucks
- personal protective equipment (PPE)

The decontamination water and PPE will be stored separately on site in 55-gallon drums or other approved containers. A sample will be collected from each drum, tank, or other approved container and analyzed for VOCs by EPA Method 8260B, organochlorine pesticides by EPA Method 8081A, PCBs by EPA Method 8082, SVOCs by EPA Method 8270C, metals by EPA Method 6010B/7000, and cyanide by EPA Method 9010A. Additional analyses, as required by the disposal facility, may be performed.

PPE will not be sampled for waste characterization, but will be characterized based on knowledge of the process generating the waste. The results of the waste characterization may also be used to classify the PPE.

5.0 REQUEST FOR ANALYSIS

This section describes analytical methods, containers, and preservative requirements, and field and laboratory quality control (QC) samples.

5.1 ANALYTICAL METHODS

The following analytical methods will be used for this project in conjunction with *Test Methods for Evaluating Solid Waste, Physical Chemical Methods, SW-846* with final updates (EPA, 1986).

Water samples

- VOCs by EPA Method 5030B/8260B
- Organochlorine pesticides by EPA Method 8081A
- PCBs by EPA Method 8082
- SVOCs by EPA Method 8270C
- Metals (not including mercury) by EPA Method 6010B
- Mercury by EPA Method 7470A
- Cyanide by EPA Method 9010B/9012A

Soil samples

- VOCs by EPA Method 5035/8260B
- Organochlorine pesticides by EPA Method 8081A
- PCBs by EPA Method 8082
- SVOCs by EPA Method 8270C
- Metals (not including mercury) by EPA Method 6010B
- Mercury by EPA Method 7470A
- Cyanide by EPA Method 9010B/9012A
- Fish Bioassay (96 Hour) by Title 22 (LC₅₀)
- Toxicity Characteristics Leaching Procedure by EPA Method 1311
- Soluble threshold limit concentration/total threshold limit concentration by California Title 22 Waste Extraction Test

5.2 SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Table A.5-1 lists the sample containers, preservatives, and holding time requirements for samples.

5.3 FIELD QUALITY CONTROL SAMPLES

Field QC samples will be collected and analyzed during the project to assess the consistency and performance of the sampling program. Field QC samples for this project may include trip blanks, field duplicates, and equipment rinsates. Field QC samples will not be applicable to the collection of waste characterization samples.

5.3.1 Trip Blanks

Trip blanks are organic-free water preserved with hydrochloric acid (HCl) and prepared by the laboratory in 40-milliliter (mL) volatile organic analysis (VOA) vials that will be carried into the field, stored with the sample, and returned to the laboratory for VOC analysis. Trip blanks will be used to determine if samples have been cross-contaminated with VOCs during sample collection and transportation. Trip blanks will be provided and analyzed for each VOC sampling and shipping event.

5.3.2 Field Duplicates

Field duplicates consist of two samples (an original and a duplicate) of the same matrix collected at the same time and location, to the extent possible, and using the same sampling techniques. The purpose of field duplicate samples is to evaluate the precision of the overall sample collection and analysis process. Field duplicates will be collected at a frequency of one per every ten samples per matrix and will be analyzed for the same analytes as the original sample. Field duplicates receive unique sample numbers; therefore, the identity of the duplicate samples is "blind" to the analytical laboratory. Exact locations of duplicate samples and their identifications will be recorded in the field logbook.

5.3.3 Equipment Rinsate Samples

Equipment rinsate samples will be collected only if nondisposable sample equipment is used. Rinsate samples consist of Type II-grade water collected from the final rinse of the decontamination process. Rinsate samples will be collected from the sample equipment, placed in appropriate pre-cleaned containers supplied by the analytical laboratory, and analyzed for the same analytes as the field samples. Equipment rinsate samples, collected at a frequency of one per day, will evaluate the effectiveness of the decontamination procedure and potential cross-contamination during sampling events.

5.4 LABORATORY QUALITY CONTROL SAMPLES

The laboratory will analyze one matrix spike/matrix spike duplicate (MS/MSD) for every 20 project samples. In order for the laboratory to prepare a project-specific MS/MSD, field personnel will collect triple the sample volumes at a minimum of one per 20 samples collected per matrix. Field personnel will designate one sample in 20 for MS/MSD analysis on the Chain-of-Custody (COC) form.

6.0 FIELD METHODS AND SAMPLING PROCEDURES

The following sections present sampling procedures and sample handling procedures to be used for this project.

6.1 PRE-CONSTRUCTION SAMPLING PROCEDURES

One soil sample will be collected within the 50-foot grid area as locations shown of Figure A.4-1. Each sample location will be marked with a pin flag or other marking device. A hand auger will be used to access the desired depth.

The pre-construction sampling will be performed as follows:

- 1) Sampling personnel will don a new pair of disposable nitrile gloves immediately before collecting soil samples at each location.
- 2) The work area around the hand augered boring will be prepared by placing plastic sheeting on the ground.
- 3) The hand auger will be advanced until the desired depth has been achieved. The soil cuttings will be placed on the plastic sheeting.
- 4) A properly decontaminated split-spoon sampler equipped with stainless steel or brass liners will be lowered to the bottom of the borehole.
- 5) The split-spoon sampler will be driven into the undisturbed formation by a slide hammer.
- 6) Following sample acquisition, the sampler will be brought to ground surface. The upper and lower fittings are loosened and the stainless steel sleeve exposed.
- 7) The sleeve containing the soil samples will be immediately removed from the sampler. One end of the sleeve will be covered with Teflon® film and sealed with a plastic cap. If the sample will be analyzed for VOCs by EPA Method 5035/8260B, the procedure in Section 6.2.1, Soil VOC Sampling Procedures, will be followed. Otherwise, both ends of the sleeve will be covered with Teflon® film and sealed with a plastic caps.
- 8) If additional sample volume is required, the split-spoon sampler will be equipped with additional liners and the sample acquisition repeated.
- 9) Each sample will be numbered, labeled, and packaged in accordance with Sections 6.5 and 6.6.
- 10) Field documentation, including field logbooks and COCs, will be filled out in accordance with Section 6.7.

6.2 WASTE CHARACTERIZATION SAMPLING PROCEDURES

Waste characterization for liquid samples will be collected as follows:

- 1) Sampling personnel will don a new pair of disposable nitrile gloves immediately before collecting samples at each drum containing liquids.
- 2) One sample per every drum will be collected for each type of waste. If the waste is liquid and stored in a tank, one sample will be collected from the tank.
- 3) The bung top of the drum or other approved container will be carefully opened and a measurement of the atmosphere inside will be taken using the photoionization detector (PID).
- 4) If the PID reads zero, proceed with completely opening the drum or container. If there are indications that VOCs exist inside, the project health and safety person should be contacted for directions.
- 5) Liquid samples will be collected using disposable Teflon® bailers. Samples will be transferred from the bailers to pre-preserved, pre-cleaned sample containers using a bottom-emptying device.
- 6) Each sample will be numbered, labeled, and packaged in accordance with Sections 6.5 and 6.6.
- 7) Field documentation, including field logbooks and COCs, will be filled out in accordance with Section 6.7.

6.2.1 Soil VOC Sampling Procedures

If soil samples are being collected for VOCs, then EPA Method 5035 using EnCore® samplers will be used as follows:

- 1) Three EnCore® samplers will be collected for each VOC sample (if more than one volatile analysis is being performed, then four EnCore® samplers will be collected for each volatile analysis sample).
- 2) Holding the coring body, the plunger rod will be pushed down until the small o-ring rests against the tabs. This will assure that the plunger will move easily.
- 3) The locking lever on the EnCore® T-handle will be depressed. The coring body, with the plunger end first, will be placed into the open end of the T-handle, aligning the slots of the coring body with the locking pins in the T-handle. The coring body will be twisted clockwise to lock the pins in the slots. The sampler will be checked to ensure that it is locked in place. The sampler will now be ready for use.
- 4) By holding the T-handle, the coring body will be pushed into the soil until the coring body is full. When full, the small o-ring will be centered in the T-handle viewing hole. The sampler will then be removed from the soil and any excess soil will be wiped from the coring body exterior.
- 5) The coring body will be capped while it is still on the T-handle. The cap should be pushed over the flat area of the ridge. To lock the cap in place, the cap will be pushed and twisted so that it seals the sampler.

- 6) The capped sampler will be removed by depressing the locking lever on the T-handle while twisting and pulling the sampler from the T-handle.
- 7) The sampler will be placed in its aluminum sealed bag. The sample label on the outside of the bag will be completed as described in Sections 6.5 and 6.6.
- 8) This procedure will be performed until the appropriate amount of EnCore® samplers are collected for each sample.
- 9) The EnCore® bags will be placed in a double-resealable bag and then placed on ice immediately.

6.3 DECONTAMINATION PROCEDURES

Decontamination of nondisposable sampling equipment will be performed to prevent the introduction of extraneous material into samples and to prevent cross-contamination between samples. All sampling equipment will be decontaminated by steam cleaning or by washing with a nonphosphate detergent, such as Liquinox™, or equivalent.

The following steps will be followed for decontamination of nondisposable sample equipment:

1. **Wash with nonphosphate detergent and water solution.** This step will remove all visible contamination from the equipment. Using a 5-gallon bucket approximately 75 percent full of solution and a long-handled brush is suggested for this step. Dilute nonphosphate detergent as directed by the manufacturer.
2. **Rinse with potable water.** This step will rinse all the detergent solution away from equipment. Using a 5-gallon bucket approximately 75 percent full of water and a long-handled brush is suggested for this step. Periodic changing of this water is required.
3. **Rinse with deionized/laboratory reagent-grade water.** This step will rinse any detergent solution and potable water residues. Rinsing is most effective when water is applied using a stainless steel Hudson-type sprayer or Nalgene® squeeze bottle while holding equipment over a 5-gallon bucket.
4. **Rinse with deionized/laboratory reagent-grade water.** This step will be a final rinse to remove any contaminants. Rinsing is most effective when water is applied using a stainless steel Hudson-type sprayer or Nalgene® squeeze bottle while holding equipment over a 5-gallon bucket.

6.4 SAMPLE NUMBER

All samples submitted to an analytical laboratory will be uniquely numbered according to the following format:

0040-YYY

Where 0040 is the four-digit CTO number and YYY is a sequential number for this project. The sample number will be recorded in the field logbook and on the COC form at the time of sample

collection. A complete description of the sample and sampling circumstances will be recorded in the field logbook and referenced using the unique sample identification number.

6.5 SAMPLE LABELING

Sample labels will be filled out with indelible black ink and will be affixed to each sample container. Each sample label will be covered with clear tape. Each sample container will be labeled, at a minimum, with the following:

- Sample identification number
- Sample collection date (month/day/year)
- Time of collection (24-hour clock)
- Sampler's initials
- Analyses to be performed
- Preservative (if any)

6.6 SAMPLE PACKAGING AND SHIPMENT

Immediately after sample labeling, custody seals will be affixed to each sample container. Each sample will be placed in double-resealable plastic bags to keep the sample container and label dry. For VOA containers, place the signed custody seal on the outside of the first resealable bag. Then place the container in another resealable bag. This will prevent any contact with the adhesive from the custody seal and the VOA containers. All glass sample containers will be protected with bubble wrap if transported by a commercial carrier.

Each cooler will be shipped with a temperature blank. A temperature blank is a sample container filled with tap water and stored in the cooler during sample collection and transportation. The temperature of the temperature blank will be recorded by the laboratory on the COC form immediately upon receipt of the samples.

Sample cooler drain spouts will be taped from the inside and outside of the cooler to prevent any leakage.

Samples transported by a laboratory assigned courier will be packed in a sample cooler with ice in sufficient quantity to keep the samples cooled. Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during transport. The COC form will be completed and signed by the courier. The cooler and the top two copies (white and pink) of the COC form will then be released to the courier for transportation to the laboratory.

Samples to be shipped by commercial carrier will be packed in a sample cooler lined with a double-plastic bag. Double-bagged ice will be added to the cooler in a sufficient quantity to keep

the samples cooled for the duration of the shipment to the laboratory. Saturday deliveries must be coordinated with the laboratory, and the airbill and cooler must be marked appropriately. The top two copies of the COC form will be sealed in a double-resealable bag. The COC form will then be taped to the inside of the sample cooler lid. Two custody seals will be taped across the cooler lid: one seal in the front and one seal in the back. Clear tape will be applied to the custody seals to prevent accidental breakage during shipping. The cooler will be taped shut with strapping tape. The samples will then be shipped to the analytical laboratory. A copy of the courier airbill will be retained for documentation.

6.7 FIELD DOCUMENTATION

At a minimum, sampling information will be recorded on a COC form and in the field logbook. Both documents will be completed in the field at the time of sample collection. All entries will be legible and will be recorded in indelible black ink.

6.7.1 Chain-of-Custody

The following will be recorded on the COC form:

- Project name
- Project location
- Sampler name
- Project contact
- Purchase order number
- Project number (FWENC)
- Sampler signature
- Airbill number (if applicable)
- Sample ID
- Date (of sample collection)
- Time (of sample collection to the nearest minute, 24-hour clock)
- Number of sample containers
- Data package requirement (Level III or IV)
- Sample type (matrix)
- Turnaround-time
- Analyses required
- Laboratory name

- Comments
 - MS/MSD samples
 - Observations specific to sample
- Sample location codes:

Examples:

grid samples	GRID-#XX
drum samples:	DRUM-#X
tank samples:	TANK-#X
QC samples:	TRIP BLANK
	EQ RINSATE
- Sample depth in feet (start, end)
- QC type:
 - REG: regular sample
 - TB: trip blank
 - FD: field duplicate
 - ER: equipment rinsate sample
- Transfer signature (to relinquish samples)
 - The sampler will be the first person to relinquish sample possession
- Courier/laboratory representative signature (for commercial carrier, write carrier's name here)
- Date/time (of custody transfer)
- Laboratory instruction
- Composite description
- Sampling comments

6.7.2 Field Logbooks

A permanently bound field logbook with consecutively numbered pages, used for sampling activities only, will be assigned to this project. All entries will be recorded in indelible black ink. At the end of each workday, the logbook pages will be signed by the responsible sampler and any unused portions of logbook pages will be crossed out, signed, and dated.

If it is necessary to transfer the logbook to another person, the person relinquishing the logbook will sign and date the last page used and the person receiving the logbook will sign and date the next page to be used.

At a minimum, the logbook will contain the following information:

- Project name and location
- Date and time
- Personnel in attendance
- General weather information
- Work performed
- Field observations
- Sampling performed, including specifics such as location, type of sample, type of analyses, and sample identification
- Field analyses performed including results, instrument checks, problems, and calibration records for field instruments
- Descriptions of deviations from the Sampling and Analysis Plan
- Problems encountered and corrective action taken
- Identification of field QC samples
- QC activities
- Verbal or written instructions
- Any other events that may affect the samples

6.7.3 Document Corrections

Changes or corrections on any project documentation will be made by crossing out the item with a single line, initialing (by the person performing the correction), and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information should be written clearly above the crossed-out item.

6.8 FSP REVISION OR AMENDMENT

When circumstances arise that impact the original project sampling objectives, such as a significant change in work scope, the FSP document will be revised or amended. The modification process will be based on EPA Guidelines and will be in conjunction with *Environmental Work Instruction #2* (SWDIV, 1999b).

7.0 REFERENCES

U.S. Environmental Protection Agency (EPA). 1986. *Test Methods for Evaluating Solid Waste, Physical Chemical Methods, SW-846*, Third Edition and Final Updates.

Southwest Division (SWDIV) Naval Facilities Engineering Command. 1999b. *Environmental Work Instruction (EWI) #2, 4EN.2, Review, Approval, Revision, and Amendment of Field Sampling Plans (FSPs) and Quality Assurance Project Plans (QAPPs)*. October.

TABLES

**TABLE A.5-1
SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIME REQUIREMENTS**

WATER SAMPLES				
Analysis	Analytical Method	Container	Preservative	Holding Time
VOCs	EPA Method 8260B	Three 40-mL VOA vials	pH \leq 2 w/ HCl, Cool to 4 \pm 2°C	14 days
Organochlorine pesticides	EPA Method 8081A	Two 1-liter glass amber	Cool to 4 \pm 2°C	7 days to extract; 40 days to analyze
PCBs	EPA Method 8082	Two 1-liter glass amber	Cool to 4 \pm 2°C	7 days to extract; 40 days to analyze
SVOCs	EPA Method 8270C	Two 1-liter glass amber	Cool to 4 \pm 2°C	7 days to extract; 40 days to analyze
Metals (including mercury)	EPA Method 6010B/7470A	500-mL HDPE container	pH \leq 2 w/ HNO ₃	6 months (except mercury which is 28 days)
Cyanide	EPA Method 9010B/9012A	250-mL HDPE container	pH > 12 w/ NaOH, Cool to 4 \pm 2°C	14 days

SOIL SAMPLES				
Analysis	Analytical Method	Container	Preservative	Holding Time
VOCs	EPA Method 5035/8260B	Three EnCore® samplers	Cool to 4 \pm 2°C	48 hours to analyze or preserve; if preserved, 14 days to analyze
VOC, TCLP*	EPA Method 1311/8260B	Use soil sample from above	Not applicable	14 days for TCLP; 14 days to analyze
PAHs	EPA Method 8310	One 8-ounce glass jar or stainless steel sleeve	Cool to 4 \pm 2°C	14 days to extract; 40 days to analyze
PAHs, TCLP*	EPA Method 1311/8310	Use soil sample from above	Not applicable	14 days for TCLP; 7 days to extract; 40 days to analyze
Organochlorine pesticides	EPA Method 8081A	One 8-ounce glass jar or stainless steel sleeve	Cool to 4 \pm 2°C	14 days to extract; 40 days to analyze
Organochlorine pesticides, TCLP*	EPA Method 1311/8081A	Use soil sample from above	Not applicable	14 days for TCLP; 7 days to extract; 40 days to analyze
PCBs	EPA Method 8082	One 8-ounce glass jar or stainless steel sleeve	Cool to 4 \pm 2°C	14 days to extract; 40 days to analyze

**TABLE A.5-1
SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIME REQUIREMENTS**

SOIL SAMPLES				
Analysis	Analytical Method	Container	Preservative	Holding Time
PCBs, TCLP*	EPA Method 1312/8082	Use soil sample from above	Not applicable	14 days for TCLP; 7 days to extract; 40 days to analyze
SVOCs	EPA Method 8270C	One 8-ounce glass jar or stainless steel sleeve	Cool to 4±2°C	14 days to extract; 40 days to analyze
SVOCs, TCLP*	EPA Method 1311/8270C	Use soil sample from above	Not applicable	14 days for TCLP; 7 days to extract; 40 days to analyze
Metals (including mercury)	EPA Method 6010B/7471A	One 8-ounce glass jar or stainless steel sleeve	Cool to 4±2°C	6 months (except mercury which is 28 days)
Metals (including mercury), TCLP*	EPA Method 1311/6010B/7471A	Use soil sample from above	Not applicable	6 months (except mercury), for TCLP; 6 months to analyze. Mercury: 28 days for TCLP; 28 days to analyze
Cyanide	EPA Method 9010B/9012a	One 8-ounce glass jar or stainless steel sleeve	Cool to 4±2°C	14 days
Fish Bioassy (96 Hour)	Title 22 (LC ₅₀)	One 8-ounce glass jar or stainless steel sleeve	Cool to 4±2°C	N/A

Notes:

°C – degrees Celsius

EPA – U.S. Environmental Protection Agency

HCl– hydrochloric acid

HDPE – high-density polyethylene

HNO₃ – nitric acidLC₅₀ – lethal concentration 50%

mL – milliliter

N/A – not applicable

NaOH – sodium hydroxide

STLC - soluble threshold limit concentration

SVOC – semivolatile organic compound

TCLP – toxicity characteristics leaching procedure

VOA – volatile organic analysis

VOC – volatile organic compound

*If required (20 x TCLP or 10 x STLC)

FIGURES

DRAWING NO:

02020611.DWG

DCN: FWSO-RAC 02-0206

CTO: #0040

APPROVED BY: AE

CHECKED BY: VR

REVISION: 0

DRAWN BY: MD

DATE: 11/16/01

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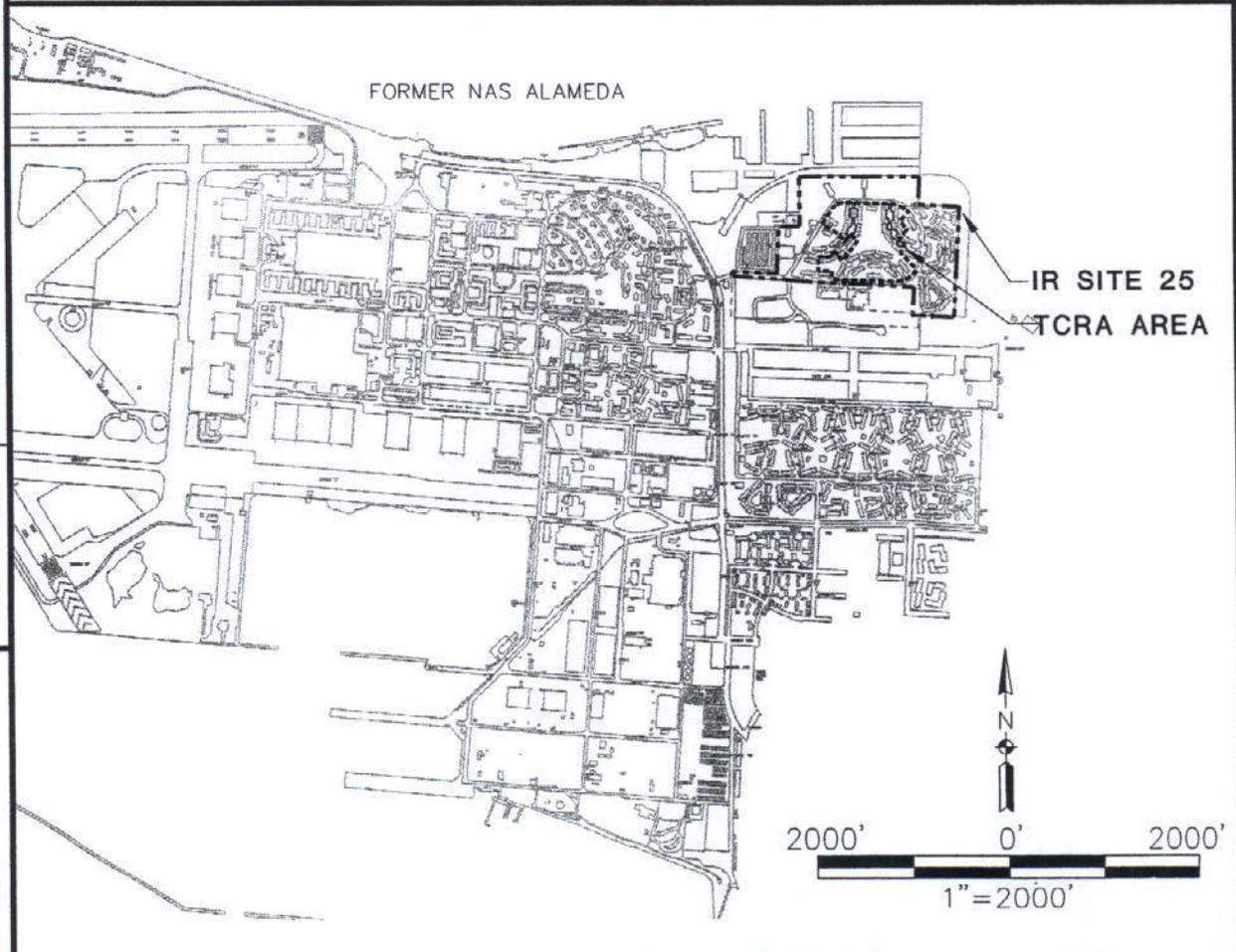
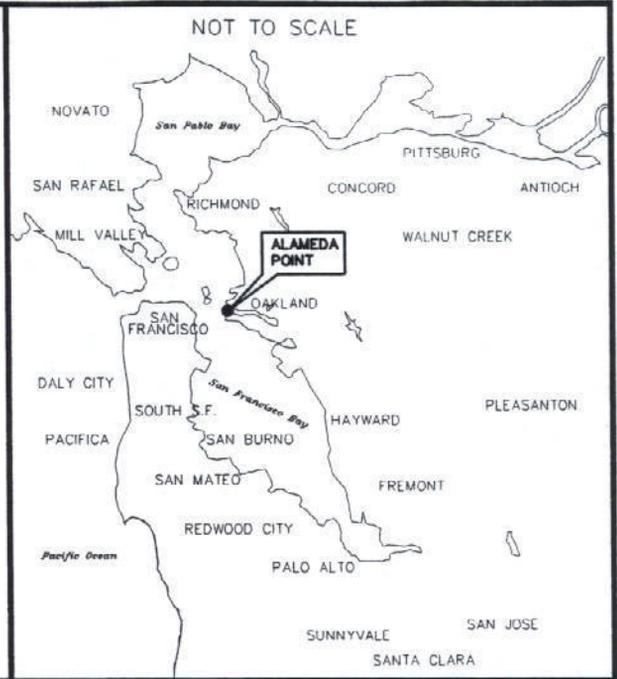


Figure A.1-1
SITE VICINITY MAP

ALAMEDA POINT - IR SITE 25

FOSTER  WHEELER
ENVIRONMENTAL CORPORATION

DRAWING NO:
02020641.DWG

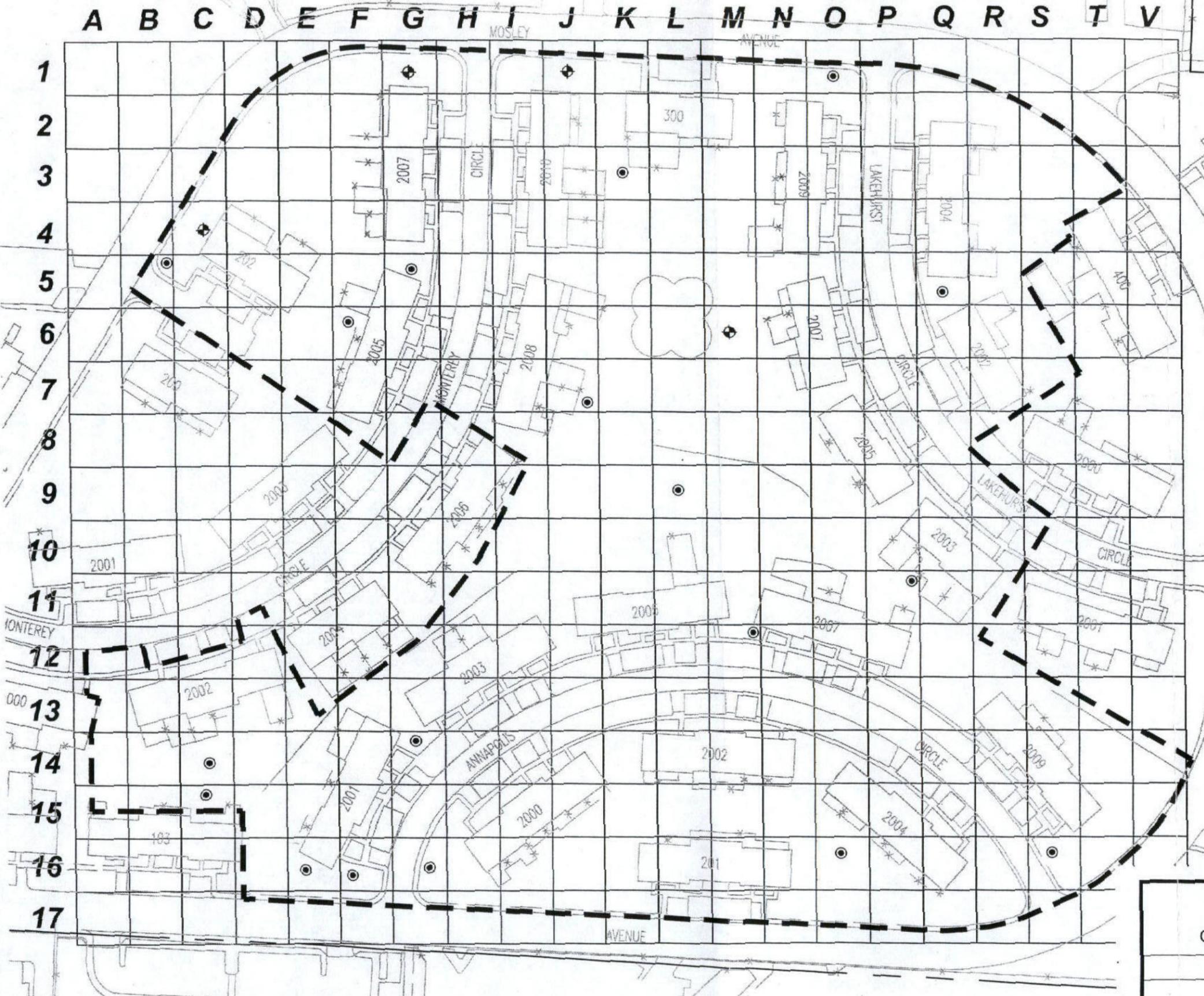
DCN: FWSO-RAC-02-0206
CTO #0040

APPROVED BY: AE

CHECKED BY: VR
REV: REVISION 0

DRAWN BY: MD
DATE: 11/16/01

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PLOT/UPDATE: NOV 20 2001 14:31:13



LEGEND:

- TCRA BOUNDARY
- ◆ SELECTIVE SAMPLE LOCATIONS FOR WASTE CHARACTERIZATION
- RANDOM SAMPLE LOCATIONS FOR WASTE CHARACTERIZATION

GRID	NORTHING	EASTING
B5	N 474147.74	E 1483751.54
C4	N 474178.47	E 1483786.17
C14	N 473676.04	E 1483784.99
C15	N 473646.17	E 1483781.25
E16	N 473575.23	E 1483874.65
F6	N 474091.22	E 1483922.64
F16	N 473570.25	E 1483919.48
G1	N 474326.15	E 1483981.19
G5	N 474141.06	E 1483981.95
G14	N 473696.94	E 1483980.12
G16	N 473577.71	E 1483991.70
J1	N 474326.15	E 1484130.98
J7	N 474014.67	E 1484146.83
K3	N 474231.29	E 1484182.26
L9	N 473932.25	E 1484231.26
M6	N 474080.91	E 1484281.12
M12	N 473798.06	E 1484300.61
O16	N 473590.16	E 1484381.46
Q5	N 474118.03	E 1484482.29
Q8	N 473985.53	E 1484482.29
P11	N 473846.21	E 1484450.20
S16	N 473591.41	E 1484580.69

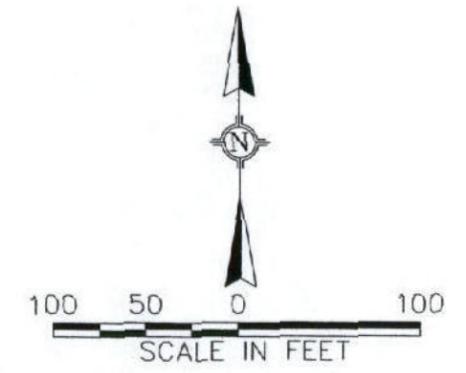


Figure A.4-1
GRID LAYOUT AND WASTE CHARACTERIZATION SAMPLE LOCATIONS
ALAMEDA POINT - IR SITE 25
FOSTER WHEELER ENVIRONMENTAL CORPORATION

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0040

APPENDIX B
FINAL
QUALITY ASSURANCE PROJECT PLAN
Revision 0
November 23, 2001

CERCLA TIME CRITICAL REMOVAL ACTION
AT INSTALLATION RESTORATION SITE 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DCN: FWSD-RAC-02-0206



FOSTER WHEELER ENVIRONMENTAL CORPORATION
1230 Columbia Street, Suite 640
San Diego, CA 92101

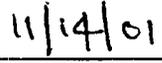
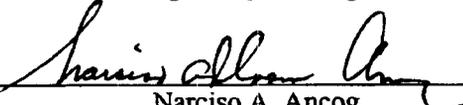
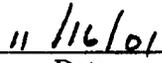
 _____ Mary Schneider Program QC Manager	 _____ Date
 _____ Narciso A. Ancog SWDIV Quality Assurance Officer	 _____ Date

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ABBREVIATIONS AND ACRONYMS

%R	percent recovery
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
CCV	continuing calibration verification
COC	Chain-of-Custody
DON	U.S. Department of the Navy
DQO	data quality objective
EDD	electronic data deliverable
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
FWENC	Foster Wheeler Environmental Corporation
GC/MS	gas chromatograph/mass spectrometer
ICAL	initial calibration
ICAP	inductively coupled argon plasma
IR	Installation Restoration
LCS	laboratory control sample
MEK	methyl ethyl ketone
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MIBK	methyl isobutyl ketone
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tertiary butyl ether
NA	not applicable
NFESC	Naval Facilities Engineering Service Center
PAH	polynuclear aromatic hydrocarbons
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control

ABBREVIATIONS AND ACRONYMS

(Continued)

RAC	Remedial Action Contract
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
SOP	standard operating procedure
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
TCLP	Toxicity Characteristics Leaching Procedure
TCRA	time-critical removal action
TPH	total petroleum hydrocarbon
VOC	volatile organic compound

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared by Foster Wheeler Environmental Corporation (FWENC) to support sampling activities at Operable Unit-5 [synonymous with Installation Restoration (IR) Site 25] located on former Naval Air Station (NAS) Alameda, Alameda Point, Alameda, California. This QAPP was prepared on behalf of the United States Department of the Navy (DoN), Southwest Division Naval Facilities Engineering Command (SWDIV) Contract Task Order No. 0040, issued under Remedial Action Contract (RAC) No. N68711-98-D-5713. This QAPP and the Field Sampling Plan (FSP) complete the project-specific Sampling and Analysis Plan required for this project.

1.1 OBJECTIVE

This QAPP was prepared in accordance with the *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5* [U.S. Environmental Protection Agency (EPA), 2001] to ensure that all data collected are precise, accurate, representative, complete, and comparable to meet their intended use. This document describes quality assurance (QA) objectives and quality control (QC) requirements for this project. The QC requirements associated with the sampling activities are presented in the FSP.

The Regional Water Quality Control Board and the Department of Toxic Substances Control are the lead regulatory agencies.

1.2 BACKGROUND

Information on site location and background is presented in Section 2.0 of the Remedial Action Work Plan (RAWP). Information presented in the RAWP will not be duplicated in this QAPP.

2.0 PROJECT ORGANIZATION

This section identifies the individuals from the DoN, regulatory agencies, and FWENC who are responsible for the oversight and/or implementation of the proposed work. The Project Organization Chart is shown in Figure B.2-1. The responsibilities of the team members associated with the sampling activities are presented in Table B.2-1.

2.1 LIST OF POINTS OF CONTACT

The following is a list of the key contacts for the project:

Agency	Contact	Title
Naval Facilities Engineering Command Southwest Division BRAC Operations 1230 Columbia Street, Suite 1100 San Diego, CA 92101	Mr. Rick Weissenborn (619) 532-0952	Remedial Project Manager
Naval Facilities Engineering Command Southwest Division 1220 Pacific Highway San Diego, CA 92132-5187	Ms. Joyce Howell-Payne (619) 532-0978	Contracting Specialist
Southwest Division Naval Facilities Engineering Command 1220 Pacific Highway San Diego, CA 92132-5190	Narciso A. Ancog (619) 532-2540	Quality Assurance Officer
Navy Facilities Engineering Command San Francisco Bay Area 2450 Saratoga Street, Suite 200 Alameda, CA 94501	Ms. Shirley Ng (510) 749-5939	Navy Technical Representative / Resident Officer in Charge of Construction
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Mr. Abram Eloskof (562) 598-6150 ext. 5886 (714) 620-5530 (cell)	PjM
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Roger Margotto, CIH (619) 471-3503 (714) 810-3742 (pager)	Project Environmental Health and Safety Manager
FWENC NAVWPNSTA Seal Beach PMO Site Trailer Industrial & Gardeners Road 800 Seal Beach Boulevard Seal Beach, CA 90740	Mary Schneider (562) 936-5881 (714) 620-4551 (cell)	Quality Control Program Manager
	Gerald Tamashiro (562) 936-5888	Project Chemist

3.0 QUALITY ASSURANCE OBJECTIVES

The overall QA objectives of this QAPP are to outline procedures for the collection and assessment of data that are within acceptable ranges of precision, accuracy, representativeness, completeness, and comparability (PARCC) to meet the project data quality objectives (DQOs). The data quality associated with environmental data is a function of the sampling plan rationale and the procedures used to collect the samples, as well as the analytical methods and instrumentation used. However, uncertainty cannot be eliminated entirely from environmental data.

3.1 DATA QUALITY OBJECTIVES

The DQO process is a series of planning steps based on scientific methods that are designed to ensure that the type, quantity, and quality of environmental data used for decision-making are appropriate for the intended application. The DQO process, as defined by the EPA, consists of the following seven steps that are designed to provide a systematic approach to resolving issues that pertain to the remediation (EPA, 2000):

- Stating the Problem
- Identifying the Decisions
- Identifying Input to the Decisions
- Defining the Boundaries
- Developing a Decision Rule
- Specifying Limits on Decision Error
- Optimizing Sampling Design

Table B.3-1 provides a step-by-step summary of the DQO process.

3.2 ANALYTICAL DATA QUALITY OBJECTIVES

Analytical data will be obtained using standard methods in a state of California-certified and DON-evaluated laboratory. Analytical DQOs will be assessed through measures of PARCC parameters. The QC criteria are defined in this section. The analytical methods used, project required reporting limits, and project QC criteria are also described.

3.2.1 Quality Control Criteria

QC criteria definitions are as follows:

- **Precision**—A measure of the reproducibility of a set of replicate results or the agreement among repeat observations made under the same conditions. Analytical precision is the measurement of the variability associated with duplicate or replicate

analyses. For this project, a laboratory control sample (LCS) will be used to determine the precision of the analytical method. Total precision is the measurement of the variability associated with the entire sampling and analysis process. It is determined by analysis of duplicate field samples and measures variability introduced by both the laboratory and field operations. Field duplicate and matrix spike duplicate samples will be used to assess field and analytical precision, and the precision measurement will be determined using the relative percent difference (RPD) between the duplicate sample results. The formula for calculating the RPD is as follows:

$$\text{RPD} = 100 \times 2 \times (\text{result} - \text{duplicate result}) / (\text{result} + \text{duplicate result})$$

- **Accuracy**—The nearness of a result or the mean of a set of results to the true or accepted value. Analytical accuracy is measured by comparing the percent recovery of analytes spiked into a LCS against a control limit. Surrogate compound recoveries are also used to assess accuracy and method performance for each sample analyzed. The formula for calculating accuracy uses the following equation to determine percent recovery (%R) of specific analytes.

$$\%R = 100 \times (\text{spiked sample result} - \text{unspiked sample result}) / \text{amount of spike added}$$

- **Representativeness**—The degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is a qualitative parameter mostly concerned with the proper design of the sampling program.
- **Completeness**—The percentage of measurements made that are judged to be valid measurements. The completeness goal is to generate a sufficient amount of valid data to meet project needs. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not qualified with a rejected ("R") flag. The requirement of completeness is 95 percent for aqueous samples and 90 percent for soil samples, and is determined using the following equation:

$$\% \text{ completeness} = 100 \times (\text{number of valid analyte results} / \text{number of possible results})$$

- **Comparability**—A qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurements for similar samples and sample conditions. The objective for the QA/QC program is to produce data with the greatest possible degree of comparability. The number of matrices that are sampled and the range of field conditions encountered are considered in determining comparability. Comparability is achieved by using standard methods for sampling and analysis, reporting data in standard units, normalizing results to standard conditions, and using standard and comprehensive reporting formats.

3.2.2 Analytical Methods

The following methods will be used during this project:

Water samples

- Volatile organic compounds (VOCs) by EPA Method 8260B
- Semivolatile organic compounds (SVOCs) by EPA Method 8270C
- Pesticides by EPA Method 8081A
- Polychlorinated biphenyls (PCBs) by EPA Method 8082
- Title 22 Metals (not including mercury) by EPA Method 6010B
- Mercury by EPA Method 7470A
- Cyanide by EPA Method 9010A

Soil samples

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270C
- Pesticides by EPA Method 8081A
- PCBs by EPA Method 8082
- Title 22 Metals (not including mercury) by EPA Method 6010B
- Mercury by EPA Method 7470A
- Cyanide by EPA Method 9010A

The reporting limits established for this project are presented in Table B.3-2.

3.2.2.1 Project Quality Control Limits

The precision and accuracy QC limits for each method are identified in Table B.3-3.

4.0 SAMPLING COLLECTION

4.1 SAMPLING LOCATIONS

Sample locations and the number of samples to be collected are described in Section 4.0 of the FSP and are not duplicated here.

4.2 SAMPLE COLLECTION

Sample collection procedures are described in Section 6.0 of the FSP and are not duplicated here.

4.3 SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Sample containers, preservatives, and holding times are described in Table A.5-1 of the FSP and are not duplicated here.

4.4 SAMPLE PACKAGING AND SHIPMENT

Sample packaging and shipment procedures are described in Section 6.6 of the FSP and are not duplicated here.

5.0 SAMPLE CUSTODY AND DOCUMENTATION

The integrity and traceability of samples from the time they are collected through the time data are reported are essential in any sampling and analysis program. The handling of the samples and transfer of custody must be well documented given the evidentiary nature of the data. A sample is considered to be in one's custody if it meets any of the following criteria:

1. In actual possession or in view of the person who collected the sample
2. Locked in a secure area
3. Placed in an area restricted to authorized personnel

5.1 FIELD SAMPLE CUSTODY AND DOCUMENTATION

In order to maintain the integrity and traceability of samples, all information pertinent to field sampling will be recorded in a field logbook. All samples will be properly labeled and custody sealed prior to being transported to the laboratory and will be accompanied by completed Chain-of-Custody (COC) documentation. All documentation will be recorded in a field logbook in black indelible ink.

5.1.1 Field Logbook

Detailed information on the field logbook is presented in Section 6.7.2 of the FSP.

5.1.2 Sample Labeling

Sample labels are necessary to prevent misidentification of samples. Labels will be filled out and affixed to sample containers at the time of sample collection. Detailed information on sample labeling is presented in Section 6.5 of the FSP.

5.1.3 Custody Seals

Sample custody seals are used to detect unauthorized tampering of samples from the time of sample collection to the time of analysis. The seals will be signed and dated by the sampler. The seals will be placed on the sample containers and shipping containers in such a way that they must be broken in order to open the containers. Seals will be affixed to containers before the samples leave the custody of sampling personnel.

5.1.4 Chain-of-Custody Records

To establish the documentation necessary to trace sample possession from the time of collection, a COC record will be completely filled out and will accompany every sample. At a minimum, the information presented in Section 6.7.1 of the FSP must be included on the COC record.

Samples will be delivered to the laboratory for analysis as soon as practicable. A COC record will accompany all samples.

5.2 LABORATORY SAMPLE CUSTODY AND DOCUMENTATION

The samples will be delivered to the person in the laboratory authorized to receive samples (referred to as the sample custodian). Upon receipt of a sample, the sample custodian will inspect the condition of the sample (including the temperature of the cooler) and the custody seal, reconcile the information on the sample label against that on the COC record, assign a laboratory number, log the sample in the laboratory logbook, and store it in a secured sample storage room.

The FWENC Project Chemist will be informed immediately of any inconsistencies between the COC form and the sample containers received. Any deviations from accepted sample handling procedures will be documented, and the FWENC Project Chemist will be informed.

5.3 CORRECTIONS TO CUSTODY DOCUMENTATION

Changes or corrections on any project documentation will be made by crossing-out the item with a single line and initialing (by the person performing the correction) and dating the correction. The original item, although erroneous, must remain legible beneath the cross-out line. The new information will be written above the crossed-out item. Corrections must be written clearly and legibly with indelible black ink.

6.0 ANALYTICAL QUALITY CONTROL PROCEDURES

This section describes analytical QC procedures, including laboratory qualification and QA program and QC procedures associated with analytical methods.

6.1 LABORATORY QUALIFICATION

The analytical laboratories selected to analyze samples for this project will be certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program for all of the analytical methods required for the project. In addition, the laboratory must successfully complete the Naval Facilities Engineering Service Center (NFESC) Laboratory Evaluation Program prior to sampling activities and maintain that status throughout the project.

Laboratories selected for the project will be capable of providing the required turnaround times, project QC, and data deliverables required by this QAPP and the FSP.

6.2 LABORATORY QUALITY CONTROL PROCEDURES

The analytical laboratory must have written standard operating procedures (SOPs) defining the instrumentation, instrumentation maintenance, tuning, calibration, method detection limits, QC acceptance criteria, blank requirements, and stepwise procedures for each analytical method. The SOPs must be available to the analysts in the laboratory. The SOPs must meet or exceed the requirements of the methods cited in Section 3.2.2 of this QAPP. The laboratory must maintain logs of all activities that have an impact on the quality of the laboratory results.

Any portion of the method that is subcontracted by the laboratory to another laboratory or sent to another facility of the same network of laboratories must have the prior approval of the FWENC Project Chemist.

The laboratory must maintain the instruments required by the methods specified for the analyses. Sufficient redundancy in equipment must be available in the laboratory to handle downtime situations.

Method substitution because of instrumental failure will not be permitted without specific approval from the FWENC Project Chemist.

6.3 LABORATORY QUALITY CONTROL SAMPLES

6.3.1 Calibration

All instruments and equipment must be calibrated in accordance with the specified methods unless different instructions are included in this document.

Initial calibrations are performed when the method is first used and again whenever the continuing calibrations fail to meet their respective acceptance criteria. In addition, if the instrument undergoes significant maintenance, the initial calibration must be repeated.

Continuing calibrations are used to verify that the instrument performance has remained within the limits set at the time of the initial calibration. The frequency of continuing calibrations is method-dependent.

6.3.2 Instrument Blanks

Instrument blanks are run to ensure that analytes from previous runs are out of the system and do not contaminate succeeding runs. Instrument blanks must be run following calibration runs, before sample analyses are performed, and after samples containing high concentrations of potentially interfering materials.

Target analytes must not appear in the instrument blanks at concentrations greater than the required quantitation limits. If the laboratory consistently observes contaminants in the instrument blanks, the laboratory must investigate the source of the contamination and eliminate it, if possible.

6.3.3 Method Blanks

Method blanks are prepared in the same manner as the samples, using the same reagents and glassware used for samples. The purpose of the method blank is to ensure that the equipment and reagents used in preparing the samples are free of contaminants that could interfere with the analysis.

The method blank must not exhibit analytes at concentrations greater than the required quantitation limits. If contaminants are found that either contribute to the apparent concentration of a particular target analyte or interfere with the analysis, the analysis sequence must be stopped, the source of contamination identified and corrected, and the analysis repeated. Contamination in the method blank above reporting limits will require that the entire associated batch of extracts or digestates be reprepared. Hence, it is very important to make sure that no such contamination is present.

6.3.4 Laboratory Control Samples

LCSs are purchased samples containing known concentrations of specific target analytes. LCSs can also be prepared by spiking known amounts of target analytes into a well-characterized blank matrix. The matrix will be laboratory reagent water for water samples and clean sand for soil samples.

The LCS is prepared and run with the associated samples, using the same reagents. All analytes in the LCS must meet recovery criteria. If the criteria are not met, the entire batch of samples must be reprepared, together with a new LCS, and reanalyzed.

6.3.5 Matrix Spike and Matrix Spike Duplicate

The matrix spike/matrix spike duplicate (MS/MSD) serves to determine whether matrix effects are affecting recoveries. For inorganic analyses, only a single MS is performed per batch. A MS/MSD is prepared by spiking a known amount of solution to two portions of a sample being run in a batch. Once the spike is added to the MS/MSD samples, these samples are carried through the complete sample preparation process along with the other samples in the batch. The recoveries for the MS/MSD samples are compared against each other and against the known amount of the spike. From this data, both accuracy and precision can be determined. The laboratory will perform a MS/MSD at a frequency of one per 20 project samples per matrix.

6.3.6 Duplicates

Two types of duplicates, field and laboratory, will be performed. Field duplicates are two samples that are duplicates of each other. Field duplicates for soil and water will be collected. However, due to the inhomogeneity of soil, results will be used to determine sampling variability rather than sampling precision. The field duplicate is treated the same as the other field samples and identification is withheld from the laboratory. Field duplicates will be collected at a frequency of one for every ten samples per matrix. Field duplicates are not applicable to waste characterization samples.

The laboratory duplicate is created by the laboratory, where two aliquots are intentionally taken from the same sample and analyzed in parallel. This analysis serves to measure the precision of laboratory operations. Duplicate analyses will be applied only for inorganic analyses.

6.4 PREVENTIVE MAINTENANCE

All instruments must be maintained in accordance with the manufacturers' recommended procedures. The laboratory must define in its QA plan the frequency and type of maintenance for each instrument. The laboratory must also record all maintenance activities in an instrument logbook.

In addition to preventive maintenance, the laboratory must keep a sufficient supply of replacement parts on hand for those parts known to require frequent changes due to wear and tear or due to contamination.

Whenever preventive or corrective maintenance is applied to an instrument, the laboratory must demonstrate the instrument's return to operating conditions and must recalibrate the instrument prior to resumption of sample analyses.

6.5 DATA REVIEW

All data reported by the laboratory must be reviewed in accordance with the SOPs. At a minimum, the written guidelines must be in accordance with the *Navy Installation Restoration Chemical Data Quality Manual* (NFESC, 1999) and the following requirements.

6.5.1 Analyst Review

Each analyst that generates a data set is responsible for ensuring that the data comply with the method and project-specific requirements and that any deviations or failure to meet criteria are documented for the project file.

6.5.2 Peer Review

One hundred percent of all data sets must be reviewed by an independent peer analyst. Peer reviews must be performed by an analyst that is qualified to perform the subject analytical method. The peer review must be comprehensive and include the following:

- Check 100 percent of manual entries for transcription errors
- Check 100 percent of manual calculations for accuracy
- Spot-check computer calculations to verify program validity
- Check for compliance with method and project-specific QC requirements
- Check for completeness of raw data or supporting materials
- Confirm spectral assignments
- Check descriptions of deviations from method or requirements
- Check for appropriate use of significant figures and rounding
- Check reported values for dilutions
- Evaluate reasonableness of results

6.5.3 Technical Reviews

Technical reviews by the responsible supervisor or designated alternate must be performed on 100 percent of reported data. The same individual may not perform peer and technical reviews on the same data set. The technical review must include the following:

- Check for compliance with method and project-specific requirements
- Check the completeness of the reported information
- Check the information in the report narrative
- Evaluate the reasonableness of the results

If the responsible supervisor is the only qualified peer reviewer for a method, the requirement for the technical review is waived.

6.5.4 Management Review

One hundred percent of all data must receive management approval prior to release. The scope and content of management's review is at the laboratory's discretion. Authority to release data may be delegated to a technical supervisor or other party, if the term of the delegated authority is documented in the QA program file.

6.5.5 QA Review

QA reviews of data from each section of the laboratory must be conducted on a routine basis. Annually, at least 10 percent of data reports generated using each analytical method must be reviewed by a member of the QA staff. The QA reviews must include the following:

- Check for compliance with required QC practices
- Check for compliance with approved SOPs
- Check for compliance with method and project requirements

QA data reviews may be conducted after the subject data have been reported to FWENC.

6.6 DELIVERABLES

The following sections describe the deliverable documents that will be submitted to FWENC by the analytical laboratory.

6.6.1 Hard-Copy Deliverables

Two copies of the hard-copy data will be submitted to FWENC by the laboratory. The report pages will be numbered. The report will contain a table of contents referencing individual sections in the data package, the original white copy of the COC form, a copy of all corrective action reports, and a case narrative documenting the resolution of all corrective actions and noncompliance events. All FWENC samples will be clearly referenced to the associated QC samples. In order to perform validation, two types of data packages will be required. They will be referred to as EPA Level III or IV packages.

All data packages will be assembled in the following sequence:

- Cover page (with laboratory service identification number, FWENC project name, and FWENC project number)
- Original COC form (including cooler temperature and sample condition)
- Sample receipt forms

- Cross-reference table
- Case narrative
- Organic raw data sequence (by test):
 - Sample result forms, including method blanks
 - (*)Sample raw data after each result form (EPA Level IV only)
 - Surrogate summaries (surrogate results may appear on the sample result forms)
 - QC summaries
 - Tune data [gas chromatograph/mass spectrometer (GC/MS) only]
 - Initial calibration (ICAL)
 - Daily calibration checks, including related continuing calibration verifications (CCVs)
 - Resolution check standards (GC/MS and pesticides)
 - QC raw data (EPA Level IV only)
 - Instrument run log
 - Sample preparation log

(*) = For EPA Level III, include a copy of chromatogram of each field sample for all total petroleum hydrocarbon (TPH) analyses

- Inorganic raw data sequence:
 - Sample results forms, including method blanks
 - Sample raw data (EPA Level IV only)
 - QC summaries
 - ICAL
 - Daily calibration checks, including all related CCVs
 - Calibration blanks, including all related continuing calibration blanks
 - Interference check standards A and B for inductively coupled argon plasma (ICAP) only
 - Detection limit check standard (graphite furnace atomic absorption only)
 - QC raw data (EPA Level IV only)
 - Postdigestion spike results
 - Analytical spike results
 - Method of standard additions
 - ICAP serial dilutions
 - Instrument run log
 - Sample preparation log

6.6.2 Electronic Deliverables

The electronic data deliverable (EDD) will be in ASCII format. This will be compatible with the Navy Environmental Data Transfer Standard. The laboratory will certify that the EDD and the hard-copy reports are identical. Both the EDD and the hard copy will present results with one to three significant figures. For inorganic results, two significant figures will be used for results less than ten and three significant figures will be used for results greater than ten. For organic results, one significant figure will be used for results less than ten and two significant figures will be used for results greater than ten. The EDD for each sample delivery group is due at the same time as the hard copy, 21 working days after the last sample of the sample delivery group has been delivered to the laboratory.

6.6.3 Analytical Data Rounding Criteria

The laboratory will use the following rounding criteria in conjunction with the significant figure criteria stated as stated in Section 6.6.2.

- If the figure following those to be retained is less than five, the figure is dropped, and the retained figures are kept unchanged. As an example, 11.443 is rounded off to 11.44.
- If the figure following those to be retained is greater than five, the figure is dropped, and the last retained figure is raised by one. As an example, 11.446 is rounded off to 11.45.
- If the figure following those to be retained is five, and if there are no figures other than zeros beyond the five, the figure five is dropped, and the last-place figure retained is increased by one if it is an odd number or it is kept unchanged if an even number. As an example, 11.435 is rounded off to 11.44, while 11.425 is rounded off to 11.42.
- Figures will be rounded after computation of data and final values have been determined.

7.0 DATA QUALITY MANAGEMENT

7.1 DATA MANAGEMENT

The following sections describe the requirements for the management of hard-copy data and electronic data.

7.1.1 Hard Copy

All relevant raw data and documentation, including, but not limited to, logbooks, data sheets, electronic files, and final reports, will be maintained by the laboratory for at least 7 years. FWENC will be notified 30 days before disposal of any relevant laboratory records.

FWENC will maintain copies of all COC forms. Laboratory reports will be logged in upon receipt and filed in chronological order. The second copy of the report will be sent for third-party data validation.

7.1.2 Electronic Data

Field information (date and time collected, sample identification, and so forth) will be entered directly into the main database from the COC form or uploaded from electronic files generated in the field.

Upon receipt by the FWENC Data Manager, electronic data will be uploaded into a Microsoft Access database. The uploaded data will also be processed to compare the fields against a list of required values. If the program returns any errors, the file will be manually edited or regenerated by the laboratory. The laboratory database will be merged with the field database, and reports will be generated from the merged database.

7.2 DATA VALIDATION

All samples, with the exception of waste characterization samples, will be validated. Data will be validated in accordance with SWDIV *Environmental Work Instruction #1* (SWDIV, 1999a) at 80 percent EPA Level III and 20 percent EPA Level IV. Data validation will be performed by an independent data validation company. The validation will be in accordance with *the National Functional Guidelines for Organic Data Review* (EPA, 1999), and the *National Functional Guidelines for Inorganic Data Review* (EPA, 1994), and the QC criteria specified in this document. Data not meeting method specification will be flagged as estimated ("J") or rejected ("R").

The data validation company will have the following qualifications:

1. A minimum of 5 years of experience in the environmental data validation business
2. Prior experience on DON RAC or Comprehensive Long-Term Environmental Action projects
3. DON data validation experience
4. Active peer review program

Personnel must have the following qualifications:

1. Data Reviewer:
 - Bachelor of Science degree or higher in chemistry or a physical science
 - Five years of combined experience with approximately 2 years in data validation and 3 years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated
2. Peer Reviewer:
 - Bachelor of Science degree or higher in chemistry or a physical science
 - Five years of combined experience with approximately 2 years in data validation and 3 years conducting laboratory analysis in an environmental laboratory using the EPA-approved methods being validated

The majority of the samples collected for this project are waste characterization samples; therefore data validation by an independent data validation company may not be performed.

7.3 DATA EVALUATION

After data validation, the FWENC Project Chemist will evaluate data. In the process of evaluating the data, the Project Chemist will determine which of the advisory data qualifiers provided by the independent data validator will be retained or deleted. The evaluation of data will be based on the results of the QC samples, the level of contamination of samples indicated by the blanks analysis, and the overall indication of interference due to contamination. The following data qualifiers will be used in the report:

- J - Result is estimated
- U - Analyte is not detected at or above the stated reporting limit
- R - Data is rejected
- UJ - Analyte is not detected, but there is an uncertainty about the reporting limits

The flagging will be used to alert data users to uncertainties associated with the data. The evaluation flags will be entered into a special field in the electronic database. Thus, when data processing is complete, the data for each analyte will have the flag designated by the laboratory and the flag designated by the evaluator, as appropriate.

8.0 QUALITY ASSURANCE OVERSIGHT

QA oversight for this project will include system audits of field activities and of the laboratory subcontracted by the DON to perform the analysis.

8.1 FIELD AUDITS

The FWENC and SWDIV QA Officers may schedule audits of field activities at any time to evaluate the execution of sample collection, identification, and control in the field. The audit will also include observations of COC procedures, field documentation, instrument calibrations, and field measurements.

Field documents and COC forms will be reviewed to ensure that all entries are printed or written in indelible black ink, dated, and signed.

Sampling operations will be reviewed and compared to the FSP, the QAPP, and other applicable SOPs. The auditor will verify that the proper sample containers are used, the preservatives are added or are already present in the container, and the documentation of the sampling operation is adequate.

Field measurements will be reviewed by random spot-checking to determine that the instrument is within calibration, that the calibration is done at the appropriate frequency, and that the sensitivity range of the instrument is appropriate for the project.

8.1.1 Corrective Action

Nonconformance identified during the field audit will be recorded on a Nonconformance Report. All nonconformance and corrective actions will be processed in accordance FWENC procedure QC-3. This procedure is presented in Attachment 5 of the *Final Contractor Quality Control Plan* (FWENC, 1999).

The Program Quality Control Manager will monitor corrective action documentation, verify implementation of corrective action, track and analyze corrective action, and close out corrective action documentation upon completion of corrective action.

8.2 LABORATORY AUDITS

Laboratories selected to perform the analyses are required to have successful completion of NFESC laboratory evaluation process throughout the project. This process consists of laboratory QA plan review, performance evaluation samples, data package review, and on-site audit. Because of this requirement, FWENC will not perform an on-site audit or visit unless it is deemed necessary.

Laboratory oversight by FWENC will be through the review of the preliminary report and hard-copy data packages. The information that may be obtained from the data packages consists of the following:

- Correctness of COC procedures
- Adherence to method or QAPP holding times
- Method detection limits and reporting limits
- Spiking levels, frequency, and recovery
- Accuracy of analytical operations through the LCS

8.2.1 Corrective Action

The laboratory will have a QA/QC and corrective action program that addresses all out-of-control situations. Following completion of analyses, laboratory personnel will verify compliance with the minimum QC requirements of the project and the laboratory QA/QC plan. If any of the parameters fall outside the control limits, corrective action will be implemented.

Initial corrective action is to verify that obvious calculation errors have not occurred. If appropriate, reanalysis will be performed. If the reanalysis confirms the initial out-of-control limits result, the chemist will notify the laboratory supervisor, who will initiate the corrective action process. Corrective actions may include, but are not limited to, the following:

- Verification of dilution factors
- Examination of sample for nonhomogeneity
- Verification of sample preparation
- Checking of standard preparation logbook
- Verification of instrument performance
- Checking of reagent water purity
- Monitoring chemist's method performance for procedure verification

Notification and prompt involvement of the FWENC Project Chemist in the corrective action process are absolutely necessary in determining an appropriate resolution. Corrective action records will document all steps taken in the corrective action process, beginning with a description of the problem and ending with a final resolution. A copy of the corrective action report will be sent to the FWENC Project Chemist immediately and will be maintained in the project files at FWENC office.

All corrective action reports will be maintained by the laboratory in a project file and delivered to FWENC as part of the hard-copy deliverable.

8.3 QAPP REVISION OR AMENDMENT

When circumstances arise that impact the original project DQOs, such as a significant change in work scope, the QAPP document will be revised or amended. The modification process will be based on EPA Guidelines and will be in conjunction with *Environmental Work Instruction #2* (SWDIV, 1999b).

9.0 REFERENCES

- Foster Wheeler Environmental Corporation (FWENC). 1999. *Final Contractor Quality Control Program Plan*.
- U.S. Environmental Protection Agency (EPA). 2001. *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5*. March.
- EPA. 2000. *Guidance for the Data Quality Objectives Process, EPA QA/G-4, QAMS*. August.
- EPA. 1999. EPA Contract Laboratory Program. *National Functional Guidelines for Organic Data Review; EPA-540/R-94-012*. October.
- EPA. 1994. EPA Contract Laboratory Program. *National Functional Guidelines for Inorganic Data Review; EPA-540/R-94-013*. February.
- Naval Facilities Engineering Service Center (NFESC), Southwest Division. 1999. *Navy Installation Restoration Chemical Data Quality Manual*. September.
- SWDIV. 1999a. *Environmental Work Instruction (EWI) #1, 4EN.1, Chemical Data Validation*. October.
- Southwest Division Naval Facilities Engineering Command (SWDIV). 1999b. *Environmental Work Instruction (EWI) #2, 4EN.2, Review, Approval, Revision, and Amendment of Field Sampling Plans (FSP) and Quality Assurance Project Plans (QAPP)*. October.

TABLES

TABLE B.2-1

PERSONNEL AND RESPONSIBILITIES

Key Position	Responsibility
SWDIV Quality Assurance Officer	<ul style="list-style-type: none"> • Provides governmental oversight of FWENC QA Program • Provides quality related directives through Contracting Officer Representative • Provides technical and administrative oversight of FWENC surveillance audit activities • Point of contact for all matters concerning QA and the DON's Laboratory QA Program • Prepares governmental budget estimates for all QA functions included in FWENC contracts • Coordinates training on matters pertaining to generation and maintenance of quality of data • Authority to suspend project execution if QA requirements are not adequately followed
Project Chemist	<ul style="list-style-type: none"> • Develops sampling and analysis plan and QA project plan • Selects qualified subcontract laboratories • Implements chemical data QC procedures and performs auditing of field performance • Reviews laboratory data prior to use • Coordinates data validation of laboratory data • Reviews data validation report • Prepares and supports report preparation
Field Chemist/ Technician	<ul style="list-style-type: none"> • Performs all sampling in accordance with approved FSP and QAPP • Ensures that field QA samples are collected as specified in the FSP • Completes sampling notes, forms, and sampling logs • Coordinates laboratory and field sampling activities • Implements corrective actions as required

TABLE B.2-1

PERSONNEL AND RESPONSIBILITIES

Key Position	Responsibility
Remedial Project Manager	<ul style="list-style-type: none"> • Project management from client perspective • Fulfills scope of work • Oversees cost and schedule • Is lead interface with Alameda
Project Manager	<ul style="list-style-type: none"> • Executes all phases of a specific project and efficiently applies the full resources of the FWENC RAC Team • Manages all technical, quality, financial, and administrative aspects of the project • Identifies and completes documents appropriate to work assignments • Approves and maintains qualification records for all project personnel • Ensures and verifies that the project team completes all work tasks and QA/QC requirements of planning documents • Logs all variances to planning documents and ensures timely follow-up and approval by the DON
ROICC	<ul style="list-style-type: none"> • Oversees the technical and QC of the field activities

Notes:

FWENC	- Foster Wheeler Environmental Corporation
FSP	- Field Sampling Plan
DON	- U.S. Department of the Navy
QA	- Quality Assurance
QAPP	- Quality Assurance Project Plan
QC	- Quality Control
RAC	- Remedial Action Contract
ROICC	- Resident Officer in Charge of Construction
SWDIV	- Southwest Division Naval Facilities Engineering Command

TABLE B.3-1

SUMMARY OF DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Input to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
<p>IR Site 25 is located within the National Priority list. Previous investigation has revealed the presence of PAHs in the soil from the fill material used to create additional land.</p> <p>TCRA will reduce soil contaminant concentrations to acceptable levels and be protective of human health by preventing exposure to the contaminated soil. The remediation of IR Site 25 will be completed by means of excavation and off-site disposal of contaminated soil.</p>	<p>Is the impacted surface soil or incidental water characterized as RCRA, non-RCRA, state-regulated, hazardous waste or non-hazardous waste?</p>	<p>Previous investigation data collected by others.</p> <p>Results from the Pre-construction sampling activities.</p> <p>Results from random sampling of water holding tank.</p>	<p>Site boundaries are identified as excavation boundaries presented in Figure A.4-1 of the FSP.</p> <p>On-site water storage tank.</p>	<p>If the impacted soil or incidental water is characterized as RCRA hazardous then the waste will be disposed at a CERCLA approved facility.</p> <p>If the impacted soil or incidental water is characterized as non-RCRA, state-hazardous waste then the waste will be disposed at a CERCLA approved facility.</p> <p>If the impacted soil and incidental water is characterized as non-hazardous waste then the waste will be disposed at a CERCLA approved facility.</p>	<p>The sampling scheme consists of the collection of 22 samples (18 randomly selected and four selected within designated PAH "hot spot" areas). The 18 samples were selected within the designated excavation area excluding the four PAH "hot spot" areas. The four "hot spot" samples are within the PAH "hot spot" areas. The areas were partitioned by evaluation of investigation data collected by previous contractors. All samples were located by a random number generator for northing and easting coordinates within their specified designated areas. The data collected will be evaluated for hazardous characteristics and used for the disposal facility waste profile.</p> <p>This project is considered an interim removal action and confirmatory samples will not be collected.</p>	<p>Sampling design for soil and wastewater samples are presented in Section 4.0 of the FSP.</p>

TABLE B.3-1

SUMMARY OF DATA QUALITY OBJECTIVES

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7
Statement of Problem	Decisions	Input to the Decisions	Boundaries of the Study	Decision Rules	Limits on Decision Errors	Optimize the Sampling Design
Pre-construction sampling will be conducted prior to excavation. Previous investigation data (concentration of PAHs) and pre-construction sampling data (VOCs, pesticides, PCBs, metals, cyanide, and fish bioassay) will be used to characterize the soil for disposal.						

Notes:

- FSP – Field Sampling Plan
- IR – installation restoration
- PAHs – polynuclear aromatic hydrocarbons
- PCBs – polychlorinated biphenyls
- RCRA – Resource Conservation and Recovery Act
- TCRA – time-critical removal action
- VOC – volatile organic compounds

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Water		
			RL	Action Level*	Unit
VOCs or TCLP VOCs	EPA Method 8260B Or 1311/8260B	1,1,1-Trichloroethane	5	NA	µg/L
		1,1,2,2-Tetrachloroethane	5	NA	µg/L
		1,1,2-Trichloroethane	5	NA	µg/L
		1,1-Dichloroethane	5	NA	µg/L
		1,1-Dichloroethene	5	700	µg/L
		1,2-Dichloroethane	5	500	µg/L
		1,2-Dichloropropane	5	NA	µg/L
		2-Hexanone	50	NA	µg/L
		Acetone	100	NA	µg/L
		Benzene	5	500	µg/L
		Bromodichloromethane	5	NA	µg/L
		Bromoform	5	NA	µg/L
		Bromomethane	5	NA	µg/L
		Carbon tetrachloride	5	500	µg/L
		Chlorobenzene	5	100,000	µg/L
		Chloroethane	5	NA	µg/L
		Chloroform	5	6,000	µg/L
		Chloromethane	5	NA	µg/L
		cis-1,2-Dichloroethene	5	NA	µg/L
		cis-1,3-Dichloropropene	5	NA	µg/L
		Dibromochloromethane	5	NA	µg/L
		Ethylbenzene	5	NA	µg/L
		MEK	100	200,000	µg/L
		MTBE	10	NA	µg/L
		Methylene chloride	5	NA	µg/L
		MIBK	50	NA	µg/L
		Styrene	5	NA	µg/L
		Tetrachloroethene	5	700	µg/L
		Toluene	5	NA	µg/L
		trans-1,2-Dichloroethene	5	NA	µg/L
		trans-1,3-Dichloropropene	5	NA	µg/L
		Trichloroethene	5	NA	µg/L
		Vinyl acetate	50	NA	µg/L
Vinyl chloride	5	200	µg/L		
Xylenes (Total)	15	NA	µg/L		

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Water		
			RL	Action Level*	Unit
PCBs or TCLP PCBs	EPA Method 8082 or 1311/8082	Aroclor-1016	2	5,000	µg/L
		Aroclor-1221	5	5,000	µg/L
		Aroclor-1232	2	5,000	µg/L
		Aroclor-1242	2	5,000	µg/L
		Aroclor-1248	2	5,000	µg/L
		Aroclor-1254	1	5,000	µg/L
		Aroclor-1260	1	5,000	µg/L
Organochlorine Pesticides or TCLP Organochlorine Pesticides	EPA Method 8081A or 1311/8082	α-BHC	0.05	NA	µg/L
		β-BHC	0.05	NA	µg/L
		δ-BHC	0.05	NA	µg/L
		γ-BHC (Lindane)	0.05	400	µg/L
		Chlordane	2	30	µg/L
		4,4'-DDD	0.1	100	µg/L
		4,4'-DDE	0.1	100	µg/L
		4,4'-DDT	0.1	100	µg/L
		Aldrin	0.05	140	µg/L
		Dieldrin	0.1	800	µg/L
		Endosulfan I	0.05	NA	µg/L
		Endosulfan II	0.1	NA	µg/L
		Endosulfan Sulfate	0.5	NA	µg/L
		Endrin	0.1	20	µg/L
		Endrin Aldehyde	0.1	NA	µg/L
		Endrin Ketone	0.1	NA	µg/L
		Heptachlor	0.05	8	µg/L
Heptachlor Epoxide	0.05	8	µg/L		
Methoxychlor	2	10,000	µg/L		
Toxaphene	5	500	µg/L		
Metals or TCLP Metals	EPA Methods 6010B/7470A or 1311/6010B/7470A	Antimony	10	15,000	µg/L
		Arsenic	10	5,000	µg/L
		Barium	10	100,000	µg/L
		Beryllium	2	750	µg/L
		Cadmium	3	1,000	µg/L
		Chromium	20	5,000	µg/L
		Cobalt	20	80,000	µg/L
		Copper	10	25,000	µg/L
		Lead	5	5,000	µg/L

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Water		
			RL	Action Level*	Unit
Metals or TCLP Metals (cont.)	EPA Methods 6010B/7470A or 1311/6010B/7470A	Mercury	0.5	200	µg/L
		Molybdenum	5	350,000	µg/L
		Nickel	20	20,000	µg/L
		Selenium	10	1,000	µg/L
		Silver	20	5,000	µg/L
		Thallium	10	7,000	µg/L
		Vanadium	10	24,000	µg/L
		Zinc	100	250,000	µg/L
Cyanide	EPA Method 9010B/9012A	Cyanide, Total	0.05	NA	mg/L
SVOCs or TCLP SVOCs	EPA Method 8270C or 1311/8270C	1,2,4,5-Tetrachlorobenzene	100	NA	µg/L
		1,2,4-Trichlorobenzene	100	NA	µg/L
		1,3-Dinitrobenzene	100	NA	µg/L
		2,3,4,6-Tetrachlorophenol	100	NA	µg/L
		2,4,5-Trichlorophenol	100	400,000	µg/L
		2,4,6-Trichlorophenol	100	2,000	µg/L
		2,4-Dichlorophenol	100	NA	µg/L
		2,4-Dimethylphenol	100	NA	µg/L
		2,4-Dinitrophenol	100	NA	µg/L
		2,4-Dinitrotoluene	100	130	µg/L
		2,4-Dinitrotoluene	100	NA	µg/L
		2,6-Dichlorophenol	100	NA	µg/L
		2,6-Dinitrotoluene	100	NA	µg/L
		2-Chloronaphthalene	100	NA	µg/L
		2-Chlorophenol	100	NA	µg/L
		2-Methylnaphthalene	100	NA	µg/L
		2-Methylphenol	100	200,000	µg/L
		2-Naphthylamine	100	NA	µg/L
		2-Nitroaniline	100	NA	µg/L
		2-Nitrophenol	100	NA	µg/L
		2-Picoline	100	NA	µg/L
		3,3'-Dimethylbenzidine	100	NA	µg/L
		3-Methylcholanthrene	100	NA	µg/L
		3-Nitroaniline	100	NA	µg/L
4,6-Dinitro-2-methylphenol	100	NA	µg/L		
4-Aminobiphenyl	100	NA	µg/L		
4-Bromophenyl phenyl ether	100	NA	µg/L		

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Water		
			RL	Action Level*	Unit
SVOCs or TCLP SVOCs (cont.)	EPA Method 8270C or 1311/8270C	4-Chloro-3-methylphenol	100	NA	µg/L
		4-Chloroaniline	100	NA	µg/L
		4-Chlorophenyl phenyl ether	100	NA	µg/L
		4-Methylphenol	100	200,000	µg/L
		4-Nitroaniline	100	NA	µg/L
		4-Nitrophenol	100	NA	µg/L
		7,12-Dimethylbenz(a)anthracene	100	NA	µg/L
		Acenaphthene	100	NA	µg/L
		Acenaphthylene	100	NA	µg/L
		Acetophenone	100	NA	µg/L
		alpha,alpha-Dimethyl phenethylamine	100	NA	µg/L
		Aniline	100	NA	µg/L
		Anthracene	100	NA	µg/L
		Benzo[a]anthracene	100	NA	µg/L
		Benzo[a]pyrene	100	NA	µg/L
		Benzo[b]fluoranthene	100	NA	µg/L
		Benzo[g,h,i]perylene	100	NA	µg/L
		Benzo[k]fluoranthene	100	NA	µg/L
		Benzyl alcohol	100	NA	µg/L
		Bis(2-chloroethoxy)methane	100	NA	µg/L
		Bis(2-chloroethyl)ether	100	NA	µg/L
		bis(2-chloroisopropyl)ether	100	NA	µg/L
		bis(2-ethylhexyl)phthalate	100	NA	µg/L
		Butyl benzyl phthalate	100	NA	µg/L
		Chrysene	100	NA	µg/L
		Dibenz(a,h)anthracene	100	NA	µg/L
		Dibenzofuran	100	NA	µg/L
		Diethyl phthalate	100	NA	µg/L
		Dimethyl phthalate	100	NA	µg/L
		Di-n-butyl phthalate	100	NA	µg/L
		Di-n-octyl phthalate	100	NA	µg/L
		Diphenylamine	100	NA	µg/L
		Fluoranthene	100	NA	µg/L
		Fluorene	100	NA	µg/L
		Hexachloro-1,3-cyclopentadiene	100	NA	µg/L
		Hexachlorobenzene	100	0.13	µg/L

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Water		
			RL	Action Level*	Unit
SVOCs (cont.)	EPA Method 8270C or 1311/8270C	Hexachlorobutadiene	100	500	µg/L
		Hexachloroethane	100	3,000	µg/L
		Indeno[1,2,3-cd]pyrene	100	NA	µg/L
		Isophorone	100	NA	µg/L
		Methyl methanesulfonate	100	NA	µg/L
		Naphthalene	100	NA	µg/L
		Nitrobenzene	100	NA	µg/L
		N-Nitrosodiethylamine	100	NA	µg/L
		N-Nitrosodimethylamine	100	NA	µg/L
		N-Nitrosodi-n-propylamine	100	NA	µg/L
		N-Nitrosodiphenylamine	100	NA	µg/L
		Pentachlorobenzene	100	NA	µg/L
		Pentachloronitrobenzene	100	NA	µg/L
		Pentachlorophenol	100	1,700	µg/L
		Phenacetin	100	NA	µg/L
		Phenanthrene	100	NA	µg/L
		Phenol	100	NA	µg/L
		Pronamide	100	NA	µg/L
		Pyrene	100	NA	µg/L
Pyridine	100	5,000	µg/L		

*Action levels are based on the most stringent of TCLP and STLC limits.

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Soil		
			RL	Action Level*	Unit
VOCs or TCLP VOCs	EPA Method 5035/8260B or 1311/8260B	1,1,1-Trichloroethane	5	NA	µg/kg
		1,1,2,2-Tetrachloroethane	5	NA	µg/kg
		1,1,2-Trichloroethane	5	NA	µg/kg
		1,1-Dichloroethane	5	NA	µg/kg
		1,1-Dichloroethene	5	14,000	µg/kg
		1,2-Dichloroethane	5	10,000	µg/kg
		1,2-Dichloropropane	5	NA	µg/kg
		2-Hexanone	50	NA	µg/kg
		Acetone	50	NA	µg/kg
		Benzene	5	10,000	µg/kg
		Bromodichloromethane	5	NA	µg/kg
		Bromoform	5	NA	µg/kg
		Bromomethane	5	NA	µg/kg
		Carbon tetrachloride	5	10,000	µg/kg
		Chlorobenzene	5	2,000,000	µg/kg
		Chloroethane	5	NA	µg/kg
		Chloroform	5	120,000	µg/kg
		Chloromethane	5	NA	µg/kg
		cis-1,2-Dichloroethene	5	NA	µg/kg
		cis-1,3-Dichloropropene	5	NA	µg/kg
		Dibromochloromethane	5	NA	µg/kg
		Ethylbenzene	5	NA	µg/kg
		MEK	50	4,000,000	µg/kg
		MTBE	10	NA	µg/kg
		Methylene chloride	5	NA	µg/kg
		MIBK	50	NA	µg/kg
		Styrene	5	NA	µg/kg
		Tetrachloroethene	5	14,000	µg/kg
		Toluene	5	NA	µg/kg
		trans-1,2-Dichloroethene	5	NA	µg/kg
		trans-1,3-Dichloropropene	5	NA	µg/kg
		Trichloroethene	5	10,000	µg/kg
		Vinyl acetate	50	NA	µg/kg
Vinyl chloride	5	4,000	µg/kg		
Xylenes (Total)	15	NA	µg/kg		

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Soil		
			RL	Action Level*	Unit
PCBs or TCLP PCBs	EPA Method 8082 or 1311/8082	Aroclor-1016	50	50,000	µg/kg
		Aroclor-1221	100	50,000	µg/kg
		Aroclor-1232	50	50,000	µg/kg
		Aroclor-1242	50	50,000	µg/kg
		Aroclor-1248	50	50,000	µg/kg
		Aroclor-1254	33	50,000	µg/kg
		Aroclor-1260	33	50,000	µg/kg
Organochlorine Pesticides or TCLP Organochlorine Pesticides	EPA Method 8081A or 1311/8082	α-BHC	1	NA	µg/kg
		β-BHC	1	NA	µg/kg
		δ-BHC	1	NA	µg/kg
		γ-BHC (Lindane)	1	NA	µg/kg
		Chlordane	50	600	µg/kg
		4,4'-DDD	2	1,000	µg/kg
		4,4'-DDE	2	1,000	µg/kg
		4,4'-DDT	2	1,000	µg/kg
		Aldrin	1	1,400	µg/kg
		Dieldrin	2	8,000	µg/kg
		Endosulfan I	1	NA	µg/kg
		Endosulfan II	2	NA	µg/kg
		Endosulfan Sulfate	5	NA	µg/kg
		Endrin	2	200	µg/kg
		Endrin Aldehyde	2	NA	µg/kg
		Endrin Ketone	2	NA	µg/kg
		Heptachlor	1	160	µg/kg
		Heptachlor Epoxide	1	160	µg/kg
Methoxychlor	10	100,000	µg/kg		
Toxaphene	100	5,000	µg/kg		
Metals or TCLP Metals	EPA Method 6010B/7471A or 1311/6010B/7471A	Antimony	5	150	mg/kg
		Arsenic	0.5	50	mg/kg
		Barium	1	1,000	mg/kg
		Beryllium	0.2	7.5	mg/kg
		Cadmium	0.3	10	mg/kg
		Chromium	2	100	mg/kg
		Cobalt	2	800	mg/kg
		Copper	0.5	250	mg/kg
		Lead	0.5	50	mg/kg
		Mercury	0.2	2	mg/kg

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Soil		
			RL	Action Level*	Unit
Metals or TCLP Metals (cont.)	EPA Method 6010B/7471A or 1311/6010B/7471A	Molybdenum	3	3,500	mg/kg
		Nickel	2	200	mg/kg
		Selenium	1	10	mg/kg
		Silver	2	50	mg/kg
		Thallium	2	70	mg/kg
		Vanadium	2	240	mg/kg
		Zinc	1	2,500	mg/kg
Cyanide	EPA Method 9010B/9012A	Total Cyanide	2.5	NA	mg/kg
SVOCs or TCLP SVOCs	EPA Method 8270C or 1311/8270C	1,2,4,5-Tetrachlorobenzene	500	NA	µg/kg
		1,2,4-Trichlorobenzene	500	NA	µg/kg
		1,3-Dinitrobenzene	500	NA	µg/kg
		2,3,4,6-Tetrachlorophenol	500	NA	µg/kg
		2,4,5-Trichlorophenol	500	8,000,000	µg/kg
		2,4,6-Trichlorophenol	500	40,000	µg/kg
		2,4-Dichlorophenol	500	NA	µg/kg
		2,4-Dimethylphenol	500	NA	µg/kg
		2,4-Dinitrophenol	500	NA	µg/kg
		2,4-Dinitrotoluene	500	2,600	µg/kg
		2,4-Dinitrotoluene	2500	NA	µg/kg
		2,6-Dichlorophenol	500	NA	µg/kg
		2,6-Dinitrotoluene	500	NA	µg/kg
		2-Chloronaphthalene	500	NA	µg/kg
		2-Chlorophenol	500	NA	µg/kg
		2-Methylnaphthalene	500	NA	µg/kg
		2-Methylphenol	500	4,000,000	µg/kg
		2-Naphthylamine	2500	NA	µg/kg
		2-Nitroaniline	2500	NA	µg/kg
		2-Nitrophenol	500	NA	µg/kg
		2-Picoline	500	NA	µg/kg
		3,3'-Dimethylbenzidine	1000	NA	µg/kg
		3-Methylcholanthrene	500	NA	µg/kg
3-Nitroaniline	2500	NA	µg/kg		
4,6-Dinitro-2-methylphenol	2500	NA	µg/kg		
4-Aminobiphenyl	500	NA	µg/kg		
4-Bromophenyl phenyl ether	500	NA	µg/kg		
4-Chloro-3-methylphenol	500	NA	µg/kg		

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Soil		
			RL	Action Level*	Unit
SVOCs (cont.)	EPA Method 8270C or 1311/8270C	4-Chloroaniline	1000	NA	µg/kg
		4-Chlorophenyl phenyl ether	500	NA	µg/kg
		4-Methylphenol	500	4,000,000	µg/kg
		4-Nitroaniline	2500	NA	µg/kg
		4-Nitrophenol	2500	NA	µg/kg
		7,12-Dimethylbenz(a)anthracene	500	NA	µg/kg
		Acenaphthene	500	NA	µg/kg
		Acenaphthylene	500	NA	µg/kg
		Acetophenone	500	NA	µg/kg
		alpha,alpha-Dimethyl phenethylamine	2500	NA	µg/kg
		Aniline	500	NA	µg/kg
		Anthracene	500	NA	µg/kg
		Benzo[a]anthracene	500	NA	µg/kg
		Benzo[a]pyrene	500	NA	µg/kg
		Benzo[b]fluoranthene	500	NA	µg/kg
		Benzo[g,h,i]perylene	500	NA	µg/kg
		Benzo[k]fluoranthene	500	NA	µg/kg
		Benzyl alcohol	1000	NA	µg/kg
		Bis(2-chloroethoxy)methane	500	NA	µg/kg
		Bis(2-chloroethyl)ether	500	NA	µg/kg
		bis(2-chloroisopropyl)ether	500	NA	µg/kg
		bis(2-ethylhexyl)phthalate	500	NA	µg/kg
		Butyl benzyl phthalate	500	NA	µg/kg
		Chrysene	500	NA	µg/kg
		Dibenz(a,h)anthracene	500	NA	µg/kg
		Dibenzofuran	500	NA	µg/kg
		Diethyl phthalate	500	NA	µg/kg
		Dimethyl phthalate	500	NA	µg/kg
		Di-n-butyl phthalate	500	NA	µg/kg
		Di-n-octyl phthalate	500	NA	µg/kg
		Diphenylamine	500	NA	µg/kg
		Fluoranthene	500	NA	µg/kg
		Fluorene	500	NA	µg/kg

TABLE B.3-2

PROJECT REPORTING LIMITS

Parameter	Method	Analyte	Soil		
			RL	Action Level*	Unit
SVOCs (cont.)	EPA Method 8270C or 1311/8270C	Hexachloro-1,3-cyclopentadiene	2500	NA	µg/kg
		Hexachlorobenzene	500	NA	µg/kg
		Hexachlorobutadiene	500	NA	µg/kg
		Hexachloroethane	500	NA	µg/kg
		Indeno[1,2,3-cd]pyrene	500	NA	µg/kg
		Isophorone	500	NA	µg/kg
		Methyl methanesulfonate	500	NA	µg/kg
		Naphthalene	500	NA	µg/kg
		Nitrobenzene	500	40,000	µg/kg
		N-Nitrosodiethylamine	500	NA	µg/kg
		N-Nitrosodimethylamine	500	NA	µg/kg
		N-Nitrosodi-n-propylamine	500	NA	µg/kg
		N-Nitrosodiphenylamine	2500	NA	µg/kg
		Pentachlorobenzene	500	NA	µg/kg
		Pentachloronitrobenzene	500	NA	µg/kg
		Pentachlorophenol	2500	17,000	µg/kg
		Phenacetin	500	NA	µg/kg
		Phenanthrene	500	NA	µg/kg
		Phenol	500	NA	µg/kg
		Pronamide	500	NA	µg/kg
Pyrene	500	NA	µg/kg		
Pyridine	500	100,000	µg/kg		

Notes:

- µg/kg – micrograms per kilogram
- µg/L – micrograms per liter
- EPA – U.S. Environmental Protection Agency
- MEK – methyl ethyl ketone
- MIBK – methyl isobutyl ketone
- MTBE – methyl tertiary butyl ether
- mg/kg – milligrams per kilogram
- mg/L – milligrams per liter
- NA – not applicable
- PAH – polynuclear aromatic hydrocarbon
- PCBs – polychlorinated biphenyls
- RL – reporting limit
- STLC – soluble threshold limit concentration
- SVOC – semivolatile organic compound
- TCLP – Toxicity Characteristics Leaching Procedure
- TPH – total petroleum hydrocarbon
- VOC – volatile organic compound

*Action levels are based on TTLC, 20 x TCLP, or 10 x STLC limits.

TABLE B.3-3

QUALITY CONTROL ACCEPTANCE CRITERIA

Method	Analyte	Accuracy Water (% R)	Precision Water (RPD)	Accuracy Soil (% R)	Precision Soil (RPD)
EPA Method 8260B	1,1-Dichloroethene	75-125	≤ 30	65-135	≤ 30
	Benzene	75-125	≤ 30	65-135	≤ 30
	Chlorobenzene	75-125	≤ 30	65-135	≤ 30
	Trichloroethene	71-125	≤ 30	61-135	≤ 30
	Toluene	74-125	≤ 30	64-135	≤ 30
	<i>Surrogates:</i>				
	Dibromofluoromethane	75-125	NA	65-135	NA
	Toluene-d8	75-125	NA	65-135	NA
	4-Bromo-fluorobenzene	75-125	NA	65-135	NA
	1,2-Dichloroethane-d4	62-139	NA	52-149	NA
EPA Method 8270C	1,2,4-Trichlorobenzene	44-142	≤ 30	34-152	≤ 30
	1,4-Dichlorobenzene	30-125	≤ 30	25-135	≤ 30
	2,4-Dinitrotoluene	39-139	≤ 30	29-149	≤ 30
	Acenaphthene	49-125	≤ 30	39-135	≤ 30
	n-Nitrosodi-n-propylamine	37-125	≤ 30	27-135	≤ 30
	Pyrene	47-136	≤ 30	37-146	≤ 30
	2-Chlorophenol	41-125	≤ 30	31-135	≤ 30
	4-Chloro-3-Methyl Phenol	44-125	≤ 30	34-135	≤ 30
	4-Nitrophenol	25-131	≤ 30	25-141	≤ 30
	Pentachlorophenol	28-136	≤ 30	38-146	≤ 30
	Phenol	25-125	≤ 30	25-135	≤ 30
	<i>Surrogates:</i>				
	2,4,6-Tribromophenol	25-134	NA	25-144	NA
	2-Fluorbiphenyl	43-125	NA	34-135	NA
	2-Fluorophenol	25-125	NA	25-135	NA
	Nitrobenzene-D5	32-125	NA	25-135	NA
Phenol-D5	25-125	NA	25-135	NA	
Terphenyl-D14	42-126	NA	32-136	NA	

TABLE B.3-3

QUALITY CONTROL ACCEPTANCE CRITERIA

Method	Analyte	Accuracy Water (% R)	Precision Water (RPD)	Accuracy Soil (% R)	Precision Soil (RPD)
EPA Method 8082	PCB-1016	54-125	≤ 30	44-127	≤ 50
	PCB-1260	41-126	≤ 30	31-136	≤ 50
	<i>Surrogates:</i>				
	DCBP	34-133	NA	25-143	NA
	TCMX	34-133	NA	25-143	NA
EPA Method 8081A	γ-BHC (Lindane)	73-125	≤ 30	63-130	≤ 50
	4,4-DDT	34-143	≤ 30	25-153	≤ 50
	Aldrin	47-125	≤ 30	37-126	≤ 50
	Dieldrin	42-132	≤ 30	32-142	≤ 50
	Endrin	43-134	≤ 30	33-144	≤ 50
	Heptachlor	45-128	≤ 30	35-138	≤ 50
	<i>Surrogates:</i>				
	DCBP	34-133	NA	25-143	NA
TCMX	45-125	NA	35-135	NA	
EPA Method 6010B	Antimony	75-125	≤ 30	75-125	≤ 30
	Arsenic	75-125	≤ 30	75-125	≤ 30
	Barium	75-125	≤ 30	75-125	≤ 30
	Beryllium	75-125	≤ 30	75-125	≤ 30
	Cadmium	75-125	≤ 30	75-125	≤ 30
	Chromium	75-125	≤ 30	75-125	≤ 30
	Cobalt	75-125	≤ 30	75-125	≤ 30
	Copper	75-125	≤ 30	75-125	≤ 30
	Lead	75-125	≤ 30	75-125	≤ 30
	Manganese	75-125	≤ 30	75-125	≤ 30
	Molybdenum	75-125	≤ 30	75-125	≤ 30
	Nickel	75-125	≤ 30	75-125	≤ 30
	Selenium	75-125	≤ 30	75-125	≤ 30
	Silver	75-125	≤ 30	75-125	≤ 30
	Thallium	75-125	≤ 30	75-125	≤ 30
	Vanadium	75-125	≤ 30	75-125	≤ 30
	Zinc	75-125	≤ 30	75-125	≤ 30

TABLE B.3-3

QUALITY CONTROL ACCEPTANCE CRITERIA

Method	Analyte	Accuracy Water (% R)	Precision Water (RPD)	Accuracy Soil (% R)	Precision Soil (RPD)
EPA Method 7470A/7471A	Mercury	75-125	≤ 30	75-125	≤ 30
EPA Method 9010B/9012A	Cyanide, Total	75-110	≤ 20	75-120	≤ 25

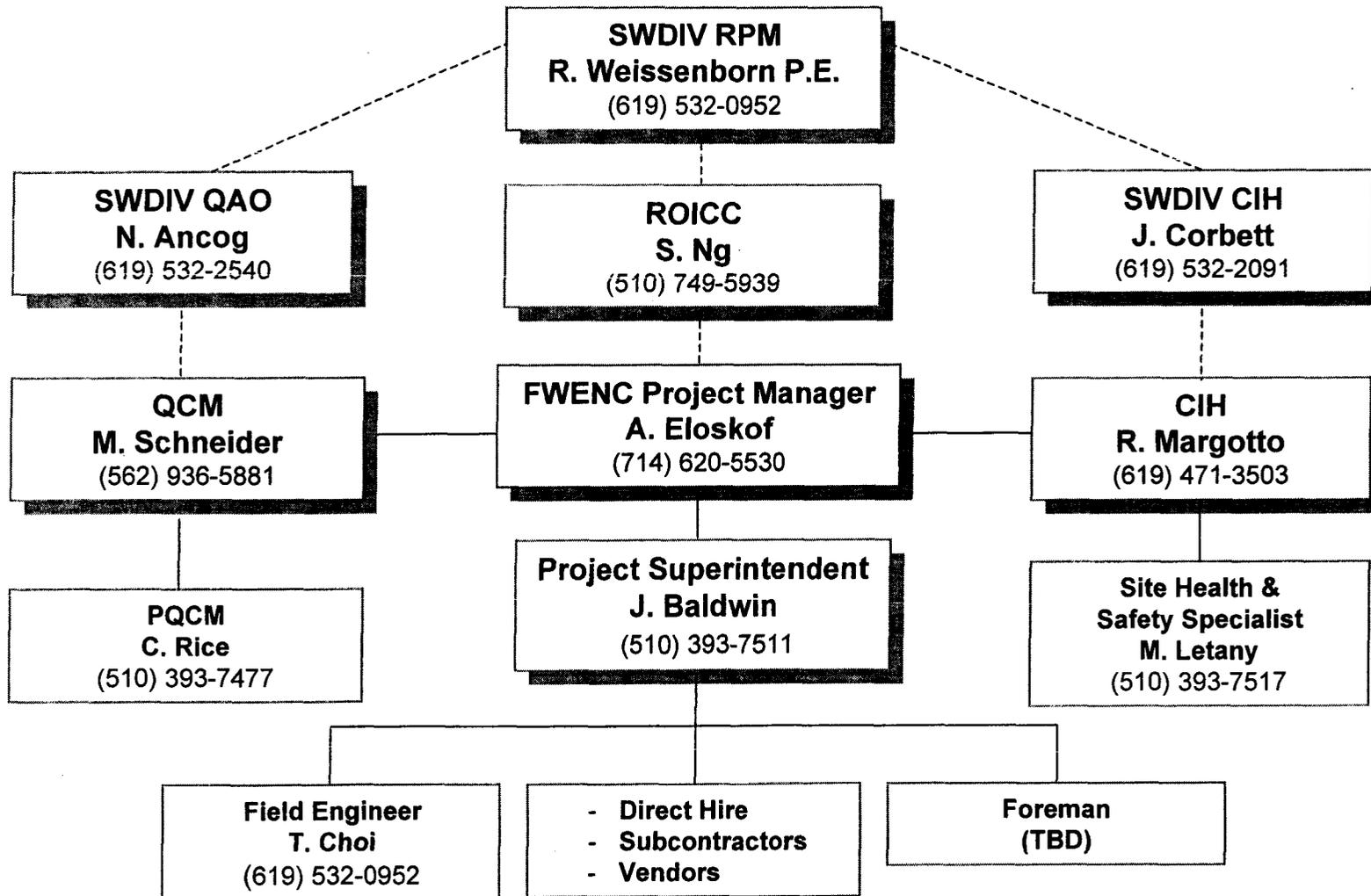
Notes:

- %R - percent recovery
- EPA - U.S. Environmental Protection Agency
- NA - not applicable
- PAH - polynuclear aromatic hydrocarbon
- RPD - relative percent difference
- TPH - total petroleum hydrocarbon
- VOC - volatile organic compound

FIGURES

Figure B.2-1

Project Organization Chart



APPENDIX C
SITE-SPECIFIC HEALTH AND SAFETY PLAN

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Building 127, Room 112
San Diego, California 92132-5190

CONTRACT NO. N68711-98-D-5713
CTO No. 0040

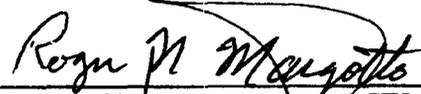
APPENDIX C
FINAL
SITE-SPECIFIC HEALTH AND SAFETY PLAN
Revision 0
November 23, 2001

CERCLA TIME-CRITICAL REMOVAL ACTION
AT INSTALLATION RESTORATION SITE 25
ALAMEDA POINT
ALAMEDA, CALIFORNIA

DCN: FWSD-RAC-02-0206



FOSTER WHEELER ENVIRONMENTAL CORPORATION
1230 Columbia Street, Suite 640
San Diego, CA 92101


Prepared by: Roger Margotto, CIH
Program Health and Safety Manager

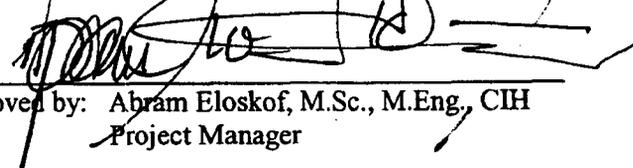

Approved by: Abram Eloskof, M.Sc., M.Eng., CIH
Project Manager

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ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
Base-Wide Plan	Base-Wide Health and Safety Plan
BRAC	Base Realignment and Closure
CIH	Certified Industrial Hygienist
CRZ	contamination reduction zone
CTO	Contract Task Order
dBA	decibels, A-scale
DON	U.S. Department of the Navy
EHS	environmental health and safety
EM	Engineer Manual
EZ	exclusion zone
FOPS	Falling Object Protective System
FWENC	Foster Wheeler Environmental Corporation
IR	Installation Restoration
LEL	lower explosive limit
mg/m ³	milligrams per cubic meter
N/A	not applicable
O ₂	oxygen
OSHA	Occupational Safety and Health Administration
PAH	polynuclear aromatic hydrocarbon
PESM	Project Environmental Health and Safety Manager
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA	quality assurance
QC	quality control
RAWP	Remedial Action Work Plan
ROICC	Resident Officer in Charge of Construction
SHSP	Site-Specific Health and Safety Plan
SHSS	Site Health and Safety Specialist
SZ	support zone
TCRA	time-critical removal action
TLV	threshold limit value

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE

This Site-Specific Health and Safety Plan (SHSP) applies to work to be performed under Contract N68711-98-D-5713, Contract Task Order (CTO) Number 0040 to complete a time-critical remedial action (TCRA) at Installation Restoration (IR) Site 25 located on former Naval Air Station Alameda, Alameda, California. Additional information can be found in the Remedial Action Work Plan (RAWP) for IR Site 25 and the Alameda Point Base-Wide Health and Safety Plan (Base-Wide Plan) Attachment 4.

1.2 APPLICATION

This SHSP will be used with the Alameda Point Base-Wide Health and Safety Plan (Base-Wide Plan) previously submitted on October 30, 2001, and prepared by Foster Wheeler Environmental Corporation (FWENC). The SHSP is applicable to all work conducted by FWENC and its subcontractors under the basic contract and this CTO. Refer to the Base-Wide Plan for additional details common to all work performed at Alameda Point. The Base-Wide Plan also lists the references used by project personnel to conduct work activities safely. Occupational Safety and Health Administration (OSHA) regulations as found in the Code of Federal Regulations, Title 29, California OSHA regulations as found in Title 8, California Code of Regulations, and the U.S. Army Corps of Engineers Engineer Manual (EM) 385-1-1, *Safety and Health Requirements Manual* are some of these key references and requirements applicable to FWENC project work.

1.2.1 Base-Wide Plan

This SHSP is not a stand-alone document. This SHSP augments the Base-Wide Plan. Personnel will receive training on the requirements of the Base-Wide Plan and the SHSP. The Base-Wide Plan includes information that is common to all projects conducted at IR Site 25. Workers should know the information contained in the Base-Wide Plan in addition to the information presented in this SHSP. Some information from the Base-Wide Plan is repeated in this SHSP to re-emphasize the importance of that information relevant to this project. However, it should not be inferred that information from the Base-Wide Plan is any less important because it is not repeated in the SHSP.

1.3 SUMMARY OF MAJOR RISKS

The potential hazards associated with this project include contact with polynuclear aromatic hydrocarbons (PAHs) in the soil during excavation, loading, and transportation activities, working with heavy equipment, and traffic. Section 4.0 describes these hazards in detail. The TCRA area is currently a residential housing for the Coast Guard and their families. This project will need to include measures that ensure risks to the residents are minimized.

2.0 ORGANIZATION OF THE PROJECT

This section identifies the individuals from the U.S. Department of the Navy (DON), and FWENC who have responsibility for the oversight and/or implementation of this project. The following is a list of key contacts for individuals involved in the project:

LIST OF POINTS OF CONTACT

Agency	Contact	Project Title
Naval Facilities Engineering Command Southwest Division Base Operations 1230 Columbia Street, Suite 1100 San Diego, CA 92101	Rick Weissenborn, P.E. (619) 532-0952	Remedial Project Manager
Southwest Division Naval Facilities Engineering Command 1220 Pacific Highway San Diego, CA 92132-5190	Narcisco A. Ancog (619) 532-2540	Quality Assurance Officer
Naval Facilities Engineering Command Southwest Division 2450 Saratoga Street, Building 110 Suite 200 Alameda Point, Alameda, CA 94501	Shirley Ng 510-749-5939	Resident Officer in Charge of Construction
Coast Guard Housing Office 99 Mosley Avenue Alameda Point, CA 94501	CBO William Potchen (570) 769-0831 ext. 112	Coast Guard Point of Contact
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Neil Hart (619) 471-3511	Program Manager
FWENC 1210 Marina Village Parkway, Suite 102 Alameda, CA 94501	Craig Rice (510) 393-7977 (cellular)	Project Construction Quality Manager
FWENC Southwest Division RAC Site Trailer Gardeners Road and Industrial Road Naval Weapons Station 800 Seal Beach Boulevard Seal Beach, CA 90740	Abram Eloskof (562) 936-5806 (714) 620-5531	Project Manager
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Jim Baldwin (510) 393-7511 (cellular)	Site Superintendent

Agency	Contact	Project Title
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Roger Margotto, CIH, CSP, CHHM (619) 471-3503	Project Environmental Health and Safety Manager
FWENC Southwest Division RAC Site Trailer Gardeners Road and Industrial Road Naval Weapons Station 800 Seal Beach Boulevard Seal Beach, CA 90740	Mary Schneider (562) 598-5881	Program Quality Control Manager
FWENC 1940 E. Deere Ave., Suite 200 Santa Ana, CA. 92705	Matt Letany (510) 393-7517 (cellular)	Site Health and Safety Specialist
FWENC 1230 Columbia Street, Suite 640 San Diego, CA 92101	Eric Goldman (510) 967-9134 (cellular)	Assistant Site Health and Safety Specialist

Other personnel may temporarily serve in the functional roles identified in the table. Certain phases or aspects of the project may use a cross-trained person to perform the duties of the Site Health and Safety Specialist (SHSS). The Project Environmental and Safety Manager (PESM) approves the selected SHSS. The PESM will inform the DON Certified Industrial Hygienist (CIH) and the Resident Officer in Charge of Construction (ROICC) by use of the Safety Plan Change Form as described in the Base-Wide Plan or by sending an electronic message (e-mail).

3.0 SITE HISTORY AND PROJECT DESCRIPTION

3.1 FACILITY DESCRIPTION AND BACKGROUND

The work area defined by the DON as the TCRA area is contained within the limits of the 42-acre IR Site 24 area located in the San Francisco Bay Area and lies in the northeastern corner of Alameda Point (Figures C.3-1 and C.3-2). IR Site 25 consist of three Alameda Point Environmental Baseline Survey (EBS) parcels (parcels 181 through 183). U.S. Coast Guard employees and their families are currently occupying a portion of the multiunit housing structures within Parcel 181, under lease from the DON. IR Site 25 is bordered by the Fleet and Industrial Supply Center, Oakland Alameda Annex Facility (Alameda Annex) to the north and east, EBS parcels 178 through 180 to the south, and privately held property to the west. A set of railroad tracks is immediately north of the site. Todd Shipyard borders the site to the northwest.

During the course of environmental investigations at former NAS Alameda and at IR Site 25, organic chemical analyses have revealed the presence of PAHs in the soil and groundwater. It is believed that the fill material used to create additional land for Alameda Island was contaminated with PAHs. These PAHs are believed to have originated from historical industrial activities in adjacent areas and are ubiquitous in the fill material.

The area encompassing IR Site 25 existed as marshland and tidal flat prior to development in the early 1900s at which time these areas were filled with dredged material of uncertain origin to create usable land for development. Several fill events have occurred in the IR Site 25 area between 1887 and 1939.

Several historical industrial operations that are likely to have released petroleum hydrocarbons to the environment were located in the vicinity of present-day Alameda Point. In particular, a manufactured gas plant that used oil (most active from 1903 through 1930) existed on the waterfront in Oakland and an oil refinery (Pacific Coast Oil Works) operated from about 1864 to 1899 at the western tip of pre-fill Alameda. Releases of oil and byproducts associated with manufacturing operations from these large industries are believed to have resulted in widespread contamination of the former Oakland Inner Harbor shoreline and tidal channels. Subsequent fill events are believed to have (1) contaminated the fill material and (2) trapped contamination in place resulting in a buried zone of elevated PAHs and petroleum hydrocarbons described as the marsh crust. The marsh crust is defined as the remnant of the tidal marsh that existed along the shoreline of Alameda before filling to create additional dry land.

The presence of PAHs in the marsh crust and fill reflects their environmental persistence. Other organic chemicals present in petroleum products such as single-ring aromatic compounds and light aliphatics are largely lost over time due to volatilization, dissolution, and breakdown by a variety of biotically mediated degradation mechanisms (Neptune and Company, Inc., 2001).

3.1.1 Site Location

The TCRA area is approximately a 14-acre area contained within the limits of EBS Parcel 181 and consisting of approximately 21 multiunit structures and open-space park areas (Figure C.3-2). Structures and cement or asphalt paving occupies approximately 4 acres of the site area. The remaining 10 acres of the site is open space covered with vegetation and soil that is proposed for excavation. The TCRA area is bordered by EBS Parcel 182 to the north and west, EBS parcels 178 through 180 to the south and the remaining area of EBS Parcel 181 to the east.

3.1.2 Type of Facility and Operational Status

EBS parcels 181, 182, and 183 comprise the IR Site 25 area. EBS parcels 181, 182, and 183 have somewhat different histories of usage. Fifty-one residential buildings constructed in 1969 and nine open-space areas presently occupy EBS Parcel 181. A sanitary sewage pump station (Facility 591) is also presently located in EBS Parcel 181 near the southeast corner of EBS Parcel 182.

3.2 PROJECT DESCRIPTION

Remedial action activities are to remove surface structures and vegetation, remove 2 feet of soil, replace soil, and replace surface structures and vegetation. Project tasks include the following:

- Coordinate with Base for notifying of residents
- Mobilize equipment, supplies and manpower
- Perform preconstruction sampling
- Perform utility clearance
- Remove fences, gazebos, large brushes, and selected trees
- Excavate soil and transport to appropriate off-site disposal facilities
- Backfill using imported clean fill
- Vegetate with sod
- Coast Guard will arrange to re-install wooden fences and trees
- Decontaminate equipment and demobilize

The proposed excavation area will extend to 2 feet bgs, and will extend laterally as outlined in Figure C.3-3. The site will be excavated in phases as follows:

- Phase I – The area east and west of Monterey Circle to 12 feet behind units 2008 and 2010.
- Phase II – The area east and west of Lakehurst Circle to approximately 12 feet behind the units to west of Lakehurst Circle.

- Phase III – The areas located south of Monterey Circle and include the single unit number 2002.
- Phase IV – The area north and south of Annapolis Circle to approximately 12 feet behind each unit.
- Phase V – The areas along Singleton Avenue unit number 201.
- Phase VI – The common area around the playground, which has been excavated under another contract.

This project poses the challenge of working in an active residential community. Success of this project will depend on coordination with the Coast Guard point of contact and the residents to ensure that the residents understand the project intent and how this project will be performed. Strict site control will reduce unauthorized access to work areas and will reduce health and safety risks to the community members.

3.3 PROJECT DURATION

This project is estimated to require 180 days of field activity. Work hours will be from 8:00 to 17:00, Monday through Friday.

4.0 POTENTIAL HAZARDS

The Base-Wide Plan identifies hazards that are common to all construction projects within Alameda Point. Site-specific hazards associated with this CTO are summarized below.

4.1 CHEMICAL HAZARDS

The likelihood of significant exposure to chemical contaminants during this TCRA is low. The contaminants of concern in soils at the IR Site 25 are PAHs. In addition, petroleum hydrocarbons and benzene have been found at this site in low levels (parts per billion) in the groundwater. They have been included Table C.4-1, Chemical Hazards Assessment, which summarizes the chemical hazards at this site.

The SHSS will also acquire Material Safety Data Sheets for all materials and chemicals brought on to the site. The SHSS will ensure that site personnel have received training on all of these chemicals, per FWENC environmental health and safety (EHS) Procedure 4-2, Hazard Communication. If unknown materials or chemicals are encountered, the SHSS will contact the PESM for additional guidance regarding these materials and to evaluate the need for additional training and protection.

Dust control measures will be implemented to minimize exposure due to inhalation and visible dust.

4.2 ENVIRONMENTAL HAZARDS

Workers may encounter poison oak, snakes, animals, bees, ticks, and other insects. The degree of hazard can range from annoyance to death from bites or anaphylactic shock. Recognition and avoidance are critical in maintaining a safe work site. Personnel with sensitivities, such as an allergy to bee stings, should notify the SHSS prior to site activities. Workers should also be very careful while working in and around bushes and equipment, as snakes often take refuge from heat in such places.

Since all planned work activities will be conducted outside where temperature conditions are unpredictable, there is a risk that site workers could develop heat stress. The likelihood of this occurring is dependent on environmental conditions, the level of work activity, and the personal control measures that are used to manage heat loads (such as work/rest cycles, use of cooling devices, hydration, and so forth). Heat stress procedures described in the Base-Wide Plan and FWENC procedure EHS 4-6, Temperature Extremes, will be followed. In addition, all site workers will be instructed in the recognition and control of thermal stress symptoms.

4.3 PHYSICAL HAZARDS

The Base-Wide Plan identifies physical hazards associated with most projects at the Alameda facility. This project requires an excavation of 2 feet, heavy equipment use, and confined work area.

Additional safety hazards likely to be associated with the planned work include heavy lifting, use of utilities, noise, slip, trip, and fall hazards and working within a residential area. These hazards and the controls that will be applied to manage them are discussed below.

4.3.1 Excavation

Underground Service Alert (Dig Alert) (800-227-2600) must be notified before any excavation work begins regardless of depth. Exploratory techniques, such as “pot-holing” will be performed to insure that any excavation near utilities can be performed safely.

Dust suppression measures may include the use of a wetting agent or water to make the soil less likely to become airborne. However, work procedures as soil is moved, and especially as it is lifted and loaded, must be performed in such a way to minimize the generation of dust. For example, loaders dumping soil into a dump truck may have to lower the bucket as close as possible to the truck before dumping to reduce the drop height of the soil and, thereby, reducing the amount of dust generated.

The following provides general requirements governing activities in and around excavation and trenches, as well as the requirements for the selection and use of protective systems:

- Surfaces surrounding open trenches and excavations shall have all surface hazards removed.
- All utilities shall be located and cleared prior to initial digging. Public or facility utility groups shall be utilized where possible for this purpose. In the absence of either, the SHSS shall specify the procedures to be used to clear utilities in consultation with the project superintendent, PESM and FWENC project manager. When the excavation is open, utilities shall be supported and protected from damage. Clearance and support methods shall be documented on the daily inspection checklist. EM 385-1-1, Section 25, requires the installation of perimeter protective systems for all open excavations. Class I perimeter protection is the most protective and requires installation of fences and barricades which would prevent members of the public (people other than workers) from entering or falling into the excavation. Consult the EM 385-1-1 for the types of protective system required for various situations.
- All sides of the 2 feet deep excavation will be sloped for easy access and to reduce fall hazards.
- Employees exposed to vehicular traffic shall wear traffic vests.
- Employees are not permitted to be under loads that are being lifted or under loads that are being unloaded from vehicles.

- When vehicles and machinery are operating adjacent to excavations, warning systems such as stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench. In any case, vehicles, equipment, materials, and supplies will never be placed closer than 2 feet from the edge of any excavation.

4.3.2 Power Tools and Landscaping Equipment

The project requires the removal of shrubs and other landscape features. Aside from the heavy equipment discussed above, the workers may use power tools such as, powered weed cutters, chain saws, hand-held power saws, and so forth. Workers will review safe operating instructions for all power tools. The tools will be inspected before each use including the blades or cutting chains on all cutting tools. Unsafe tools will be repaired or removed from service. Power tools using fuel must be refilled in a designated area. All tools will be turned off any time they are being refueled. Never refuel tools while they are placed on beds of trucks.

4.3.3 Heavy Lifting

Removing and planting vegetation may require heavy lifting. Such activities carry the risk of back and muscle strain. To control this hazard, workers will be instructed to use proper lifting techniques when moving heavy loads. These techniques will include using mechanical lifting devices whenever feasible to move equipment or supplies. When lifting exceptionally heavy loads, workers will maintain ergonomically safe lifting postures and have others help if mechanical lifting devices cannot be used.

4.3.4 Slips, Trips, and Falls

There are likely to be slip, trip, and fall hazards during removal operations. Maintaining housekeeping and employee awareness will control these hazards. Site workers will wear steel-toed safety boots and will pay careful attention to surface conditions to prevent slip, trip, and fall injuries.

4.3.5 Falling Objects

All items raised will be lowered slowly to the ground using a grapple and/or skip bucket. Personnel will not work under equipment at any time. Also, the SHSS will ensure that an adequate area is clear of personnel while the equipment is in operation. Dump truck drivers will remain in their trucks while soil and debris is placed in their trucks if their trucks are equipped with a Falling Object Protective System (FOPS). If their trucks are not equipped with FOPS, the drivers will get out of their trucks and stand clear of the loading operation.

4.3.6 Contact with Mechanical Equipment and Heavy Equipment

Operators, drivers, and passengers must wear seat belts at all times. Drivers and operators must have a valid driver's license and must comply with state, county, and local regulations governing

the safe and legal operation of vehicles. The driver is responsible to ensure that passengers are seated and properly secured before moving the vehicle. Under no circumstances will personnel ride on fenders, running boards, vehicle top, in buckets, on the lift forks of a forklift, on beds of dump trucks, on beds of pickup trucks, or in any other area where a passenger cannot be secured by a properly installed seat belt. Operators of heavy equipment must follow the regulations specific for the type of equipment they are operating.

A traffic plan will be discussed each day during the morning tailgate meeting. Backing up of hauling trucks is to be minimized. The SHSS may require ground personnel to direct the backing up of hauling vehicles. Those personnel directly involved with spotting for an operator are typically the only personnel allowed on the ground in the vicinity of heavy equipment. Other personnel will remain a safe distance away from operations. Personnel needing to approach heavy equipment while the equipment is operating will observe the following protocols:

- Make eye contact with the operator (and spotter)
- Signal the operator to cease heavy equipment activity, if applicable
- Approach the equipment operator and inform the operator of intentions

Prior to moving parked heavy equipment, the operator will visually inspect and walk around the vehicle to ensure that the equipment is in good condition and that there are no personnel on the ground or objects that could be damaged by vehicle movement. Operators will use handrails and footholds for mounting and dismounting equipment (three points of contact). Operators will follow equipment startup procedures described in the equipment operating manual. The operator will keep hauling equipment under positive control at all times. Heavy equipment must have booms, forks, buckets, blades, belly pans, and any other similar type of part lowered to the ground when the equipment is shut off. Heavy equipment has the right-of-way over other traffic.

When temporarily parked in the field, the keys are to remain in the ignition switch. Do not leave running equipment unattended. Operators are required to use vehicle chocks, positioned to reduce the potential for rolling when parked, for wheeled vehicles and other equipment as specified by supervisor.

4.3.7 Noise

Noise levels in excess of 85 decibels, A-scale (dBA) may occur when using heavy equipment. Plugs and/or muffs will be used for hearing protection. Refer to the Base-Wide Plan and EHS Procedure 4-4, Hearing Conservation.

4.3.8 General Precautions and Controls

- Hazard assessment is a continuous process and all personnel must be aware of their surroundings and constantly aware of the chemical and physical hazards that are or may be present.

- The use of the buddy system is mandatory.
- Site personnel will be familiar with the physical characteristics of each site including site access, emergency assembly areas and evacuation routes, and the location of communication devices and safety equipment.
- DO NOT touch any unknown objects on the ground.
- Workers shall wear steel-toed boots, hard hats, traffic vests, eye protection, and suitable work gloves for the work being done.
- Activity Hazard Analyses (AHAs) will be developed for each specific task not covered within this plan to further characterize and define potential physical hazards and to implement control measures to prevent personal injury and/or property damage.

4.4 STOCKPILE MANAGEMENT

Removed contaminated soil is to be placed in hauling trucks as it is excavated and temporarily stockpiled in the staging area to be located north of Mosley Street in a secured and fenced area. Clean backfill materials may be stockpiled in the staging area. Contaminated soils will be placed in a bermed and lined area and covered with plastic. This plastic liner is to prevent wind and rain erosion. This cover must be maintained. Sandbags will be used to prevent the wind from removing the plastic covers on the stockpiles. Sandbags are heavy and workers must follow safe lifting procedures. Label all stockpiles if they are left in place more than 1 day and secure area. The plastic cover can be slippery and is a hazard, especially if the plastic is wet.

4.5 SPECIAL CONSIDERATIONS FOR WORK IN RESIDENTIAL AREAS

It is important that the work areas are isolated from the general public, primarily for their protection. The excavation area must be barricaded at all times until the area is restored. If work area is active and physical means do not preclude public access, do not leave the area unattended during break times. The RAWP requires that excavations, especially in the housing areas, be backfilled the same day; therefore excavations will not be left open over night.

Initially the RAWP requires that all first floor windows and the sliding patio doors be covered with plastic to minimize dust that may intrude into the residences. If work procedures and site control measures are demonstrated to be effective, plastic will not be used on the remaining residences. Whenever there is a potential hazard for a resident who may leave the residence during the excavations, barricade tape will be used as necessary to warn the residents. In some cases, barricade tape may be temporarily placed across doors. However, at no time will this tape impede the residents' ability to leave the residence in an emergency.

Equipment and tools will be returned to the staging area at the end of the day. Security will provide oversight at night and weekends to reduce unauthorized access to equipment, stockpiled contaminated soils and backfill materials.

Residents' pets and stray animals may be encountered during work activities. Try to keep animals out of exclusion zones (EZs), but do not approach unfriendly animals. Do not feed strays. (Residents have been instructed by the Coast Guard Housing Office to remove pets from the work areas.)

When near homes, keep noise levels as low as possible, adhere to work times, and remove your trash. Any contact with the residents should be referred to the following project contact personnel:

- Base Housing Office Contact, CBO William Potchen at (570) 769-0831, extension 112
- Base Realignment and Closure Environmental (BRAC) Liaison, Steve Edde at (510) 749-5952
- BRAC Environmental Coordinator, Mike McClelland at (619) 532-0965
- Remedial Project Manager, Rick Weissenborn at (619) 532-0952.

5.0 ACTIVITY HAZARD ANALYSIS

The AHAs for this project are included as Attachment 2. The SHSS will modify these AHAs as appropriate, add new AHAs for any changes in tasks, and ensure that all employees who perform these tasks receive a briefing on the appropriate AHA. The SHSS will forward any modified or new AHAs to the PESM for review and approval. The equipment used for the task can vary dependent upon which subcontractors are used for work. The AHAs will be expanded to include specific equipment as the project RAWP becomes final.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protective equipment (PPE) required for each task on this project is listed in Table C.6-1, Personal Protective Equipment. This table is prepared based on data provided prior to the start of the project. As additional testing, monitoring, and background information become available, the SHSS may adjust the action levels and PPE accordingly. Any changes to PPE require approval by the PESH. PPE levels were selected based on the presumption that there are low-level contaminants associated with PAHs.

7.0 AIR MONITORING AND OTHER MONITORING ACTIVITIES

Ambient air monitoring will be conducted during excavating and backfilling operations at the TCRA in order to determine airborne contamination levels. Two sampling stations, each consisting of three high-volume and medium-volume air samplers will be installed at the school/day care and within the work areas to monitor for fugitive dust and PAHs. Details of ambient air monitoring are outlined in the Air Monitoring Plan located in Appendix D of the RAWP. Personal air sampling is not planned at this time. The SHSS will contact the PESM if conditions change from those now anticipated.

7.1 DIRECT READING INSTRUMENTS

7.1.1 Photoionization Detector

A photoionization detector (PID) will be used to determine the presence and concentration of organic vapor. Contaminants such as the volatile petroleum hydrocarbons and benzene are detectable with PID.

Instrument: PID

Action Level: 10 parts per million (ppm) in breathing zone

Action: Stop work, notify PESM. Notify project contact person.

7.1.2 Explosimeter

A Gastech Model 1314 or MSA Model 260 explosimeter or equivalent may be used to screen for the presence of flammable vapors, oxygen (O₂)-deficient atmosphere, and O₂-enriched atmosphere. If flammable vapors are at 10 percent lower explosive limit (LEL) or greater, work will cease and the area allowed to ventilate. If O₂ levels below 20.8 percent or above 22 percent are encountered, personnel will leave the area and the area will be ventilated. The instrument is used during excavating and hot work procedures such as welding, cutting, and grinding.

Instrument: Gastech Model 1314 or MSA Model 260 or equivalent

Action Level: 10 percent \geq LEL, <20.8 percent O₂ or >22 percent O₂

Action: Stop work, allow area to ventilate and notify PESM and project contact person.

7.1.3 Particulate Monitor

A MiniRam Monitor Model PDM-3 will be used to measure respirable airborne particulates between 0.1 to 10 micrometers in size. The MiniRam will be used as an indicator of total ambient dust in the work area and will serve to monitor when additional dust control is required.

Worst-case scenarios can be assessed for the purpose of establishing a total dust action level by utilizing half of the threshold limit value (TLV) as the action level.

- Instrument:** MiniRam Aerosol Monitor Model PDM-3
- Action Level:** 1.5 milligrams per cubic meter (mg/m³) for work areas
0.5 mg/m³ for perimeter of work area
(level chosen to minimize overall permissible dust release from site)
- Action:** Implement dust control procedures.

If dust cannot be reduced below the specified concentration, respiratory protection will be required which will consist of a full-face air purifying respirator and HEPA cartridges.

7.1.4 Noise Monitoring

A noise survey meter will be used to measure the noise levels in the work area and at the work perimeter. The results will be recorded in the logbook. Workers will adhere to procedures found in FWENC procedure EHS 4-4, Hearing Conservation Program. Employees will use hearing protective plugs or muffs whenever levels are greater than 84 dBA. Levels consistently over 85 dBA will be reported to the PESM to determine if additional monitoring with dosimetry equipment will be conducted and additional noise controls will be instituted.

7.2 MONITORING STRATEGY

7.2.1 Personnel

Background levels will be measured with the PID before any work commences. Monitoring of the area will begin by taking background readings. The PID will be used wherever odors are detected and will continue to be used until odors can no longer be detected and organic vapor levels are below 5 ppm. The SHSS, in consultation with the PESM, will determine if further actions and/or measurements are warranted to prevent or minimize exposure of personnel. It is essential that odors and measurable levels of organic vapors be limited to the EZ. Similarly, assess suspected contamination by approaching from a safe area to the area of concern.

The combustible gas meter will be used continuously during excavation to ensure that there are not any unexpected flammable vapors or gases. Personal sampling is not anticipated for these tasks.

7.2.2 Residents

Dust levels will be monitored with the MiniRam and integrated air monitoring for total suspended particulates, PAHs, and PM₁₀. Baseline integrated samples will be collected for 1 week prior to the start of the project, and sampling will continue daily throughout the remainder of excavation and backfilling activities. The sample stations will be located at the excavation, work area, and the school grounds, which are adjacent to the site. The SHSS after

conferring with the PESM may modify the sample locations and may take additional samples. All levels above background will be immediately reported to the PESM, who will evaluate the results. The results of all of the testing will be shared with the ROICC and the project point of contact.

Results from direct reading instruments as discussed in Section 7.1 will be used by the PESM, project manager, the ROICC, and the project point of contact to ascertain if residents must be evacuated. At this time, it is anticipated that the low level of contaminants and effective site control methods will make the potential for evacuation unlikely. The housing office maintains a list of each resident and their phone number in the event an evacuation is necessary.

7.3 QUALITY ASSURANCE/QUALITY CONTROL

Adherence to a proper quality assurance/quality control (QA/QC) plan is essential for a meaningful air sampling effort. The major concerns of a QA/QC plan are calibration of equipment and document control.

7.3.1 Calibration and Maintenance Procedures

All direct reading instruments will be calibrated daily, or before and after each use. Calibration records will be kept detailing date, time, span gas, or other standard and the name of the person performing the calibration. The calibration gas for the PID is isobutylene. The SHSS will ensure that the instrument is kept clean and will follow manufacturer's directions for keeping the lamp clean. The SHSS will not perform any other maintenance procedures unless approved by the PESM.

The calibration gas for the explosimeter is usually a methane/air or a hexane/air mixture. O₂ is calibrated against normal air in a clean environment. A low O₂ calibration gas can be used for calibrating the response of the O₂ sensor. Often, 100 percent nitrogen is used to "zero" the O₂ sensor. For purposes of this plan, calibration of the explosimeter means a daily field check with known calibration gases. The reading on the instrument must be within 3 percent of the stated value of the gas. If it is not, then formal calibration of the instrument must follow the manufacturer's calibration procedure.

The miniRAM requires factory calibration annually. It cannot be field calibrated. However, the zero value of the instrument must be checked daily. If the zero value exceeds the manufacturer's recommended value, the instrument must be cleaned. The instrument's zero is reset by following the manufacturer's instructions.

7.3.2 Documentation

Strict adherence to document and data control procedures is essential for good QA/QC. Data and calibration records must be accounted for and retrievable at all times. Types of documents that

are essential include notes, logbooks, maps, data sheets, equipment calibration logs, and reports. Forms required for this CTO are presented in Attachment 3. These must be placed in the project files. Copies of all field data reports and personal sampling records will be sent to the PESH for review.

8.0 SITE CONTROL

Site control requires the establishment of a regulated area and designated site work zones. Site control is also required to keep non-project personnel from entering job site areas. To minimize the transfer of potentially hazardous substances from the site, contamination control procedures will be employed. The establishment of site work zones will be one method of contamination control. Site control through access control points will reduce the possibility of:

- Personnel exposure to site contaminants.
- Contaminant translocation by personnel or equipment from the site.

For field operations at the site, the three-zoned approach will be used. The three zones include the EZ, the contamination reduction zone (CRZ), and the support zone (SZ).

8.1 EXCLUSION ZONE

The EZ for this project will be demarcated for the excavation area. The excavation area will be an area that can be excavated and backfilled within the same day. An excavation plan has been submitted to the Coast Guard. Barricade tape will be used to demarcate the area for the day. For a period of time, the excavated area, 2-feet deep, will remain open until such time as the backfill material is placed. At this time, the barricades will remain and the area will still be considered an EZ. Once backfill is placed and compacted, the area will no longer be an EZ. EZs in the housing area will be in place only at 8 AM through 5 PM during weekdays.

The excavated soil will be immediately placed in trucks and hauled to the designated storage area. The stockpile area will not be located in the housing areas. The stockpile area will be an EZ, and will be fenced.

8.2 CONTAMINATION REDUCTION ZONE

All personnel and equipment that may have been in the EZ will be subject to decontamination in the CRZ. The CRZ will be a minimum of 10 feet around the demarcated area. The SHSS will set up the CRZ in an upwind direction if possible.

8.2.1 Decontamination Procedures

Site workers will be provided with hand washing facilities. Workers are required to wash exposed areas of the skin (for example, hands and face) upon exiting the EZ. Smoking, eating, or drinking is not allowed in the EZ or CRZ.

The same area will be used for equipment decontamination and personnel decontamination. Decontamination of personnel will not be conducted concurrently with equipment decontamination minimizing contamination of personnel from over spray.

8.2.2 Personnel Decontamination

Personnel departing the EZ are required to proceed through a decontamination line. The decontamination procedure is:

- **Station 1** - Segregated Equipment Drop: drop equipment onto plastic liner or shelf.
- **Station 2** - Brush off work boots. If boot covers are worn, wash off outer boot cover and remove.
- **Station 3** - Remove and discard outer coverall and place into disposal containers.
- **Station 4** - Remove any gloves, if worn, and discard.
- **Station 5** - Field Wash: wash hands and face with water.

In case of an emergency, gross decontamination procedures will be implemented and the person will be immediately transported to the nearest medical facility at the direction of the SHSS according to the Site Emergency Response Plan. The medical facility will be informed that the injured person is on the way and has not been fully decontaminated. The medical facilities will be notified of the potential chemicals present and of the exposure-prevention measures that can be used while treating the victim. If personnel wear disposable outer coveralls to keep clean, the coveralls will be removed before washing hands. Coveralls will be discarded as contaminated PPE.

8.2.3 Equipment Decontamination

PPE, construction monitoring, and sampling equipment may require decontamination. A simple scraping and brushing off of the equipment for the contaminants on this project followed by washing, if needed, should remove the contamination. A small area will be set up with a minimum 20-mil high-density polyethylene liner and used as a decontamination pad to facilitate containment and collection of all potentially contaminated water and decontamination fluids. The waste liquids will be transferred to appropriate drums or holding tank. All PPE wastes generated will be bagged, labeled, and stored for off-site disposal or incorporation into other waste materials. FWENC will store waste in a manner and in an area designated by the facility. In no case will storage exceed 90 days from the start date of accumulation of the waste.

8.3 SUPPORT ZONE

The SZ will be arranged considering accessibility, utility availability, wind direction, and line-of-sight to work. Included in this area will be an administration area, vehicle parking, and water for hand washing. Also in this area will be a portable toilet and access to drinking water. The SZ will

be outside the CRZ and will be the area where support workers will provide assistance to workers inside the EZ and CRZ. A field trailer will be set up at a centralized staging area near the stockpiled soil. Smoking is allowed only in areas designated by the SHSS.

9.0 MEDICAL SURVEILLANCE PROCEDURES

There are not any additional medical surveillance procedures for this project at this time.

10.0 SAFETY CONSIDERATIONS

For safety considerations, refer to the Base-Wide Plan. In addition, these guidelines should be adhered to:

- Ensure that there are communications in place that are functional. Check functions daily.
- Workers will work in sight of each other. If it is necessary for workers to work out of sight of each other, the buddy system will be used and each team will have a means of communicating with a team that has radio communication with SHSS (that is, each team would have local radio communication with all other teams, but at least one team has the radio that can contact the SHSS),
- Each work team will have an air horn to be used to summon help.
- All workers must comply with the FWENC *Project Rules Handbook, Volume I and Volume II*. Refer to the Base-Wide Plan for other rules.
- Workers will wear seat belts in all vehicles.
- Workers will wear reflective safety vests at all times when working in the EZ and at any time they are working near vehicle traffic including roads and parking lots so that they are readily visible to other workers and motorists.
- Ensure that the area is clear of personnel other than FWENC personnel and subcontractors.
- Use care when driving vehicles. Stay on roads. If the vehicle must be driven off-road, be sure to drive slowly. Be aware that there can be sudden dips or depressions, or that there can be a sudden drop off. Drive on unpaved roads only during daylight hours.
- At a minimum, a shaded break area will be provided for employees.
- The SHSS shall set up a Daily On-site Log to track all individuals on site at any given moment and to ensure that all personnel, visitors, and subcontractors are accounted for in case of emergency.
- Refer to Base-Wide Plan – Emergency Response Plan in the event of an earthquake.
- The protection of the residents in the work areas is essential. At any time there are residents or children in the work area, all personnel will ensure that no one is near any equipment or work activity. When children are present, at least one person on the ground will inspect around each vehicle before the vehicle is moved in any direction. It may be necessary for the ground person to “walk with” the vehicle as the vehicle drives slowly to ensure that children do not get in the path of the moving vehicle. The ground person will maintain visual contact with the operator of the vehicle at all times.

11.0 DISPOSAL PROCEDURES

Refer to the Base-Wide Plan for general guidelines and to the Waste Management Plan (Appendix G of the RAWP) for details on the types of waste streams to be generated and the appropriate methods for packaging and disposal.

12.0 EMERGENCY RESPONSE PLAN

Refer to the Base-Wide Plan for emergency response activities. The staging area is the site trailer, which will be located on Mosely Avenue near the park. (The park has already been fenced as it is an area requiring work.) The evacuation routes from each housing site to the staging area will be discussed at each morning safety meeting. The meeting place will be the site trailer. The city of Alameda Fire and Rescue Service will be contacted to provide the necessary emergency support. Nearby clinics and hospitals have been identified in the event that workers may be able to be transported more quickly by ground transportation. The hospital route to Alameda Hospital from the site trailer is depicted in Figure C.12-1.

All decisions to transport injured workers by ground transportation must be evaluated carefully. The Alameda Fire and Rescue Service may place us in contact with an emergency medical provider who may help us in making the decision. The decision is based on many factors including the stability of the injured worker, whether the worker can be safely moved without causing further injury to the worker, the severity of the injury and the need for immediate treatment, the location of the project site, the proximity of nearby medical services, and the response time for emergency service to arrive at the site.

Table C.12-1 is the list of emergency contacts and phone numbers. Both the figure for the hospital route (Figure C.12-1) and Table C.12-1 must be placed on the dashboard of each vehicle.

13.0 TRAINING

All heavy equipment operators will have documented training records for the specific piece of equipment to be used in addition to their hazardous waste training health and safety certificates. Prior to commencing work, training records will be reviewed by the SHSS. Refer to the Base-Wide Plan required for all personnel working at this Base.

14.0 LOGS, REPORTS, AND RECORDKEEPING

Refer to the Base-Wide Plan for requirements. A forms section, including a number of the forms used on FWENC projects, follows this plan. Additional forms are found in FWENC EHS procedures in the Corporate Reference Library. Prior to use, a competent person will certify that equipment is in working order.

15.0 FIELD PERSONNEL REVIEW

All personnel are required to review the Base-Wide Plan and this SHSP. Upon completion of their review, all project personnel will sign the SHSP review form.

16.0 REFERENCES

Foster Wheeler Environmental Corporation. 1998. *Project Rules Handbook, Volume I and Volume II.*

Neptune and Company, Inc. 2001. *Final Remedial Investigation Work Plan for Operable Unit 5, Alameda Point, Alameda, California.* June.

TABLES

TABLE C.4-1
CHEMICAL HAZARDS ASSESSMENT

Chemical Name	PEL/TLV	Routes of Exposure	Symptoms of Exposure	Target Organs
Gasoline	PEL – 300 ppm (Cal-OSHA) TLV – 300 ppm	Skin absorption, inhalation, ingestion	Acute: Nose/throat, lung irritation, headaches, blurred vision, vomiting, dizziness, fever, slurred speech, unconsciousness. Chronic: Appetite loss, nausea, weight loss, insomnia, and sensitivity in digital extremities.	Skin, eye, respiratory, and CNS
Diesel fuel	PEL – none established TLV – none established	Skin contact, inhalation, ingestion	Acute: Eye irritation, skin irritation, nose/throat/lung irritation, nausea, vomiting, diarrhea, restlessness, drowsiness, and loss of coordination. Chronic: Repeated contact with skin causes dermatitis.	CNS, skin, respiratory system
PAHs, coal tar pitch volatiles (Chrysene, Pyrenes, Phenanthrene, etc.) from residuals of diesel fuel	PEL - 0.2 mg/m ³ TLV - 0.2 mg/m ³	Inhalation ingestion contact	Acute: Skin contact may cause irritation, redness, burning, itching, dermatitis, and burns. Photosensitization may occur (rash worsens with exposure to sunlight). Inhalation irritating to respiratory tract. Eye contact may cause conjunctivitis, keratitis, or corneal burns. Ingestion may result in nausea, vomiting, abdominal pain, respiratory distress, and shock. Exposure to large doses, especially by ingestion, may be fatal. Chronic: Dermatitis, skin cancer, lung cancer.	Respiratory system, skin, bladder, kidneys (lung, kidney and skin cancer)

TABLE C.4-1
CHEMICAL HAZARDS ASSESSMENT

Chemical Name	PEL/TLV	Routes of Exposure	Symptoms of Exposure	Target Organs
Benzene	PEL- 1ppm TLV – 0.5 ppm STEL 5 ppm	Inhalation Ingestion Contact	Carcinogenic. Acute: Irritation of eyes, nose, respiratory tract, breathlessness, euphoria, nausea, drowsiness, headache, dizziness, and intoxication. Severe exposure can cause convulsions and unconsciousness. Skin contact may cause dermatitis. Chronic: Blood disorders including leukemia.	Blood, CNS, bone marrow, eyes, skin, upper respiratory tract

Notes:

Cal-OSHA – California Occupational Health and Safety Administration

CNS – central nervous system

mg/m³ – milligrams per cubic meter

PAH – polynuclear aromatic hydrocarbon

PEL – permissible exposure level

ppm – parts per million

STEL – short term exposure limit

TLV – threshold limit values

TABLE C.6-1
PERSONAL PROTECTIVE EQUIPMENT

Task	EPA Level	Respiratory Protection	Head	Hand	Clothing	Boots	Face	Eye	Hearing	Additional
Site setup, surveys	D	None required, unless dust exceeds action level.	Hard hat	Leather work gloves, as needed.	Work uniform or Tyvek® coveralls to keep clean.	Steel toe, leather	N/A	Safety glasses	Protection when noise levels exceed 84 dBA.	Fall protection for work above 6-foot level or near edges of excavation. Reflective safety vests.
Clearing and grubbing	D	None required, unless dust or vapors exceed action levels.	Hard hat	Leather work gloves or puncture/cut-resistant gloves.	Work uniform or Tyvek® coveralls to keep clean.	Steel toe, leather	N/A	Safety glasses	Protection when noise levels exceed 84 dBA.	Fall protection for work above 6-foot level or near edges of excavation. Reflective safety vests.
Excavating and backfilling	C mod	None required unless PID or dust levels exceed action levels.	Hard hat	Nitrile inner gloves, Nitrile or equivalent gloves, leather work gloves over.	Tyvek® or cotton coveralls to keep clean	Steel toe, leather	Shield, if liquids	Safety glasses	Protection when noise levels exceed 84 dBA.	Reflective safety vests.
Planting and fencing	D	None required, unless dust or vapors exceed action levels.	Hard hat	Leather work gloves, as needed.	Work uniform or Tyvek® coveralls to keep clean.	Steel toe, leather	N/A	Safety glasses	Hearing protection required around heavy equipment unless noise levels are less than 84 dBA.	Reflective safety vests.

Notes:

DBA – decibels, A-scale

EPA – U.S. Environmental Protection Agency

N/A – not applicable

PID – photoionization detector

TABLE C.12-1

EMERGENCY INFORMATION

REPORT ALL FIRES, SERIOUS INJURY, OR UNCONTROLLED SPILLS IMMEDIATELY: 911
--

Hospital:	Alameda Hospital (510) 522-3700 2070 Clinton Avenue Alameda, CA		
Directions:	Exit east out of site onto Mariner Square Loop, heading west to Tinker Avenue. Turn left onto Tinker Avenue heading south to Webster Street. Merge onto Webster Street heading west to Central Avenue. Turn left onto Central Avenue heading south to Encinal Avenue. Turn right on Encinal Avenue heading south to Grand Street. Turn right on Grand Street heading west to Clinton Avenue. Turn left onto Clinton Avenue heading south to Alameda Hospital (2070 Clinton Avenue)		
Clinic:	Concentra Medical Center (510) 465-9565 384 Embarcadero West Oakland, CA		
Directions:	Exit the site on Perimeter Road, turn left onto Arizona Street, right onto 2 nd Avenue, left onto Fulton, right onto 5 th , left onto Atlantic for about 1 mile, left onto SR-61 (Webster Street) for 0.6 miles, bear right onto Posey Tube for 0.6 miles and continue north on Harrison Street for about 150 yards, left onto 6 th Street for about 100 yards, left onto Webster Street for 0.3 miles, and right onto Embarcadero West for 80 yards to Concentra Medical Clinic.		
Fire/Police/EMS:	911 This number will connect you to emergency dispatch.. <i>911 calls from a cell phone go directly to the California Highway Patrol.</i>		
FWENC Contacts:	Project Manager Abram Eloskof (562) 936-5886 cell: (714) 620-5530	Project PESM (CIH) Roger Margotto (619) 471-3503 pager: (714) 810-3742	Project Superintendent Jim Baldwin cell: (619) 991-1574
RPM:	Rick Weissenborn, P.E. (619) 532-0952		
Environmental Liaison:	Steve Edde (510) 749-5952		
BRAC Environmental Coordinator	Mike McClelland (619) 532-0965		
Poison Control Center:	Emergency Phone: (800) 876-4766 [All of CA]		
CHEMTREC:	(800) 424-9300		
National Response Center:	(800) 424-8802		
RCRA Hotline:	(800) 424-9346		

FIGURES

DRAWING NO:
02020611.DWG

DCN: FWSO-RAC-02-0206

CTO: #0040

APPROVED BY: AE

CHECKED BY: VR

DRAWN BY: MD

REVISION: 0

DATE: 11/16/01

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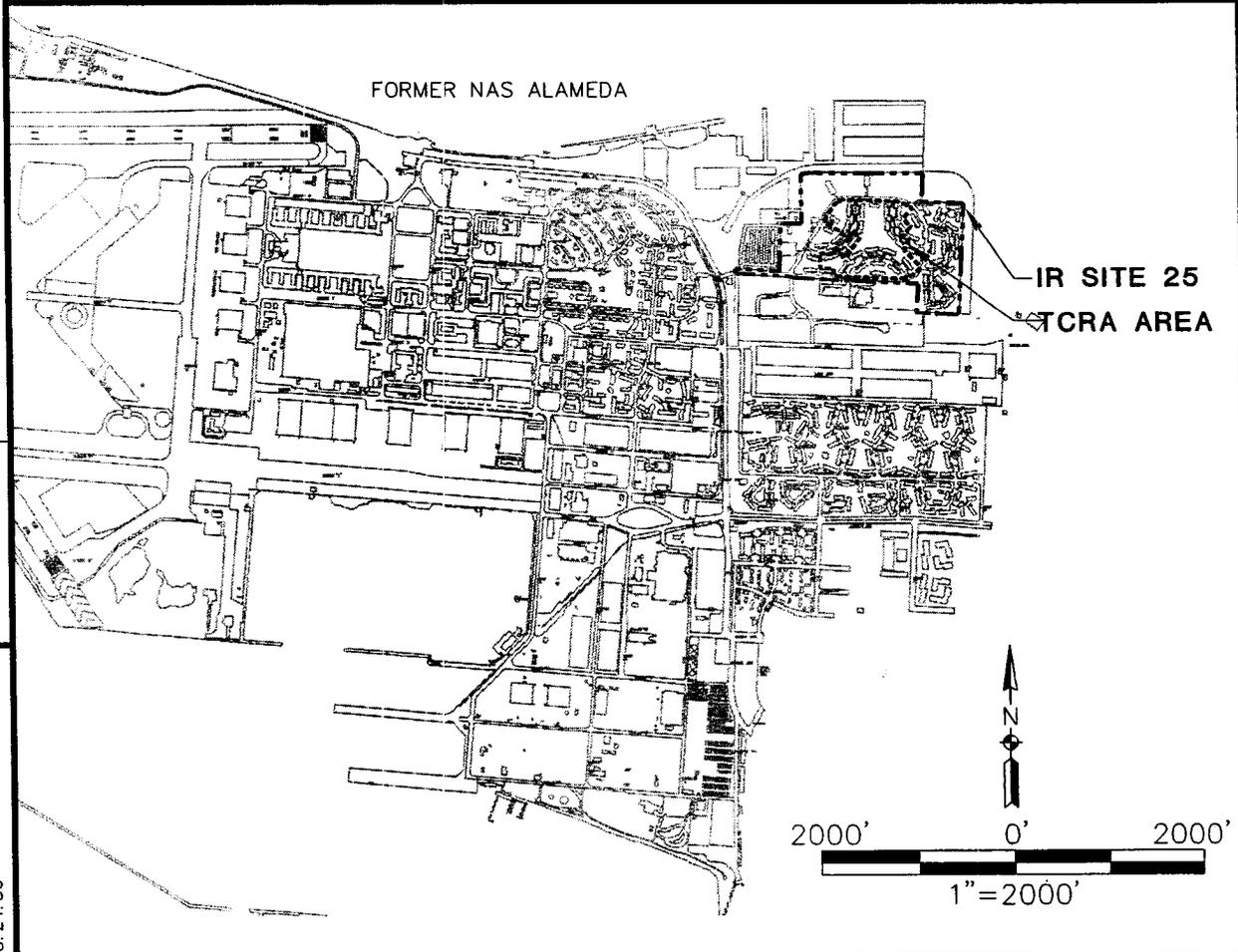
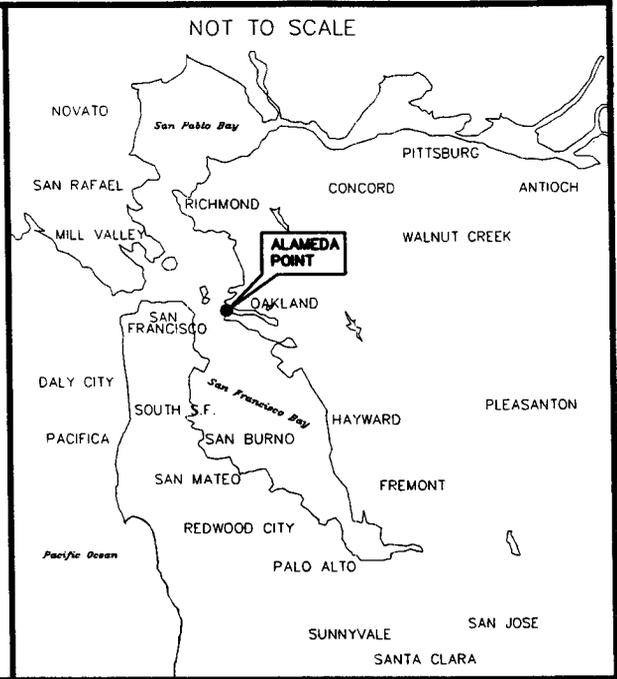
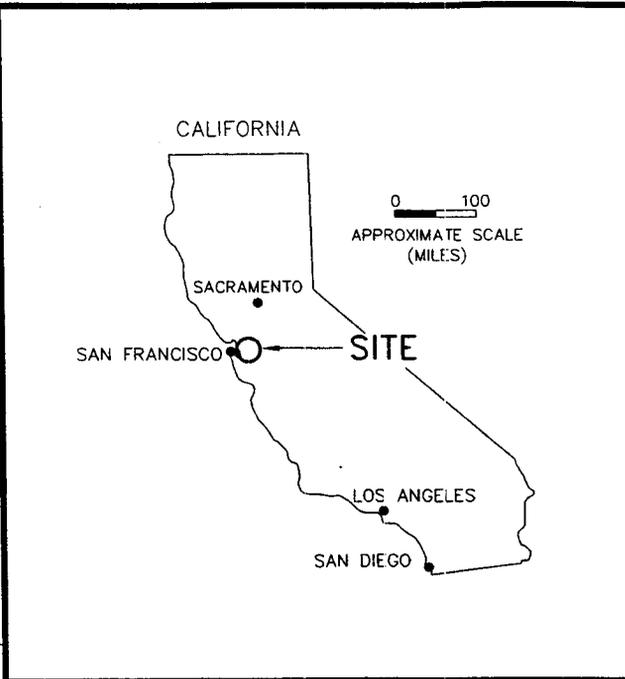


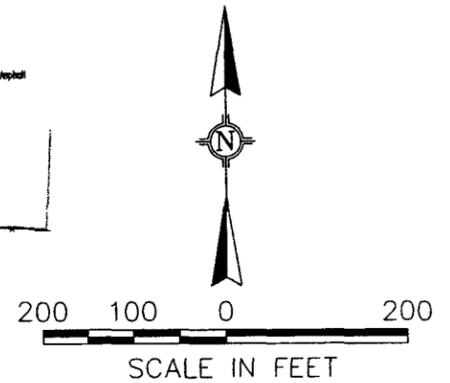
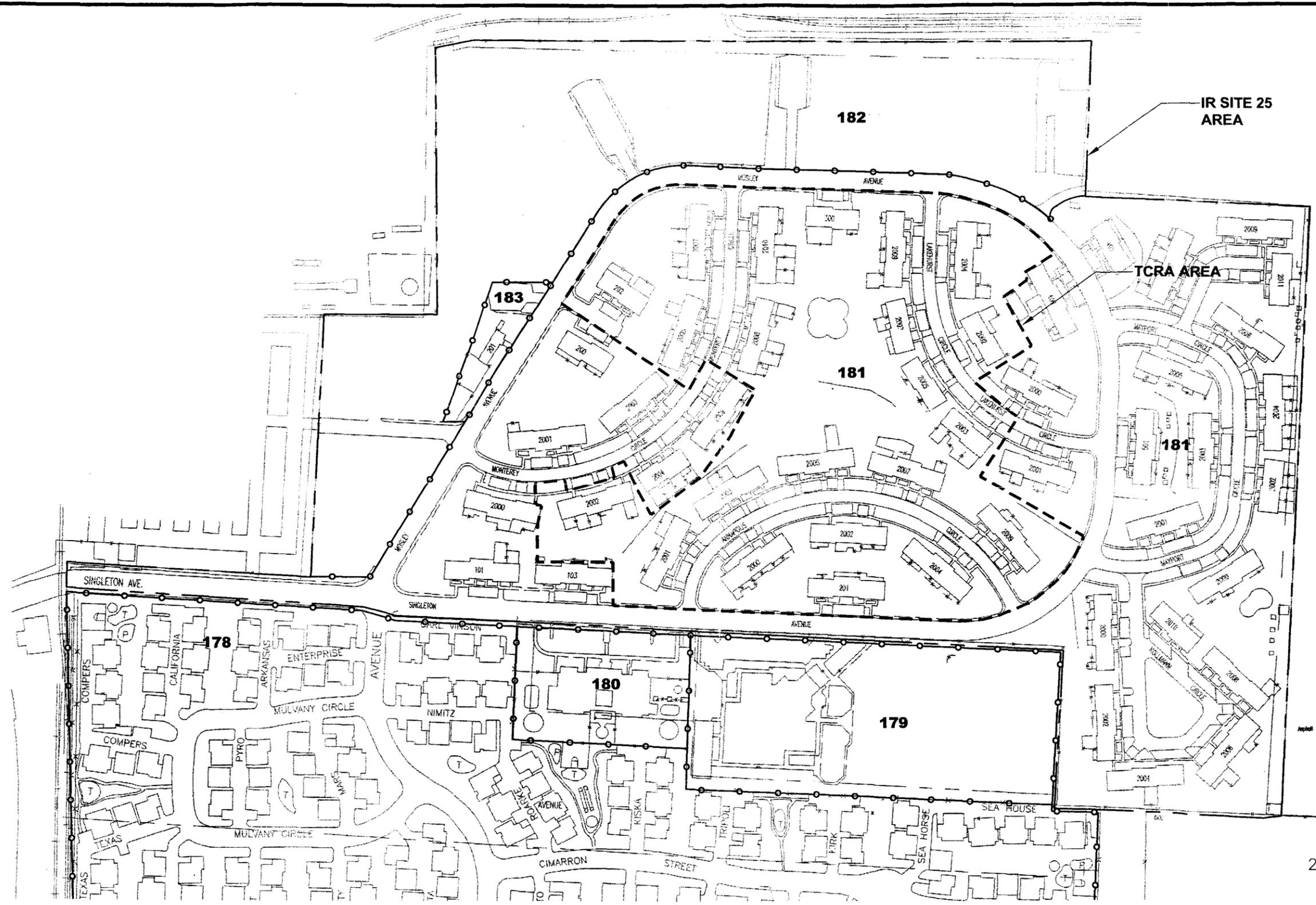
Figure C.3-1
SITE VICINITY MAP

ALAMEDA POINT - IR SITE 25

FOSTER  WHEELER
ENVIRONMENTAL CORPORATION

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 CTO #0040
 APPROVED BY: AE
 CHECKED BY: VR
 DATE: 11/16/01
 REV: REVISION 0

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- LEGEND:**
- TIME-CRITICAL REMOVAL ACTION (TCRA) BOUNDARY
 - IR 25 SITE BOUNDARY
 - ENVIRONMENTAL BASELINE SURVEY (EBS) PARCEL BOUNDARY
 - 181** EBS PARCEL NUMBER

Figure C.3-2
 SITE LOCATION MAP
 ALAMEDA POINT - IR SITE 25
 FOSTER WHEELER
 ENVIRONMENTAL CORPORATION

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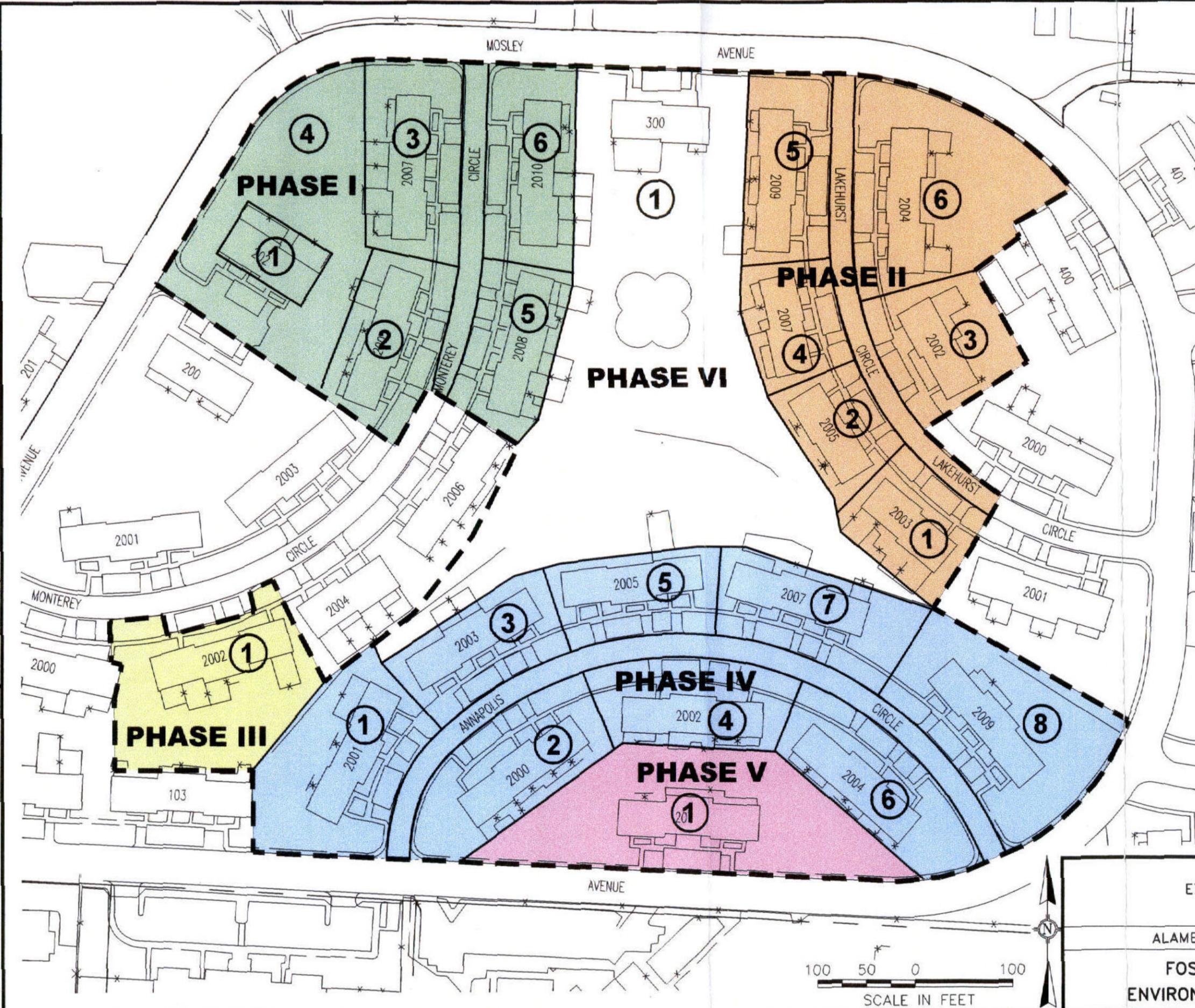
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CTO #0040

APPROVED BY: AE

CHECKED BY: VR
REV: REVISION 0

DRAWN BY: MD
DATE: 11/19/01

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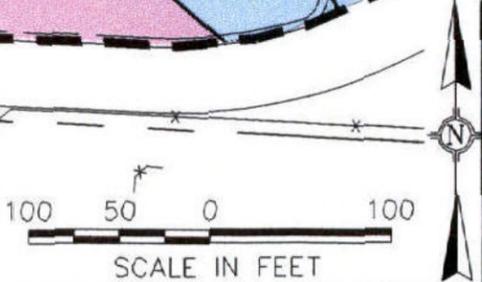


LEGEND:
--- TCRA BOUNDARY
⑥ HOUSING NUMBER WITH EACH PHASE

Figure C.3-3
EXCAVATION PHASES

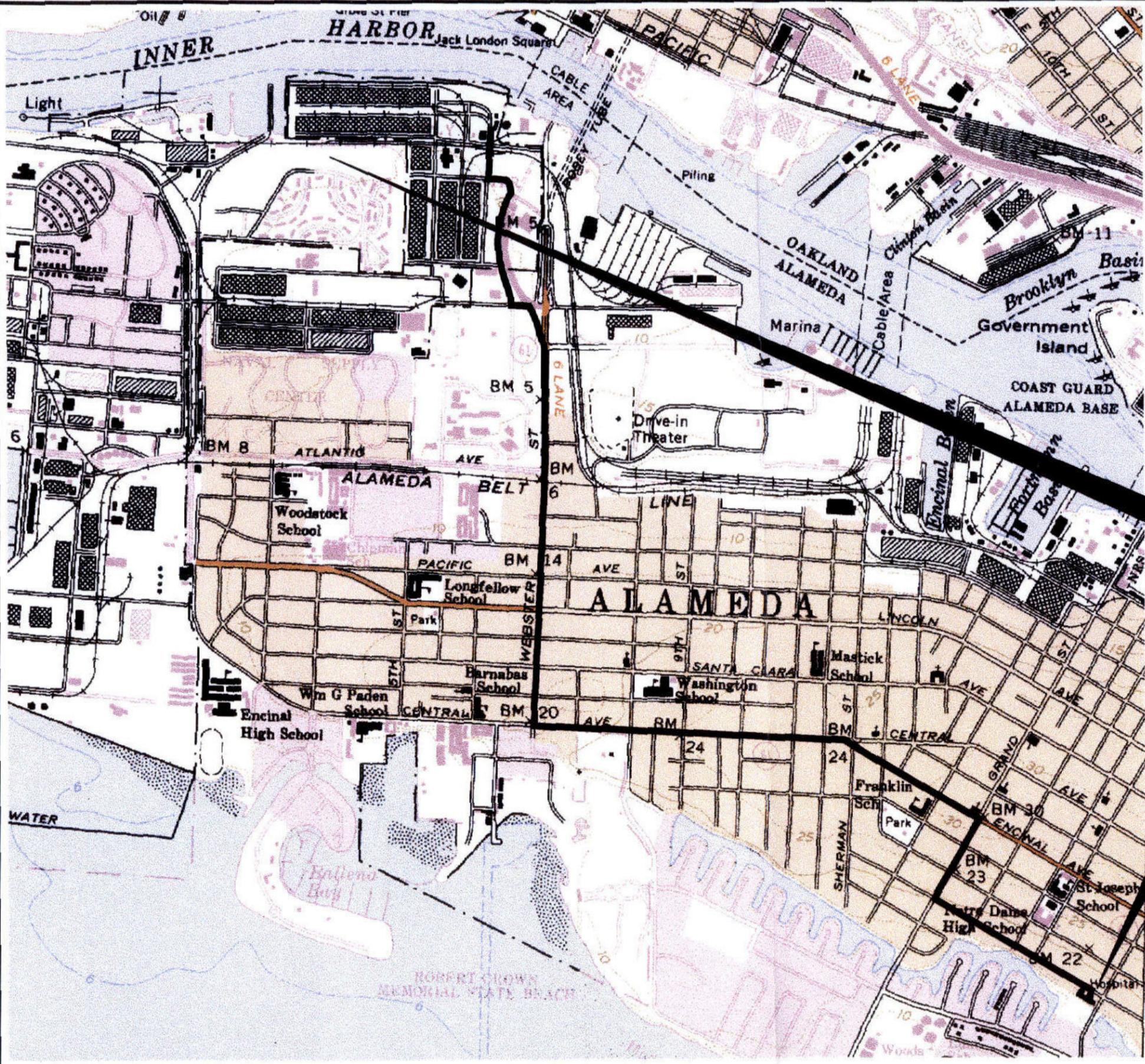
ALAMEDA POINT - IR SITE 25

FOSTER WHEELER
ENVIRONMENTAL CORPORATION



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 CTO #0040
 APPROVED BY: AE
 CHECKED BY: VR
 REV: REVISION 0
 DRAWN BY: MD
 DATE: 11/20/01

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 PLOT/UPDATE: NOV 21 2001 08:40:50



HOSPITAL DIRECTIONS:

Exit east out of site onto Mariner Square Loop heading west to Tinker Avenue. Turn left onto Tinker Avenue heading south to Webster Street. Merge onto Webster Street heading west to Central Avenue. Turn left onto Central Avenue heading south to Encinal Avenue. Make slight right onto Encinal Avenue heading south to Grand Street. Turn right on Grand Street heading west to Clinton Avenue. Turn left onto Clinton Avenue heading south to Alameda Hospital (2070 Clinton Avenue).



I.R. SITE 25
 ALAMEDA POINT
 N.A.S.

ALAMEDA HOSPITAL
 2070 CLINTON AVENUE
 ALAMEDA, CA 94501
 (510) 522-3700

Figure C.12-1
EMERGENCY ROUTE MAP
 ALAMEDA POINT - IR SITE 25
 FOSTER  WHEELER
 ENVIRONMENTAL CORPORATION

ATTACHMENT 1
MATERIAL SAFETY DATA SHEETS

ARISTECH CHEMICAL -- COAL TAR PITCH - SEALING COMPOUND
MATERIAL SAFETY DATA SHEET
NSN: 8030002812341
Manufacturer's CAGE: 94977
Part No. Indicator: A
Part Number/Trade Name: COAL TAR PITCH

=====

General Information

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Item Name: SEALING COMPOUND
Company's Name: ARISTECH CHEMICAL CORPORATION
Company's Street: 600 GRANT STREET
Company's City: PITTSBURGH
Company's State: PA
Company's Country: US
Company's Zip Code: 15230-0250
Company's Emerg Ph #: 412-433-7654/412-433-5811
Company's Info Ph #: 412-433-7654
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 01OCT88
Safety Data Review Date: 07FEB90
Supply Item Manager: 75
MSDS Serial Number: BHJFQ
Hazard Characteristic Code: N1
Unit Of Issue: CN
Unit Of Issue Container Qty: 5 GALLONS
Type Of Container: CAN
Net Unit Weight: 50 POUNDS

=====

Ingredients/Identity Information

=====

Proprietary: NO
Ingredient: COAL TAR PITCH VOLATILES (BENZENE SOLUBLE FRACTION),
ANTHRACENE, BAP, PHENANTHACENE, ACRIDINE, CHRYSENE, PYRENE.
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: GF8655000
CAS Number: 65996-93-2
OSHA PEL: 0.2 MG/M3
ACGIH TLV: 0.2 MG/M3, A1; 9192
Other Recommended Limit: NOT ESTABLISHED

=====

Physical/Chemical Characteristics

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Appearance And Odor: BLACK SOLID. NO ODOR AT AMBIENT TEMPERATURE. AROMATIC
AFTER MELTING.
Boiling Point: >450F, >232C
Vapor Pressure (MM Hg/70 F): 4 @ 440F
Vapor Density (Air=1): >1
Specific Gravity: 1.2
Solubility In Water: NEGLIGIBLE
Percent Volatiles By Volume: NEGL.

=====

Fire and Explosion Hazard Data

=====

Flash Point: >200F, >93C
Flash Point Method: CC
Extinguishing Media: USE CARBON DIOXIDE, FOAM, DRY CHEMICAL, OR WATER FOG.
Special Fire Fighting Proc: FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA &
FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER SPRAY TO
COOL NEARBY CONTAINERS EXPOSED TO FIRE.

Unusual Fire And Expl Hazrds: FINE PITCH DUST IS AS EXPLOSIVE AS COAL DUST. MOLTEN PITCH AT ELEVATED TEMPERATURE WILL BURN.

=====
 Reactivity Data
 =====

Stability: YES
 Cond To Avoid (Stability): HIGH TEMPERATURES, AND OPEN FLAMES.
 Materials To Avoid: STRONG OXIDIZING AGENTS
 Hazardous Decomp Products: CARBON DIOXIDE, CARBON MONOXIDE, TOXIC FUMES.
 Hazardous Poly Occur: NO
 Conditions To Avoid (Poly): NOT APPLICABLE

=====
 Health Hazard Data
 =====

Route Of Entry - Inhalation: YES
 Route Of Entry - Skin: YES
 Route Of Entry - Ingestion: NO
 IRRITATION, PHOTOTOXIC REACTIONS, ACNE, FOLLICULITIS, AND MORE SERIOUS SKIN DISORDERS. INHALATION: SWOLLEN OR IRRITATED NASAL MUCOSA AND SINUSES. CHRONIC-VARIOUS TYPES OF CANCER INCLUDING SKIN CARCINOMAS, LUNG, LIP AND KIDNEY TUMORS.
 Carcinogenicity - NTP: NO
 Carcinogenicity - IARC: YES
 Carcinogenicity - OSHA: NO
 Explanation Carcinogenicity: COAL TAR PITCH IS A CONFIRMED HUMAN CARCINOGEN BY IARC.
 IRRITATION, BURNING, ITCHING, SWELLING, REDNESS. INHALATION: UPPER RESPIRATORY TRACT IRRITATION, COUGHING, SNEEZING.
 Med Cond Aggravated By Exp: INDIVIDUALS WITH CHRONIC RESPIRATORY DISORDERS (ASTHMA, CHRONIC BRONCHITIS, EMPHYSEMA, ETC.) MAY BE ADVERSELY AFFECTED BY ANY FUME OR AIRBORNE PARTICULATE MATTER EXPOSURE.
 Emergency/First Aid Proc: INHALATION: REMOVE SUBJECT TO FRESH AIR. GIVE OXYGEN/CPR IF NEEDED. SEE DOCTOR. EYE: FLUSH WITH PLENTY OF WATER FOR 15 MINUTES. SEE DOCTOR. SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER. SEE DOCTOR. MOLTEN PITCH IS A SEVERE BURN HAZARD. INGESTION: SEE DOCTOR IMMEDIATELY.

=====
 Precautions for Safe Handling and Use
 =====

Steps If Matl Released/Spill: RELEASE OR SPILLAGE OF SOLID CAN BE TREATED AS A COAL SPILLAGE AND RECOVERY MADE AVOIDING SKIN AND EYE CONTACT. IF HOT LIQUID IS SPILLED, CONTAIN WITH ABSORBENT SOLIDS, SUCH AS SAND, EARTH, ETC. ALLOW TO COOL, SCRAPE UP AND DISPOSE.
 Neutralizing Agent: NONE APPLICABLE FOR THIS MATERIAL
 Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
 Precautions-Handling/Storing: STORE IN COOL, DRY, WELL VENTILATED AREA. PROTECT FROM HEAT AND IGNITION SOURCES. KEEP CONTAINERS CLOSED.
 Other Precautions: NONE.

=====
 Control Measures
 =====

Respiratory Protection: NIOSH/MSHA-APPROVED RESPIRATOR WITH CARTRIDGE APPROPRIATE FOR DUST AND ORGANIC VAPORS. RESPIRATOR SELECTION DEPENDS ON THE TYPE AND MAGNITUDE OF EXPOSURE.
 Ventilation: LOCAL EXHAUST VENTILATION REQUIRED. GENERAL DILUTION VENTILATION MAY ASSIST IN REDUCING CONTAMINANT CONCENTRATIONS.
 Protective Gloves: PVA, VYTON.
 Eye Protection: SAFETY GLASSES. FACESHIELD IF SPLASHING.
 Other Protective Equipment: PVA, VYTON PROTECTIVE GARMENTS, FULL BODY CLOTHING, EYE WASH STATION AND SAFETY SHOWER.
 Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING. LAUNDRER CONTAMINATED CLOTHING BEFORE REUSE.
 Suppl. Safety & Health Data: NONE.

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Transportation Data
=====

Trans Data Review Date: 90038
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION

=====
Disposal Data
==========
Label Data
=====

Label Required: YES
Label Status: G
Common Name: COAL TAR PITCH
IRRITATION, PHOTOTOXIC REACTIONS, ACNE, FOLLICULITIS, AND MORE SERIOUS SKIN
DISORDERS. INHALATION: SWOLLEN OR IRRITATED NASAL MUCOSA AND SINUSES.
CHRONIC-VARIOUS TYPES OF CANCER INCLUDING SKIN CARCINOMAS, LUNG, LIP AND
KIDNEY TUMORS. EYES: IRRITATION, BURNING, TEARING.
SKIN: IRRITATION, BURNING, ITCHING, SWELLING, REDNESS. INHALATION: UPPER
RESPIRATORY TRACT IRRITATION, COUGHING, SNEEZING.
Label Name: ARISTECH CHEMICAL CORPORATION
Label Street: 600 GRANT STREET
Label City: PITTSBURGH
Label State: PA
Label Zip Code: 15230-0250
Label Country: US
Label Emergency Number: 412-433-7654/412-433-5811

MATERIAL SAFETY DATA SHEET

**BENZENE (AMOCO/TOTAL)**

MSDS No. 11697000 ANSI/ENGLISH

1.0 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BENZENE (AMOCO/TOTAL)**MANUFACTURER/SUPPLIER:**Amoco Oil Company
200 East Randolph Drive
Chicago, Illinois 60601 U.S.A.**EMERGENCY HEALTH INFORMATION:**

1 (800) 447-8735

EMERGENCY SPILL INFORMATION:

1 (800) 424-9300 CHEMTREC (USA)

**OTHER PRODUCT SAFETY
INFORMATION:**

(312) 856-3907

2.0 COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS#	Range % by Wt.
Benzene	71-43-2	_ 99.80
Toluene	108-88-3	0.20

(See Section 8.0, "Exposure Controls/Personal Protection", for exposure guidelines)

3.0 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Danger! Extremely flammable. Causes eye and skin irritation. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. Harmful or fatal if liquid is aspirated into lungs. Danger! Contains Benzene. Cancer hazard. Can cause blood disorders. Harmful when absorbed through the skin.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: Causes mild eye irritation.

SKIN CONTACT: Causes mild skin irritation. Causes skin irritation on prolonged or repeated contact. Harmful when absorbed through the skin.

INHALATION: Cancer hazard. Can cause blood disorders. Inhalation causes headaches, dizziness, drowsiness, and nausea, and may lead to unconsciousness. See "Toxicological Information" section (Section 11.0).

INGESTION: Harmful or fatal if liquid is aspirated into lungs. See "Toxicological Information" section (Section 11.0).

HMIS CODE: (Health:2) (Flammability:3) (Reactivity:0)

NFPA CODE: (Health:2) (Flammability:3) (Reactivity:0)

4.0 FIRST AID MEASURES

EYE: Flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation persists.

SKIN: Wash exposed skin with soap and water. Remove contaminated clothing, including shoes, and thoroughly clean and dry before reuse. Get medical attention if irritation develops.

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

INGESTION: If swallowed, drink plenty of water, do NOT induce vomiting. Get immediate medical attention.

5.0 FIRE FIGHTING MEASURES

FLASHPOINT: 12°F(-11°C)

UEL: 8.0%

LEL: 1.5%

AUTOIGNITION TEMPERATURE: 928°F (498°C)

FLAMMABILITY CLASSIFICATION: Extremely Flammable Liquid.

EXTINGUISHING MEDIA: Agents approved for Class B hazards (e.g., dry chemical, carbon dioxide, foam, steam) or water fog.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable liquid. Vapor may explode if ignited in enclosed area.

FIRE-FIGHTING EQUIPMENT: Firefighters should wear full bunker gear, including a positive pressure self-contained breathing apparatus.

PRECAUTIONS: Keep away from sources of ignition (e.g., heat and open flames). Keep container closed. Use with adequate ventilation.

HAZARDOUS COMBUSTION PRODUCTS: Incomplete burning can produce carbon monoxide and/or carbon dioxide and other harmful products.

6.0 ACCIDENTAL RELEASE MEASURES

Remove or shut off all sources of ignition. Remove mechanically or contain on an absorbent material such as dry sand or earth. Increase ventilation if possible. Wear respirator and spray with water to disperse vapors. Keep out of sewers and waterways.

7.0 HANDLING AND STORAGE

HANDLING: Use with adequate ventilation. Do not breathe vapors. Keep away from ignition sources (e.g., heat, sparks, or open flames). Ground and bond containers when transferring materials. Wash thoroughly after handling. After this container has been emptied, it may contain flammable vapors; observe all warnings and precautions listed for this product.

STORAGE: Store in flammable liquids storage area. Store away from heat, ignition sources, and open flame in accordance with applicable regulations. Keep container closed. Outside storage is recommended.

8.0 EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE: Do not get in eyes. Wear eye protection.

SKIN: Do not get on skin or clothing. Wear protective clothing and gloves.

INHALATION: Do not breathe mist or vapor. If heated and ventilation is inadequate, use supplied-air respirator approved by NIOSH/MSHA.

ENGINEERING CONTROLS: Control airborne concentrations below the exposure guidelines.

EXPOSURE GUIDELINES:

Component	CAS#	Exposure Limits
Benzene	71-43-2	OSHA PEL: 1 ppm OSHA STEL: 5 ppm ACGIH TLV-TWA: 10 ppm
Toluene	108-88-3	OSHA PEL: 100 ppm (1989); 200 ppm (1971) OSHA STEL: 150 ppm (1989); Not established. (1971) OSHA Ceiling: 300 ppm (1971) ACGIH TLV-TWA: 50 ppm (skin)

9.0 CHEMICAL AND PHYSICAL PROPERTIES

APPEARANCE AND ODOR: Liquid. Colorless. Sweet odor.

pH: Not determined.

VAPOR PRESSURE: 74.6 mm Hg at 20 °C

VAPOR DENSITY: Not determined.

BOILING POINT: 176°F(80°C)

MELTING POINT: 42°F(6°C)

SOLUBILITY IN WATER: Slight, 0.1 to 1.0%.

SPECIFIC GRAVITY (WATER=1): 0.88

10.0 STABILITY AND REACTIVITY

STABILITY: Stable.

CONDITIONS TO AVOID: Keep away from ignition sources (e.g. heat, sparks, and open flames).

MATERIALS TO AVOID: Avoid chlorine, fluorine, and other strong oxidizers.

HAZARDOUS DECOMPOSITION: None identified.

HAZARDOUS POLYMERIZATION: Will not occur.

11.0 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY DATA:

EYE IRRITATION: Testing not conducted. See Other Toxicity Data.

SKIN IRRITATION: Testing not conducted. See Other Toxicity Data.

DERMAL LD50: Testing not conducted. See Other Toxicity Data.

ORAL LD50: 3.8 g/kg (rat).

INHALATION LC50: 10000 ppm (rat)

OTHER TOXICITY DATA: Acute toxicity of benzene results primarily from depression of the central nervous system (CNS). Inhalation of concentrations over 50 ppm can produce headache, lassitude, weariness, dizziness, drowsiness, or excitation. Exposure to very high levels can result in unconsciousness and death.

Long-term overexposure to benzene has been associated with certain types of leukemia in humans. In addition, the International Agency for Research on Cancer (IARC) and OSHA consider benzene to be a human carcinogen. Chronic exposures to benzene at levels of 100 ppm and below have been reported to cause adverse blood effects including anemia. Benzene exposure can occur by inhalation and absorption through the skin.

Inhalation and forced feeding studies of benzene in laboratory animals have produced a carcinogenic response in a variety of organs, including possibly leukemia, other adverse effects on the blood, chromosomal changes and some effects on the immune system. Exposure to benzene at levels up to 300 ppm did not produce birth defects in animal studies; however, exposure to the higher dosage levels (greater than 100 ppm) resulted in a reduction of body weight of the rat pups (fetotoxicity). Changes in the testes have been observed in mice exposed to benzene at 300 ppm, but reproductive performance was not altered in rats exposed to benzene at the same level.

Aspiration of this product into the lungs can cause chemical pneumonia and can be fatal. Aspiration into the lungs can occur while vomiting after ingestion of this product. Do not siphon by mouth.

12.0 ECOLOGICAL INFORMATION

Ecological testing has not been conducted on this product.

13.0 DISPOSAL INFORMATION

Disposal must be in accordance with applicable federal, state, or local regulations. Enclosed-controlled incineration is recommended unless directed otherwise by applicable ordinances. Residues and spilled material are hazardous waste due to ignitability.

14.0 TRANSPORTATION INFORMATION

U.S. DEPT OF TRANSPORTATION

Shipping Name	Benzene
Hazard Class	3
Identification Number	UN1114
Packing Group	II
RQ	RQ

INTERNATIONAL INFORMATION:

Sea (IMO/IMDG)

Shipping Name Not determined.

Air (ICAO/IATA)

Shipping Name Not determined.

European Road/Rail (ADR/RID)

Shipping Name Not determined.

Canadian Transportation of Dangerous Goods

Shipping Name Not determined.

15.0 REGULATORY INFORMATION

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR Part 302.4): This product is reportable under 40 CFR Part 302.4 because it contains the following substance(s):

Component/CAS Number	Weight %	Component Reportable Quantity (RQ)
Benzene 71-43-2	99.80	10 lbs.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR Part 355): This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA TITLE III SECTIONS 311/312 HAZARDOUS CATEGORIZATION (40 CFR Part 370): This product is defined as hazardous by OSHA under 29 CFR Part 1910.1200(d).

SARA TITLE III SECTION 313 (40 CFR Part 372): This product contains the following substance(s), which is on the Toxic Chemicals List in 40 CFR Part 372:

Component/CAS Number	Weight Percent
Benzene 71-43-2	99.80

U.S. INVENTORY (TSCA): Listed on inventory.

OSHA HAZARD COMMUNICATION STANDARD: Flammable liquid. Carcinogen. Irritant. CNS Effects. Target organ effects.

EC INVENTORY (EINECS/ELINCS): In compliance.

JAPAN INVENTORY (MITI): Not determined.

AUSTRALIA INVENTORY (AICS): Not determined.

KOREA INVENTORY (ECL): Not determined.

CANADA INVENTORY (DSL): Not determined.

PHILIPPINE INVENTORY (PICCS): Not determined.

16.0 OTHER INFORMATION

Prepared by:

Environment, Health and Safety Department

Issued: November 14, 1995

This material Safety Data Sheet conforms to the requirements of ANSI Z400.1.

This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

SHELL OIL -- REG UNLEADED GASOLINE, CODE:02104-02110-02120- - GASOLINE, UNLEADED
MATERIAL SAFETY DATA SHEET
NSN: 9130012084172
Manufacturer's CAGE: 54527
Part No. Indicator: B
Part Number/Trade Name: REG UNLEADED GASOLINE, CODE:02104/02110/02120/
(SUPPLEMENT)

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General Information
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Item Name: GASOLINE, UNLEADED
Company's Name: SHELL OIL COMPANY
Company's Street: 1 SHELL PLAZA
Company's P. O. Box: 2463
Company's City: HOUSTON
Company's State: TX
Company's Country: US
Company's Zip Code: 77001
Company's Emerg Ph #: 713-473-9461 (24 HOUR EMERGENCY)
Company's Info Ph #: 713-241-4819
Record No. For Safety Entry: 048
Tot Safety Entries This Stk#: 064
Status: FE
Date MSDS Prepared: 01JAN88
Safety Data Review Date: 20OCT94
Supply Item Manager: KY
MSDS Preparer's Name: J.C.WILLETT
Preparer's Company: PRODUCT SAF & COMPLIANCE, SHELL OIL CO
Preparer's St Or P. O. Box: POB 4320
Preparer's City: HOUSTON
Preparer's State: TX
Preparer's Zip Code: 77210
MSDS Serial Number: BVHJP
Specification Number: VV-G-1690
Spec Type, Grade, Class: CIVGAS
Hazard Characteristic Code: F2
Unit Of Issue: DR
Unit Of Issue Container Qty: 55 GALLONS
Type Of Container: DRUM, 18 GAGE
Net Unit Weight: 329.8 LBS

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: GASOLINE, REGULAR UNLEADED
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM/500STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: MIXTURE, ALKANES, CYCLOALKANES, ALKENES & AROMATIC
HYDROCARBONS.
Ingredient Sequence Number: 02
Percent: BALANCE
NIOSH (RTECS) Number: 1006871MU
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 03
Percent: 0-25
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM/150STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: TOLUENE (SARA III)
Ingredient Sequence Number: 04
Percent: 0-25
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM; Z-2
ACGIH TLV: S, 50 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 05
Percent: 0-4
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: SEE 1910.1028
ACGIH TLV: 10 PPM; A2; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: HEXANE (N-HEXANE)
Ingredient Sequence Number: 06
Percent: 0-3
NIOSH (RTECS) Number: MN9275000
CAS Number: 110-54-3
OSHA PEL: 500 PPM
ACGIH TLV: 50 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 0-15
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: 1,2,4-TRIMETHYLBENZENE (SARA III)
Ingredient Sequence Number: 08
Percent: 0-5
NIOSH (RTECS) Number: DC3325000
CAS Number: 95-63-6
OSHA PEL: 25 PPM
ACGIH TLV: 25 PPM; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 09
Percent: 0-1

NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 10
Percent: 0-3
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM/125STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 11
Percent: 0-1
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM
ACGIH TLV: 10 PPM/15 STEL; 9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: STYRENE, MONOMER (SARA III)
Ingredient Sequence Number: 12
Percent: 0-4
NIOSH (RTECS) Number: WL3675000
CAS Number: 100-42-5
OSHA PEL: 100 PPM
ACGIH TLV: S,50PPM/100STEL;9394
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: NOTE:CONTENT OF GASOLINE COMPONENTS WILL VARY;INDIVIDUAL
COMPONENTS MAY BE PRESENT FROM TRACE AMTS UP TO MAX GIVEN ABOVE
Ingredient Sequence Number: 13
Percent: N/A
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE RECOMMENDED

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Physical/Chemical Characteristics
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Appearance And Odor: BRONZE COLOR, CLEAR & BRIGHT LIQUID, HYDROCARBON
ODOR.
Boiling Point: N/A
Melting Point: -72F, -58C
Vapor Pressure (MM Hg/70 F): 7-1405PSI
Vapor Density (Air=1): 3.5
Specific Gravity: 0.72-0.76
Evaporation Rate And Ref: N/A
Solubility In Water: NEGLIGIBLE.
Percent Volatiles By Volume: 100

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Fire and Explosion Hazard Data
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Flash Point: -40F, -40C
Flash Point Method: TCC
Lower Explosive Limit: 1.3

Upper Explosive Limit: 7.6

Extinguishing Media: USE WATER FOG, FOAM, DRY CHEM OR CO2. DO NOT USE DIRECT STREAM OF WATER, MATL WILL FLOAT & CAN BE REIGN ON SURFACE OF WATER.

Special Fire Fighting Proc: DANGER. EXTREMELY FLAMM. CLEAR AREA OF PUBLIC. ISOLATE. DO NOT ENTER CONFINED FIRE SPACE W/O FULL BUNKER GEAR + POS PRESSURE NIOSH APPROVED SCBA. COOL CNTNR W/WATER.

Unusual Fire And Expl Hazrds: VAP HEAVIER THAN AIR/ACCUMULATE IN LOW AREAS/TRAVEL ALONG GROUND. DON'T WELD/HEAT/DRILL ON/NEAR CNTNR. IF EMERG REQUIRE DRILLING-SHOULD BE DONE BY TRAIN EMRG PERS

Reactivity Data

Stability: YES

Cond To Avoid (Stability): AVOID HEAT, SPARKS, OPEN FLAMES & STRONG OXIDIZING AGENTS. PREVENT VAPOR ACCUMULATION.

Materials To Avoid: STRONG OXIDIZING AGENTS.

Hazardous Decomp Products: CARBON MONOXIDE & OTHER UNIDENTIFIED ORGANIC COMPOUNDS CAN BE FORMED UPON COMBUSTION.

Hazardous Poly Occur: NO

Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN

Route Of Entry - Inhalation: YES

Route Of Entry - Skin: YES

Route Of Entry - Ingestion: YES

Health Haz Acute And Chronic: EYE:MIN IRRIT. SKIN:PROLONG/REPEAT LIQ CONTACT CAN CAUSE DEFATTING & DRYING RESULTING IN IRRIT/DERM. INHAL:NOSE/THROAT/RESP TRACT IRRIT.MAY PRODUCE LIVER/KIDNEY DAMAGE.HIGH VAP CONCEN MAY PRODUCE CNS DEPRESS. INGEST:HARMFUL/FATAL.VOMIT,ASPIRATION OF VOMITUS INTO LUNGS RESULTING IN ASPIRATION PNEUMONITIS.

Carcinogenicity - NTP: YES

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: YES

Explanation Carcinogenicity: CONTAINS BENZENE. PER IARC DETERMINES GASOLINE CARCINOGENIC (GROUP 2B).

Signs/Symptoms Of Overexp: CNS DEPRESS:GIDDINESS,HEAD,DIZZ,NAU.ALSO UNCONSCIOUSNESS,DEATH. ASPIRATION PNUITIS:COUGHING,LABORED BREATHING, CYANOSIS(BLUIISH SKIN),DEATH.KIDNEY DAMAGE:CHANGES IN URINE OUTPUT,URINE APPEARANCE,EDEMA. LIVER DAMAGE:LOSS OF APPETITE,JAUNDICE (YELLOWISH SKIN COLOR),PAIN IN UPPER ABDOMEN ON RIGHT SIDE.

Med Cond Aggravated By Exp: PRE-EXISTING EYE/SKIN/RESP DISORDERS. IMPAIRED LIVER & KIDNEY FUNCTIN(S) FROM PRE-EXISITNG DISORDERS.

Emergency/First Aid Proc: EYE:FLUSH W/WATER FOR 15MINS OPENING EYELIDS.GET MED ATTN. SKIN:FLUSH W/WATER WHILE REMOVING CONTAMIN CLOTH/ SHOES.WASH W/SOAP & WATER.IRRIT PERSISTS GET MED ATTN. INHAL:REMOVE TO FRESH AIR.PROVIDE OXYGEN IF BREATHING DIFFICULTY.GIVE ARTI RESP IF NOT BREATHING.GET MED ATTN. INGEST:DO NOT INDUCE VOMIT.IF OCCURS SPONTANEOUSLY KEEP HEAD BELOW HIPS.GET MED ATTN. (SEE SUPPLEMENTAL)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE ALL IGN SOURCES.GROUND EQPMT. ISOLATE AREA.WEAR APPROPRIATE RESP/PPE.SHUT OFF SOURCE W/O RISK.DIKE/CONTAIN.WATER FOG FOR SUPPRESSING VAP.CONTAIN RUNOFF.REMOVE W/VAC TRUCKS/PUMP TO STORAGE/SALV VESS.SOAK RESIDUE W/ABSORBENT.FLUSH W/ATER.

Neutralizing Agent: NONE SPECIFIED BY MFG.

Waste Disposal Method: NONE SPECIFIED BY MFG. HOWEVER DISPOSE OF IAW LOCAL, STATE AND FEDERAL REGULATIONS.

Precautions-Handling/Storing: AVOID HEAT/SPARKS/OPEN FLAMES/PILOT LIGHTS/STRONG OXIDIZING AGENTS.USE EXPLOSION-PROOF VENTI TO PREVENT VAP ACCUMULATION.ALL EQPMT MUST BE GROUNDED.

Other Precautions: DO NOT SIPHON BY MOUTH.FOR USE AS MOTOR FUEL ONLY.DO

NOT USE AS CLEANING SOLVENT OR NON-MOTOR FUEL. IF MAJOR SPILL OCCURS GET UPWIND & NOTIFY EMERG PERSONNEL. REMEMBER EXPLOSION & FIRE IS THE MOST IMMED DANGER.

Control Measures

Respiratory Protection: UNDER CONDITIONS OF POTENTIAL HIGH EXPOSURE USE OF NIOSH-APPROVED RESP IS RECOMMENDED. PER 29CFR1910.134 OR 29CFR1910.1028 USE EITHER ATM-SUPPLYING RES OR AIR-PURIFYING RESP FOR ORGANIC VAPORS. Ventilation: USE EXPLOSION-PROOF VENTILATION AS REQUIRED TO CONTROL VAPOR CONCENTRATIONS. Protective Gloves: NITRILE RUB, PVA, VITON/NEOPRENE GLOVES. Eye Protection: CHEM GOGGLES. Other Protective Equipment: CLOTHING FOR PROTECTION AS NECESSARY. Work Hygienic Practices: WASH CONTAMIN CLOTH/SHOE PRIOR TO REUSE. WASHW/ SOAP & WATER BEFORE EAT/DRINK/SMOKE/TOILET FACILITIES. IF >2.0ML/KG INGEST & NO VOMITING EMESIS HSOULD BE INDUCED W/MED SUPERVISION. IF SYMPTOMS (EX:LOSS OF GAG REFLEX, CONVULSIONS, UNCONSCIOUSNESS) OCCUR BEFORE EMESIS GASTRIC LAVAGE USING CUFFED ENDOTRACHEAL TUBE SHOULD BE CONSIDERED.

Transportation Data

Trans Data Review Date: 94293
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: MUC
IATA UN ID Number: 1203
IATA Proper Shipping Name: GASOLINE
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7
Additional Trans Data: PER MSDS:DOT PROPER SHIPPING NAME:GASOLINE, UN1203.

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 20OCT94
Label Status: F
Common Name: REG UNLEADED GASOLINE, CODE:02104/02110/02120/ (SUPPLEMENT)
Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X

Special Hazard Precautions: EYE:MIN IRRIT. SKIN:PROLONG/REPEAT LIQ CONTACT CAN CAUSE DEFATTING & DRYING RESULTING IN IRRIT/DERM. INHAL:NOSE/THROAT/RESP TRACT IRRIT.MAY PRODUCE LIVER/KIDNEY DAMAGE.HIGH VAP CONCEN MAY PRODUCE CNS DEPRESS. INGEST:HARMFUL/FATAL.VOMIT,ASPIRATION OF VOMITUS INTO LUNGS RESULTING IN ASPIRATION PNEUITIS. 1ST AID:EYE:FLUSH W/WATER FOR 15MINS OPENING EYELIDS.GET MED ATTN.SKIN:FLUSH W/WATER WHILE REMOVING CONTAMIN CLOTH/SHOES.WASH W/SOAP & WATER.IRRIT PERSISTS GET MED ATTN.INHAL:REMOVE TO FRESH AIR.GIVE OXY IF BREATH DIFFICULTY.GIVE ARTI RESP IF NOT BREATH.GET MED ATTN.INGEST:DO NOT INDUCE VOMIT.IF OCCURS SPONT KEEP HEAD BELOW HIPS. GET MED ATTN.

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: SHELL OIL COMPANY

Label Street: 1 SHELL PLAZA

Label P.O. Box: 2463

Label City: HOUSTON

Label State: TX

Label Zip Code: 77001

Label Country: US

Label Emergency Number: 713-473-9461 (24 HOUR EMERGENCY)

CHEVRON ENVIRONMENTAL HEALTH CENTER -- DIESEL FUEL NO. 2 - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865295
Manufacturer's CAGE: 0AHD1
Part No. Indicator: B
Part Number/Trade Name: DIESEL FUEL NO. 2

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General Information
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Item Name: DIESEL FUEL
Company's Name: CHEVRON ENVIRONMENTAL HEALTH CENTER
Company's Street: 15299 SAN PABLO AVE.
Company's P. O. Box: 4054
Company's City: RICHMOND
Company's State: CA
Company's Country: US
Company's Zip Code: 94804-0054
Company's Emerg Ph #: 800-457-2022
Company's Info Ph #: 800-582-3835
Distributor/Vendor # 1: HAYCOCK DISTRIBUTING CO INC
Distributor/Vendor # 1 Cage: 5N126
Distributor/Vendor # 2: BRESHEAR W.H. INC (209-522-7291)
Distributor/Vendor # 2 Cage: 5W305
Distributor/Vendor # 3: RAYMOND WEEKS OIL CO INC (6056963)
Distributor/Vendor # 3 Cage: 9V384
Record No. For Safety Entry: 005
Tot Safety Entries This Stk#: 092
Status: FE
Date MSDS Prepared: 01MAR92
Safety Data Review Date: 06SEP94
Supply Item Manager: KY
MSDS Serial Number: BPFWD
Specification Number: VV-F-800
Spec Type, Grade, Class: DF-2 GRADE
Hazard Characteristic Code: F4
Unit Of Issue: CN
Unit Of Issue Container Qty: 5.0 GAL
Type Of Container: CAN
Net Unit Weight: 35.4 LBS

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Ingredients/Identity Information
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Proprietary: NO
Ingredient: PETROLEUM MID-DISTILLATE (DIESEL FUELS NO. 2)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: 1004302PE
CAS Number: 68476-34-6
OSHA PEL: 5 MG/M3 AS OIL MIST
ACGIH TLV: 5 MG/M3 AS OIL MIST
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: DISTILLATES, STRAIGHT RUN MIDDLE
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: LX3296000
CAS Number: 64741-44-2
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: HYDRODESULFURIZED MIDDLE DISTILLATE
Ingredient Sequence Number: 03

NIOSH (RTECS) Number: LX3296000
CAS Number: 64742-80-9
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: 5 MG/M3

Proprietary: NO
Ingredient: KEROSENE
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: OA5500000
CAS Number: 8008-20-6
OSHA PEL: 100 PPM
ACGIH TLV: 100 PPM 9091
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: KEROSENE, HYDRODESULFURIZED
Ingredient Sequence Number: 05
NIOSH (RTECS) Number: 1002450KE
CAS Number: 64742-81-0
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: LIGHT HYDROCARBON BLEND
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: 1004286BL
CAS Number: 64741-59-9
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

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Physical/Chemical Characteristics

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Appearance And Odor: PALE YELLOW LIQUID.
Boiling Point: 349F,176C
Melting Point: N/A
Vapor Pressure (MM Hg/70 F): 0.04 PSIG
Specific Gravity: 0.84
Decomposition Temperature: UNKNOWN
Solubility In Water: INSOLUBLE
pH: N/A
Corrosion Rate (IPY): UNKNOWN

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Fire and Explosion Hazard Data

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Flash Point: 125F,52C
Flash Point Method: PMCC
Lower Explosive Limit: 0.6
Upper Explosive Limit: 4.7
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, OR DRY CHEMICAL.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND A FULL FACED SELF CONTAINED BREATHING APPARATUS. EVACUATE AREA. COOL FIRE EXPOSED CONTAINERS WITH WATER SPRAY.
Unusual Fire And Expl Hazrds: COMBUSTION OR HEAT OF FIRE MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS AND VAPORS. LIQUID EVAPORATES AND FORMS VAPORS WHICH CAN CATCH FIRE WITH VIOLENT BURNING

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF IGNITION

Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: TOXIC CARBON MONOXIDE AND CARBON DIOXIDE, AND
SULFUR DIOXIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

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Health Hazard Data
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LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYES:IRRITATION. SKIN:MODERATE SKIN
IRRITANT. INHALATION: CNS EFFECTS. INGESTION:PRACTICALLY NON-TOXIC TO
INTERNAL ORGANS. HOWEVER, IF ASPIRATED INTO LUNGS IT MAY CAUSE CHEMICAL
PNEUMONITIS WHICH CAN BE FATAL. CHRONIC:MIDDLE DISTILLATE HAS CAUSED SKIN
CANCER WHEN REPEATED APPLIED TO MICE OVER LIFETIME.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: WHOLE DIESEL ENGINE EXHAUST IS LISTED AS A
PROBABLE CARCINOGEN BY IARC AND NIOSH.
Signs/Symptoms Of Overexp: SKIN:PAIN OR A FEELING OF HEAT, DISCOLORATION,
SWELLING, AND BLISTERING. INHALATION: HEADACHE, DIZZINESS, LOSS OF
APPETITE, WEAKNESS AND LOSS OF COORDINATION.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES:FLUSH WITH FRESH WATER FOR 15 MINUTES.
SKIN: REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH SOAP AND
WATER. SEE A DOCTOR IF SYMPTOMS DEVELOP. INHALATION: REMOVE TO FRESH AIR.
INGESTION: GIVE WATER OR MILK TO DRINK AND GET IMMEDIATE MEDICAL ATTENTION.
DO NOT MAKE PERSON VOMIT UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL.

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Precautions for Safe Handling and Use
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Steps If Matl Released/Spill: THIS MATERIAL IS CONSIDERED TO BE A WATER
POLLUTANT AND RELEASES OF THIS PRODUCT SHOULD BE PREVENTED. ELIMINATE ALL
OPEN FLAMES. STOP SOURCE OF THE LEAK. CONTAIN LIQUID. CLEAN UP SPILL USING
APPROPRIATE TECHNIQUES SUCH AS ABSORBENT MATERIALS.
Neutralizing Agent: NONE
Waste Disposal Method: PLACE CONTAMINATED MATERIALS IN DISPOSABLE
CONTAINERS AND DISPOSE OF IN A MANNER CONSISTENT WITH APPLICABLE
REGULATIONS. CANTACT LOCAL ENVIRONMENTAL OR HEALTH AUTHORITIES FOR APPROVED
DISPOSAL OF THIS MATERIAL.
Precautions-Handling/Storing: STORE IN A COOL AREA. KEEP CONTAINER LID
TIGHTLY CLOSED.
Other Precautions: DO NOT INHALE VAPORS OR EXHUST FUMES, AVOID SKIN
CONTACT.

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Control Measures
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Respiratory Protection: NONE NORMALLY REQUIRED. USE NIOSH APPROVED SELF-
CONTAINED BREATHING APPARATUS IF TLV IS EXCEEDED OR WHEN SPRAYING OR USING
IN CONFINED SPACES.
Ventilation: USE THIS MATERIAL ONLY IN WELL VENTILATED AREAS.
Protective Gloves: PVC
Eye Protection: GOGGLES
Other Protective Equipment: WEAR PROTECTIVE CLOTHINGS.
Work Hygienic Practices: WASH HANDS THOROUGHLY AFTER HANDLING THIS
PRODUCT.
Suppl. Safety & Health Data: NONE

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Transportation Data
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Trans Data Review Date: 92309

DOT PSN Code: GTF
DOT Proper Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
DOT Class: 3
DOT ID Number: UN1202
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HIA
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o *
IMO Regulations Page Number: 3345
IMO UN Number: 1993
IMO UN Class: 3.3
IMO Subsidiary Risk Label: - *
IATA PSN Code: MTX
IATA UN ID Number: 1202
IATA Proper Shipping Name: GAS OIL
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MTX
AFI Prop. Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT *
AFI Class: 3
AFI ID Number: UN1202
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
N.O.S. Shipping Name: CONTAINS KEROSENE, PETROLEUM DISTILLATE.

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Disposal Data
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Label Data
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Label Required: YES
Technical Review Date: 04DEC92
MFR Label Number: NONE
Label Status: F
Common Name: CHEVRON DIESEL FUEL #2
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Moderate: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: COMBUSTIBLE LIQUID! HARMFUL OF FATAL IF SWALLOWED. CAUSES SKIN IRRITATION. PROLONGED OR REPEATED SKIN CONTACT MAY INCREASE THE RISK OF SKIN CANCER. STORE IN A COOL AREA. KEEP CONTAINER LID REMOVE CONTAMINATED CLOTHING. WASH SKIN THOROUGHLY WITH SOAP AND WATER. SEE GIVE WATER OR MILK TO DRINK AND GET IMMEDIATE MEDICAL ATTENTION. DO NOT MAKE PERSON VOMIT UNLESS DIRECTED TO DO SO BY MEDICAL PERSONNEL.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: CHEVRON ENVIRONMENTAL HEALTH CENTER INC.
Label Street: 15299 SAN PABLO AVE.
Label P.O. Box: 4054
Label City: RICHMOND
Label State: CA
Label Zip Code: 94804-0054
Label Country: US
Label Emergency Number: 415-233-3737, 800-457-2022
Year Procured: 1992

ATTACHMENT 2
ACTIVITY HAZARD ANALYSES

ACTIVITY HAZARD ANALYSIS #1

Activity: Mobilization and Site SetupAnalyzed By/Date: J. Samaniego 9/30/01Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Set up work areas	<p>Potential exposure to chemical hazards</p> <p>Noise exposure</p> <p>Slip, trip, and fall hazards</p> <p>Sharp objects/punctures</p> <p>Strains from manually moving materials and equipment</p>	<ul style="list-style-type: none"> • Delineate exclusion zones and use PPE specified in Table C.6-1. • Ambient air monitoring and visual observation shall be used to verify selection of PPE. • Identify all chemical hazards and receive training Materials Safety Data Sheets (MSDS) regarding safe handling of chemicals. The SHSS will file copies of all material safety data sheets (MSDSs) at site. • Hearing protection is required when sound levels exceed 84 dBA continuously. Areas where hearing protection is required shall display warning signs requiring hearing protection. • Work areas shall be visually inspected and slip, trip, and fall hazards shall be marked, barricaded, or eliminated, if feasible. • Maintain proper illumination in all work areas. • Refer to EHS Procedure 3-8, Fall Protection. • Wear cut-resistant work gloves when sharp edges or other objects may cause the possibility of lacerations or other injury. When possible, sharp edges will be blunted. • Workers should not stand or walk on equipment or supplies. • Personnel shall be directed to use proper lifting techniques such as keeping the back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment. • Use of hand truck shall be encouraged. • Employees will not lift more than 50 pounds. • Refer to EHS Procedure 3-1, Ergonomics.

ACTIVITY HAZARD ANALYSIS #1

Activity: Mobilization and Site Setup

Analyzed By/Date: J. Samaniego 9/30/01

Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Set up work areas (continued)	<p>Exposure to extreme temperatures</p> <p>Eye hazards</p> <p>Lack of communication in widely dispersed areas</p> <p>Struck by or against heavy equipment</p> <p>Unauthorized access</p>	<ul style="list-style-type: none"> • Monitor for heat stress in accordance with EHS Procedure 4-6, Temperature Extremes. • Provide fluids and rest breaks during warm weather and while wearing impermeable protective clothing. • Safety glasses are the minimum required eye protection for all work areas. • Ensure each work team has a telephone or access to a telephone for communication. • If more than one team at a time is working, ensure that there is communication between the work teams and project management. • Wear high visibility reflective vests when exposed to vehicle traffic or golfers. • Make eye contact with operators before approaching equipment. • Understand and review posted hand signals. • Traffic barricades, signs, flags, and backup spotters will be used during field activities. • Ensure barriers in place and inform crew to keep unauthorized access to work areas.

ACTIVITY HAZARD ANALYSIS #1

Activity: Mobilization and Site SetupAnalyzed By/Date: J. Samaniego 9/30/01Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Installation of utilities: temporary or permanent	Electrocution; improper installation	<ul style="list-style-type: none"> • Only qualified electricians are allowed to hook up or disconnect electrical circuits. • Inspect all extension cords and generators daily for structural integrity, ground continuity, and damaged areas. • Inspect extension cord connection. • Use ground fault circuit interrupters on all outdoor 115 to 120 volts, 20 amps or less circuits. • Elevate or cover electric wire or flexible cord passing through work area to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching. (Cover only in accordance with National Electrical Code requirements.) • Keep plugs and receptacles out of water unless they are approved- submersible types. • Ground all electrical circuits in accordance with the National Electrical Code or other applicable standards and regulations. • Portable generators should be placed on level ground, housing closed, and wheels chocked.
Install barricades and other support structures	Power and hand tools Material handling	<ul style="list-style-type: none"> • Inspect all tools before each use. • Personnel will be trained in the proper use of hand tools. • All power tools will be grounded or double insulated. • Identify and avoid pinch points. • Maintain communication with others involved in material handling. • Use appropriate PPE.

ACTIVITY HAZARD ANALYSIS #1

Activity: Mobilization and Site SetupAnalyzed By/Date: J. Samaniego 9/30/01Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Install barricades and other support structures (continued)	Strains from handling materials	<ul style="list-style-type: none"> • Personnel shall be directed to use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment. • Use of hand trucks shall be encouraged. • Personnel shall work at a steady pace. • Refer to EHS Procedure 3-1, Ergonomics.
Equipment to be Used	Inspection Requirements	Training Requirements
Heavy equipment, hand tools	Daily and before use	<ul style="list-style-type: none"> • Only trained equipment operators may operate heavy equipment; only Department of Motor Vehicles-licensed personnel will operate trucks. • Specific training for power tools, hand tools, and electrical safety.

Notes:

dBA – decibels, A-scale

EHS – Environmental Health and Safety

MSDS – Materials Safety Data Sheet

PPE – personal protective equipment

SHSS – Site Health and Safety Specialist

ACTIVITY HAZARD ANALYSIS #2

Activity: Removing/Replacing Shrubs and Fencing Analyzed By/Date: J. Samaniego 09/30/01 Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Use heavy equipment to remove shrubs, fences, and debris	Struck by or against heavy equipment	<ul style="list-style-type: none"> • Wear high visibility reflective vests when exposed to vehicle traffic. • Make eye contact with operators before approaching equipment. • Understand and review posted hand signals. • Use signs, flags, and backup spotters.
Loading and hauling materials	<p>Hauling</p> <p>Noise</p>	<ul style="list-style-type: none"> • Be sure materials are secured to vehicle transporting them. • If materials are consolidated into a truck for hauling to a disposal site, ensure that all material is compatible and acceptable for the disposal site. Do not mix chemical wastes with debris or containers containing any materials (dispose of these separately as required by the waste management plan). • When handling vegetation use leather gloves. • Wear hearing protection.
Removing/replacing shrubs and fences	<p>Underground and aboveground utilities</p> <p>Potential underground gas pockets</p> <p>Sharp objects and debris</p>	<ul style="list-style-type: none"> • Verify that utilities are not present. • Note any abnormal smell indicating the presence of gases. STOP WORK! Use combustible gas meter to determine if gases are flammable. If the LEL is at 10 percent or greater, do not continue. Contact Project Manager and PESM. • Handle debris with leather /cut-resistant gloves.

ACTIVITY HAZARD ANALYSIS #2

Activity: Removing/Replacing Shrubs and Fencing **Analyzed By/Date:** J. Samaniego 09/30/01 **Reviewed By:** Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Removing shrubs and fences (continued)	Strains from manually moving materials, shrubs, trees, and debris Exposure to insects, snakes, animals Potential exposure to chemical hazards and dust	<ul style="list-style-type: none"> • Personnel shall be directed to use proper lifting techniques such as keeping the back straight, lifting with the legs, limiting twisting, and getting help in moving bulky/heavy materials and equipment. • Use of mechanical assistance is recommended. • Employees will not lift more than 50 pounds. • Objects that are bulk with unevenly distributed weight or objects heavier than 50 pounds require more than one person. • If material is lifted using chains, slings, or wire ropes, these devices must be inspected and rated for the weight of the load being lifted regardless of the height the material is raised. Follow safe rigging techniques. • Refer to EHS Procedure 3-1, Ergonomics. • Be aware that snakes often can take shelter near objects that are on the ground. Poke around or prod before moving the object with your hands. • Bees, hornets, and wasps often nest in various objects as well as in shrubs and trees. Before disturbing any object or area, look for these insects. • Perform air monitoring as specified in SHSP. • Wear required PPE. • Minimize generation of dust. Use dust control measures. • Do not refuel any equipment that is located on a pickup truck or trailer. Refuel equipment on a level surface such as concrete. Clean up all spills immediately using readily available spill control materials. Report any spills.

ACTIVITY HAZARD ANALYSIS #2

Activity: Removing/Replacing Shrubs and Fencing **Analyzed By/Date:** J. Samaniego 09/30/01 **Reviewed By:** Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Removing shrubs and fences (continued)	Use of mowing equipment/weed cutters	<ul style="list-style-type: none"> • Wear proper PPE, especially safety glasses and hearing protection. (Most cutting equipment produces noise of at least 92 dBA.) • When using weed cutters, wear leg protection or wear heavy fabric pants such as denim or canvas. • Perform a foreign object and debris check prior to using any cutting equipment. • Ensure that other people are not within the vicinity of cutting equipment. Other people must maintain a safe clearance distance. • Inspect all equipment before use, especially any cutting blades and the attachments. • Review AHA for chain saws.

Equipment to be Used	Inspection Requirements	Training Requirements
Hand tools, power tools, and heavy equipment	Daily or before use	<ul style="list-style-type: none"> • Only trained equipment operators may operate heavy equipment; only Department of Motor Vehicles-licensed personnel will operate trucks. • Specific training on the use equipment (chain saws). • Specific training on rigging, if chains, wire ropes, or slings are used to lift trees and other objects.

Notes:

dBA – decibels, A- scale
 EHS – Environmental Health and Safety
 LEL – Lower Explosive Limit

PESM – Project Environmental and Safety Manager
 PPE – personal protective equipment
 SHSS – Site Health and Safety Specialist
 SHSP – Site-Specific Health and Safety Plan

ACTIVITY HAZARD ANALYSIS #3

Activity: Excavating and Backfilling **Analyzed By/Date:** J. Samaniego 09/30/01 **Reviewed By:** Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Excavating/backfilling (Continued)	Excavation hazards Dust and Vapors Strains from use of tools, such as shovels Heavy equipment hazards	<ul style="list-style-type: none"> • Maintain eye contact with operators. Personnel must wear visible vests. • Barricade all open excavations as required by EM 385-1-1, Section 25. • Handle soil carefully to avoid dust generation. • Backfill excavation each day. • Do not leave open excavations at end of day. • Monitor excavated materials to ensure proper level of protection. • Control dust by wetting soil. • Maintain steady pace when using tools and take adequate rest periods. • Use appropriate tools for the task and maintain tools in good condition. • Equip all heavy equipment on this project with rollover protection systems and backup alarms. • Stay clear of moving equipment unless necessary. • Inspect all equipment daily before use to ensure proper maintenance is being performed. • Make eye contact with operator, heavy equipment has right-of-way.
Backfilling	Material handling Hot work	<ul style="list-style-type: none"> • Use mechanical means to place materials in excavation whenever feasible. • When backfilling with gravel or soil, ensure that no one is in the trench. • Hot work in trench requires authorization form PESM.

ACTIVITY HAZARD ANALYSIS #3

Activity: Excavating and Backfilling **Analyzed By/Date:** J. Samaniego 09/30/01 **Reviewed By:** Roger Margotto, CIH

Equipment to be Used	Inspection Requirements	Training Requirements
Heavy equipment, dump trucks	Daily or before use. Inspect all equipment upon arrival at site. Obtain a mechanics certificate of inspection before equipment is delivered to site.	<ul style="list-style-type: none"> Only trained equipment operators may operate heavy equipment; only Department of Motor Vehicles-licensed personnel will operate trucks.

Notes:

EHS – Environmental Health and Safety

EM – Engineer Manual

PPE – personal protective equipment

PESM – Project Environmental and Safety Manager

ACTIVITY HAZARD ANALYSIS #4

Activity: Decontamination and Demobilization Analyzed By/Date: J. Samaniego 09/30/01 Reviewed By: Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Decontaminate equipment	<p>Atmospheric, chemical and contact hazards</p> <p>Slip, trip, and fall hazards</p> <p>Exposure to high temperatures</p> <p>Strains from manually moving materials and equipment</p>	<ul style="list-style-type: none"> • Wear required PPE. • Use ambient air monitoring and visual monitoring to verify PPE selection. • Visually inspect work areas and slip, trip, and fall hazards will be marked, barricaded, or eliminated as feasible. • Maintain proper illumination in all work areas. • Refer to EHS Procedure 3-8, Fall Protection. • Monitor for heat stress in accordance with EHS Procedure 4-6, Temperature Extremes. • Maintain fluid intake and take breaks as needed. • Use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment. • Use of lifting devices whenever possible. • Refer to EHS Procedure 3-1, Ergonomics. • Do not lift more than 50 pounds without help.
Demobilization and site restoration	Struck by or against heavy equipment	<ul style="list-style-type: none"> • Wear high visibility reflective vests when exposed to vehicle traffic. • Make eye contact with operators before approaching equipment. • Understand and review posted hand signals. • Use traffic barricades, signs, flags, and backup spotters during demobilization.

ACTIVITY HAZARD ANALYSIS #4

Activity: Decontamination and Demobilization **Analyzed By/Date:** J. Samaniego 09/30/01 **Reviewed By:** Roger Margotto, CIH

Principal Steps	Potential Hazards	Recommended Controls
Demobilization and site restoration (continued)	Strains from manually moving materials and equipment	<ul style="list-style-type: none"> • Use proper lifting techniques such as keeping back straight, lifting with legs, limiting twisting, and getting help when moving bulky/heavy materials and equipment. • Use lifting devices whenever possible. • Refer to EHS Procedure 3-1, Ergonomics.

Equipment to be Used	Inspection Requirements	Training Requirements
Heavy equipment, hand tools, power tools	Daily or before use	<ul style="list-style-type: none"> • Only trained equipment operators may operate heavy equipment; only Department of Motor Vehicles-licensed personnel will operate trucks. • Specific training for power tools, hand tools, and electrical safety.

Notes:

EHS – Environmental Health Services

PPE – personal protective equipment