MARE ISLAND
INSTALLATION RESTORATION SITE 22
FINAL
RECORD OF DECISION

**(Pursuant to the
Comprehensive Environmental Response,
Compensation, and Liability Act)**

December 15, 2000

Issued by

**Department of the Navy
Southwest Division**

TETRA TECH EM INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N62474-94-D-7609 Document Control No. DS . 0293 . 16028

TO: Mr. Richard Selby, Code 02R1
Contracting Officer
Naval Facilities Engineering Command
Southwest Division
1230 Columbia Street, Suite 1100
San Diego, CA 92132-5190

DATE: 02/09/01
CTO: 0293
LOCATION:
Mare Island Naval Shipyard, Vallejo

FROM: Dan Chow
Daniel Chow, Program Manager

DOCUMENT TITLE AND DATE:
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February 9, 2001

Jerry Dunaway
Base Environmental Coordinator
Southwest Division
Naval Facilities Engineering Command
1230 Columbia Street, Suite 1100
San Diego, CA 92101-8517

Subject: **Installation Restoration Site 22 Final Record of Decision**
Mare Island, California
CLEAN II Contract No. N62474-94-D-7609, Contract Task Order 293

Dear Mr. Dunaway:

Please find enclosed a copy of the fully executed "Mare Island Installation Restoration Site 22 Final Record of Decision", dated December 15, 2000. Additional copies of the document will be distributed as indicated on the attached transmittal form.

If you have any questions, please call me at (415) 222-8205 or Michael Foster at (619) 525-7188.

Sincerely,

Roger Batra
Project Manager

Enclosures

cc: Distribution

~~DS.0380.14990-01~~

CONTENTS

Appendices

ACRONYMS AND ABBREVIATIONS

bgs	Below ground surface
BRAC	Base Realignment and Closure
Cal/EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	Chemicals of potential concern
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
EPC	Exposure point concentration
ERA	Ecological risk assessment
HHRA	Human health risk assessment
IR	Installation Restoration
µg/dL	micrograms per deciliter
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OU	Operable Unit
PCB	Polychlorinated biphenyls
PRG	Preliminary remediation goal
RAB	Restoration Advisory Board
RI	Remedial investigation
ROD	Record of decision
TRC	Technical review committee
UCL_{95}	95th percentile upper confidence limit of the arithmetic mean

1.0 DECLARATION FOR NO ACTION AT INSTALLATION RESTORATION SITE 22

1.1 SITE NAME AND LOCATION

Former Mare Island Naval Shipyard (hereinafter "Mare Island")
Installation Restoration Site 22 (IR22)
Vallejo, California

Mare Island, located in Vallejo, California (Appendix A, Figure 1), was one of the oldest Navy facilities on the West Coast until it was closed on April 1, 1996. Mare Island was operated from 1853 until it was selected and approved for closure under the Base Realignment and Closure (BRAC) Program. Site IR22 at Mare Island consists of ammunition bunkers A-249 and A-250 and is in the south-central area of Mare Island (Appendix A, Figure 2).

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for IR22 at Mare Island. The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The no action decision is based on the administrative record for IR22.

The California Environmental Protection Agency (Cal/EPA), as evidenced by the signature of its representatives, concurs with the selected remedy.

1.3 DESCRIPTION OF THE SELECTED REMEDY: NO ACTION

The Navy, with the concurrence of Cal/EPA has selected no action for IR22. IR22 consists of two concrete bunkers, A-249 and A-250, formerly used to store munitions. Bunkers A-249 and A-250 were originally identified as a potential source area in 1989, when an unknown white powdery substance was observed on the floor of both bunkers. At the time, the bunkers were used to store pesticides, and the powder was suspected to be residue from previous pesticide spills.

As part of Phase I activities, following the discovery of the white powder, the bunker floors were steam-washed, and samples were collected from the concrete floor and analyzed for pesticides as well as metals and nitrates. The samples were found to contain pesticides and metals.

Phase II was conducted in 1994, which included additional sampling at IR22 to reassess the pesticide and metal concentrations and to evaluate whether contamination had migrated out of the bunkers. The additional sampling included sampling the surface and subsurface soil outside of each bunker. During the soil investigation, small lead tags were discovered. Following review of the analytical results and discovery of the tags, a small area of soil (less than 1 cubic yard) was excavated in front of each bunker and additional surface samples were collected to verify the efficacy of the soil removal. Additional sampling was conducted that revealed the presence of metals (primarily lead) in the soil in front of bunker A-250. As a result, an additional 14 cubic feet of soil was excavated.

The Navy conducted a human health risk assessment (HHRA) to evaluate the potential carcinogenic risks and noncarcinogenic hazards of exposure to residual soil contamination at IR22. Samples collected from IR22 contained low concentrations of lead in surface soil. The risk assessment showed that lead concentrations were within acceptable risk limits, and that no threat to human health or the environment exists. Because IR22 is not considered a habitat for ecological receptors, no ecological risk assessment (ERA) was performed.

The Navy, with the concurrence of Cal/EPA, has concluded that conditions at IR22 are protective of human health and the environment and that a no action decision under CERCLA is appropriate for IR22.

1.4 STATUTORY DETERMINATIONS

Based on an evaluation of analytical data and other information, the Navy, with the concurrence of Cal/EPA, has determined that no remedial action is necessary to protect human health and the environment at IR22 at Mare Island.

Hazardous substances are not present at IR22 at concentrations above acceptable risk levels; as a result, the 5-year review requirement under CERCLA is not applicable.

Jerry Dunaway — 1/8/01

Mr. Jerry Dunaway
Navy BRAC Environmental Coordinator
Naval Facilities Engineering Command,
Southwest Division

Date

Anthony J Landis — 1-19-01

Mr. Anthony J. Landis, P.E.
Chief of Operation, Office of Military Facilities
California Environmental Protection Agency
Department of Toxic Substances Control

Date

Loretta K. Barsamian — 2-7-01

Ms. Loretta K. Barsamian
Executive Officer
California Environmental Protection Agency
Regional Water Quality Control Board
San Francisco Bay Region

Date

2.0 DECISION SUMMARY FOR INSTALLATION RESTORATION SITE 22

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Mare Island is an offshore island connected to land by a narrow spit, which has been modified by land reclamation to become a peninsula. Mare Island is about 3.5 miles in length and 1.25 miles in width (Appendix A, Figure 1). The island originally consisted of about 1,000 acres of dry land and 300 acres of wetlands, and the peninsula now occupies an area of about 2,800 acres as a result of land reclamation projects, excluding the intertidal zone (the area that is inundated between low and high tides).

The original island was a bedrock outcrop surrounded by low areas and tule marshes. The outline of the bedrock outcrop roughly coincides with the hilly area at the south end of Mare Island. Over time, the island was expanded to the north and west by placement of various fill materials and dredge spoils to form the current contours of the peninsula.

Mare Island's highest point (284 feet above mean sea level [msl]) is at the southern end of Mare Island, on the original bedrock ridge. Outside the hilly area at the south end of the island, the topography of the peninsula is generally flat, with elevations of about 10 to 20 feet above msl. Groundwater at IR22 is not a potential drinking water source, based on U.S. Environmental Protection Agency's (EPA) criteria of insufficient yield under the "Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy June 1988." Groundwater at IR22 will not provide a sustained yield of 150 gallons per day per household. In addition, groundwater at IR22 is not a potential source of drinking water based on the criteria of State Water Resources Control Board Resolution 88-63, which requires a sustained yield of 200 gallons per day.

IR22 consists of ammunition bunkers A-249 and A-250 and is in the hilly southeastern end of the island. Bunkers A-249 and A-250 were constructed in 1942 during the Mare Island wartime expansion to meet increasing storage needs (Appendix A, Figure 2).

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The following sections present a brief description of the history and the environmental investigation activities at Mare Island. IR22 is not the subject of any CERCLA enforcement order or other enforcement activity.

2.2.1 Background

Mare Island was one of the first Navy facilities on the West Coast. The Navy purchased 956 acres of Mare Island in 1853 for a shipbuilding, repair, and maintenance facility on the West Coast. The first ship built at Mare Island joined the Pacific fleet in 1858, and the first dry dock was completed in 1891.

During World War II, Mare Island became a vital naval installation for shipbuilding, repair, overhaul, and maintenance. Following the war, Mare Island became one of the primary West Coast facilities for the construction, overhaul, and maintenance of submarines. The shipyard area of the facility consisted of 4 dry docks and 24 active docking berths to facilitate ship maintenance.

IR22 consists of bunkers A-249 and A-250. The bunkers were cut into bedrock on the sloping hillside and were constructed of reinforced concrete. They were covered on all sides and topped with soil fill derived from the excavated hillside. The interior of the bunkers measures about 25 by 50 feet, with a maximum height of 12 feet. A concrete apron about 10 feet wide and 40 feet long extends from the entrance of each bunker to the roadway for use as a loading ramp. The bunkers were used primarily to store ammunition, explosive devices, and later, pesticides. The layouts of bunkers A-249 and A-250 are shown in Appendix A, Figures 3 and 4.

2.2.2 Environmental Investigation Activities at Installation Restoration Site 22

The Navy began environmental studies at Mare Island in the early 1980s. In 1989, IR22 was identified as a potential source area when an unknown white powdery substance was observed on the floors of the bunkers. At the time, the bunkers were used to store pesticides, and the powder was suspected to be a residue from previous pesticide spills. As a result, the Navy investigated those areas during a remedial investigation (RI) under CERCLA. The Navy has since prepared two reports documenting conditions at IR22: a site characterization summary report for Mare Island and a Phase II RI report.

In 1994, the U.S. Department of Defense designated Mare Island for closure as an active military base under its BRAC Program. Mare Island was closed in April 1996.

2.3 COMMUNITY PARTICIPATION

In the early 1980s, the Navy formed a technical review committee (TRC) consisting of community members and representatives of the regulatory agencies. The TRC met to discuss environmental issues pertaining to Mare Island. In 1994, the Navy formed a restoration advisory board (RAB), which replaced

replaced the TRC. The RAB is comprised of members of the community, the Navy, and the regulatory agencies. The RAB meets monthly to discuss environmental progress at Mare Island.

Environmental investigation reports for IR22 were released to the public in 1992 and 1995. The proposed plan for IR22 was released to the public on November 3, 2000. The reports and proposed plan are contained in the administrative record and are available for public review at the Navy's Southwest Division offices in San Diego, California, and in an information repository at the John F. Kennedy Library in Vallejo, California. In addition, the proposed plan was mailed to 800 people on the Mare Island project mailing list. A notice of availability of the proposed plan was published in *The Vallejo Times Herald* and *The Contra Costa Times* on November 6, 2000. A 30-day public comment period on the proposed plan was held from November 3, 2000, through December 6, 2000. A public meeting was held on November 30, 2000. At that meeting, representatives of the Navy and Cal/EPA presented the basis for the proposed no-action alternative. The Navy, Cal/EPA, and EPA were available to answer questions about the proposed plan. No public comments were received at the public meeting or during the public comment period. Those community participation activities fulfill the requirements of Section 113(k)(2)(B)(i-v) and Section 117(a)(2) of CERCLA.

2.4 SCOPE AND ROLE OF THE INSTALLATION RESTORATION SITE 22 NO-ACTION ALTERNATIVE

Mare Island is a large federal facility containing numerous potential source areas. To facilitate the investigation and remediation of the facility, IR sites on Mare Island were divided into three operable units (OU). IR22 consists of OU1. Under the current Federal Facility Site Remediation Agreement schedule, the ROD approval dates for all areas at Mare Island fall within the next 5 years.

The Navy's site management strategy is to accelerate actions at sites, while identifying and closing-out assessment activities at sites not requiring action. That strategy meets President Clinton's goal of quickly identifying parcels of property that can be transferred to the community or other agencies under the BRAC Program.

IR22 is the first site for which a remedy has been selected. As a result of the base closure and environmental investigation activities, the Navy, with state concurrence, has concluded that the conditions at IR22 do not pose a significant risk to human health or the environment; therefore, no action is necessary at IR22.

2.5 INSTALLATION RESTORATION SITE 22 SITE CHARACTERISTICS

IR22 consists of bunkers A-249 and A-250, which were formerly used to store munitions. The bunkers were identified as a potential source area in 1989, when an unknown white powdery substance was observed on the floor of both bunkers. At the time, the bunkers were used to store pesticides, and the powder was suspected to be a residue from previous pesticide spills.

In 1989, bunkers A-249 and A-250 at IR22 were steam-washed. At that time, concrete chip samples were collected from the floor surface of bunkers A-249 and A-250 to verify the efficiency of the cleanup efforts and to test for pesticides, metals, and nitrates. The concrete samples were found to contain trace concentrations of pesticides and some heavy metals. The detected metals included arsenic (2.3 milligrams per kilogram [mg/kg] to 13.7 mg/kg), barium (143 to 196 mg/kg), beryllium (43.5 to 172 mg/kg), copper (2,170 to 8,270 mg/kg), and lead (41.5 to 1,100 mg/kg). The sampling locations are presented in Appendix A, Figures 3 and 4.

A Phase II RI was conducted in 1994 to reassess the metal concentrations detected during the earlier investigations, and to evaluate the potential for migration of contaminants outside of the bunkers. The Phase II RI work included steam-washing, concrete core sampling in the bunkers, soil sample collection from beneath the bunker floors, and surface and subsurface (to 4 feet below ground surface [bgs]) soil sampling outside of the bunkers.

Concrete core samples from bunker A-249 did not contain pesticides, polychlorinated biphenyls (PCB), or ordnance-related compounds, and the samples contained only low concentrations of heavy metals. At bunker A-250, some of the concrete core samples contained trace concentrations of PCBs and pesticides.

Analytical results of surface soil samples from outside of bunkers A-249 and A-250 indicated the presence of arsenic, beryllium, lead, manganese, PCBs, and pesticides.

Lead was present at concentrations ranging from 5.6 to 704 mg/kg in a small area of soil in front of each bunker. In addition, copper and zinc were detected. The highest concentrations of lead, copper, and zinc were found in soil samples from borings on the western side of each loading ramp. Analytical results of the two soil samples collected in front of bunker A-250 showed lead at concentrations of 818 and 948 mg/kg, copper at concentrations of 209 and 211 mg/kg, and zinc at concentrations of 894 and 1,400 mg/kg. The result of the subsurface sampling showed a lead concentration of 342 mg/kg in the sample from boring GB002 (Appendix A, Figure 4).

Lead concentrations at IR22 are believed to be attributable to small metallic tags observed in the soil during the field investigations. According to Mare Island personnel, the tags were small lead crimps that were attached to a loop of wire and used to seal ordnance containers stored inside the bunkers. The tags were referred to as "pilfer seals" and allowed for easy identification of the bunker's unopened inventory.

Based on the analytical results and on the presence of the pilfer seals, a small amount of soil in front of each bunker was excavated to remove the soil containing the seals. Soil was excavated until an asphalt layer was reached. The total volume of soil excavated was less than 1 cubic yard.

At bunker A-249, 4 to 6 inches of soil was excavated until an asphalt layer was encountered at a depth of 4 to 6 inches bgs, resulting in a total excavation of about 3 cubic feet of soil from the area in front of bunker A-249.

At bunker A-250, the upper 6 inches of soil was also removed, but no asphalt layer was encountered. After about 5 cubic feet of soil was removed from the area in front of bunker A-250, two surface samples were then collected from the newly exposed soil at bunker A-250. The results of this soil analysis indicated that the excavation at bunker A-250 was not sufficient, and an additional 14 cubic feet of soil was excavated until an asphalt surface was encountered and all soil potentially containing the lead seals was removed.

2.6 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Mare Island is a Navy facility that was closed in April 1996. Under current land use conditions, the bunkers are not in use, and access is restricted. The Navy is currently in the process of transferring the facility to the City of Vallejo. The City of Vallejo's reuse plan designates the area in which IR22 is located as an open space for recreational use as a regional park. It is anticipated that IR22 and the surrounding area will be used for hiking, cycling, and fishing.

Groundwater at Mare Island is not considered a potential source of potable water or suitable for agricultural or industrial use because of naturally high levels of salinity. Freshwater replenishment is considered to be the only potential beneficial use of Mare Island groundwater.

2.7 SUMMARY OF SITE RISKS

The following sections present the results of the HHRAs and ERAs performed at IR22.

2.7.1 Human Health Risk Assessment

Decisions regarding site remediation are based in part, on whether or not chemical contaminants present at a site pose a significant risk to human health. Therefore, an HHRA was performed as part of the Phase II RI, using EPA, Region IX preliminary remediation goals (PRG) for residential soil to estimate potential risk. Potential health effects of lead were assessed by calculating blood-lead levels using Version 6 of Cal/EPA's "Lead Risk Assessment Spreadsheet (Leadspread)."

Since the HHRA was performed in 1995, EPA, Region IX has revised its PRG table and risk assessment methodologies to reflect changes in reference doses, cancer slope factors, and other toxicological aspects of the chemicals. As a result, the original risk estimates were revised using the updated PRGs and a new version (Version 7) of Leadspread and the new risk estimates were presented in an addendum to the Phase II RI report for OU1 of Mare Island. The risk estimates presented in this ROD are from the revised HHRA.

Consistent with EPA and Department of Toxic Substances Control (DTSC) guidance on using Region IX PRGs to assess risk, a three-step process was used to assess risk at IR22. First, chemicals of potential concern (COPC) were identified. Second, an exposure assessment was performed. Third, cancer and noncancer risks were quantified. Each of those steps, and their outcomes, is briefly described in the following subsections.

2.7.1.1 Identification of Chemicals of Potential Concern

COPCs are generally defined as chemicals detected in the environment at higher-than-expected concentrations. In the HHRA, COPCs were identified from chemical analytical data generated during the Phase II RI for soil samples collected under the concrete floors of bunkers A-249 and A-250 and from areas surrounding the bunkers. All of the organic compounds detected in soil were retained as COPCs. Chemicals eliminated as COPCs consisted of metals detected at concentrations within their respective ambient concentration range and essential nutritional elements (calcium, iron, magnesium, potassium, and sodium). The chemicals retained as COPCs are:

Aluminum	Antimony	Barium	Beryllium
Cobalt	Copper	Lead	Manganese
Mercury	Nickel	Selenium	Thallium
Vanadium	Zinc	Aroclor-1260	4,4'-DDD
4,4'-DDE	4,4'-DDT	Endrin aldehyde	

Following the procedure used in the original HHRA, separate sets of risk estimates were calculated for soil collected under the bunker floors and for soil collected from areas around the bunkers.

2.7.1.2 Exposure Assessment

IR22 consists of two bunkers (A-249 and A-250) and a defined land area surrounding each bunker. According to the City of Vallejo's final reuse plan for Mare Island, IR22 will most likely be redeveloped for open-space recreational use. Nevertheless, risk estimates developed during the HHRA were based on residential use of the site, which requires using longer exposure time, frequency, and duration than is required of any other land use. Cleanup decisions based on risk estimates for residential land use will protect public health even though the land is redeveloped for other uses.

Human exposure was assumed to occur by ingestion of soil, dermal contact with soil, and inhalation of airborne soil (dust). None of the COPCs is volatile. Therefore, vapor inhalation is not an exposure pathway at the site.

2.7.1.3 Quantitation of Risk

Quantitative estimates of noncancer risk (hazard quotients) were calculated for all of the COPCs, and quantitative estimates of cancer risk were calculated for the carcinogenic COPCs. Those estimates were calculated for COPCs in soil under the floor of each bunker (covered soil) and in soil surrounding each bunker (uncovered soil).

For each COPC, a hazard quotient was obtained by dividing the exposure point concentration (EPC) by the noncancer-based PRG. For each carcinogenic COPC, a cancer risk estimate was obtained by dividing the EPC of the COPC by the cancer-based PRG and multiplying the quotient by 10^{-6}. PRGs are from EPA table"1999 EPA Region IX PRGs."

Nominally, the EPCs were the 95 percent upper confidence limit of the arithmetic mean (UCL_{95}) of the reported concentrations. When the UCL_{95} exceeded the highest reported concentration, the highest concentration was used as the EPC.

Estimated Potential Health Risks

Estimated lifetime excess cancer risks for COPCs at IR22 ranged from 1×10^{-7} to 2×10^{-6} and the hazard indices ranged from 0.7 to 0.9 (Appendix B, Table 1). The higher risk estimates were associated with bunker A-250.

Evaluation of Lead

Although the EPC for lead is less than the Region IX PRG of 400 mg/kg, an evaluation of lead was performed by calculating the blood-lead level in children exposed under conditions set by the Leadspread program and comparing it with a benchmark value of 10 micrograms per deciliter (µg/dL). The calculated 99th percentile blood-lead level, based on an EPC of 300 mg/kg, is 8.4 µg/dL.

2.7.1.4 Conclusions

The results of the HHRA indicate that environmental conditions at IR22 are protective for unrestricted reuse of the area beneath, and immediately surrounding, bunkers A-249 and A-250. The estimated hazard indices for covered and uncovered soil at each bunker are less than the threshold value of 1, and estimated blood-lead concentrations are less than 10 µg/dL, the level of concern. Those estimates were based on a residential scenario.

The estimated cancer risks are less than 1×10^{-6} for both covered and uncovered soils at bunker A-249 and for covered soil at bunker A-250. The cancer risk for uncovered soil at bunker A-250 (2×10^{-6}) just slightly exceeds the lower end of the acceptable risk range (1×10^{-6} to 1×10^{-4}) established in the NCP. Risk levels that just exceed the lower end of the risk range are generally considered protective of human health. Risk estimates do not represent exact values, so a risk estimate of 2×10^{-6} is essentially indistinguishable from 1×10^{-6}. Cancer risk estimates are based on residential land use, which generally represents the greatest potential for exposure to site contaminants. As a result, the bunker areas would also show acceptable risk for other uses such as industrial or recreational. The intended future use of IR22 is as an open-space recreational area.

2.7.2 Ecological Risk Assessment

Because IR22 and the immediate surrounding area are not considered a habitat area for ecological receptors, and the soil outside of the bunkers is not in contact with or near any surface waters or wetlands habitats, an ERA was not performed.

2.8 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Based on the environmental investigation results, as described in this ROD, IR22 does not pose an unacceptable risk to human health or the environment for unrestricted use. Therefore, no action is appropriate for IR22.

2.9 DOCUMENTATION OF SIGNIFICANT CHANGES

None.

3.0 RESPONSIVENESS SUMMARY

No comments were received.

APPENDIX A

FIGURES

SENSITIVE RECORD

PORTIONS OF THIS RECORD ARE CONSIDERED SENSITIVE AND ARE NOT AVAILABLE FOR PUBLIC VIEWING

FIGURES 1 AND 2

FOR ADDITIONAL INFORMATION, CONTACT:

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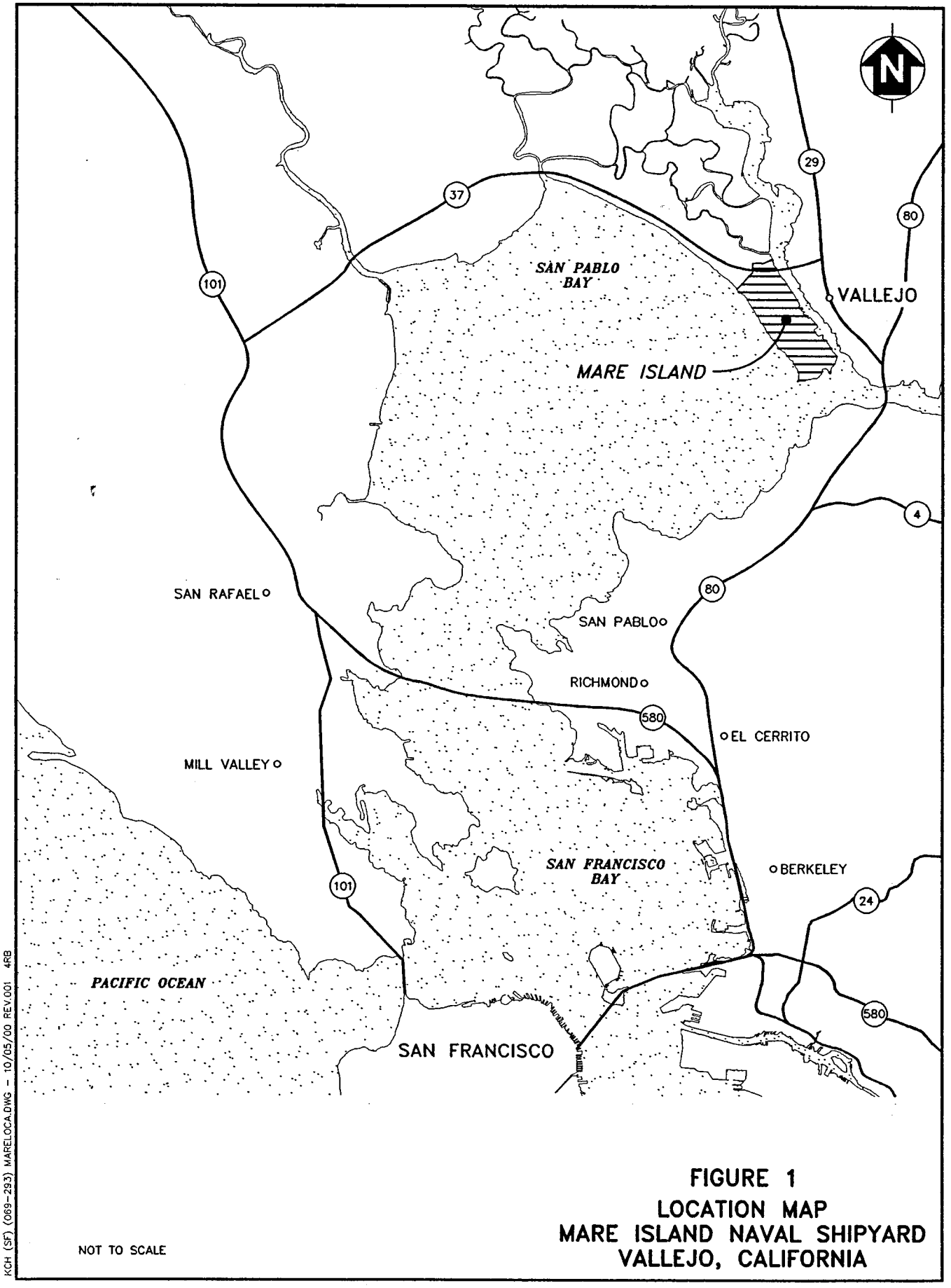

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NOT TO SCALE

FIGURE 1
LOCATION MAP
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

SENSITIVE

LEGEND

- IR SITE 22 BOUNDARY
- INVESTIGATION AREA E BOUNDARY
- GOLF COURSE AREA

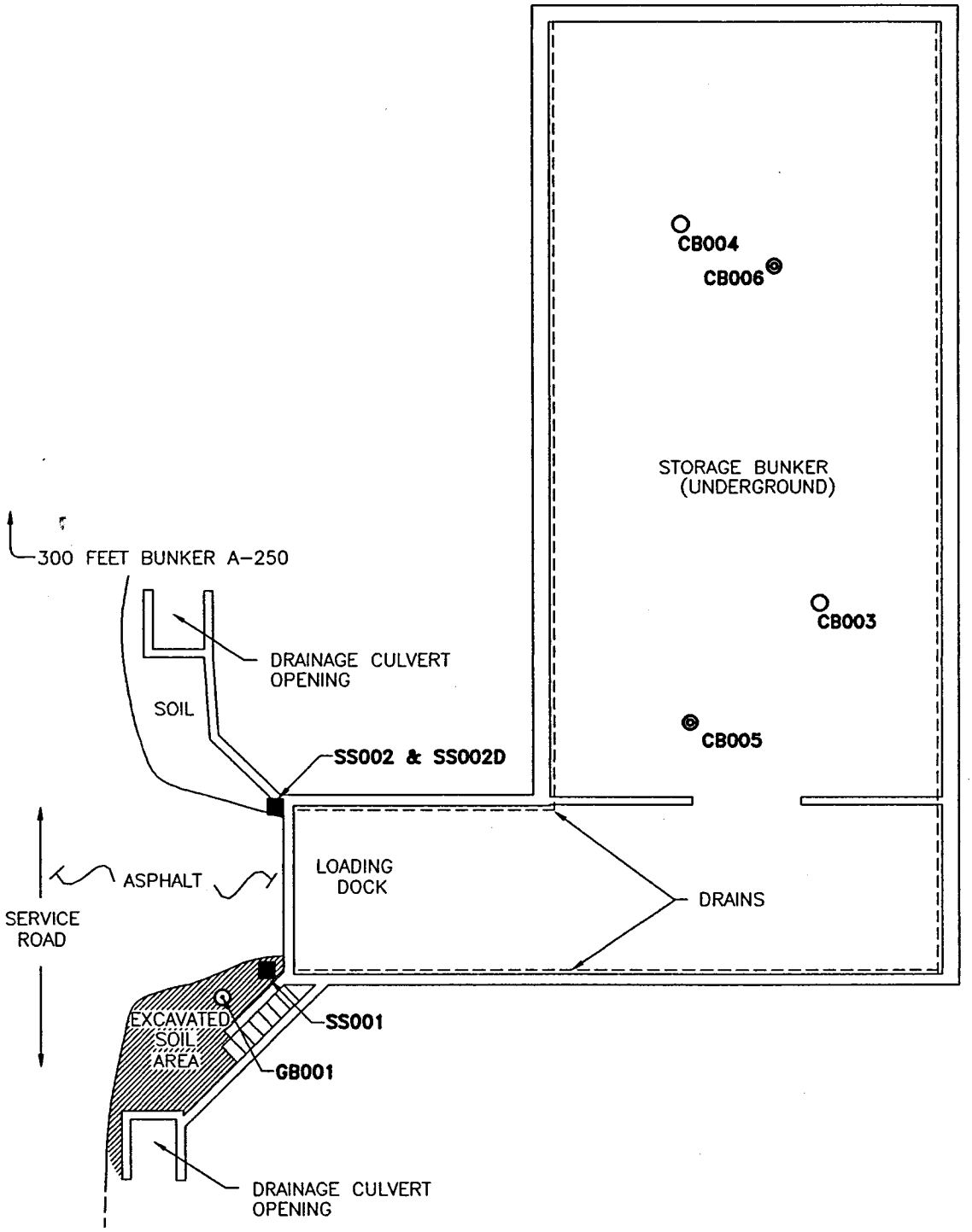
750 0 750 1500
SCALE IN FEET

FIGURE 2

LOCATION OF IR SITE 22
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

K:/MAREISL/AMLS/E_ROD.MAP E_ROD.AML rogallp
12/13/00

SENSITIVE



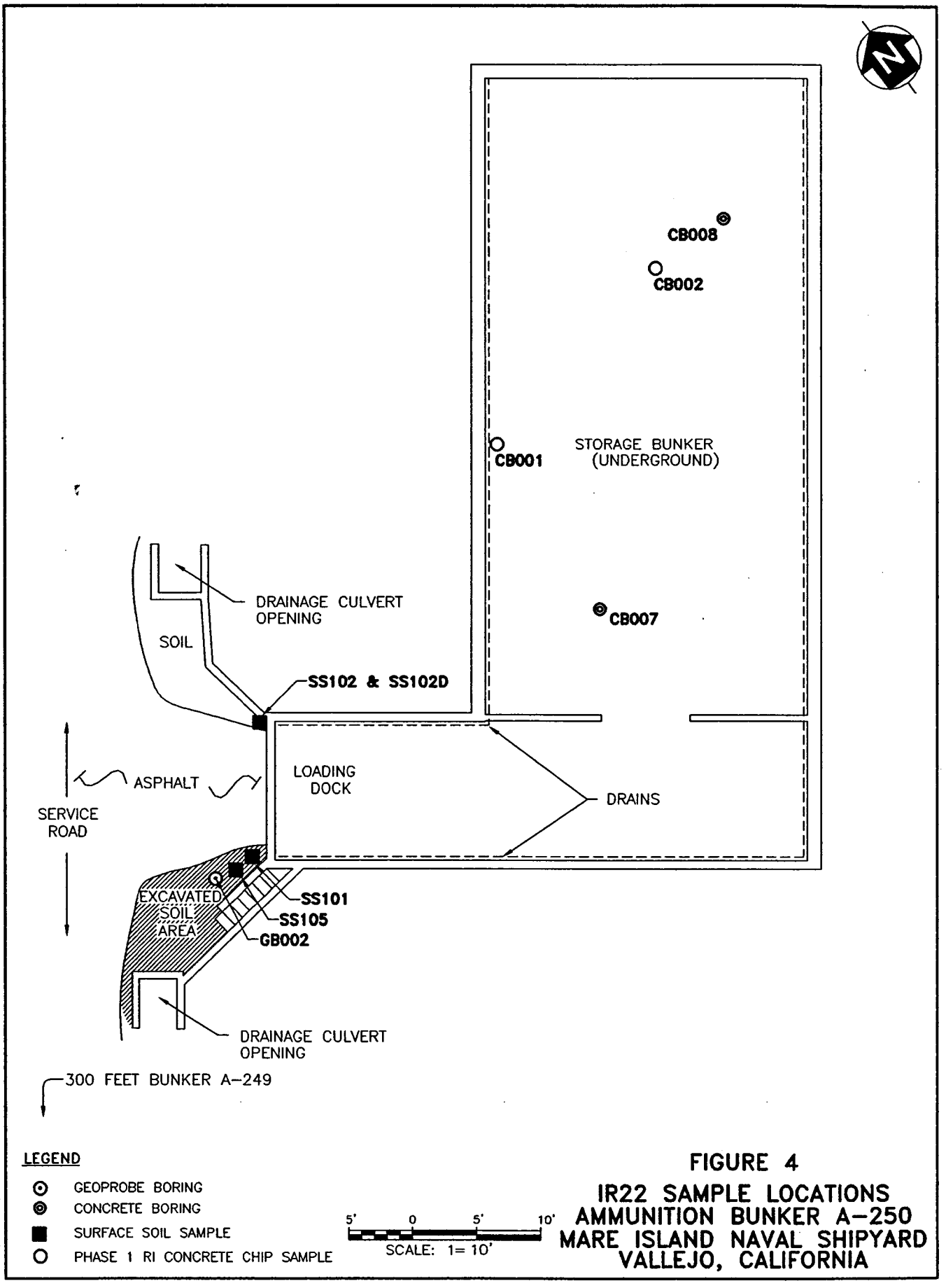
LEGEND

- GEOPROBE BORING
- CONCRETE BORING
- SURFACE SOIL SAMPLE
- PHASE 1 RI CONCRETE CHIP SAMPLE

5' 0 5' 10'
SCALE: 1= 10'

FIGURE 3
IR22 SAMPLE LOCATIONS
AMMUNITION BUNKER A-249
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

KCH (069-293) BUNKER.DWG 10/05/00 REV.004



KCH (069-293) BUNKER.DWG 10/05/00 REV.004

FIGURE 4

IR22 SAMPLE LOCATIONS
AMMUNITION BUNKER A-250
MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA

APPENDIX B

TABLE

Table 1 **Estimated Total Cancer Risk and Hazard Indices for Chemicals of Potential Concern in Soil at IR22**

TABLE 1

ESTIMATED TOTAL CANCER RISK AND HAZARD INDICES FOR CHEMICALS OF POTENTIAL CONCERN IN SOIL AT IR22 MARE ISLAND, VALLEJO, CALIFORNIA

Exposure Unit[a]	Cancer Risk	Hazard Index
BUNKER A-249		
Covered soil	1×10^{-7}	0.7[b]
Exposed soil	2×10^{-7}	0.8
BUNKER A-250		
Covered soil	2×10^{-6}	0.8
Exposed soil	4×10^{-7}	0.9

Notes:

a Covered soil refers to the soil beneath the bunkers and exposed soil refers to the exposed soil in front of the bunkers.

b Highest segregated hazard index.

APPENDIX C

ADMINISTRATIVE RECORD INDEX

DRAFT ADMINISTRATIVE RECORD FILE INDEX - UPDATE (SORTED BY RECORD DATE/RECORD NUMBER)

DOCUMENTS RELATED TO SITE 22, OU 1, AREA E AND IA E

UIC No. / Rec. No. Doc. Control No. Record Type Contr./Guid. No. Approx. # Pages	Prc. Date Record Date CTO No. EPA Cat. #	Author Affil. Author Recipient Affil. Recipient	Subject	Classification	Keywords	Sites	Location Box No.
N00221 / 000956	11-29-1999	PRC	DRAFT FINAL INSTALLATION RESTORATION (IR) SITES 01 THROUGH 24 DETAILED WORK PLAN FOR BASELINE HUMAN HEALTH RISK ASSESSMENTS (WP/HHRA)	ADMIN RECORD	HHRA	001	IRON MOUNTAIN
	09-30-1994				WP	002	45359768
RPT	NONE					003	
NONE	00.0					004	
0000						005	
						006	
						007	
						008	
						009	
						010	
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						024	
						BASEWIDE	

This Administrative Record (AR) Index includes references to documents which cite bibliography sources. These bibliographic citations are considered to be part of this AR but may not be cited separately in the index.

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N00221 / 000955 MOUNTAIN	11-29-1999	NAVY	SUBMISSION OF DRAFT FINAL INSTALLATION		ADMIN RECORD	HHRA	001 IRON
	10-04-1994		RESTORATION (IR) SITES 01 THROUGH 24 DETAILED WORK PLAN FOR BASELINE HUMAN		WP	002	45359768
LTR	NONE		HEALTH RISK ASSESSMENTS (WP/HHRA)			003	
NONE	00.0					004	
0000						005	
						006	
						007	
						008	
						009	
						010	
						011	
						012	
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N00221 / 003011	11-29-1999	USEPA	COMMENTS ON THE DRAFT FINAL INSTALLATION RESTORATION SITES 01	ADMIN RECORD	HHRA	001	IRON MOUNTAIN
	12-05-1994		THROUGH 24, DETAILED WORK PLAN (WP)		WP	002	45359776
CMNT	NONE	NAVY	FOR BASELINE HUMAN HEALTH RISK			003	
NONE	00.0	SINATS, JURIS A.	ASSESSMENTS (HHRA) - 30 SEPTEMBER				
NONE	00.0	SINATS, JURIS A.				004	
0004						005	
						006	
						007	
						008	
						009	
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N00221 / 000972 MOUNTAIN	11-29-1999	DTSC	AGENCY COMMENTS ON IR SITES 1 THROUGH 24 DETAILED WORK PLAN (WP) FOR BASELINE HUMAN HEALTH RISK ASSESSMENT (HHRA), DRAFT FINAL		ADMIN RECORD WP	HHRA 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 BASEWIDE	001 IRON 45359768
	12-07-1994						
CMNT NONE 0000	NONE 00.0						
N00221 / 001001	11-29-1999	PRC	DRAFT PHASE II REMEDIAL INVESTIGATION (RI) REPORT OPERABLE UNIT 1 (OU 1)	INFO REPOSITORY	RI	022 IA E OU 1	IRON MOUNTAIN 45359769
	04-20-1995						
RPT NONE 0000	NONE 00.0						

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N00221 / 001000	11-29-1999	NAVY	SUBMISSION OF DRAFT PHASE II REMEDIAL INVESTIGATION (RI) REPORT OPERABLE UNIT 1 (OU 1)	INFO REPOSITORY	OU	022	IRON MOUNTAIN
	04-29-1995				RI	IA E	45359769
LTR NONE 0000	NONE 00.0					OU 1	
N00221 / 001083	11-29-1999	PRC	FINAL SUPPLEMENT TO INSTALLATIONS RESTORATION SITES 01 THROUGH 24, DETAILED WORK PLAN (WP) FOR BASELINE HUMAN HEALTH RISK ASSESSMENTS (HHRA)	ADMIN RECORD	HHRA	001	IRON MOUNTAIN
	07-24-1995	WERTER, JEFF			WP	002	45359772
RPT N62474-88-D-5086 0094	00144 00.0	DTSC CLARK, GLENNA, M				003 004 005 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024	

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N00221 / 001082	11-29-1999	NAVY	SUBMISSION OF FINAL SUPPLEMENT TO INSTALLATIONS RESTORATION SITES 01	ADMIN RECORD	HHRA	001	IRON MOUNTAIN
	07-25-1995	SINATS, JURIS A.	THROUGH 24, DETAILED WORK PLAN FOR			002	45359772
LTR	00144	DTSC	BASELINE HUMAN HELATH RISK			003	
N62474-88-D-5086	00.0	GRIBBLE, CHIP	ASSESSMENTS (HHRA) - 24 JULY 19				
N62474-88-D-5086	00.0	GRIBBLE, CHIP				004	
0002						005	
						007	
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N00221 / 002087	11-29-1999	DTSC	COMMENTS ON THE DRAFT PHASE II REMEDIAL INVESTIGATION (RI) REPORT,	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	07-28-1995	GRIBBLE, CHIP	OPERABLE UNIT NUMBER 1 (OU 1) - 20 APRIL		RI		45359776
CMNT	NONE	NAVY	1995				
NONE	00.0	SINATS, JURIS A.					
0004							
N00221 / 001092	11-29-1999	NAVY	SUBMISSION OF DRAFT FINAL PHASE II REMEDIAL INVESTIGATION (RI) REPORT FOR	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	10-13-1995	SINATS, JURIS A.	OPERABLE UNIT 1 (OU 1) - 13 OCTOBER 1995		RI		45359772
LTR	00144	DTSC					
N62474-88-D-5086	00.0	GRIBBLE, CHIP					
0002							

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N00221 / 001093	11-29-1999	PRC	DRAFT FINAL PHASE II REMEDIAL INVESTIGATION (RI) REPORT FOR OPERABLE	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	10-13-1995	WERTER, JEFF	UNIT 1 (OU 1) (SEE AR #29 - ADDENDUM TO		RI		45359772
RPT	00144	NAVY	RI)				
N62474-88-D-5086	00.0	CLARK, GLENNA, M					
0050							
N00221 / 002091	11-29-1999	RWQCB	COMMENTS ON THE DRAFT FINAL PHASE II REMEDIAL INVESTIGATION (RI) REPORT,	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	11-17-1995	KATHURIA, GINA	OPERABLE UNIT NUMBER 1 (OU 1) - 13		RI		45359776
CMNT	NONE	NAVY	OCTOBER 1995				
NONE	00.0	SINATS, JURIS A.					
0002							
N00221 / 002092	11-29-1999	ARC	COMMENTS ON DRAFT FINAL PAHSE II REMEDIAL INVESTIGATION (RI) REPORT,	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	11-22-1995	HACK, KAREN	OPERABLE UNIT NUMBER 1 (OU 1) - 13		RI		45359776
CMNT	NONE	NAVY	OCTOBER 1995				
NONE	00.0	CLARK, GLENNA, M					
0004							
N00221 / 002093	11-29-1999	NAVY	RESPONSE TO COMMENTS ON THE DRAFT FINAL PHASE II REMEDIAL INVESTIGATION (RI)	ADMIN RECORD	OU	OU 1	IRON MOUNTAIN
	01-10-1996	SINATS, JURIS A.	REPORT, OPERABLE UNIT 1 (OU 1) - 13		RI		45359776
RESP	NONE	DTSC	OCTOBER 1995				
NONE	00.0	GRIBBLE, CHIP					
0014							
N00221 / 002023	11-29-1999	NAVY	SCHEDULE REVISION FOR RECORD OF DECISION (ROD) FOR INVESTIGATION AREA	ADMIN RECORD	ROD	IA E	IRON MOUNTAIN
	03-29-1996	SINATS, JURIS A.	"E", GOLF COURSE AND UPLANDS MAGAZINE				45359774
LTR	NONE	DTSC	AREA				
NONE	00.0	GRIBBLE, CHIP					
0005							
N00221 / 002027	11-29-1999	NAVY	SCHEDULE REVISION FOR RECORD OF DECISION (ROD) FOR INVESTIGATIONS AREA	ADMIN RECORD	ROD	022	IRON MOUNTAIN
	03-29-1996	SINATS, JURIS A.	"E" - GOLF COURSE AND UPLANDS MAGAZINE			IA E	45359774
LTR	NONE	DTSC	AREA				
NONE	00.0	GRIBBLE, CHIP					
0004							

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N00221 / 003112	11-29-1999	PRC	DRAFT PROPOSED PLAN FOR AREA E FACT SHEET	ADMIN RECORD		AREA E	IRON MOUNTAIN
	03-01-1997	JUDY, DEBRA				IA E	45359779
FACT N62474-94-D-7609 0005	00103 00.0	NAVY VENTURA, FLORENC					
N00221 / 003111	11-29-1999	PRC	SUBMISSION OF THE DRAFT RECORD OF DECISION/REMEDIAL ACTION PLAN (ROD/RAP)	ADMIN RECORD	RAP	AREA E	IRON MOUNTAIN
	03-07-1997	JUDY, DEBRA	AND PROPOSED PLAN FACT SHEET FOR		ROD	IA E	45359779
LTR N62474-94-D-7609 0002	00103 00.0	NAVY VENTURA, FLORENC	AREA E - MARCH 1997				
N00221 / 003113	11-29-1999	PRC	DRAFT RECORD OF DECISION/REMEDIAL ACTION PLAN (ROD/RAP) FOR AREA E	ADMIN RECORD	RAP	AREA E	IRON MOUNTAIN
	03-07-1997	JUDY, DEBRA			ROD	IA E	45359779
RPT N62474-94-D-7609 0027	00103 00.0	NAVY VENTURA, FLORENC					
N00221 / 003238 MOUNTAIN	11-29-1999	TETRA TECH	DRAFT FINAL TECHNICAL MEMORANDUM (TM)		ADMIN RECORD	ERA	AREA E IRON
	10-06-1997	HAROUN, LYNNE	SAMPLING RESULTS AND FOCUSED HUMAN HEALTH AND ECOLOGICAL RISK		HHRA	IA E	45359783
RPT N62474-94-D-7609 0100	00067 00.0	NAVY BERNAL, EMMANUAL	ASSESSMENT (ERA) FOR AREA E		TM		
N00221 / 003237 MOUNTAIN	11-29-1999	NAVY	SUBMISSION OF THE DRAFT FINAL TECHNICAL		ADMIN RECORD	ERA	AREA E IRON
	10-07-1997	PENDER, BOB	MEMORANDUM (TM) SAMPLING RESULTS AND FOCUSED HUMAN HEALTH AND		HHRA	IA E	45359783
LTR N62474-94-D-7609 0003	00067 00.0	DTSC GRIBBLE, CHIP	ECOLOGICAL RISK ASSESSMENT (ERA) FOR AREA E - 06 OCTOBER 199		TM		
N00221 / 003438	11-29-1999	NAVY	PROPERTY TRANSFER REQUIREMENTS RELATED TO UNEXPLODED ORDNANCE,	ADMIN RECORD		AREA E	IRON MOUNTAIN
	08-16-1999	PENDER, BOB	UPLAND MAGAZINE AREA, INVESTIGATIVE			IA E	45359791
LTR NONE 0004	NONE 00.0	DTSC GRIBBLE, CHIP	AREA E				

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N00221 / 000004 MOUNTAIN	08-08-2000	TETRA TECH EM INC.	FINAL TECHNICAL MEMORANDUM SAMPLING RESULTS AND FOCUSED HUMAN HEALTH AND		ADMIN RECORD	BRAC	022 IRON
NONE RPT N62474-94-D-7609 N62474-94-D-7609 0150	**01-07-2000** 00067	INC. L. HAROUN NAVFAC - NAVFAC - SOUTHWEST DIVISION	ECOLOGICAL RISK ASSESSMENT FOR INVESTIGATION AREA E, INCLUDES FAX TRANSMITTAL LETTER REGARDING DTSC APPROVING THE REPORT AS FINAL DOCUMENT	INFO REPOSITORY	DDE DDT ERA FSAP IRA OU PRG RI	AREA E	37041348
N00221 / 000019	09-28-2000	NAVFAC - SOUTHWEST	RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES OF 29 JUNE 2000	ADMIN RECORD	FOST	003	SOUTHWEST DIVISION
NONE NONE MM NONE 0030	**07-31-2000** NONE	SOUTHWEST DIVISION NAVFAC - SOUTHWEST DIVISION		INFO REPOSITORY	MTG MINS RAB ROD	008 024 025 026 027 AREA A1 AREA E BLDG. 213 BLDG. 513 PARCEL 10 PARCEL X	DIVISION DIVISION

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N00221 / 000013 NONE NONE MM NONE 0026	08-30-2000 **08-21-2000** NONE	NAVFAC - SOUTHWEST SOUTHWEST DIVISION NAVFAC - SOUTHWEST DIVISION	RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES OF 25 MAY 2000	ADMIN RECORD INFO REPOSITORY	FOST LEAD METALS MTG MINS PCB RAB RAP ROD SOIL UXO	001 004 017 022 AREA A1 AREA E BLDG. 571 BLDG. 655 BLDG. 99 BLDG. H1 PARCEL 10 PARCEL 15 UST 655-1 UST 993 UST 999	IRON MOUNTAIN 37041348 37041348
N00221 / 000026 DS.0293.14322 DS.0293.14322 PLAN N62474-94-D-7609 0004	12-21-2000 **10-01-2000** 00293	NAVFAC - SOUTHWEST DIVISION NAVFAC - SOUTHWEST DIVISION	DRAFT PROPOSED PLAN	ADMIN RECORD		22	SOUTHWEST DIVISION DIVISION
N00221 / 000027 SWDIV SER SWDIV SER 06CM.JD/0806 LTR NONE 0002	12-21-2000 **10-03-2000** NONE	NAVFAC - SOUTHWEST SOUTHWEST DIVISION J. DUNAWAY DTSC, BERKELEY, CA C. GRIBBLE	TRANSMITTAL OF DRAFT TECHNICAL MEMORANDUM, PROPOSED PLAN AND RECORD OF DECISION	ADMIN RECORD	PROPSED PLAN ROD TECH MEMO	22 OU 1	SOUTHWEST DIVISION DIVISION DIVISION

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N00221 / 000028 DS.0293.14322 PLAN N62474-94-D-7609 0022	12-21-2000 **10-04-2000** 00293	TETRA TECH EM INC. NAVFAC - SOUTHWEST DIVISION	DRAFT RECORD OF DECISION	ADMIN RECORD INFO REPOSITORY	ARSENIC CANCER COPC DDD DDE DDT DUST METALS PCB PESTICIDES RAB REMOVAL ROD SOIL TRC	022 A-249 A-250	SOUTHWEST DIVISION
N00221 / 000029 DS.0293.14322 RPT N62474-94-D-7609 0014	12-21-2000 **10-04-2000** 00293	TETRA TECH EM INC. INC. R. BATRA NAVFAC - SOUTHWEST DIVISION	ADDENDUM TO THE DRAFT FINAL PHASE II REMEDIAL INVESTIGATION REPORT - HUMAN HEALTH RISK ASSESSMENT (SEE AR #1093 - DRAFT FINAL RI)	ADMIN RECORD	CANCER COPC PRG RA RI SOIL	022 A-249 A-250	SOUTHWEST DIVISION DIVISION
N00221 / 000025 DS.0293.14319 PLAN N62474-94-D-7609 0004	12-19-2000 **11-01-2000** 00293	TETRA TECH EM INC. NAVFAC - SOUTHWEST DIVISION	FINAL PROPOSED PLAN	ADMIN RECORD INFO REPOSITORY	PROPOSED PLAN	022	SOUTHWEST DIVISION

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No Keywords
Sites=022;22;AREA E;IA E;OU 1