NAVAL AIR FACILITY
EL CENTRO
IMPERIAL COUNTY, CALIFORNIA 92243

FINAL
ACTION MEMORANDUM/ REMEDIAL ACTION PLAN FOR NON-TIME-CRITICAL REMOVAL ACTION AT SITE 3, SLUDGE BURIAL AREA NAVAL AIR FACILITY EL CENTRO, CALIFORNIA

SITE STATUS:	NON-NPL
CATEGORY:	NON-TIME-CRITICAL REMOVAL ACTION
CERCLIS ID:	CA6170090017
SITE ID:	SITE 3, SLUDGE BURIAL AREA
DATE:	FEBRUARY 1997

DEPARTMENT OF TOXIC
SUBSTANCES CONTROL
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ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
Ca-HSC	California Health and Safety Code
Cal-EPA	California Environmental Protection Agency
CCR	*California Code of Regulations*
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	chemical of concern
COPC	chemical of potential concern
CTO	Contract Task Order
DDE	dichlorodiphenyldichloroethene
DERP	Defense Environmental Restoration Program
DHS	(California) Department of Health Services
DoD	Department of Defense
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
ESA	Ecological Scoping Assessment
°F	degrees Fahrenheit
HRS	hazard ranking system
ICAPCD	Imperial County Air Pollution Control District
IRP	(Navy) Installation Restoration Program
LDR	land-disposal restrictions
mg/kg	milligrams per kilogram
NAF	Naval Air Facility
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NFA	no further action
NPL	National Priorities List
NTCRA	non-time-critical removal action

PCB	polychlorinated biphenyl
POC	Point of Contact
PRG	preliminary remediation goal
RAB	Restoration Advisory Board
RAP	Remedial Action Plan
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RWQCB	(California) Regional Water Quality Control Board
SI	Site Investigation
STLC	soluble threshold limit concentration
SVOC	semivolatile organic compound
SWAT	Solid Waste Water Quality Assessment Test
TCLP	toxicity characteristic leaching procedure
TFH	total fuel hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TTLC	total threshold limit concentration
UL	upper limit
USC	*United States Code*
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound
WET	(Cal-EPA) Waste Extraction Test

Section 1
PURPOSE

This Action Memorandum documents, for the Administrative Record, the Department of the Navy (DON) decision to undertake a non-time-critical removal action (NTCRA) for soils impacted by chlordane and metals at the Naval Air Facility (NAF) El Centro Installation Restoration Program (IRP) Site 3, Sludge Burial Area. The Department of Defense (DoD) is authorized to undertake Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions, including removal actions, under 42 *United States Code* (USC) §9604, 10 USC §2705, and Federal Executive Order 12580. This document is prepared in accordance with the United States Environmental Protection Agency (U.S. EPA) guidelines given in the Superfund Removal Procedures: Action Memorandum Guidance (U.S. EPA 1990). This Action Memorandum and accompanying attachments are intended to meet the requirements for a Remedial Action Plan (RAP) pursuant to Chapter 6.8 of the California Health and Safety Code (Ca-HSC).

The objective of the removal action selected for Site 3 is to reduce the potential for future human and ecological exposure to soil contaminants resulting from past use of the site as a sludge burial area, and to pursue no further action (NFA) status for soil at the site. Potential groundwater contamination is being assessed under a separate program.

The proposed removal action for Site 3 is deemed consistent with the factors set forth within the National Oil and Hazardous Substances Pollution Control Contingency Plan (NCP) (40 *Code of Federal Regulations* [CFR] Part 300) based on the findings of "actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains."

Site 3 received a Relative Risk Site Evaluation Model ranking of "Y4 high." There are no nationally significant or precedent-setting issues associated with this site.

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Section 2
SITE CONDITIONS AND BACKGROUND

NAF El Centro is located approximately 7 miles northwest of El Centro, California, 7 miles north of the Mexican border, and 100 miles east of San Diego (Figure 2-1). Site 3 is located at the northwest corner of NAF El Centro (Figure 2-2), east of the sewage stabilization ponds, and north of Patrol Road.

2.1 REMOVAL SITE EVALUATION

In 1987, the Naval Energy and Environmental Support Activity (NEESA) conducted a Preliminary Assessment/Site Inspection (NEESA 1987) in which 16 sites at NAF El Centro were evaluated for potential contamination. During the Preliminary Assessment/ Site Inspection, information from sources such as historical records, aerial photographs, on-site surveys, and personnel interviews was used to evaluate the 16 potentially contaminated sites. The evaluation consisted of assessing:

- possible discharge of hazardous waste;
- potential for contamination in the waste to migrate via surface water, groundwater, and air; and
- potential for the waste to affect humans and the ecology.

Based on the evaluation, 14 of the 16 sites, including Site 3, were selected for further investigations under the IRP.

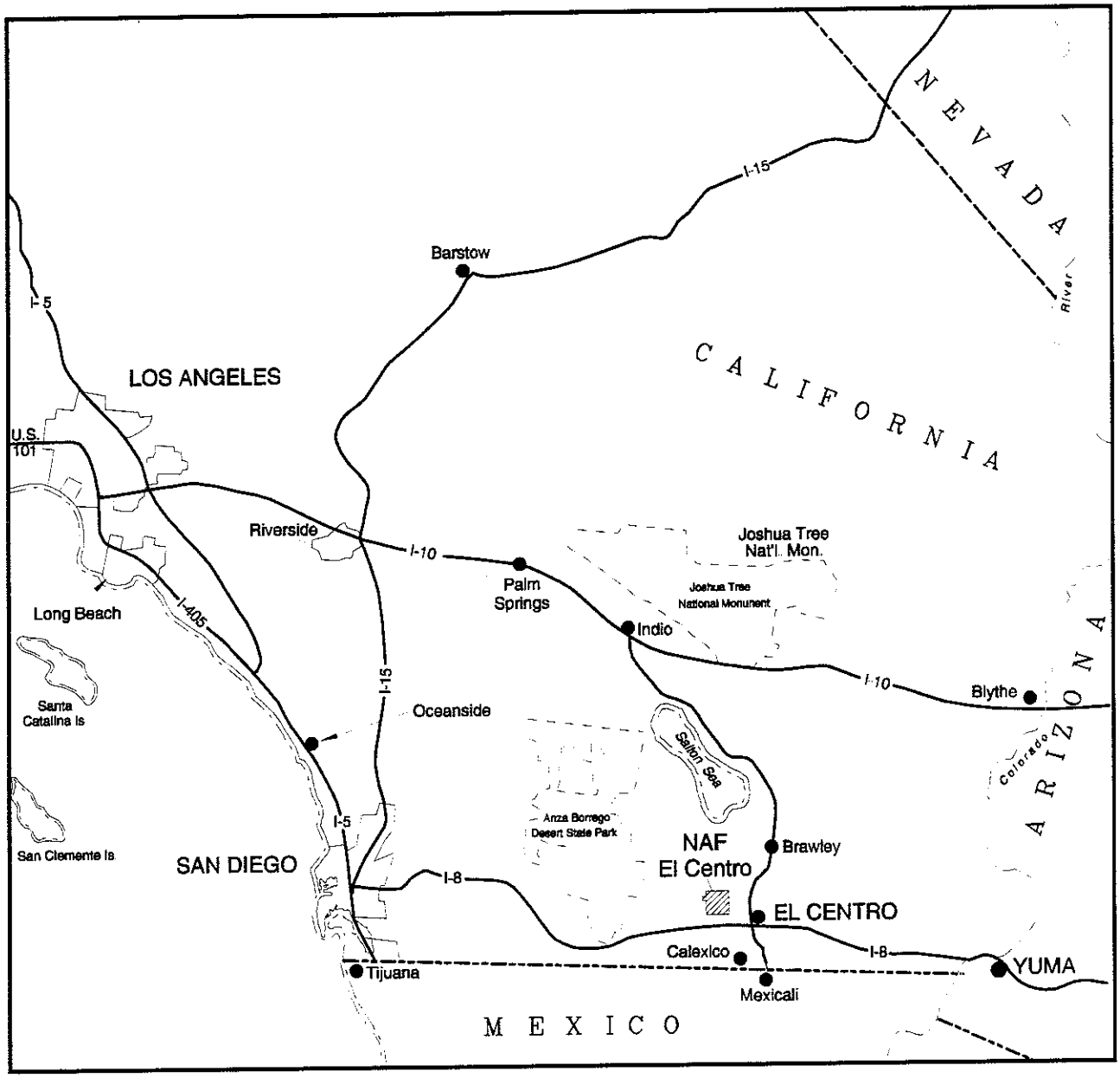
According to the Preliminary Assessment/Site Inspection (NEESA 1987), approximately 800 cubic feet of sewage sludge were dumped into a 20- by 10-foot, by 5-foot-deep unlined pit in 1986. The pit was closed by applying soil cover and grading.

During July through September 1991, a Solid Waste Water Quality Assessment Test (SWAT) and Site Investigation (SI) (Ogden 1993) was conducted at the site to assess the potential for the release of hazardous substances and to perform a preliminary assessment of the nature of contamination in the event that a release had occurred. The investigation was not intended to characterize the extent of contamination but to determine if further investigation or remediation was necessary.

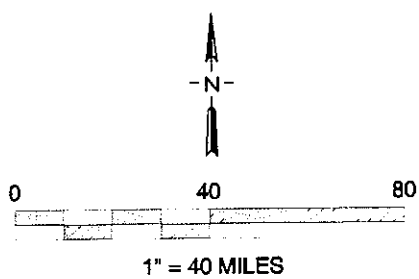
The SWAT/SI included drilling and sampling of six soil borings, installation and sampling of one groundwater monitoring well, and sampling of nearby surface water. The approximate locations of the soil borings and the groundwater monitoring well are shown in Figure 2-3.

Seven of the soil samples collected from the soil borings were submitted to an off-site laboratory and analyzed for organic and inorganic elements and chemicals. The sample analyses included:

- total recoverable petroleum hydrocarbons (TRPH) (U.S. EPA Method 418.1);



SOURCE: Master Plan - NAF El Centro 1988



Action Memorandum Site 3
Figure 2-1
Regional Location Map
Sludge Burial Area

NAF El Centro, Imperial County, California

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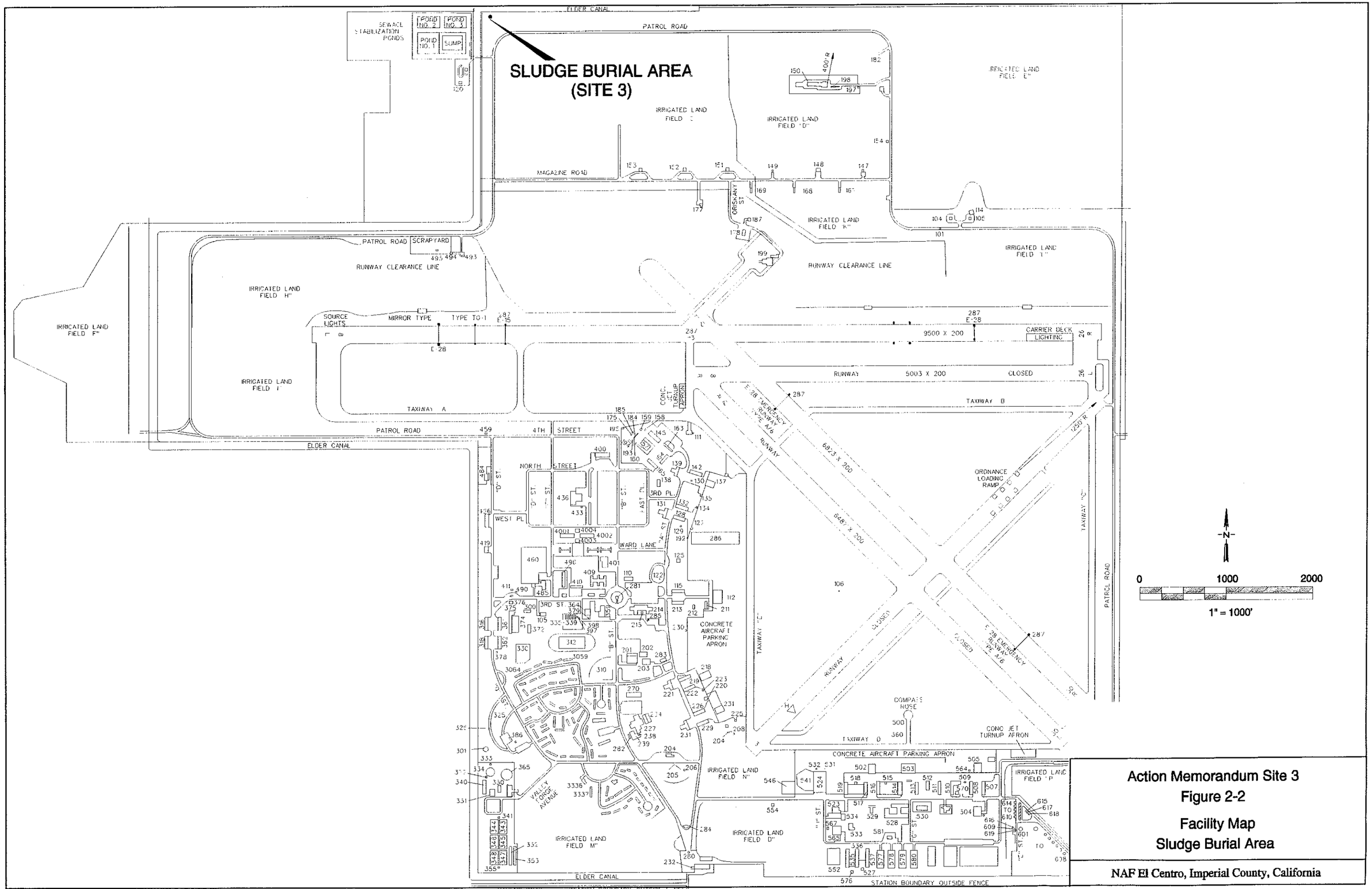

Action Memorandum Site 3
Figure 2-2
Facility Map
Sludge Burial Area

NAF El Centro, Imperial County, California

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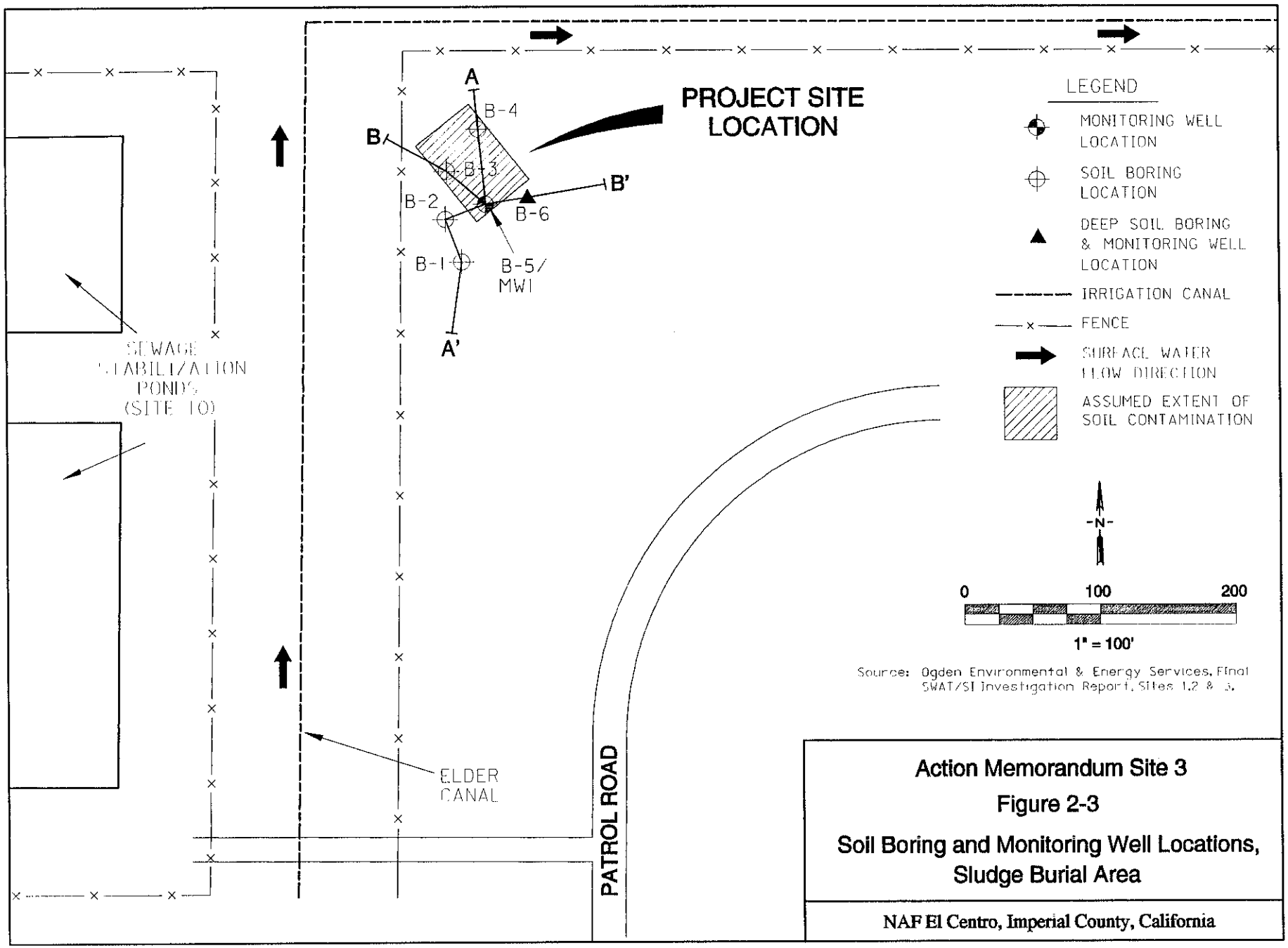

Source: Ogden Environmental & Energy Services, Final SWAT/SI Investigation Report, Sites 1,2 & 3.

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Figure 2-3

Soil Boring and Monitoring Well Locations, Sludge Burial Area

NAF El Centro, Imperial County, California

- total fuel hydrocarbons (TFH) (modified U.S. EPA Method 8015);
- aromatic volatile organic compounds (VOCs) (U.S. EPA Methods 8010/8020);
- total phenols (U.S. EPA Method 9066);
- total cyanide (U.S. EPA Method 9012);
- ethylene dibromide (U.S. EPA Method 504);
- VOCs (U.S. EPA Method 8240);
- semivolatile organic compounds (SVOCs) (U.S. EPA Method 8270);
- organochlorine pesticides (U.S. EPA Method 8080); and
- priority pollutant metals (various methods).

The results of the soil sample analyses are provided in Attachment A.

TRPH constituents were detected in five samples at concentrations ranging between 1 and 1,100 milligrams per kilogram (mg/kg). However, these samples did not contain concentrations of TFH above the laboratory detection limits. Chlordane, 2,4-dichlorodiphenyldichloroethene (2,4-DDE), and total cyanide were reported in one soil sample at concentrations of 1 mg/kg, 0.093 mg/kg, and 2.7 mg/kg, respectively.

All seven soil samples contained concentrations of arsenic, beryllium, cadmium, chromium, copper, lead, nickel, and zinc above the laboratory detection limits. Antimony, mercury, selenium, silver, and thallium were also detected above the laboratory detection limits in some samples.

2.2 PHYSICAL LOCATION

The location of the sludge burial pit shown in the NEESA report (NEESA 1987) appears to differ from the soil borings drilled during the SWAT/SI (Ogden 1993). A DON representative (SWDIV 1995) indicated that the Ogden borings were drilled in the vicinity of the sludge burial pit and that the location shown in the NEESA report was incorrect. The reported dimensions of the original sludge burial pit (Ogden 1993) were 20 by 10 feet by 5 feet deep. Based on the results of the soil sample analyses, soil contamination appears to extend beyond the original sludge burial pit.

The New River and Elder Canal are located within 1 mile of Site 3. The New River, along with the Alamo River, form the two main drainages for Imperial Valley. The New River originates primarily as agricultural return flows from the Imperial and Mexicali Valleys, and it flows north to the Salton Sea. The Elder Canal provides raw water from the Colorado River for domestic agricultural purposes in the Imperial Valley. It flows north along the western perimeter of NAF El Centro.

The climate in the NAF El Centro area is arid, with hot, dry summers and mild winters. The summer temperatures average 92 degrees Fahrenheit (°F) with highs often reaching

115°F. During winter, the low temperatures are near 30°F, and the high temperatures exceed 80°F.

Rainfall in the area occurs as gentle winter rains or intense summer thunderstorms. The mean annual rainfall is 2.4 inches. Evapotranspiration at NAF El Centro exceeds 6 feet per year. During the winter and spring, the prevailing winds are from the west; in the summer, winds are generally from the southwest.

NAF El Centro has an average winter population of 1,500 and an annual summer population of 1,000. The closest community is Seeley, which is approximately 1 mile southwest of the base. The mid-1991 population of Seeley, as estimated by the County of Imperial Community Economic Development, was 1,228.

NAF El Centro is surrounded by unincorporated portions of Imperial County, and land is primarily agricultural. Approximately 18 percent of the county is irrigated agricultural land. The developed areas, including the incorporated cities, unincorporated communities, and supporting facilities, comprise less than 1 percent of the total county area. Approximately 74 percent of the county is desert/mountains owned either by the federal government, Native American nations, or private parties. The Salton Sea occupies approximately 7 percent of the county area.

The Imperial County Ultimate Use Plan, cited in the Ogden (1993) report, states that agriculture is the dominant economic sector of the county. The plan discourages new urban development within or adjacent to existing urban areas and agricultural margin lands. The plan encourages the preservation of prime agricultural land and also emphasizes the preservation of unique natural areas.

2.3 SITE CHARACTERISTICS

NAF El Centro is an operational facility owned and operated by the DON. Land use within the base is generally classified as a "military operating area" for both current and future use. Site 3 is currently unused. During a visit to the site on 20 April 1995, stockpiled soil was observed near the sludge burial area. DON representatives indicated that the stockpiled soil consisted of construction waste unrelated to Site 3 and did not contain sewage sludge.

The site reportedly contains approximately 800 cubic feet of sewage sludge covered with a 2-foot-thick layer of soil (Ogden 1993).

2.4 RELEASE OR THREATENED RELEASE INTO THE ENVIRONMENT OF A HAZARDOUS SUBSTANCE, POLLUTANT, OR CONTAMINANT

This section as well as Sections 2.9, 2.10, and 2.11 of the Engineering Evaluation/Cost Analysis (EE/CA) (Attachment A) are intended to meet the RAP requirements in Ca-HSC Section 25356.1 (d)(4). Specifically, these sections provide a discussion of site-specific characteristics related to potential contamination at the site. The results of the soil sample

analyses performed during the SWAT/SI (Ogden 1993) identified chlordane, cyanide, 2,4-DDE, and a variety of priority pollutant metals as chemicals of potential concern (COPCs) for Site 3. As part of the EE/CA prepared for the site, background concentrations of metals were estimated and streamlined risk screening was performed to identify chemicals of concern (COCs) from the list of COPCs. Background concentrations of metals were estimated using a California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) recommended procedure. This procedure consisted of the following steps:

- combine data from background and site samples for each analyte;
- prepare a cumulative frequency probability plot;
- check normality of data;
- graphically identify the upper limit (UL) of the background population as an inflection point on the highest part of the probability plot;
- extract the background data points from the combined population;
- evaluate the extracted data for anomalies (e.g., data points below the inflection point but an obvious deviation from the linear plot, a coefficient of variation greater than 100 percent, or a range greater than two orders of magnitude); and
- use 95th percentile of the background population as the UL for background concentration.

A summary of the background metals concentrations is provided in Table 2-1.

Table 2-1
Upper Limit of Background Concentration
Using 95th Percentile of the Background Population

Analyte	Upper Limit of Background Concentration as 95th Percentile (mg/kg)[a]	Typical Metal Concentrations in Soil, Western U.S.[b] (mg/kg)
Arsenic	6.3	< 0.1-97
Beryllium	1.1	< 1-15
Cadmium	4.6	np[c]
Chromium	17	3-2,000
Copper	25	2-300
Lead	17	< 10-700
Nickel	20	< 5-700
Silver	0.6	np
Zinc	70	10-2,100

Notes:
[a] mg/kg – milligrams per kilogram
[b] United States Geological Society Professional Paper 1270 (Shacklette et al. 1984)
[c] np – not published

Due to the uncertainties in direct comparison with the UL values, additional factors were considered in discriminating between background and nonbackground concentrations as an indication of potential contamination at the site. The factors considered in evaluating whether sample results were indicative of potential contamination include the following:

- similar or greater background sample concentrations that also exceed the UL values;
- the magnitude of sample concentration relative to the UL values;
- constituents likely associated with the suspected contaminant source;
- comparison of sample concentrations with laboratory method detection limits in instances where there are no UL values (i.e., where nondetectable concentrations of particular analytes in most background and nonbackground samples precluded calculating a UL value); and
- comparison of sample concentrations with typical concentrations of metal occurring in the western United States (Shacklette et al. 1984) (Table 2-1)

The streamlined risk screening was performed by comparing the highest measured concentration of the COPC to the U.S. EPA Region IX preliminary remediation goals (PRGs) for a residential exposure scenario (U.S. EPA 1995). The Cal-EPA has adopted the U.S. EPA Region IX PRGs as screening concentrations and no longer recommends using the screening concentrations calculated according to the Preliminary Endangerment Assessment guidance manual (DTSC 1990). The residential soil PRGs are concentrations corresponding to a lifetime cancer risk of one in a million (10^{-6}) for carcinogenic effects and a hazard index of 1.0 for noncarcinogenic effects. Therefore, if the concentration of a chemical exceeds its PRG, the concentration may result in a level of exposure corresponding to an upper-bound cancer risk exceeding 10^{-6} if the chemical is a carcinogen, or it may result in an illness of another type if the chemical is not a carcinogen.

Cancer risk factors were developed for each carcinogenic COPC, and a hazard index was developed for each noncarcinogenic COPC. Summaries of the streamlined risk-screening calculations are provided in Tables 2-2 and 2-3. A discussion of the streamlined risk-screening process and of the method used to develop background concentrations for COPCs at NAF El Centro is provided in the EE/CA (Attachment A). Those carcinogenic COPCs having a cancer risk factor greater than 1×10^{-6} and those noncarcinogenic COPCs having a hazard index greater than 1.0 were identified as COCs for Site 3. The COCs identified for Site 3 included:

- arsenic,
- cadmium,
- chromium (as hexavalent chromium),
- lead, and
- chlordane.

The results of the SWAT/SI were not sufficient to assess the vertical and lateral extent of the soil contaminated by the COCs. Based on these data (Attachment A), it appears that the soil contamination extends vertically at least 6 feet deep. The lateral extent of the soil contamination does not appear to extend southward beyond soil boring EC3-B5 (Figure 2-3). The north, east, and west boundaries of the soil contamination have not been established. However, the COCs do appear to occur in soil borings EC3-B3 and EC3-B4. Thus, it appears that the COCs may extend beyond the original burial pit dimensions of 20 by 10 feet, and 5 feet deep.

The COCs identified at Site 3 remain from past activities at the site. Because these activities are no longer conducted at Site 3, there is no potential for future releases. However, the existing COCs may migrate by several routes. Data collected from the groundwater monitoring well installed as part of the SWAT/SI activities indicate that groundwater below the site is shallow (i.e., approximately 12 to 15 feet below the ground surface). Vertical migration of the COCs to the groundwater may occur by rainwater percolating through the contaminated soil. Therefore, the potential for future groundwater contamination exists.

Table 2-2
Estimated Total Cancer Risk for Chemicals of Potential Concern at Site 3

Chemical	Residential PRG[a] (mg/kg)[b]	Highest Measured Concentration (mg/kg)	Risk
Arsenic	0.32	13.1	4.09×10^{-5}
Beryllium	0.14	1.2[c]	8.57×10^{-6}
bis-2-(ethylhexyl)phthalate	32	1.0	3.13×10^{-8}
Cadmium[d]	9.0	12.6	1.40×10^{-6}
Chlordane	0.34	1.0	2.94×10^{-6}
Chromium, hexavalent	(0.2)	(127)	(6.35×10^{-4})
Chromium, total	210	127	6.05×10^{-7}
2,4-DDE (as 4,4′-DDE)[e]	1.30	0.09	7.15×10^{-8}
Total Assuming Cr as Total Chromium[f]			$\mathbf{5.45 \times 10^{-5}}$
Total Assuming Cr as Cr^{+6}[g]			$\mathbf{(6.89 \times 10^{-4})}$

Notes:
[a] PRG – United States Environmental Protection Agency (U.S. EPA) Region IX preliminary remediation goal for residential soil (carcinogenic effects), February 1995
[b] mg/kg – milligrams per kilogram
[c] measured concentration of 1.2 mg/kg was judged to be background
[d] for cadmium California Environmental Protection Agency (Cal-EPA)-modified PRG was used
[e] DDE – dichlorodiphenyldichloroethene; PRG for 4,4′-DDE was used because 2,4-DDE has no PRG
[f] assumes trivalent (Cr^{+3}) and hexavalent (Cr^{+6}) chromium in the same proportions as the U.S. EPA Region IX PRG for total chromium
[g] assumes total chromium is hexavalent chromium (Cr^{+6}), Cal-EPA-modified PRG (i.e., 0.2 mg/kg) used in risk calculation

Table 2-3
Estimated Total Hazard Indices for Chemicals of Potential Concern at Site 3

Chemical	Residential PRG[a] (mg/kg)[b]	Highest Measured Concentration (mg/kg)	Hazard Index
Antimony	31	1.1 J[c]	0.035
Arsenic	22	13.1	0.595
Beryllium	380	1.2	0.003
bis(2-ethylhexyl)phthalate	1,300	1.0	0.000
Cadmium	38	12.6	0.332
Chromium, hexavalent[d]	380	127	0.334
Chromium, total[e]	1×10^5 M[f]	127	0.000
Copper	2,800	985	0.352
Cyanide, total (as CuCN)[g]	380	2.7	0.007
2,4-DDE[h] (as 4,4′-DDE)	1×10^5 M	0.09	0.000
di-n-butyl phthalates	6,500	0.17	0.000
Lead	130	209	1.608
Mercury	23	2.5	0.109
Nickel	150	28.2	0.188
Nitrate as N	100,000	4,080	0.041
Selenium	380	37	0.097
Silver	380	111	0.292
Thallium	5.4	1.2	0.222
Zinc	23,000	772	0.034
Total Hazard Index Assuming Cr as Total Chromium[e]			**3.915**
Total Hazard Index Assuming Cr as Cr^{+6}[d]			**4.249**

Notes:
- [a] PRG – United States Environmental Protection Agency (U.S. EPA) Region IX preliminary remediation goal for residential soil (noncarcinogenic effects), February 1995
- [b] mg/kg – milligrams per kilogram
- [c] J – data validation qualifier indicating that the value has been estimated
- [d] assumes total chromium is hexavalent chromium
- [e] assumes trivalent (Cr^{+3}) and hexavalent (Cr^{+6}) chromium in the same proportions as the U.S. EPA Region IX PRG for total chromium
- [f] maximum (saturated) concentration, not included in hazard sum
- [g] PRG is for parenthetical chemical because measured chemical has no PRG
- [h] DDE – dichlorodiphenyldichloroethene; PRG for 4,4′-DDE was used because 2,4-DDE has no PRG

The COCs identified for the site are considered hazardous substances as defined by §101(14) of CERCLA, pollutants or contaminants as defined by §101(33), and hazardous substances as defined in Table 302.4 of 40 CFR. Accordingly, the provisions of the NCP apply to Site 3 and this NTCRA.

2.5 NATIONAL PRIORITIES LIST STATUS

Site 3 is included in the DoD IRP at NAF El Centro. The IRP forms the basis for assessments and response actions on DoD installations. The IRP is designed to identify, confirm, quantify, and remediate problems with past and present management of hazardous wastes. NAF El Centro is not a listed or proposed National Priorities List (NPL) site.

2.6 PREVIOUS ACTIONS

Previous environmental investigations conducted at Site 3 were the Preliminary Assessment/Site Inspection (NEESA 1987) and the SWAT/SI (Ogden 1993) (Section 2.1). The Preliminary Assessment/Site Inspection involved assessing the need for further investigation at the site (NEESA 1987). The SWAT/SI was performed based on the recommendations of the Preliminary Assessment/Site Inspection. The objective of the SWAT/SI was to assess the potential for the release of hazardous substances and to evaluate the nature of contamination in the event that a release had occurred. The SWAT/SI was not intended to characterize the extent of contamination but to assess if further investigation or remediation was necessary (Ogden 1993).

2.7 CURRENT ACTIONS

The DON has initiated a basewide study to characterize groundwater at NAF El Centro in an effort to address groundwater issues at Site 3 as well as at other IRP sites. These efforts are currently underway.

As the lead federal agency, the DON has also initiated community relations at NAF El Centro. The EE/CA (Attachment A) summarizes the previous studies. These activities have consisted of establishing an information repository that contains the Administration Record Index (Attachment B). This includes responses to regulatory and public comments (Attachment C) during three public meetings since March 1995, including one open house at NAF El Centro; solicitations to interested parties for participation in a Restoration Advisory Board (RAB); development of fact sheets and brochures describing the Navy IRP and the legal background (Attachment D); and establishment of information repositories. This Action Memorandum, which is available to the public for review and comment at the information repositories, will be included in the Administrative Record. The Administrative Record is located at the Environmental Technical Library, Southwest Division Naval Facilities Engineering Command, 1220 Pacific Highway, Building 129, San Diego, CA 92132-5190. The Point of Contact (POC) is Chris Potter at (619) 532-1144. An index to the Administrative Record is included in Attachment B.

Pertinent documents from the Administrative Record will be available at three information repositories located at the NAF El Centro, City of El Centro Public Library, and City of Brawley Public Library. The addresses and POCs are:

NAF El Centro
Public Works Department
El Centro, CA 92243-5001
POC: Fred Rivera (619) 339-2201

City of El Centro Public Library
539 State Street
El Centro, CA 92243
POC: Librarian (619) 337-4565

City of Brawley Public Library
400 Main Street
Brawley, CA 92227
POC: Librarian (619) 344-1891

Due to limited community interest in the activities at NAF El Centro, a RAB has not yet been established. Future community relations planned for the facility include continued efforts to establish a RAB and updating the information in the information repositories.

2.8 STATE AND LOCAL ACTIONS TO DATE

Federal Executive Order 12580 delegates to the DoD the President's authority to undertake CERCLA response actions. Congress further outlined this authority in its Defense Environmental Restoration Program (DERP) Amendments, (10 USC §2701-2705). Both CERCLA §120(f) and 10 USC §2705 require DON facilities to assure that state and local officials be given the timely opportunity to review and comment on DON response actions. CERCLA §120 further requires the DON to apply state removal and remedial action law requirements at its facilities.

Accordingly, the following agencies have provided technical advice, oversight, and approval during previous activities conducted for Site 3:

- Cal-EPA, DTSC (formerly known as the California Department of Health Services [DHS]); and
- California Regional Water Quality Control Board (RWQCB), Colorado River Basin Region.

The Cal-EPA DTSC will prepare an initial study, pursuant to the California Environmental Quality Act (CEQA), California Public Resources Code Section 21000. Based upon the initial study and public comment, DTSC will approve a negative declaration or an environmental impact report for this removal action. A negative declaration is anticipated. These activities address portions of the Ca-HSC Section 25356.1 (d)(6) RAP requirements.

2.9 POTENTIAL FOR CONTINUED STATE AND LOCAL RESPONSE

Cal-EPA DTSC and RWQCB, Colorado River Basin Region, will continue to provide technical advice, oversight, and assistance throughout the IRP process. Because the removal action may generate particulate emissions and fuel-related emissions from the operation of heavy equipment, it is anticipated that the Imperial County Air Pollution Control District (ICAPCD) will also be involved. It is expected that the DON DERP account will continue to fund this program.

Section 3
THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

This section and Sections 2.10 and 2.11 of the EE/CA (Attachment A) are intended to address the RAP requirements of Ca-HSC 25356.1 (d)(1) and (2). These sections contain a discussion of the health and safety risks posed by the conditions at Site 3.

In accordance with the NCP, the following threats must be considered in determining the appropriateness of a removal action (40 CFR § 300.415[b][2]):

(i) actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations, animals, or food chains;

(ii) actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iii) hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release;

(iv) high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate;

(v) weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

(vi) threat of fire or explosion;

(vii) the availability of other appropriate federal or state response mechanisms to respond to the release; and

(viii) other situations or factors that may pose threats to public health or welfare or the environment.

Item (i) has been identified as the primary threat at Site 3 to public health or welfare and the environment. The following sections describe the threats to humans and the environment posed by the wastes at Site 3.

3.1 THREATS TO PUBLIC HEALTH OR WELFARE

Because the site is currently not used and the COCs appear be buried below the site surface, there does not appear to be an immediate threat to public health or welfare. However, future uses of the site that disturb the soil may result in human exposure to the COCs. Human exposure to the COCs may occur through several routes. These include:

- dermal absorption;
- ingestion of contaminated food, water, or soil; and
- inhalation of airborne contaminants.

In addition, vertical migration of the COCs to the groundwater may occur when rainwater percolates through the contaminated soil. This transport mechanism may result in the contamination of groundwater below the site.

Descriptions of the human-health effects for the five COCs identified for Site 3 are presented below.

- Arsenic is a known human carcinogen, as well as a poison. The fatal oral dose for arsenic trioxide is about 120 milligrams in an adult human. For a 70-kilogram person, that amount is equivalent to a dose of 1.7 mg/kg. The toxicity of arsenic is due to its ability to interfere with cellular metabolism by enzyme inhibition. Chronic exposure to arsenic can cause liver and kidney damage, heart failure, anemia, and weight loss.
- Chlordane is a synthetic pesticide. In humans, the effects most frequently observed involve the central nervous system and the blood. Symptoms of central nervous system involvement include irritability, salivation, convulsions, and muscle tremors. Effects on the blood include anemia and leukemia. Chlordane has been reported to cause cancer in laboratory animals. The organ that it attacks is the liver.
- Cadmium is a gastrointestinal irritant at high doses. Acute symptoms of cadmium poisoning include nausea, vomiting, abdominal pain, and cramps. Similar symptoms occur with chronic exposure. In addition, chronic ingestion of cadmium is believed to cause severe back pain and demineralization of bone. Cadmium is classified as a probable human carcinogen.
- Chromium is most commonly found in the forms of trivalent and hexavalent chromium. Trivalent chromium compounds are less soluble in water than hexavalent chromium compounds and are also less toxic. Chromium has been reported to cause contact dermatitis, liver and kidney damage, lung congestion, and lung cancer in humans. Hexavalent chromium also appears to be a cause of lung cancer.
- Lead affects the central and peripheral nervous system, the blood system, the cardiovascular system, and the male reproductive tract. Its effects on the central nervous system are of particular concern. Lead is particularly toxic to children; exposure to very low levels can result in mental and developmental retardation in children. The U.S. EPA classifies lead as a probable human carcinogen.

3.2 THREATS TO THE ENVIRONMENT

The Ecological Scoping Assessment (ESA), performed as part of the EE/CA (Attachment A), identified potential floral and faunal receptors to the COCs at Site 3. These include:

- mammals: Colorado valley wood rat (a California species of special concern), coyote, mice/kangaroo rats, desert cottontail, and black-tailed jackrabbit;
- birds: burrowing owl (a California species of special concern), road runner, and red-tailed hawk;
- invertebrates: red ants;
- reptiles: flat-tailed horned lizard (a California species of special concern); and
- plants: four-wing saltbush and Torrey's sea-blight.

The potential exposure routes include:

- direct uptake of the COCs by plants,
- dermal absorption of COCs by wildlife,
- ingestion of the COCs in contaminated food or water sources, and
- inhalation of airborne COCs.

The ESA identified potentially complete exposure pathways for both plants and wildlife.

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Section 4
ENDANGERMENT DETERMINATION

The streamlined risk screening was performed for Site 3 by comparing the highest reported concentrations of the COCs to the U.S. EPA Region IX PRGs for a residential exposure scenario. The screening indicated that current conditions at Site 3 pose potential threats to human health and the environment. If not addressed by implementing the response action selected in this Action Memorandum, actual or potential releases of hazardous substances from this site may endanger public health, welfare, or the environment in the future.

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Section 5
PROPOSED ACTIONS AND ESTIMATED COSTS

In the EE/CA performed for Site 3, eight removal action alternatives were developed and subjected to preliminary screening. The removal action alternatives included:

- Alternative 1 - characterization, excavation, and disposal;
- Alternative 2 - excavation, on-site treatment using solidification/stabilization, and on-site disposal;
- Alternative 3 - excavation, on-site treatment using solidification/stabilization, and off-site disposal;
- Alternative 4 - excavation, on-site treatment using soil washing, and on-site disposal;
- Alternative 5 - excavation, on-site treatment using soil washing, and off-site disposal;
- Alternative 6 - *in situ* stabilization/solidification;
- Alternative 7 - on-site containment (capping);
- Alternative 8 - no action.

Alternatives 2 through 7 were eliminated from further consideration following the preliminary screening. Alternative 2 was eliminated because solidification/stabilization would not render the contaminated soil "inert" as defined by the RWQCB, Colorado River Basin Region. Alternative 3 was eliminated because the anticipated volume of soil requiring treatment did not justify the mobilization and setup cost associated with the treatment system. Alternatives 4 and 5 were eliminated because soil washing was not considered to be an effective treatment process for fine-grained soil such as that present at Site 3. Alternatives 6 and 7 were eliminated because these alternatives were not consistent with the removal action objective of NFA for soil and the DoD preference for unrestricted land use following completion of the removal action. Alternatives 1 and 8 were retained for detailed evaluation. Details of the preliminary screening and detailed evaluation are provided in the EE/CA (Attachment A).

The approximate size of the original sludge burial area was 20 by 10 feet by 5 feet deep (Ogden 1993). The analytical results of soil samples collected during the SWAT/SI indicate that the extent of contamination may encompass an area of approximately 70 by 50 feet by 8 feet deep. The total in-place volume of contaminated soil to be removed is estimated to be 1,040 cubic yards (approximately 1,600 tons). The excavated soil will be disposed according to the selected removal action alternative. The excavation will be backfilled with clean, imported soil.

5.1 PROPOSED ACTION

Based on comparative analysis of the removal action alternatives completed in the EE/CA (Attachment A), Alternative 1 (characterization, excavation, and disposal) is the recommended alternative because it has a high level of long-term effectiveness. Alternative 8 is not recommended because it will not reduce the risk from exposure to the contaminated soil on-site and would not meet cleanup objectives. Details of the removal action alternative evaluation, including a discussion of how the proposed removal action reduces the toxicity, mobility, and volume of the contamination, are provided in Section 4

of the EE/CA (Attachment A). This portion of the EE/CA is intended to address the portion of Ca-HSC Section 25356.1 (d) (3) RAP requirements.

The following sections describe the site characterization, excavation, disposal, and confirmatory sampling process of Alternative 1. Although site characterization is included in the removal action, it is considered a preconstruction activity and may be conducted independently prior to the removal action field activities. This process is presented as a decision-flow diagram in Figure 5-1.

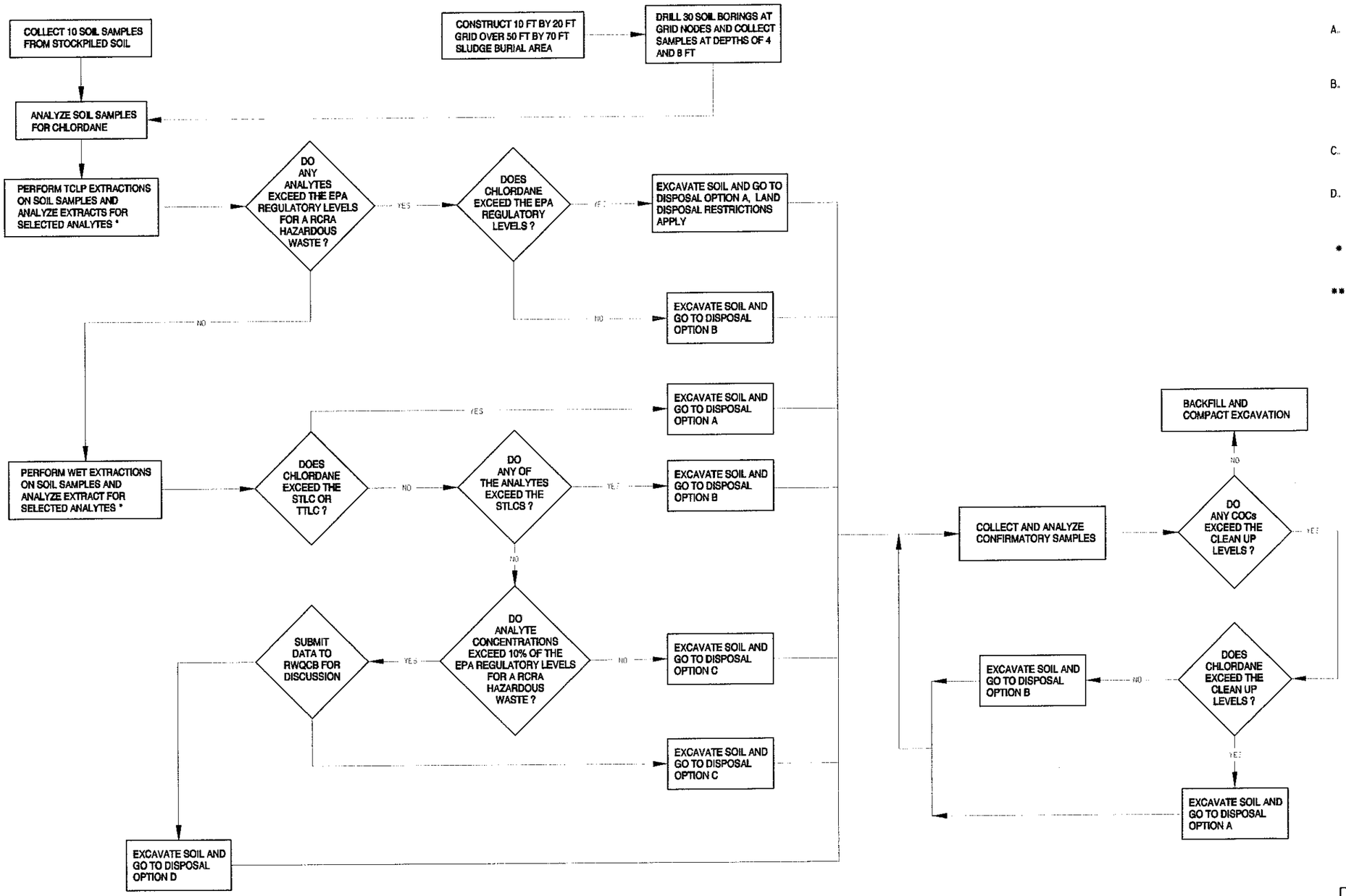
5.1.1 Proposed Action Description

Prior to beginning the removal activities, a biologist will inspect the site for the presence of the burrowing owl, Colorado valley wood rat, Yuma clapper rail, and the flat-tailed horned lizard (California species of special concern). If active owl burrows are identified and it is not mating season (i.e. March through June), the burrowing owl residents will be moved to an off-site burrow. Removal action activities will not be performed during the mating season if active burrows are observed on-site. Any flat-tailed horned lizards or wood rats observed on the site will be relocated prior to the removal action. Once the site has been inspected by a biologist, the site will be cleared of vegetation.

5.1.1.1 SITE CHARACTERIZATION

The approximate size of the original sludge burial pit was 20 by 10 feet by 5 feet deep (Ogden 1993). The limited data collected during the SWAT/SI indicate that the extent of contamination may encompass an area approximately 70 by 50 feet by 8 feet deep. The following procedure will be used to characterize the site.

- A total of 10 samples will be collected from the construction wastes currently stockpiled on the site.
- A 10- by 20-foot grid will be laid out over the estimated area (70 by 50 feet) affected by the buried sludge. Samples from 4 and 8 feet below the surface will be collected from soil borings drilled at each of the 30 grid nodes. A total of 60 soil samples will be collected.
- Each of the 70 samples (10 samples from the stockpiled construction wastes plus 60 samples from the soil borings) will be submitted to an off-site laboratory for analysis of chlordane. Toxicity characteristic leachate procedure (TCLP) extractions will also be obtained from each sample and the extracts will be analyzed for the COCs listed in Table 5-1. If any analytes exceed the U.S. EPA regulatory levels for a Resource Conservation and Recovery Act (RCRA) hazardous waste, the sample will be classified as RCRA hazardous. If chlordane exceeds the U.S. EPA regulatory level for a RCRA hazardous waste, the sample will be classified as RCRA hazardous with land-disposal restrictions (LDRs).



DISPOSAL OPTIONS

A. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR CHLORDANE. EXCAVATE AND TRANSPORT OFF-SITE FOR INCINERATION **

B. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR ANALYTE OTHER THAN CHLORDANE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL AT A CLASS I FACILITY **

C. SOIL CLASSIFIED AS INERT. EXCAVATE AND TRANSPORT TO SITE I FOR DISPOSAL.

D. SOIL CLASSIFIED AS DESIGNATED OR NON-HAZARDOUS SOLID WASTE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL **

* ANALYTES INCLUDE: ARSENIC, CADMIUM, CHROMIUM (TOTAL), HEXAVALENT CHROMIUM, LEAD AND CHLORDANE

** ONLY SOIL FROM AREAS CLASSIFIED AS CONTAINING HAZARDOUS, DESIGNATED, OR NON-HAZARDOUS SOLID WASTE WILL BE TRANSPORTED OFF-SITE.

Action Memorandum
Figure 5-1
Characterization, Excavation, and Disposal Decision Flow Diagram
Site 3

NAF El Cento, Imperial County, California

090C204S.wsN 2/12/97

Table 5-1
Proposed Soil Cleanup Levels

Chemicals of Concern	Cleanup Levels (mg/kg)[a]
Arsenic	6.3[b]
Cadmium	9[c]
Chlordane	0.34[c]
Chromium, hexavalent	0.2[d]
Chromium, total	210[c]
Lead	130[c]

Notes:
[a] mg/kg – milligrams per kilogram
[b] Proposed cleanup level based on the upper limit of the background concentration because the upper limit of background exceeds the preliminary remediation goal (PRG).
[c] Proposed cleanup level based on the U.S. EPA Region IX PRG for residential soils, February 1995
[d] Proposed cleanup level based on the California Environmental Protection Agency-modified PRG. If a laboratory detection limit equal to or less than the PRG is not available, the lowest available laboratory detection limit will be used as the soil cleanup level.

- The Cal-EPA Waste Extraction Test (WET) will be performed on samples that do not contain COCs exceeding the U.S. EPA regulatory levels for a RCRA hazardous waste. The extracts will be analyzed for the COCs listed in Table 5-1. If any of the analytes exceed the soluble threshold limit concentrations (STLCs), the sample will be classified as California hazardous If chlordane exceeds the STLC or the total threshold limit concentration (TTLC) the sample will be classified as California hazardous with LDR.
- Samples that do not contain COCs exceeding the STLCs or the chlordane TTLC and that do not contain COCs in the TCLP extract exceeding ten percent of the U.S. EPA regulatory levels for a RCRA hazardous waste, will be classified as inert.
- Samples that do not contain COCs exceeding the STLCs or the chlordane TTLC, but do contain COCs in the TCLP extract exceeding ten percent of the U.S. EPA regulatory levels for a RCRA hazardous waste, will be submitted to the RWQCB with supporting data for classification as inert or nonhazardous

Based on the results of the site characterization, the site will be segregated into areas containing hazardous soil, nonhazardous soil, and inert soil.

5.1.1.2 EXCAVATION

The contaminated areas (as defined in the characterization stage) will be excavated and placed on-site in stockpiles according to classification. Additional excavation will be performed to remove potentially contaminated soil based on visual evidence (i.e., unusual

During the excavation, soil stockpiling, and backfilling activities, water will be sprayed on the stockpiled soil and around the excavated area, as needed, to control dust.

5.1.1.3 DISPOSAL

After the soil is excavated and stockpiled according to classification, it will be disposed of as follows.

- Soil classified as inert will be transported to Site 1 for disposal. Site 1 is an existing, inactive landfill that received waste from NAF El Centro between 1965 and 1983.
- Soil classified as nonhazardous will be transported to a licensed Class II or III facility for disposal.
- Soil classified as hazardous will be transported to a licensed Class I facility for disposal.
- Soil classified as hazardous with LDRs will be transported to a licensed incineration facility for disposal.

5.1.1.4 CONFIRMATORY SAMPLING

Confirmatory sampling will be performed to evaluate whether COCs remain following excavation. The following procedure will be used.

- A minimum of six confirmatory samples will be collected (two from the bottom and one from each sidewall) from the final excavation and submitted to an off-site laboratory for analysis.
- The confirmatory samples will be analyzed for arsenic, cadmium, total chromium, hexavalent chromium, and lead using U.S. EPA 6000/7000 series methods and for chlordane using U.S. EPA Method 8080.
- The results of the confirmatory sample analyses will be compared to the clean-up levels (Table 5-1). If any results exceed the cleanup levels, the soil in the vicinity of the sample will be excavated and disposed in a Class I facility.
- If additional excavation is performed, confirmatory sampling will be performed again in the newly excavated area.

5.1.1.5 BACKFILLING

When the results of the confirmatory sample analyses indicate that the soil containing COCs at concentrations exceeding the soil cleanup levels has been removed from the site, clean fill material will be imported to the site, and the excavation will be backfilled and compacted.

5.2 POTENTIAL IMPACTS ON SENSITIVE POPULATIONS AND HABITATS

Site 3 is characterized by exposed soil with sparse vegetation. Vegetation includes four-wing saltbush and Torrey's sea-blight shrubs. The site is surrounded by agricultural fields and other vegetated areas. It will be necessary to remove this vegetation to perform the proposed removal action. Several kinds of birds, mammals, and reptiles may cross or forage at the site. These animals may include the burrowing owl and flat-tailed horned lizard, which are California species of special concern. The flat-tailed horned lizard has been proposed for inclusion on the federal threatened and endangered species list. The proposed removal action may impact the potential use of the site by these species. However, once the removal activities are completed, the site will again be available for use.

5.3 POSTREMOVAL SITE CONTROL

The intent of the proposed removal action is to remove the COC-contaminated soil such that NFA status can be obtained for soil at the site. Thus, postremoval site control is not anticipated for the site.

5.4 CONTRIBUTION TO REMEDIAL PERFORMANCE

The proposed removal action will eliminate potential exposure risks to human health and the environment from contaminated soil at the site. Soil containing significant contamination will be excavated and removed from Site 3. No further action for soil is anticipated to be required at the site. This section is intended to address Section 25356.1 (d) (1) Ca-HSC RAP requirements.

5.5 DESCRIPTION OF ALTERNATIVE TECHNOLOGIES

The following paragraph is intended to address portions of Ca-HSC Section 25356.1 (d)(3) and Section 25356.1 (d)(6), specifically preference for permanence and treatment and the potential environmental impacts of alternative remedial action measures.

Eight removal action alternatives were developed and subject to preliminary screening in the EE/CA (Attachment A). These alternatives included:

- Alternative 1 - characterization, excavation, and disposal;
- Alternative 2 - excavation, on-site treatment using solidification/stabilization, and on-site disposal;
- Alternative 3 - excavation, on-site treatment using solidification/stabilization, and off-site disposal;
- Alternative 4 - excavation, on-site treatment using soil washing, and on-site disposal;

- Alternative 5 - excavation, on-site treatment using soil washing, and off-site disposal;
- Alternative 6 - *in situ* stabilization/solidification;
- Alternative 7 - on-site containment (capping);
- Alternative 8 - no action.

Alternatives 2 through 7 were eliminated from further consideration following the preliminary screening. Alternative 2 was eliminated because solidification/stabilization would not render the contaminated soil "inert" as defined by the RWQCB, Colorado River Basin Region. Alternative 3 was eliminated because the anticipated volume of soil requiring treatment did not justify the mobilization and setup cost associated with the treatment system. Alternatives 4 and 5 were eliminated because soil washing was not considered to be an effective treatment process for fine-grained soil such as that present at Site 3. Alternatives 6 and 7 were eliminated because these alternatives were not consistent with the removal action objective of NFA for soil and the DoD preference for unrestricted land use following completion of the removal action. Alternatives 1 and 8 were retained for detailed evaluation.

No action (Alternative 8) was eliminated following the detailed evaluation because it would not reduce the risk from exposure to the contaminated soil at the site and would not meet cleanup objectives. The toxicity, mobility, and volume of COCs would not be reduced. There are no costs associated with this alternative. Details of the preliminary screening and detailed evaluation are provided in the EE/CA (Attachment A).

5.6 ENGINEERING EVALUATION/COST ANALYSIS

An EE/CA has been developed for this NTCRA (Attachment A). The EE/CA identified and compared eight removal action alternatives for the contaminated soil at Site 3. The EE/CA was released for public review and comment. An Administrative Record has also been developed and is available for public review. The public comment period on the EE/CA, draft Action Memorandum occurred from 04 November through 04 December 1996. No public comments were received.

5.7 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 300.415(i) of the NCP provides that removal actions must attain applicable or relevant and appropriate requirements (ARARs) to the extent practicable, considering the exigencies of the situation.

Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site.

Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws. While not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstances at a CERCLA site, these laws address problems or situations sufficiently similar to those encountered at the CERCLA site and are well-suited to the particular site.

Because CERCLA on-site response actions do not require permitting, only substantive requirements are considered as possible ARARs. Administrative requirements (e.g., approval of or consultation with administrative bodies, issuance of permits, documentation, reporting, record keeping, and enforcement) are not ARARs for CERCLA actions confined to the site. Only those state standards that are identified by a state in a timely manner and are more stringent than federal requirements may be applicable or relevant and appropriate. ARARs must be identified based on information about chemicals at the site, features of the site location, and removal actions under consideration.

As the lead federal agency, DON is primarily responsible for identifying federal ARARs at Site 3. As the lead state agency, Cal-EPA has the responsibility for identifying state ARARs. In a letter dated 13 April 1995, the DON requested that Cal-EPA identify ARARs for the NAF El Centro IRP sites, including Site 3. On 21 June 1995, Cal-EPA submitted a letter to DON listing a wide variety of potential state ARARs for the NAF El Centro IRP sites (DTSC 1995). Many of the ARARs identified by the state agencies were not relevant to the activities planned for Site 3 and are not discussed in this document. The ARARs analysis presented in this Action Memorandum represents a summary of the information provided by Cal-EPA.

There are three types of ARARs. The first type includes "chemical-specific" requirements. These ARARs set limits on concentrations of specific hazardous substances, contaminants, and pollutants in the environment. Examples of this type of ARAR are ambient water quality criteria and drinking water standards. The second type of ARAR includes "location-specific" requirements that restrict certain types of activities based on site characteristics. These include restrictions on activities in wetlands, floodplains, and historic sites. The third type of ARAR includes "action-specific" requirements. These are technology-based restrictions triggered by the type of action under consideration. Examples of action-specific ARARs are RCRA regulations for waste storage and disposal.

In general, the federal and state hazardous waste management regulations promulgated in the *California Code of Regulations* (CCR) Title 22 will be the controlling ARARs for the removal action at Site 3. These regulations characterize the hazardous nature of the excavated material, and they specify how it must be managed and disposed after excavation if it is hazardous. If the excavated soil is nonhazardous, the controlling ARARs for soil management will be the State Water Resources Control Board waste discharge to land requirements (CCR Title 23, Chapter 15). Additionally, various rules

and regulations of the ICAPCD promulgated pursuant to the Clean Air Act are ARARs for soil excavation activities at Site 3. A detailed evaluation of ARARs is provided in the EE/CA (Attachment A).

5.7.1 Chemical-Specific ARARs

The proposed removal action does not involve groundwater, surface water, or air. Therefore, there were no chemical-specific ARARs for these media. Summaries of the federal and state chemical-specific ARARs for soil are provided in Tables 5-2 and 5-3 and discussed below.

5.7.1.1 FEDERAL SOIL ARARs

Based on the maximum concentrations reported in soil samples at Site 3 (Ogden 1993), the soil may be a RCRA hazardous waste by toxicity characteristic for total chromium and lead. The requirements that determine whether a waste is a RCRA hazardous waste are described in 22 CCR 66261.100. The applicable chemical-specific standards of RCRA include the maximum concentrations of contaminants for the toxicity characteristic (22 CCR 66261.24a[1]). Other action-specific RCRA requirements that may apply or may be relevant and appropriate are addressed in Section 5.7.3.

5.7.1.2 STATE SOIL ARARs

Based on the maximum concentrations reported at Site 3, the soil may be non-RCRA, state-regulated hazardous waste for cadmium, total chromium, and lead. Thus, Title 22 is applicable, and the chemical-specific requirements for characterization of the excavated soil include the list of inorganic persistent and bioaccumulative toxic substances (22 CCR 66261.24[a][2][A]) and the list of organic persistent and bioaccumulative toxic substances (22 CCR 66261.24[a][2][B]).

5.7.2 Location-Specific ARARs

The ESA performed as part of the EE/CA identified the potential for two California species of special concern to use the site. One of these species, the flat-tailed horned lizard, is proposed for inclusion on the federal threatened and endangered species list. Based on this assessment, the federal Endangered Species Act of 1973 is identified as a federal location-specific ARAR because the removal actions will involve excavation of potential habitats. No other federal location-specific ARARs were identified.

Provisions of the California Fish and Game Code pertaining to actions that may jeopardize the survival and reproduction of endangered species are state location-specific ARARs because: 1) the ESA identified the potential for endangered species to use the site, and 2) the removal action will disturb the site and potential habitats. Summaries of the federal and state location-specific ARARs for are provided in Tables 5-4 and 5-5.

Table 5-2
Federal Chemical-Specific ARARs[a,b,c]

Requirement	Prerequisite	Citation	ARAR Determination	Comments
SOIL				
Resource Conservation and Recovery Act				
Definition of RCRA[d] hazardous waste.	Waste soil	Title 22 CCR[e] Sections 66261.21, 66261.22(a)(1) and (2) 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether excavated soil is hazardous waste.

Notes:
[a] ARAR – applicable or relevant and appropriate requirement
[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.
[c] Chemical-specific concentrations used for removal action alternative evaluation may not be ARARs indicated in this table, but the concentrations may be based upon other factors. Such factors may include the following:
- human-health risk-based concentrations (risk-based PRGs; 40 CFR 300.430[e][A][1] and [2])
- ecological risk-based concentrations (40 CFR 300.430[e][G])
- practical quantitation limits of contaminants (40 CFR 300.430[e][A][3])

Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.
[d] RCRA – Resource Conservation and Recovery Act
[e] CCR – *California Code of Regulations*

Table 5-3
State Chemical-Specific ARARs[a,b,c]

Requirement	Prerequisites	Citation	ARAR Determination	Comments
GROUNDWATER, SURFACE WATER AND SOIL				
Cal-EPA[d] Department of Toxic Substances Control				
Definition of non-RCRA[e] hazardous waste	Waste soil	22 CCR[f] 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C), or 66261.3(a)(2)(F)	Applicable	Applicable for determining whether excavated soil is a non-RCRA hazardous waste.
State MCL[g] list	Public water system	22 CCR 64435 and 64444.5	Not an ARAR	
State secondary MCL (SMCL[h]) list	Public water system	22 CCR 64473	Not an ARAR	
State and Regional Water Quality Control Board				
Authorizes the state and regional water boards to establish in water quality control plans beneficial uses and numerical and narrative standards to protect both surface and groundwater quality; authorizes regional water boards to issue permits for discharges to land, surface water, or groundwater that could affect water quality, including National Pollutant Discharge Elimination System permits, and to take enforcement action to protect water quality.	Existence of surface water or groundwater	California Water Code, Division 7, Section 13241, 13243, 13263(a), and 13360 (Porter-Cologne Water Quality Control Act)	Not an ARAR	Removal action will not affect surface water quality or address groundwater.
		Other provisions of Porter-Cologne Water Quality Control Act	Not an ARAR	
Describes the water basins in Colorado River Basin region; establishes beneficial uses of ground and surface waters; establishes water quality objectives, including narrative and numerical standards; establishes implementation plans to meet water quality objectives and protect beneficial uses and incorporates statewide water quality control plans and policies.	Existence of surface water or groundwater	Comprehensive Water Quality Control Plan for the Colorado River (Water Code 13240)	Not an ARAR	Substantive provisions would be ARARs for removal actions affecting water quality. The removal action at Site 3 will not affect surface water quality or address groundwater.

(table continues)

Table 5-3 (continued)

Requirement	Prerequisites	Citation	ARAR Determination	Comments
Incorporated into all regional board basin plans; designates all ground and surface waters of the state as drinking water except where the total dissolved solids are greater than 3,000 ppm[i], the well yield is less than 200 gallons per day from a single well, the water is a geothermal resource or in a water conveyance facility, or the water cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices.	Existence of surface water or groundwater	State Water Resources Control Board Resolution No. 88-63 (Sources of Drinking Water Policy)	Not an ARAR	Not applicable because the removal action at Site 3 will not affect surface water quality or address groundwater.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes in their entirety or policies as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered ARARs.

[c] Chemical-specific concentrations used for the removal action alternative evaluation may not be ARARs indicated in this table, but the concentrations may be based upon other factors. Such factors may include the following:

- human health risk-based concentrations (risk-based PRGs 40 CFR 300.430[e][A][1] and [2])
- ecological risk-based concentrations (40 CFR 300.430[e][G])
- practical quantitation limits of contaminants (40 CFR 300.430[e][A][3])

Many action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

[d] Cal-EPA – California Environmental Protection Agency

[e] RCRA – Resource Conservation and Recovery Act

[f] CCR – *California Code of Regulations*

[g] MCL – maximum contaminant level

[h] SMCL – secondary maximum contaminant level

[i] ppm – parts per million

Table 5-4
Federal Location-Specific ARARs[a,b]

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Endangered Species Act of 1973					
Critical habitat upon which endangered species or threatened species depend	Action to conserve endangered species or threatened species, including consultation with the Department of the Interior	Determination of effect upon endangered or threatened species or its habitat	16 USC[c] 1536(a)	Relevant and appropriate	Relevant and appropriate because the ecological scoping assessment conducted for Site 3 indicates species proposed for inclusion on the national endangered species list have the potential to use the site.

Notes:
[a] ARAR – applicable or relevant and appropriate requirements
[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statues or policies in their entirety as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered ARARs.
[c] USC – *United States Code*

Table 5-5
State Location-Specific ARARs[a,b]

Location	Requirement	Prerequisites	Citation	ARAR Determination	Comments
Fish and Game Code					
Endangered species habitat	No person shall import, export, take, possess, or sell any endangered or threatened species or part or product thereof	Threatened or endangered species determination on or before 1 January 1985 or a candidate species with proper notification	Fish and Game Code Section 2080	Relevant and Appropriate	Ecological scoping assessment identified potential for two California species of special concern to use the site. One of these species (the flat-tailed horned lizard) has been proposed as a threatened species for inclusion on the federal threatened and endangered species list.
Endangered species habitat	Department policy and legislative findings and definitions for significant natural areas		Fish and Game Code Sections 2050-2068	Not an ARAR	Procedural; not a "cleanup standard, standard or control," or "other substantive requirement, criteria, or limitation."
Endangered species habitat	Assures that action taken will not jeopardize the survival and reproduction of any threatened or endangered species		Fish and Game Code Sections 2090-2096	Not an ARAR	Not effective after 1 January 1994.

Notes:
[a] ARAR – applicable or relevant and appropriate requirement
[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as ARARs. Specific ARARs follow each general heading; only substantive requirements of the specific citations are considered ARARs.

5.7.3 Action-Specific ARARs

Action-specific ARARs are addressed according to actions anticipated in executing the removal at Site 3. The proposed removal action includes excavation and disposal of the contaminated soil. The contaminated soil will be excavated and transported to Site 1 for reuse or to an off-site facility for disposal. A disposal option has not been selected for the soil at Site 3 because the site has not been characterized. As such, ARARs for both cases are considered. Action-specific ARARs are discussed below. Summaries of the federal and state action-specific ARARs are provided in Tables 5-6 and 5-7.

5.7.3.1 REMOVAL ACTION

Ca-HSC Section 253561(b) states that except as provided in subdivision (h), an RAP shall be prepared for a site where a removal action is planned. Ca-HSC Section 25356.1(h)(1) states that an RAP is not required if the conditions present at a site present an imminent or substantial endangerment to the public health and safety or to the environment, or if the estimated cost of the removal action is less than $1 million. The planned removal action is estimated to cost less than $1 million, but has the potential to cost more than $1 million if a significant volume of soil requires incineration. Therefore, the EE/CA and this Action Memorandum are intended to meet the requirements of the RAP.

5.7.3.2 FUGITIVE DUST EMISSIONS

Fugitive dust may be generated during the excavation and handling of the contaminated soil. The applicable provisions of the ICAPCD Regulation VIII and Rule 404 are considered ARARs for these activities. ICAPCD Regulation VIII requires that reasonably available control measures be applied to prevent fugitive dust emissions. Rule 404 limits the discharge of particulate matter from point sources.

5.7.3.3 FUEL-BURNING EQUIPMENT

The requirements of ICAPCD Rule 401 prohibit air contaminant emissions from fuel-burning equipment darker than No. 1 on the Ringleman chart for more than 3 minutes total in any hour.

5.7.3.4 WASTE PILES

The substantive provisions of 22 CCR 66262.34 are ARARs for accumulation of contaminated soil during excavation. The requirements of 22 CCR 66264.251 (except Subsections [c], [j], and [l]1) are ARARs for waste pile design, construction, and monitoring. The provisions of 22 CCR 66264.258 (a) and (b), which pertain to the closure of waste piles, are also identified as ARARs.

Table 5-6
Federal Action-Specific ARARs[a,b]

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
Resource Conservation and Recovery Act 42 USC[f] 6901 et seq.							
On-site waste generation	Person who generates waste shall determine if that waste is a hazardous waste.	Generation of waste in California.	22 CCR[g] 66262.10(a), 66262.11	x			Applicable for any operation where waste is generated. Determination of hazardous waste status should be documented.
Hazardous waste accumulation	Generator may accumulate waste on-site for 90 days or less or must comply with requirements for operating a storage facility.	Accumulation of hazardous waste.	22 CCR Section 66262.34	x			Accumulation of hazardous wastes on-site for longer than 90 days would be subject to requirements for storage facilities.
Waste pile	Design and operating requirements for waste piles. Use a single liner and leachate collection system, unless exempted. Controls for run-on, runoff, and fugitive emissions required.	Noncontainerized accumulation of solid, nonflammable hazardous waste that is used for treatment or storage.	22 CCR 66264.251 (except (j) and (I)1).		x		Relevant and appropriate to removal action alternatives that require temporary storage of excavated soil prior to disposal.
Closure of waste piles	At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate; owner shall manage all such waste as hazardous waste.	Waste pile used to store hazardous waste.	22 CCR 66264.258(a) and (b) except references to procedural requirements		x		Relevant and appropriate for closure of areas used for temporary storage of excavated soil.
Closure with no postclosure care (e.g., clean closure)	General performance standard requires elimination of need for further maintenance and control; elimination of postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products; removal or decontamination of all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate; and management of all such waste as hazardous waste, as necessary.	Land-based unit containing hazardous waste. Hazardous waste placed at site after the effective date of the requirements, or placed into another unit. Cleanup to health-based standards that will not require long-term management. Not applicable to material treated, stored, or disposed only before the effective date of the requirements, or if treated *in situ*, or consolidated within area of contamination.	22 CCR 264.111 and 22 CCR 264.114 except for cross-references to procedural requirements such as preparation and submittal of closure plans and other notifications		x		Requirement relevant and appropriate for sites where clean closure or no further response action planned is a removal action objective. This is the case at Site 3.

(table continues)

Table 5-6 (continued)

Action	Requirement	Prerequisites	Citation	ARAR Determination A	RA	TBC	Comments
Placement of waste in land disposal unit	Attain land-disposal treatment standards before putting waste into landfill in order to comply with land-ban restrictions.	Placement of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, or underground mine or cave.	22 CCR 66268.40; 22 CCR 66268.105	x			Applicable if restricted hazardous waste is disposed.
Clean Air Act 40 USC 7401 et seq.							
Fugitive dust emissions	Persons engaging in the handling, transport, or disposition of bulk materials shall apply reasonably available control measures to prevent fugitive dust emissions.	Engaging in nonexempt handling, transport, or disposition of bulk materials.	ICAPCD[h] Regulation VIII	x			Removal actions will involve nonexempt handling, transport, and disposition of bulk materials.
Opaque emissions	Release or discharge to the atmosphere from a single source of emission of an air contaminant for a period or periods of more than three minutes in any hour which is darker than No. 1 on the Ringleman chart.	Discharge of opaque emissions.	ICAPCD Rule 401	x			May be applicable to emissions from fuel-burning equipment.
Particulate mater emissions	Discharge in one hour of particulate matter in total quantities in excess of the amount shown in referenced table.	Discharge of particulate emissions.	ICAPCD Rule 404	x			Excavation and handling of soil may result in discharge of particulate matter.

(table continues)

Table 5-6 (continued)

Action	Requirement	Prerequisites	Citation	ARAR Determination A	RA	TBC	Comments
U.S. Department of Transportation, 49 USC 1802, et seq.							
Hazardous materials transportation	No person shall represent that a container or package is safe unless it meets the requirements of 49 USC 1802, et seq., or shall represent that a hazardous material is present in a package or motor vehicle if it is not.	Interstate carriers transporting hazardous waste and substances by motor vehicle. Transportation of hazardous material under contract with any department of the executive branch of the federal government.	49 CFR[1] 171.2(f)		x		Substantive portions of these requirements would be ARARs for transport of hazardous materials on-site. Off-site transport must comply with both substantive and administrative requirements. Soil at Site 3 is potentially hazardous waste.
Hazardous materials marking, labeling, and placarding	Each person who offers hazardous material for transportation or each carrier that transports it shall mark each package, container, and vehicle in the manner required.	Person who offers hazardous material for transportation; carries hazardous material; or packages, labels, or placards hazardous material.	49 CFR 172.300, et. seq.	x			Soil at Site 3 is potentially hazardous waste.
	Each person offering nonbulk hazardous materials for transportation shall mark the proper shipping name and identification number (technical name) and consignee's name and address.		49 CFR 172.301	x			Soil at Site 3 is potentially hazardous waste.
	Hazardous materials for transportation in bulk packages must be labeled with proper ID[1] number, specified in 49 CFR 172.101 table, with required size of print. Packages must remain marked until cleaned or refilled with material requiring other marking.		49 CFR 172.302	x			Soil at Site 3 is potentially hazardous waste.
	No package marked with a proper shipping name or ID number may be offered for transport or transported unless the package contains the identified hazardous material or its residue.		49 CFR 172.303	x			Soil at Site 3 is potentially hazardous waste.
	The markings must be durable, in English, in contrasting colors, unobscured, and away from other markings.		49 CFR 172.304	x			Soil at Site 3 is potentially hazardous waste.

(table continues)

Table 5-6 (continued)

Action	Requirement	Prerequisites	Citation	ARAR Determination A	RA	TBC	Comments
Hazardous materials marking, labeling, and placarding (continued)	Labeling of hazardous material packages shall be as specified in the list.		49 CFR 172.400	x			Soil at Site 3 is potentially hazardous waste.
	Nonbulk combination packages containing liquid hazardous materials must be packed with closures upward, and marked with arrows pointing upward.		49 CFR 172.312	x			Soil at Site 3 is potentially hazardous waste.
	Each bulk packaging or transport vehicle containing any quantity of hazardous material must be placarded on each side and each end with the type of placards listed in Tables 1 and 2 of 49 CFR 172.504.		49 CFR 172.504	x			Soil at Site 3 is potentially hazardous waste.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement
[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs. Specific ARARs are addressed in the table below each general heading.
[c] A – applicable
[d] RA – relevant and appropriate
[e] TBC – to be considered
[f] USC – *United States Code*
[g] CCR – *California Code of Regulations*
[h] ICAPCD – Imperial County Air Pollution Control District
[i] CFR – *Code of Federal Regulations*
[j] ID – identification

Table 5-7
State Action-Specific ARARs[a,b]

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
State Water Resources Control Board and Regional Water Quality Control Board Colorado River Basin Region							
Excavation of contaminated soil	Establishes policies and procedures for the oversight of investigations and cleanup and abatement activities resulting from discharges of waste that affect or threaten water quality. It requires cleanup of all waste discharged and restoration of affected water to background conditions. Requires actions for cleanup and abatement to conform to Resolution 68-16 and applicable provisions of Title 23 CCR[f], Division 3, Chapter 15 as feasible.	Prior discharge of waste	SWRCB[g] Resolution 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code §13304) (Water Code §13307)				Invalidated by California office of Administrative law in September 1993. Not an ARAR.
Excavation of contaminated soil	Prohibits discharge of known human carcinogens or reproductive toxins to source of drinking water or on land where it could pass into a source of drinking water. Chemicals and applicable regulatory levels are listed in Title 22, CCR §12000 et seq.		Safe Drinking and Toxic Enforcement Act of 1986 (Proposition 65), California Health and Safety Code, Division 20				Not an ARAR.
Excavation of contaminated soil	Guidance on TPH[h] allowable levels in soil.	TPH in soil	SWRCB LUFT[i] Field Manual (SWRCB 1989)			x	TBC for TPH remaining in soil following the removal.
California Code of Regulations, Title 23, Chapter 15							
Disposal of excavated soil in a land-based unit	Regulates siting, design, construction, operation, closure, and monitoring of waste discharges to land for treatment, storage, or disposal, including landfills, surface impoundments, waste piles, and land treatment facilities. Wastes regulated include hazardous waste, designated waste, nonhazardous waste, and inert waste.	Waste management unit	Title 23 CCR, Division 3, Chapter 15 (Discharges of Waste to Land), Article 1, Section 2511(d), Article 2, Sections 2520-2524	x			Applicable because Site 3 wastes are potential hazardous and/or designated waste.

(table continues)

Table 5-7 (continued)

Action	Requirement	Prerequisites	Citation	ARAR Determination A	ARAR Determination RA	ARAR Determination TBC	Comments
Waste pile	New waste piles shall comply with Article 4, Construction Standards.	Waste pile used to store hazardous or designated waste	Section 2540(d)		x		Relevant and appropriate for removal alternatives that require temporary storage of excavated soil prior to treatment and disposal.
Waste pile	Class I and Class II waste piles shall be covered as necessary to prevent percolation of precipitation through waste.	Waste pile used to store hazardous or designated waste	Section 2544(c)	x			Applicable because removal action at Site 3 potentially involves temporary storage of hazardous or designated waste in a waste pile.
Waste pile	Closure requirements for surface impoundments, waste piles, and land-treatment facilities.		Sections 2582, 2583, and 2584				Not more stringent than Federal ARARs at 22 CCR 66264.258.
Use of contaminated soil in the foundation layer of a landfill cover	Contaminated soil may be used in the foundation layer of a landfill cover provided it has appropriate engineering properties.		Section 2581	x			Not an ARAR.
California Health and Safety Code, Chapter 6.8							
Removal action	Except as provided in subdivision (h), the department or, if appropriate, the regional board shall prepare or approve remedial action plans for all sites listed pursuant to Section 25356	Removal action is planned	Section 25356.1.(b)	x			Applicable because a removal action is planned.
Removal action	A remedial action plan is not required if conditions present at a site present an imminent or substantial endangerment to the public health and safety or to the environment, or if the estimated cost of the removal action is less than $1 million	Removal action is planned	Section 25356.1.(h)(1)	x			Applicable because the removal action is projected to cost less than $1 million.

Table 5-7 (continued)

Action	Requirement	Prerequisites	Citation	ARAR Determination A	RA	TBC	Comments
Removal action	"Removal action work plan" means a work plan prepared or approved by the department or a California regional water quality control board that is developed to carry out a removal action, in an effective manner that is protective of the public health and safety and the environment. The removal action work plan shall include a detailed engineering plan for conducting the removal action, a description of the on-site contamination, the goals to be achieved by the removal action, and any alternative removal options that were considered and rejected and the basis for that rejection	Removal action planned for which a removal action work plan is required	Section 25323.1		x		Relevant and appropriate content requirements for the Engineering Evaluation/Cost Analysis.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as ARARs. Specific ARARs are addressed in the table below each general heading; only substantive requirements of the specific actions are considered ARARs.

[c] A – Applicable

[d] RA – relevant and appropriate

[e] TBC – to be considered

[f] CCR – *California Code of Regulations*

[g] SWRCB – (California) State Water Resources Control Board

[h] TPH – total petroleum hydrocarbons

[i] LUFT – (California) Leaking Underground Fuel Tank (Field Manual)

5.7.3.5 ON-SITE WASTE CLASSIFICATION

Generators of waste are required by 22 CCR 66262.10(a) and 66262.11 to characterize the waste and determine if it is hazardous. These regulations are considered ARARs for the excavated soil that may be produced.

5.7.3.6 TRANSPORT OF HAZARDOUS WASTES

Substantive portions of 49 CFR 171.2 (f) are considered ARARs for transport of hazardous wastes. Substantive portions of 40 CFR 172.300, 172.301, 172.302, 172.303, 172.400, 174.312, and 172.504 and 49 USC 1802, which involve hazardous waste marking, labeling, and placarding, are also ARARs.

5.7.3.7 PLACEMENT OF WASTE IN LAND-DISPOSAL UNIT

If the soil is determined to be nonhazardous but consists of or contains pollutants that could be released and cause degradation of groundwater, state regulations regarding waste discharge to land (23 CCR Division 3, Chapter 5) may be ARARs. Section 2522 of these regulations require designated waste to be discharged only to approved Class I or Class II waste management units.

5.7.3.8 CLOSURE

The ultimate objective of the removal action at Site 3 is NFA for soil. To achieve this objective, soil containing concentrations of the COCs identified in Table 5-1 that exceeded the U.S. EPA Region IX PRG for residential soil or the upper limit of the background concentrations will be removed from the site. The COCs that will be cleaned up to the PRGs include cadmium, chromium, hexavalent chromium, lead, and chlordane. Arsenic will be cleaned up to the upper limit of the background concentration. The substantive portions of 22 CCR 66264.111 and 22 CCR 66264.114, which involve closure of hazardous waste management facilities, are identified as ARARs for this objective. These regulations establish the general performance standard for clean closure, including a requirement to control, minimize, or eliminate postclosure escape of hazardous wastes, hazardous leachate, contaminated rainfall or runoff, or waste decomposition products to the ground or surface waters or to the atmosphere.

5.8 PROJECT SCHEDULE

The removal action activities at Site 3 are scheduled for funding in 1997. The activities of several other removal actions at NAF El Centro will be coordinated with the removal action at Site 3 due to the on-base reuse of inert waste at the Magazine Road Landfill (Site 1). Consequently, the schedule for the removal action at Site 3 will be subject to changes, depending on the work schedules of the other sites.

The anticipated removal action schedule for Site 3 is as follows:

Draft EE/CA and Action Memorandum Issued for Public Comment	November 1996
Response to Public Comments	December 1996
Final EE/CA and Action Memorandum	February 1997
Work Plan Preparation	May 1997 - October 1997
NTCRA Implementation	October 1997 - March 1998

5.9 ESTIMATED COSTS

This section is intended to address Ca-HSC, Section 25356.1 (d)(5), cost effectiveness of remedial action measures. The estimated costs for the proposed removal action (Alternative 1) are summarized in Table 5-8. Details of the cost-estimating procedure are provided in the EE/CA (Attachment A). It is anticipated that only a minimal amount of soil will be sent off-base for incineration and that the overall project will cost less than $1 million.

Table 5-8
Alternative 1 Cost Estimate

Cost Category	Cost[a] (disposal at Site 1)	Cost[a] (off-base disposal at a Class II or III facility)	Cost[a] (off-base disposal at a Class I facility)	Cost[a] (off-base incineration)
Direct Costs				
Excavation and backfill	$24,000	$24,000	$24,000	$24,000
Transport to Site 1	7,000	not applicable	not applicable	not applicable
Transport and disposal at off-site facility	not applicable	137,000	221,000	1,133,000
Sampling and analysis	45,000	45,000	45,000	45,000
Professional labor (project oversight)	5,000	6,000	6,000	6,000
Total Direct Costs	**$81,000**	**$212,000**	**$296,000**	**$1,208,000**
Indirect Costs	49,000	88,000	123,000	504,000
Escalation[b]	15,000	34,000	47,000	193,000
Contingency[c]	31,000	67,000	93,000	381,000
TOTAL	**$176,000**	**$401,000**	**$559,000**	**$2,286,000**

Notes:
[a] Costs for each disposal option were estimated assuming 100 percent of the excavated soil will go to that option. Depending on the site characterization, each option may receive a portion of the excavated soil.
[b] Escalation modifies the costs in the RACER database from January 1992 to the assumed project start date of August 1996.
[c] A 20 percent contingency has been added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects.

Section 6
EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

This section is intended to address a portion of Ca-HSC Section 25356.1 (d)(5). Because Site 3 is currently not used by NAF El Centro personnel, the COCs identified at the site do not pose an immediate threat to human health. In addition there is no evidence that ecological receptors are currently impacted by the COCs at the site. If action should be delayed or not taken, future use of the site by humans and ecological receptors may result in exposures through several exposure pathways, including inadvertent ingestion of soil, dermal contact with soil, and inhalation of airborne particulates. Contamination could also potentially spread to groundwater, by rain percolating through contaminated soil, or to surrounding areas, through erosion of the site surface. This spread of contamination may result in increased risk to the exposed populations.

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Section 7
OUTSTANDING POLICY ISSUES

There are no outstanding policy issues with regard to the proposed removal action.

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Section 8
RECOMMENDATION

This decision document represents the selected removal action for Site 3, Sludge Burial Area, NAF El Centro, Imperial County, California, developed in accordance with CERCLA, as amended, and is consistent with the NCP. This decision is based on the Administrative Record for the site.

Signature: _____ Date: 12 Feb 97

P. T. MADISON
Captain, U.S. Navy
Commanding Officer

Section 9
REFERENCES

40 CFR Part 300. 1990. National Oil and Hazardous Substances Pollution Contingency Plan. *U.S. Code of Federal Regulations*.

40 CFR Parts 300-375. 1993. Superfund, Emergency Planning, and Community Right-to-Know Programs. *U.S. Code of Federal Regulations*.

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SWDIV. *See* Southwest Division Naval Facilities Engineering Command.

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ATTACHMENT A

ENGINEERING EVALUATION/COST ANALYSIS

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

FINAL
ENGINEERING EVALUATION/ COST ANALYSIS
SITE 3, SLUDGE BURIAL AREA
NAVAL AIR FACILITY
EI CENTRO, CALIFORNIA

CTO-0090/0280
February 1997

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

Signature: _____ Date: 12-Feb-97
Gregory A. Cagle, R.G., CTO Leader

SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) was performed in accordance with current U. S. Navy guidance documents for a non-time-critical removal action under the Comprehensive Environmental Response, Compensation and Liability Act and Chapter 6.8 of the California Health and Safety Code. This document characterizes the site, identifies removal action objectives, describes removal action alternatives, contains analysis of these alternatives, and describes the recommended removal action alternative.

This EE/CA was performed as part of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) requirements to evaluate potential removal actions for contaminated soil at Naval Air Facility El Centro Installation Restoration Program Site 3, former Sludge Burial Area. In 1986, this site was used for disposal of approximately 30 cubic yards of sewage sludge. Based on the results of two previous investigations, the Department of the Navy has decided to implement a non-time-critical removal action at the site to reduce the potential threat to public health and the environment associated with soil contaminants.

This EE/CA included evaluation of the Solid Waste Water Quality Assessment Test/Site Investigation (Ogden 1993a) analytical data to identify chemicals of concern (COCs), as well as site-specific removal action cleanup levels for those COCs. The data evaluation included:

- calculating background threshold values to discriminate between background (i.e., naturally occurring) concentrations of metals and concentrations indicative of potential contamination related to past activities at Site 3;
- streamlined risk screening, including comparison of the greatest COC concentrations with U.S. Environmental Protection Agency Region IX and California-modified preliminary remediation goals for residential soils; and
- comparing analytical results with federal and state criteria for the classification of hazardous waste.

The COCs identified include chlordane, arsenic, cadmium, chromium, and lead. The results of the streamlined risk screening indicate that these COCs may present risks to human health. Additionally, some of the COCs are present at concentrations that could potentially cause the soils to be classified as hazardous waste.

The scope of the removal action selected for Site 3 is to reduce the potential of exposure to ecological receptors and human receptors in a future residential scenario, and to pursue no further action status for soil at the site.

Eight removal action alternatives, were developed and evaluated:

- Alternative 1 - characterization, excavation, and disposal;
- Alternative 2 - excavation, on-site treatment using solidification/stabilization, and on-site disposal;
- Alternative 3 - excavation, on-site treatment using solidification/stabilization, and off-site disposal;
- Alternative 4 - excavation, on-site treatment using soil washing, and on-site disposal;

- Alternative 5 - excavation, on-site treatment using soil washing, and off-site disposal;
- Alternative 6 - *in situ* stabilization/solidification;
- Alternative 7 - on-site containment (capping); and
- Alternative 8 - no action.

Because the scope of previous investigations did not focus on complete characterization of the nature and extent of the soil contamination, assumptions in this regard were made to develop the alternatives. The removal action alternatives were evaluated with respect to the criteria of effectiveness, implementability, and cost set forth in the NCP.

The recommended removal action at Site 3 is Alternative 1: characterization, excavation, and disposal off-base or at Site 1 (Magazine Road Landfill). Only soil from areas classified as hazardous, designated, or nonhazardous will be transported off-site. Soil classified as inert will be selected for on-base reuse at Site 1.

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ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
BNI	Bechtel National, Inc.
Ca-HSC	California Health and Safety Code
Cal-EPA	California Environmental Protection Agency
CCR	*California Code of Regulations*
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	chemical of concern
COPC	chemical of potential concern
CTO	Contract Task Order
DDE	dichlorodiphenyldichloroethene
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
EO	Executive Order
ESA	Ecological Scoping Assessment
°F	degrees Fahrenheit
ICAPCD	Imperial County Air Pollution Control District
IRP	(Navy) Installation Restoration Program
LDR	land-disposal restrictions
mg/kg	milligrams per kilogram
mg/L	milligram per liter
MSL	mean sea level
NAF	Naval Air Facility
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NFA	no further action
PCB	polychlorinated biphenyl
PRG	U.S. EPA Region IX preliminary remediation goal

ACRONYMS/ABBREVIATIONS (continued)

RACER	Remedial Action Cost Engineering Requirements
RAP	Remedial Action Plan
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RWQCB	(California) Regional Water Quality Control Board
SI	Site Investigation
SWAT	Solid Waste Water Quality Assessment Test
STLC	soluble threshold limit concentration
SWDIV	Southwest Division Naval Facilities Engineering Command
TBC	to be considered
TCLP	toxicity characteristic leaching procedure
TFH	total fuel hydrocarbons
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TTLC	total threshold limit concentration
UL	upper limit
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound
WET	(Cal-EPA) Waste Extraction Test

SECTION 1

INTRODUCTION

Section 1
INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) for Site 3, former Sludge Burial Area located at the Naval Air Facility (NAF) El Centro in Imperial County, California, has been prepared by Bechtel National, Inc. (BNI), on behalf of the U.S. Department of the Navy (DON), Southwest Division Naval Facilities Engineering Command (SWDIV), under Contract Task Order (CTO) -0090, issued under the Comprehensive Long-Term Environmental Action Navy (CLEAN) II contract No. N68711-92-D-4670.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) define removal actions to include "the cleanup or removal of released hazardous substances from the environment, such actions as may necessarily be taken in the event of the threat of release of hazardous substance into the environment, such action as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal or removal of material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release." The United States Environmental Protection Agency (U.S. EPA) has classified removal actions into three types based on the circumstances surrounding the release or threat of release: emergency, time-critical, and non-time-critical. The removal action at Site 3 will be a non-time-critical removal action, because on-site action will be taken more than 6 months after commencement of the planning period.

Additionally, the California Health and Safety Code (Ca-HSC) specifies the preparation of necessary documentation which depends upon the costs of the necessary documentation which depends upon the costs of the removal action. The Ca-HSC requires development of either: a Remedial Action Plan (RAP) for removal actions that costs $1 million or greater; or a Removal Action Work Plan (RAWP) for removal actions that cost less that $1 million. Further, the Ca-HSC authorizes the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) to waive the RAP requirements, in favor of an RAWP or an RAP-equivalent document, for removal actions when an imminent and/or substantial endangerment determination exists. DTSC may also waive the RAP requirements if an RAP-equivalent document that meets the requirements of Ca-HSC 25356.1(h) (3) is prepared. The removal action for Site 3 may cost more than $1 million, and therefore, the requirements for a RAP apply. This EE/CA is intended to satisfy these requirements.

Under 40 *Code of Federal Regulations* (CFR) 300.415 of the NCP, the lead agency (i.e., the DON) is required to conduct an EE/CA for the non-time-critical removal actions. This EE/CA is being prepared based on Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (U.S. EPA 1993a).

The removal action objectives for Site 3 are to reduce the potential for human and ecological exposure to soil contamination associated with the sewage sludge formerly deposited at the site and to mitigate contaminated soils that have potential to contaminate groundwater at the site. Potential groundwater contamination is being assessed under a separate program.

The development and evaluation of removal actions in this EE/CA is based on the available data regarding the nature and extent of soil contamination. Previous investigations performed at the site (NEESA 1987; Ogden 1993a) were focused on evaluating the presence of contamination due to historical activities at the site. A complete site characterization, which defines the nature, extent, and background concentrations of contaminants at the site, has not been performed. However, the existing data were sufficient to allow the development of this EE/CA. In the preparation of this EE/CA, it was necessary to make a variety of assumptions regarding the type, extent, and concentration of the contaminants. A discussion of the additional data needs and assumptions is presented in Section 2.12.

The public is encouraged to review and comment on the proposed removal activities described in this EE/CA. To gain a more thorough understanding of the activities associated with this removal action the public is encouraged to review the administrative record for this activity available at the following locations:

Southwest Division Naval Facilities Engineering Command
Environmental Technical Library
1220 Pacific Highway, Building 129
San Diego, CA 92132-5190
(619) 532-1144

NAF El Centro
Public Works Department
El Centro, CA 92243-5001
(619) 339-2201

City of El Centro Public Library
539 State Street
El Centro, CA 92243
(619) 337-4565

City of Brawley Public Library
400 Main Street
Brawley, CA 92227
(619) 344-1891

SECTION 2

SITE CHARACTERIZATION

Section 2
SITE CHARACTERIZATION

In 1987, the Naval Energy and Environmental Support Activity (NEESA) conducted a Preliminary Assessment/Site Inspection (NEESA 1987) in which 16 sites at NAF El Centro were evaluated for potential contamination. Fourteen of the 16 sites, including Site 3, were selected for further investigations under the Navy Installation Restoration Program (IRP). Investigation findings are documented in the Solid Waste Water Quality Assessment Test (SWAT)/Site Investigation (SI) reports (Ogden 1993a,b). The information presented in this section was obtained primarily from these sources.

2.1 SITE LOCATION

NAF El Centro is an operational naval facility located approximately 7 miles northwest of El Centro, California, 7 miles north of the Mexican border, and 100 miles east of San Diego, California (Figure 2-1).

Site 3, the sludge burial area, is located at the northwest corner of NAF El Centro, east of sewage stabilization ponds and north of Patrol Road (Figures 2-2 and 2-3).

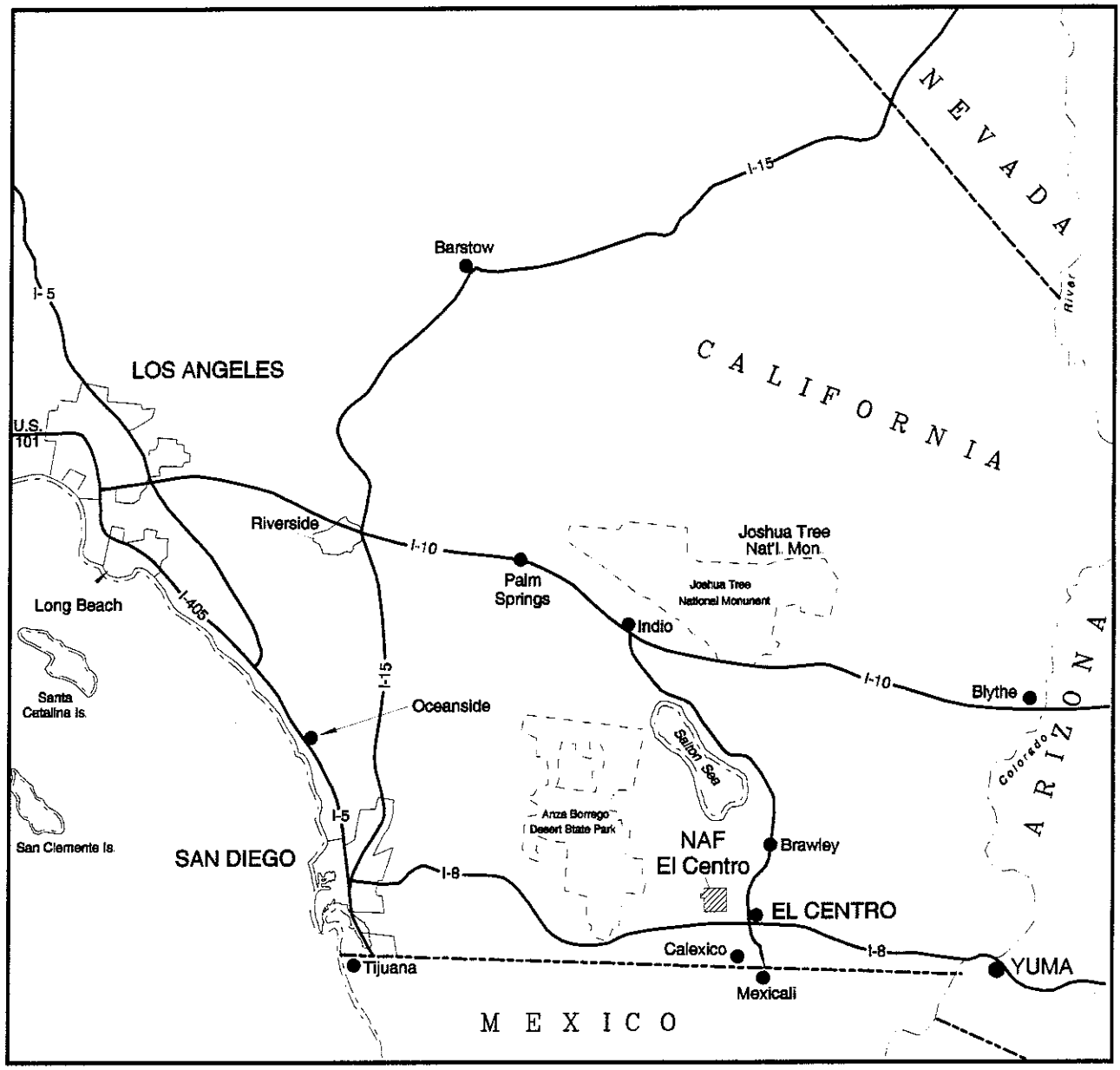
2.2 TYPE OF FACILITY AND OPERATIONAL STATUS

According to the NEESA (1987) report, approximately 800 cubic feet of sewage sludge were dumped into a 20- by 10-foot, 5-foot-deep unlined pit in 1986. The pit was closed by applying soil cover and grading. During a visit to the site on 20 April 1995, stockpiled soil was observed around the pit area. Base representatives indicated that the stockpiled soil did not contain sewage sludge and that it was construction waste unrelated to Site 3. However, these stockpiled soils will be characterized as part of the removal action and handled accordingly (see Section 4).

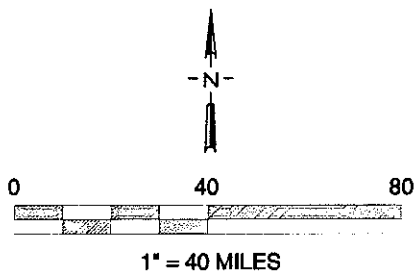
2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

NAF El Centro is located in Imperial Valley, which is within the Colorado Desert geomorphic province of California (Norris and Webb 1990). The Imperial Valley occupies the north-central part of the Salton Trough, a large topographic and structural depression that extends from near Palm Springs about 180 miles south to the head of the Gulf of California. The Salton Trough is separated from the Gulf of California by the broad fan-shaped delta of the Colorado River. The lowest part of the trough is occupied by the Salton Sea, a saline lake fed primarily by waste irrigation water imported from the Colorado River. Much of the land surface in the Salton Trough is below sea level. Imperial Valley drains north into the Salton Sea (Hely et al. 1966).

The Imperial Valley is bordered on the northwest by the Salton Sea. On the southeast, the valley is contiguous with the Mexicali Valley in Mexico. The Imperial Valley is flanked by the Chocolate Mountains on the northeast, and the Peninsular Ranges of southern California and Baja California on the southwest. The Imperial Valley is divided into three regions: eastern, central, and western. NAF El Centro is located within the



SOURCE: Master Plan - NAF El Centro 1988



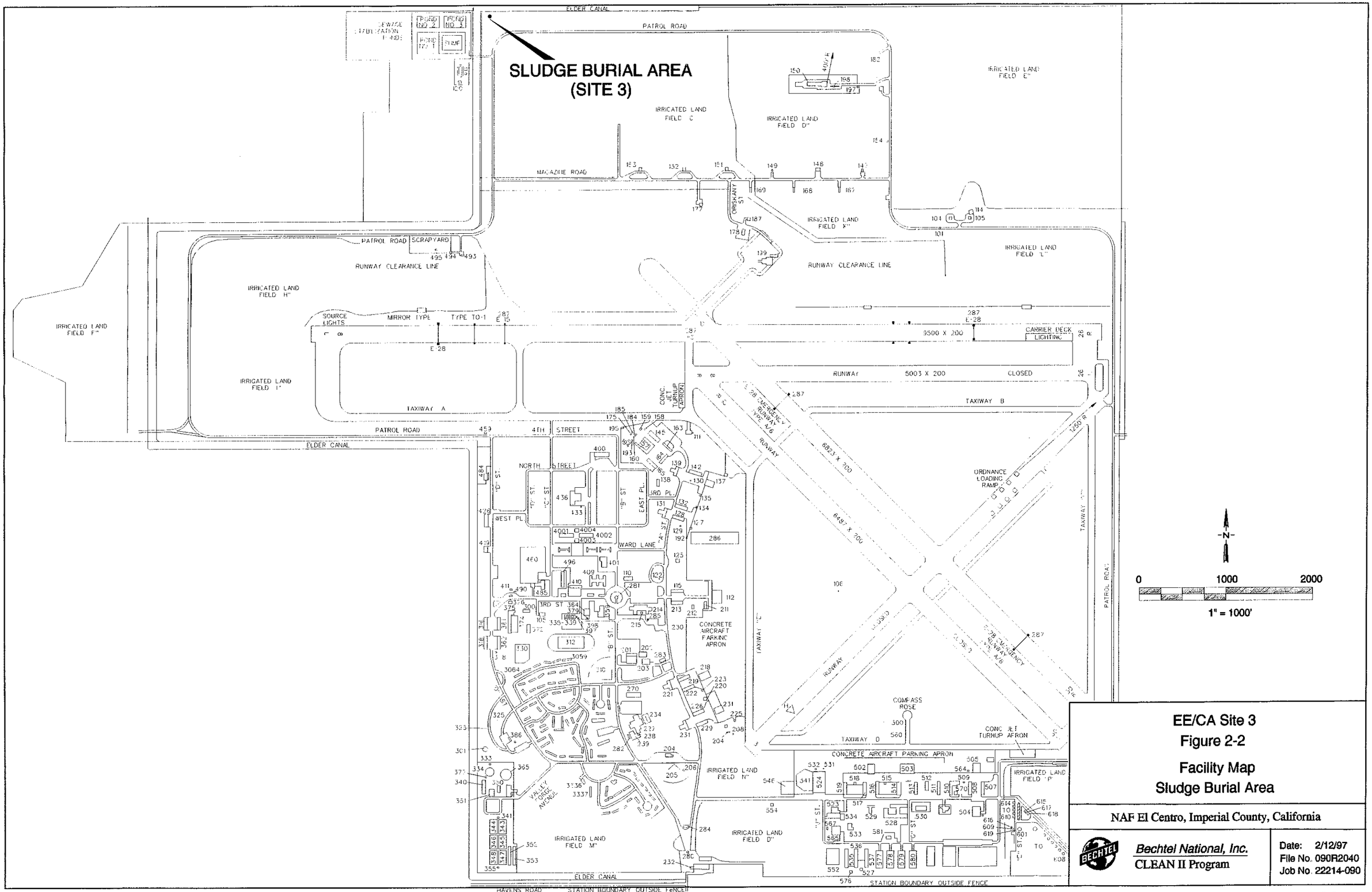
EE/CA Site 3

Figure 2-1

Regional Location Map

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

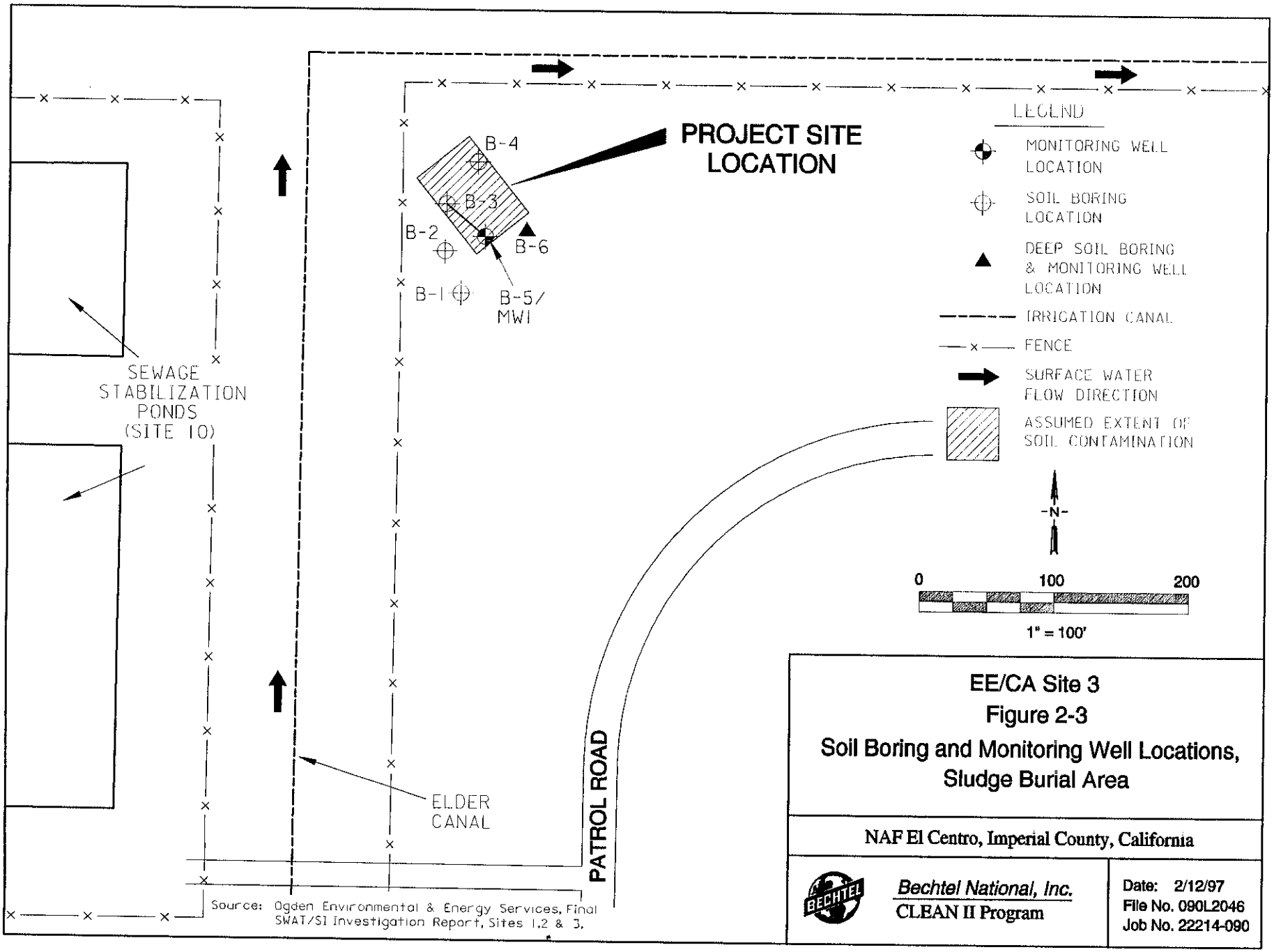


EE/CA Site 3
Figure 2-2
Facility Map
Sludge Burial Area

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No. 090R2040
Job No. 22214-090



EE/CA Site 3
Figure 2-3
Soil Boring and Monitoring Well Locations, Sludge Burial Area

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No. 090L2046
Job No. 22214-090

lowlands of the central Imperial Valley, which is a broad, flat, northwest-sloping lowland that represents the bed of ancient Lake Cahuilla (Loeltz et al. 1975).

The Imperial Valley is a seismically active area that historically has experienced numerous strong earthquakes. The faults in the Imperial Valley (Figure 2-4) are considered to be part of the San Andreas Fault System. Nearly all of the recognized faults are considered active.

The California Department of Water Resources has divided the state into nine hydrologic study areas. The Imperial Valley is located in the Colorado Desert hydrologic study area. Most of the Imperial Valley is underlain by the Imperial Valley Groundwater Basin, which encompasses 1,870-square miles of the Imperial Valley and drains into the Salton Sea via the Alamo and New Rivers. The Chocolate Mountains piedmont slope area of the eastern Imperial Valley includes parts of the East Salton Sea, Amos Valley, and Ogilby Valley Groundwater Basins. The western Imperial Valley includes part of the Coyote Wells Groundwater Basin. These mountain-margin basins are small alluvial basins with limited well yields and generally poor water quality, particularly in the east (California Department of Water Resources 1975). The groundwater reservoir in the Imperial Valley Basin consists of Cenozoic valley-fill deposits. Although the valley fill is probably more than 20,000 feet thick, the usable part of the reservoir consists of the heterogeneous nonmarine deposits in the upper few thousand feet.

The general direction of groundwater flow in the Imperial Valley is toward the axial part of the valley, and then northwestward toward the Salton Sea (Loeltz et al. 1975). The principal area of discharge is the heavily cultivated central Imperial Valley.

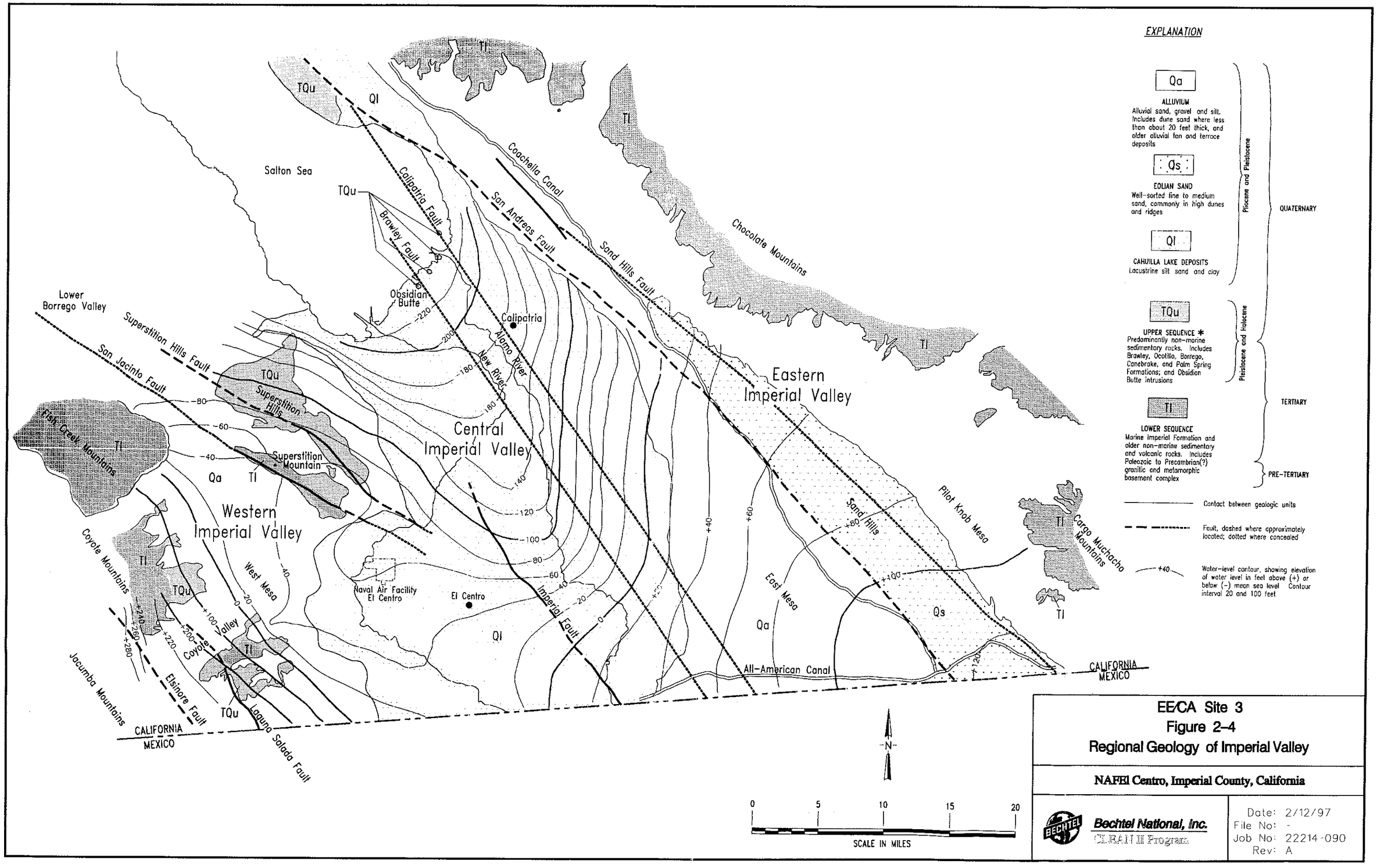
2.4 LOCAL GEOLOGY AND HYDROGEOLOGY

The following sections include discussion of the local geology and hydrogeology of the central Imperial Valley.

2.4.1 Geology

The central Imperial Valley is a broad, flat lowland that slopes northwestward from about MSL at the international border to approximately 230 feet below mean sea level (MSL) at the shore of the Salton Sea (Figure 2-4). The elevation at NAF El Centro is approximately 50 feet below MSL. The central Imperial Valley is drained by the Alamo and New Rivers, and by a network of drains installed to remove irrigation water.

The central Imperial Valley lies entirely within the paleoshorelines of ancient Lake Cahuilla (Loeltz et al. 1975). Surface conditions throughout the central Imperial Valley are similar, unlike those in the more diverse eastern and western parts of the valley. Recent deposits, formed during the presence of Lake Cahuilla, contain a large proportion of clay and silt, in contrast with the generally sandy soils of the eastern and western parts of the valley.



EE/CA Site 3
Figure 2-4
Regional Geology of Imperial Valley

NAFEl Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No: -
Job No: 22214-090
Rev: A

In general, Lake Cahuilla deposits are believed to be less than 100 feet thick (Loeltz et al. 1975); however, in some areas deposits have been reported up to 300 feet thick (Elders 1979).

During the site investigations performed at Sites 1 through 11, 56 soil borings up to 51.5 feet deep and 20 trenches up to 5 feet deep were excavated and logged according to the Unified Soil Classification System. Six soil borings were drilled and logged at Site 3. The soils logged in these soil borings and trenches were described as unconsolidated interbedded layers of fine sand, silt, clay, and sand-silt-clay mixtures up to the maximum depth investigated (Ogden 1993a,b).

2.4.2 Groundwater

The main source of groundwater recharge in the Imperial Valley comes from the Colorado River and leakage from canals (Loeltz et al. 1975). In areas where there is substantial recharge due to leakage from canals, the chemical quality of the water resembles that of the Colorado River, which is characterized by sulfate as the predominant ion. Where canal leakage does not contribute to groundwater recharge, either sodium or bicarbonate is the principal ion (Loeltz et al. 1975). The groundwater recharge from the application of irrigation water is difficult to estimate; however, it is believed that most of the irrigation water is discharged to the New River through a network of underground drains. The recharge contribution from precipitation, runoff, and underflow is assumed to be minimal, due to the arid environment.

The water table in the central Imperial Valley is generally close to the ground surface due to intensive irrigation in the area. This shallow occurrence of groundwater is reported to be a discontinuous perched system recharged by local irrigation practices. In the vicinity of NAF El Centro, groundwater levels have been reported to be as shallow as 3 to 5 feet below ground surface (bgs) (U.S. Department of Agriculture 1981). Records from previous geotechnical investigations in the area indicate groundwater levels from 8 to 15 feet bgs (NEESA 1987). During the SWAT/SI activities performed at IRP Sites 1 through 11 (Ogden 1993a,b), groundwater was encountered in the soil borings at depths ranging between approximately 8 and 13 feet bgs. Data regarding the occurrence of a deeper, regional aquifer are not available for NAF El Centro; however, soil samples collected at depths up to 51.5 feet during the site investigation were described as saturated (Ogden 1993a).

Based on the data collected during the SWAT/SI, groundwater flow direction varies throughout NAF El Centro. It appears to be complexly influenced by irrigation as well as by the network of drains that underlie the agricultural fields in the area. The groundwater flow direction is estimated to be northwest in the vicinity of Site 3 (Ogden 1993a).

The water quality of the shallow aquifer is generally poor and is characterized by high concentrations of total dissolved solids. Groundwater samples collected during 1991 and 1992 contained concentrations of total dissolved solids generally between 2,000 and 15,000 milligrams per liter (mg/L), although concentrations as high as 30,000 mg/L were observed in a number of samples (Ogden 1993a,b). These concentrations exceed the

California Department of Health Services and U.S. EPA secondary maximum contaminant level of 500 mg/L and the California agricultural water quality goal of 450 mg/L (California Regional Water Quality Control Board, Central Valley Region 1995 [Marshack 1995]).

2.4.3 Surface Water

The New River and the Elder Canal are located within 1 mile of the site. The New River originates primarily from agricultural return in the Imperial and Mexicali Valleys, and flows north to the Salton Sea. The water quality of the New River is poor. The Elder Canal is a lined canal that provides raw water from the Colorado River for domestic and agricultural use in Imperial Valley. It flows north along the western perimeter of NAF El Centro.

During the SWAT/SI (Ogden 1993a), surface water samples collected from the New River and Elder Canal upstream and downstream of NAF El Centro showed contamination at various concentrations. Contaminants detected include total petroleum hydrocarbons (TPH), 1,1,1-trichloroethane, methylene chloride, and several heavy metals.

2.5 SURROUNDING LAND USE AND POPULATIONS

The land use within NAF El Centro is generally classified as "military operating area" for both current and future use. The base is surrounded by unincorporated portions of Imperial County, and land use is primarily agricultural. Approximately 18 percent of the county is irrigated agricultural land. The developed areas, including the incorporated cities, unincorporated communities, and supporting facilities, compose less than one percent of the total county area. Approximately 74 percent of the county is desert/mountains owned either by the federal government, Native American nations, or private parties. The Salton Sea occupies approximately 7 percent of the county area.

The Imperial County Ultimate Use Plan, cited in the Ogden report (1993a), states that agriculture is the dominant economic sector of the county. The plan discourages new urban development within or adjacent to existing urban areas and agricultural margin lands. The plan encourages the preservation of prime agricultural land and also emphasizes the preservation of unique natural areas.

NAF El Centro has an average winter population of 1,500 and an annual summer population of 1,000. The closest community to the base is Seeley, which is approximately 1 mile southwest of the base. The County of Imperial Community Economic Development estimated the mid-1991 population of Seeley to be 1,228.

2.6 SENSITIVE ECOSYSTEMS

The area around Site 3 is disturbed. Four-wing saltbush up to 4 feet tall dominates the site with a lesser shrub component of Torrey's sea-blight. There are a few saltbush seedlings as an understory. Mammals, birds, invertebrates and reptiles are potentially

expected at Site 3. Four sensitive species (California species of special concern), the burrowing owl, Colorado valley wood rat, Yuma clapper rail, and flat-tailed horned lizard, may be found at the site. The flat-tailed horned lizard is proposed as federal threatened or endangered species

2.7 METEOROLOGY

The climate in the NAF El Centro area is arid, with hot, dry summers and mild winters. The summer temperatures average 92 degrees Fahrenheit (°F) with highs often reaching 115°F. During winter, the low temperatures are near 30°F, and the highs are over 80°F.

Rainfall in the area occurs as gentle winter rains or intense summer thunderstorms. The mean annual rainfall is 2.4 inches. Evapotranspiration exceeds 6 feet per year.

During the winter and spring, the prevailing winds are westerly; in hot summer months, winds are generally from the southwest. Wind speeds are calm to 10 knots 78 percent of the time, 11 to 16 knots 12 percent of the time, and 16 to 27 knots about 8 percent of the time.

2.8 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

A Preliminary Assessment/Site Inspection (NEESA 1987) and a SWAT/SI (Ogden 1993a) have been performed at the site. No removal actions have been conducted. This section summarizes the findings from the two investigations.

2.8.1 Preliminary Assessment/Site Inspection

During the Preliminary Assessment/Site Inspection, information from sources such as historical records, aerial photographs, on-site surveys, and personnel interviews was used to evaluate 16 potentially contaminated sites (NEESA 1987). The evaluation consisted of determination of possible discharge of hazardous waste; the potential for contaminants in the waste to migrate via surface water, groundwater, and wind; and the potential to affect humans and the ecology. The study recommended that 14 of the 16 sites undergo further investigation. The sludge burial area (Site 3) was included as one of these 14 sites.

2.8.2 Solid Waste Water Quality Assessment Test and Site Investigation

The SI was completed in May 1993. Because the site was used to dispose solid waste, a SWAT was also conducted for submission to the California Regional Water Quality Control Board (RWQCB), Colorado River Basin Region, in accordance with Section 13273 of the California Water Code (Ogden 1993a).

The objective of the SWAT/SI was to assess the potential for the release of hazardous substances and to perform a preliminary assessment of the nature of contamination in the event that a release had occurred. As stated in the report (Ogden 1993a), the investigation was not intended to characterize the extent of contamination, but to assess whether further investigation or remediation was necessary.

2.8.2.1 SWAT/SI ACTIVITIES AND RESULTS

The SWAT/SI included drilling and sampling of six soil borings to depths ranging from 12.5 to 51.5 feet bgs. The locations of the borings (B-1 to B-6) are shown in Figure 2-3. One boring, B5/MW1, was converted into a monitoring well.

Seven soil samples were collected and analyzed for chemicals of potential concern (COPCs) using the following analytical procedures:

- total recoverable petroleum hydrocarbons (TRPH) (U.S. EPA Method 418.1),
- TFH (modified U.S. EPA Method 8015),
- aromatic and volatile organic compounds (VOCs) (U.S. EPA Method 8010/8020),
- total phenols (U.S. EPA Method 9066),
- total cyanide (U.S. EPA Method 9012),
- ethylene dibromide (U.S. EPA Method 504),
- VOCs (U.S. EPA Method 8240),
- semivolatile organic compounds (U.S. EPA Method 8270),
- organochlorine pesticides (U.S. EPA Method 8080), and
- priority pollutant metals (various methods).

The results from these analyses are presented in Table 2-1.

TRPH (i.e., U.S. EPA Method 418.1) was detected in five samples at concentrations ranging between 1 and 1,100 milligrams per kilogram (mg/kg). U.S. EPA Method 418.1 (TRPH) is an infrared detection method used to quantify total oil and grease compounds extractable in a soil matrix by dissolution in Freon. These compounds may include naturally occurring biological and mineral hydrocarbons as well as refined petroleum hydrocarbon products. The same five samples did not contain concentrations of total fuel hydrocarbons (TFH) (modified U.S. EPA Method 8015) above the laboratory detection limit. Modified U.S. EPA Method 8015 is a quantitative and qualitative method for detecting gasoline and diesel (i.e., refined fuels) hydrocarbons using gas chromatography. The method allows for the qualitative identification of gasoline- and diesel-related hydrocarbons based on unique hydrocarbon distribution patterns and quantification based on hydrocarbon molecular-weight ranges. Gasoline hydrocarbons are generally quantified as the sum of compounds having 4 to 12 carbon atoms in the molecular structure, and diesel hydrocarbons are generally quantified as the sum of the compounds having 10 to 23 carbon atoms in the molecular structure.

All seven samples contained concentrations of arsenic, beryllium, cadmium, chromium, copper, nickel, total lead, and zinc above the laboratory detection limits. Antimony, cyanide, chlordane, 2,4-dichlorophenylethylene, mercury, selenium, silver, and thallium were detected above the detection limits in some of the samples.

Table 2-1
Analytical Results[a] of Soil Samples Collected at Sludge Burial Area (Site 3)
(units reported in mg/kg[b])

Analyte	SAMPLE NUMBERS						
	EC3-B1-S3-D5.0	EC3-B2-S2-D3.0	EC3-B3-S4-D6.0	EC3-B3-D4-D6.0	EC3-B4-S2-D3.0	EC3-B5-S3-D4.5	EC3-B6-S1-D1.5
Total recoverable petroleum hydrocarbons U.S. EPA[c] Method 418.1	3	1	880	< 1	1,100	< 1.0	2
Total fuel hydrocarbons U.S. EPA Method 8015	< 6.3	< 5.5	< 9.1	< 6.0	< 10	< 5.6	< 5.5
Aromatic and volatile organic compounds U.S. EPA Method 8010/8020	< DL[d]	NA[e]	NA	NA	< DL	< DL	< DL
Total phenols U.S. EPA Method 9066	NA	NA	< 0.4	< 0.2	NA	< 0.2	NA
Total cyanide U.S. EPA Method 9012	NA	NA	2.7	< 0.6	NA	< 0.1	NA
Ethylene dibromide U.S. EPA Method 504	NA	NA	< 1.1	< 1.0	NA	< 1.0	NA
Volatile organics U.S. EPA Method 8240	NA	< DL	< DL	< DL	NA	NA	NA
Semivolatile organics U.S. EPA Method 8270	NA	NA			NA		NA
di-N-butyl phthalate	NA	NA	< 0.17 TR[f]	< 0.17 TR	NA	0.17*B[g]	NA
bis(2-ethylhexyl)phthalate	NA	NA	1.0	< 0.17 TR	NA	< 0.17	NA
Pesticides and PCBs[h] U.S. EPA Method 8080	NA	NA		< DL	NA	< DL	NA
2,4-DDE[i]			0.093				
Chlordane			1				
Priority pollutant metals							
Antimony	< 0.71 J[j]	0.96 J	1.1 J	< 0.72 J	< 1.2 J	< 0.67 J	< 0.66 J
Arsenic	3.2	4.3	11.3	5.2	13.1	4.3	5

(table continues)

Table 2-1 (continued)

Analyte	SAMPLE NUMBERS						
	EC3-B1-S3-D5.0	EC3-B2-S2-D3.0	EC3-B3-S4-D6.0	EC3-B3-D4-D6.0	EC3-B4-S2-D3.0	EC3-B5-S3-D4.5	EC3-B6-S1-D1.5
Beryllium	0.79	0.57	0.63	0.71	0.51	0.53	1.2
Cadmium	0.48	1.2	12.1	0.6	12.6	0.35	2
Chromium	11	9	127	11.6	114	7.5	15.3
Copper	14.6	12.8	985	15.6	929	8.4	22.2
Organolead	NA	NA	< 0.55	< 0.36	NA	< 0.33	NA
Lead	9.3	7.7	209	10.6	197	7.2	14.1
Mercury	< 0.13	< 0.11	2.5	< 0.12	1.8	< 0.11	< 0.09
Nickel	13	11.1	20.8	13.6	28.2	9.5	17.6
Selenium	< 1.2	< 1.0	37	< 1.2	27.5	< 1.1	< 1.1
Silver	< 0.30	< 0.26	86.5	0.34	111	< 0.28	< 0.28
Thallium	< 1.2	< 1.0	< 1.8	< 1.2	< 2.1	< 1.1	< 1.2
Zinc	41.4	35.2	772	42.7	735	29.5	54.7
General chemistry							
Carbonate as $CaCO_3$	126	638	< 5.0	240	< 5.0	524	< 5.0
Bicarbonate as $CaCO_3$	215	49	437	257	681	< 5.0	270
Hydroxide as $CaCO_3$	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	17	< 5.0
Total alkalinity as $CaCO_3$	341	687	437	497	681	541	270
Chloride	5,980	550	720	4,800	800	1,540	13,400
Electrical conductivity (μS^k)	6,180	9,650	8,270	4,470	4,840	1,310	47,000
Fluoride	8.4	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Moisture (percent)	21	9.1	45.1	16.6	51.6	10.4	9.7
Nitrate as Nitrogen	2.2	1.6	4,080	13.2	2,150	1.9	69.8
pH (unitless)	9.3	10	5.7	8.8	5.9	9.6	10.1
Sulfate	2,950	2,630	6,380	848	5,970	1,790	2,130
Calcium	60,400	5,130	24,000	57,400	26,000	40,100	50,100
Iron	12,100	11,400	31,700	12,900	31,200	8,990	18,100

(table continues)

Table 2-1 (continued)

Analyte	SAMPLE NUMBERS						
	EC3-B1-S3-D5.0	EC3-B2-S2-D3.0	EC3-B3-S4-D6.0	EC3-B3-D4-D6.0	EC3-B4-S2-D3.0	EC3-B5-S3-D4.5	EC3-B6-S1-D1.5
Potassium	2,320	1,630	1,940	2,200	1,930	1,420	3,580
Magnesium	11,200	10,600	5,130	12,000	5,710	8,740	13,200
Manganese	420	370	3,000	395	3,720	303	476
Sodium	5,970	2,980	2,940	4,620	3,000	3,000	8,650
Formaldehyde	NA	NA	< 1.0	< 1.0	< 1.0	NA	NA

Notes:
[a] above analytical data were taken from Ogden 1993a report
[b] units for all analyses are mg/kg, except for pH (unitless), moisture content (percent), and electric conductivity (microsiemens)
[c] U.S. EPA – United States Environmental Protection Agency
[d] DL – detection limit
[e] NA – not analyzed
[f] TR – compound detected at an unquantifiable trace level
[g] *B – analyte found in associated reagent blank
[h] PCB – polychlorinated biphenyl
[i] DDE – dichlorodiphenyldichloroethene
[j] J – is a data qualifier; see Section 2.9.3 for discussion
[k] µS – microsiemens

The groundwater quality data from the monitoring well at the site indicate that some metals are present in the groundwater at concentrations in the parts-per-billion range.

Metals detected include cadmium, copper, selenium, and silver. It is unclear if the concentrations represent background water quality or impact from site contamination.

Surface water quality in the vicinity was characterized by sampling along the New River and Elder Canal upstream and downstream of the site. The results do not indicate that Site 3 wastes have affected the water quality of the streams. It is not expected that the Site 3 wastes would impact the Elder Canal because the canal is lined and physically separated from the surrounding soil. The canal is also elevated above the surrounding area so that surface runoff from Site 3 is not likely to enter the canal.

The recommendations listed in the SWAT/SI (Ogden 1993a) report for Site 3 are as follows:

- continuation of quarterly groundwater monitoring for another year followed by yearly monitoring, and
- grading and revegetation of soil on top of the buried material at the pit.

2.9 EVALUATION OF SWAT/SI RESULTS

The evaluation of SWAT/SI results consisted of characterizing the background metals concentrations, comparing the detection limits with U.S. EPA Region IX preliminary remediation goals (PRGs) (U.S. EPA 1995), and assessing the contaminant characterization data.

2.9.1 Background Metals Characterization

Metals occur commonly in nature. Therefore, it is necessary to discriminate between background (i.e., naturally occurring) concentrations of these analytes and concentrations indicative of potential contamination related to past operations at NAF El Centro. In general, samples collected from representative background locations are used to evaluate upper limits (ULs) for the background concentrations, which differentiates contamination from naturally occurring concentrations.

As part of the SWAT/SI activities, 14 soil samples from eight background locations were collected and analyzed (Ogden 1993a,b). These locations within the facility were believed to be unaffected by past base operations. To increase the sample size and to develop statistically significant background levels for metals, a data set consisting of metal concentrations in soil samples collected from ten NAF El Centro IRP sites and the eight background sample locations were used (Ogden 1993a,b). Background concentrations for metals using the combined data set were estimated based on Cal-EPA DTSC recommendations (Appendix A).

The combined data set was used only when at least half of the samples analyzed had detectable concentrations of the analyte. A review of laboratory data in the Ogden reports (Ogden 1993a,b) indicated that chemical concentrations of four metals (mercury, antimony, selenium, and thallium) in a majority of soil samples collected from the sites and background locations were below the detection limits. Therefore, background concentrations were not calculated for these metals.

The procedure described in DTSC recommendations consisted of the following steps:

- combine data from background and site samples for each analyte;
- prepare a cumulative frequency probability plot;
- check normality of data;
- graphically identify the UL of the background populations as an inflection point on the highest part of the probability plot;
- extract the background data points from the combined population;
- evaluate the extracted data for anomalies (e.g., any data points below the inflection point but an obvious deviation from the linear plot, with a coefficient of variation greater than 100 percent, or a range greater than two orders of magnitude); and
- use 95th percentile of the background population as the UL for background concentration.

Based on Cal-EPA DTSC recommendations, the 95th percentile of normal distribution of the background population is selected as the UL for background concentration. The mean and the standard deviation of the background distributions were used to calculate the 95th percentile using the following equation:

$$X_{95} = m + Z\,S$$

where:

X_{95} = 95th percentile value of the background population,
m = mean,
Z = factor for the 95th percentile, which is equal to 1.646 for normal distribution (obtained from Table A1, Gilbert 1987), and
S = standard deviation.

The values of the inflection point, the mean, the standard deviation, and the UL of background concentration as the 95th percentile of the population for each analyte are summarized in Table 2-2. These values are also compared in the table with metal concentration typically occurring in the western United States (Shacklette et al. 1984).

Table 2-2
Upper Limit of Background Concentration
Using 95th Percentile of the Background Population
(units reported in milligrams per kilogram)

Analyte	Concentration at the Inflection Point	Mean	Standard Deviation	Upper Limit of Background Concentration as 95th Percentile	Typical Metal Concentrations in Soil, Western U.S.[a]
Arsenic	7.2	3.84	1.49	6.3	< 0.1-97
Beryllium	1.3	0.67	0.28	1.1	< 1-15
Cadmium	5.2	(-0.28)[b]	(1.1)[b]	4.6	np[c]
Chromium	17	11.12	3.42	17	3-2,000
Copper	22.7	14.57	6.29	25	2-300
Lead	24	9.86	4.37	17	< 10-700
Nickel	22	12.89	4.5	20	< 5-700
Silver	0.7	0.3	0.16	0.6	np
Zinc	96	41.64	17.10	70	10-2,100

Notes:
[a] USGS Professional Paper 1270 (Shacklette et al. 1984)
[b] mean and standard deviation of log (concentration), no units
[c] np – not published

Analyses of the data sets indicated that the background population for cadmium is lognormally distributed (i.e., logarithm of concentration is normally distributed). Therefore, mean and standard deviations of the logarithm of concentrations were used to calculate the 95th percentile of the lognormal distribution that was then converted to the actual concentrations as the UL value for cadmium.

2.9.1.1 UNCERTAINTIES IN APPLICATION OF BACKGROUND CONCENTRATIONS

The UL of the background concentration was estimated as the 95th percentile of the background population. As such, it is expected that approximately 5 percent of the soil samples that represent background (i.e., naturally occurring) conditions will contain concentrations of metals exceeding the UL. Therefore, a simple comparison of sample results with the UL is not sufficient to discriminate between naturally occurring concentrations of analytes and concentrations indicative of potential contamination. A metal concentration in a sample that exceeds the UL does not necessarily mean that the concentration is related to contamination.

Due to the uncertainties in direct comparison with the UL values, additional factors are considered in discriminating between background and nonbackground concentrations as an indication of potential contamination at the site. The factors considered in evaluating whether sample results are indicative of potential contamination include the following:

- similar or greater background sample concentrations that also exceed the UL values;
- the magnitude of sample concentration relative to the UL values;
- constituents likely associated with the suspected contaminant source (i.e., sewage sludge);
- comparison of sample concentrations with laboratory method detection limits in instances where there are no UL values (i.e., where nondetectable concentrations of particular analytes in most background and nonbackground samples precluded calculating a UL value); and
- comparison of sample concentrations with typical concentrations of metals occurring in the western United States (Shacklette et al. 1984) (Table 2-2).

2.9.2 Assessment of Contaminant Characterization Data

Contaminants identified in soil samples are presented in Section 5.8 of the SWAT/SI report (Ogden 1993a). These data were subject to validation, and as necessary, specific results were qualified with respect to usability. Validation qualifiers attached to the data are shown in Table 2-1. Copies of data validation reports were evaluated to assess whether qualifiers attached to the results would have an effect on the proposed remedial alternatives.

The only qualifier attached to data collected from Site 3 was the "J" qualifier. The "J" qualifier indicates that the quantification of the result has some uncertainty and the value used is estimated. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (U.S. EPA 1989) requires that the value be used as reported.

Analytical detection limits reported by the laboratory for the cases where analytes were not detected were reviewed and compared to the U.S. EPA (1995) Region IX PRGs for residential soil. The review was conducted to assess if the data collected during the SWAT/SI were sufficient to perform a risk screening. Table 2-3 lists analytes with detection limits higher than the PRGs.

Analytical methods used for the SWAT/SI have detection limits greater than the PRGs for:

- vinyl chloride,
- N-nitrosodimethylamine,
- bis(2-chloroethyl)ether,
- benzo(a)pyrene,

Table 2-3
Summary of Laboratory Detection Limits Greater Than U.S. EPA Region IX Preliminary Remediation Goals (units reported in milligrams per kilogram)

Sample/Chemical	Detection Limit[a]	PRG[b]
EC3-B3-S4-D6.0		
U.S. EPA Method 8080		
Dieldrin	0.061	0.028
Toxaphene	0.61	0.4
Aroclor 1221	0.30	0.066
Aroclor 1232	0.30	0.066
Aroclor 1242	0.30	0.066
Aroclor 1248	0.30	0.066
Aroclor 1260	0.30	0.066
U.S. EPA Method 8240		
Vinyl chloride	0.009	0.0052
U.S. EPA Method 8270		
N-nitrosodimethylamine	0.17	0.0087
bis(2-chloroethyl)ether	0.17	0.074
Benzo(a)pyrene	0.17	0.061
Dibenz(a,h)anthracene	0.17	0.062
EC3-B4-S2-D3.0		
U.S. EPA Method 8010/8020		
Vinyl chloride	0.021	0.0052
EC3-B5-S3-D4.5		
U.S. EPA Method 8010/8020		
Vinyl chloride	0.011	0.0052
U.S. EPA Method 8270		
N-nitrosodimethylamine	0.17	0.0087
bis(2-chloroethyl)ether	0.17	0.074
Benzo(a)pyrene	0.17	0.061
Dibenz(a,h)anthracene	0.17	0.062
Metals		
Organolead	0.33	0.0065
EC3-B3-D4-D6.0		
U.S. EPA Method 8240		
Vinyl chloride	0.006	0.0052
U.S. EPA Method 8270		
N-nitrosodimethylamine	0.17	0.0087
bis(2-chloroethyl)ether	0.17	0.074
Benzo(a)pyrene	0.17	0.061
Dibenz(a,h)anthracene	0.17	0.062
Metals		
Organolead	0.36	0.0065

Notes:
[a] detection limits reported in Ogden reports (Ogden 1993a,b)
[b] PRG – U S EPA Region IX preliminary remediation goal

- dibenz(a,h)anthracene,
- dieldrin,
- toxaphene,
- polychlorinated biphenyls (PCBs) (Aroclor compounds), and
- organolead.

The reported detection limits for vinyl chloride, N-nitrosodimethylamine, bis(2-chloroethyl)ether, benzo(a)pyrene, dibenz(a,h)anthracene, and organolead were the best practically achievable (U.S. EPA 1994a) and were typically two to three times the PRG values. In the cases of N-nitrosodimethylamine and organolead, the PRGs were 20 and 50 times less than the detection limits, respectively. N-nitrosodimethylamine is generally associated with rocket fuel production and lubricant manufacturing processes. No records of these manufacturing process at NAF El Centro were found in the available literature. Organolead would only be expected in the presence of gasoline, which was not identified as a contaminant at this site. These chemicals were not detected in samples from Site 3 at any concentrations and, therefore, are not included as COPCs.

Sample EC3-B3-S4-D6.0 had elevated detection limits reported for dieldrin, toxaphene, and PCBs. The detection limits for these compounds were raised by a factor of five because the sample was diluted in order to properly quantify the chemicals that were detected (i.e., chlordane). The elevated detection limits were greater than the PRGs; however, analysis of a field duplicate sample (EC3-B3-D4-D6.0) did not result in elevated detection limits. Analyte concentrations or detection limits greater than the PRGs were not reported in the field duplicate.

Based on this evaluation, it appears that the quality of the data gathered in the SWAT/SI is sufficient to perform risk screening with no additional sampling or analysis required.

2.10 STREAMLINED RISK SCREENING

The eight factors described in the NCP (40 CFR Section 300.415[b][2]) for determining the appropriateness of a removal action were reviewed. The following factor was identified as being applicable.

- Actual or potential exposure to nearby human populations, animals, or the food chain may result from hazardous substances or pollutants or contaminants present at the site.

"Acceptable exposure levels" are defined in the NCP (40 CFR 300.430[e][2][A]) according to the following criteria.

- For systemic toxicants, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety.

- For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 1×10^{-6} and 1×10^{-4} using information on the relationship between dose and response.

The risk screening was performed according to U.S. EPA guidelines described in Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (U.S. EPA 1993a).

2.10.1 Potential Threat to Human Populations

The streamlined risk screening was conducted to estimate whether or not the highest measured concentration of each COPC exceeded its respective U.S. EPA or Cal-EPA-modified residential soil PRG (U.S. EPA 1995). The residential soil PRGs are concentrations corresponding to a lifetime cancer risk of 1×10^{-6} for carcinogenic effects and a hazard index of 1.0 for noncarcinogenic effects. Therefore, if the concentration of a chemical exceeds its PRG, the concentration may result in a level of exposure corresponding to an upper-bound cancer risk exceeding 1×10^{-6} if the chemical is a carcinogen; or it may result in an illness of another type if the chemical is not a carcinogen.

The total risk for each carcinogen, based on the U.S. EPA or Cal-EPA-modified residential soil PRGs (February 1995) for carcinogens, is summarized in Table 2-4. The incremental risk (i.e., the risk associated with the presence of the carcinogen above the background concentration) is also provided in Table 2-4.

Incremental risk was not calculated for noncarcinogenic effects (Table 2-5). Unlike carcinogenic effects, noncarcinogenic effects are based on threshold concentrations. Below the threshold concentration, there are no health effects associated with the presence of the chemical. Above the threshold concentration, health hazards become apparent. Release of a chemical to the environment may cause the total concentration of the compound (background plus the added amount) to exceed the threshold. These threshold concentrations (i.e., noncarcinogenic PRGs) are typically several orders of magnitude greater than the carcinogenic PRG for chemicals that have both carcinogenic and noncarcinogenic effects (e.g., arsenic).

Four carcinogens (arsenic, beryllium, cadmium, and chlordane) were found at concentrations exceeding their respective residential PRGs. However, beryllium was not present at a concentration exceeding the estimated background. Three chemicals are considered to be chemicals of concern (COCs) for Site 3: arsenic, cadmium, and chlordane. Total chromium was not observed at concentrations exceeding the U.S. EPA Region IX residential PRG (210 mg/kg) for total chromium. If it is assumed that total chromium is 100 percent hexavalent chromium, then chromium (i.e., as hexavalent chromium) also exceeds the Cal-EPA-modified PRG (0.2 mg/kg) for hexavalent chromium (see Table 2-4) and is considered a COC for Site 3. This conservative

Table 2-4
Estimated Total Cancer Risk for Chemicals of Potential Concern at Site 3
(units reported in milligrams per kilogram)

Chemical	Residential PRG[a]	Highest Measured Concentration	Risk	UL[b] of Background Concentration[c]	Net Concen-tration[d]	Incremental Risk
Arsenic	0.32	13.1	4.09×10^{-5}	6.3	6.8	2.13×10^{-5}
Beryllium	0.14	1.2[c]	8.57×10^{-6}	1.1	0.0	0
bis(2-ethylhexyl) phthalate	32	1.0	3.13×10^{-8}	None	1.0	3.13×10^{-8}
Cadmium[e]	9.0	12.6	1.40×10^{-6}	4.6	8.0	8.89×10^{-7}
Chlordane	0.34	1.0	2.94×10^{-6}	None	1.0	2.94×10^{-6}
Chromium, hexavalent[f]	(0.2)	(127)	(6.35×10^{-4})	(0)	(127)	(6.35×10^{-4})
Chromium, total[g]	210	127	6.05×10^{-7}	17	110	5.24×10^{-7}
2,4-DDE (as 4,4′-DDE)[h]	1.30	0.09	7.15×10^{-8}	None	0.09	7.15×10^{-8}
Total Assuming Cr as Total Chromium[g]			**5.45×10^{-5}**			**2.58×10^{-5}**
Total Assuming Cr as Cr^{+6}[f]			**(6.89×10^{-4})**			**(6.60×10^{-4})**

Notes:
[a] PRG – U.S. EPA Region IX preliminary remediation goal
[b] UL – upper limit
[c] measured concentration of 1.2 milligrams per kilogram (mg/kg) was judged to be background
[d] net concentration above background UL
[e] for cadmium Cal-EPA-modified PRG was used
[f] assumes total chromium is hexavalent chromium (Cr^{+6}), Cal-EPA-modified PRG (i.e., 0.2 mg/kg) used in risk calculation
[g] assumes trivalent (Cr^{+3}) and hexavalent (Cr^{+6}) chromium in the same proportions as the U.S. EPA Region IX PRG for total chromium
[h] PRG for 4,4′-DDE was used because 2,4-DDE has no PRG

Table 2-5
Estimated Total Hazard Indices for Chemicals of Potential Concern at Site 3

Chemical	Residential PRG[a] (mg/kg)[b]	Highest Measured Concentration (mg/kg)	UL[c] of Background Concentration (mg/kg)	Hazard Index
Antimony	31	1.1 J[d]	None	0.035
Arsenic	22	13.1	6.3	0.595
Beryllium	380	1.2	1.1	0.003
bis(2-ethylhexyl)phthalate	1,300	1.0	None	0.000
Cadmium	38	12.6	4.6	0.332
Chromium, hexavalent[e]	380	127	None	0.334
Chromium, total[f]	1×10^5 M[g]	127	17	0.000
Copper	2,800	985	25	0.352
Cyanide, total (as CuCN)[h]	380	2.7	None	0.007
2,4-DDE[i] (as 4,4′-DDE)[h]	1×10^5 M[g]	0.09	None	0.000
di-n-butyl phthalates	6,500	0.17	None	0.000
Lead	130	209	17	1.608
Mercury	23	2.5	None	0.109
Nickel	150	28.2	20	0.188
Nitrate as N	100,000	4,080	None	0.041
Selenium	380	37	None	0.097
Silver	380	111	0.6	0.292
Thallium	5.4	1.2	None	0.222
Zinc	23,000	772	70	0.034
Total Hazard Index Assuming Cr as Total Chromium[f]				**3.915**
Total Hazard Index Assuming Cr as Cr^{+6}[e]				**4.249**

Notes:
- [a] PRG – United States Environmental Protection Agency (U.S. EPA) Region IX preliminary remediation goal
- [b] mg/kg – milligrams per kilogram
- [c] UL – upper limit
- [d] J – data validation qualifier indicating that the value has been estimated
- [e] assumes total chromium is hexavalent chromium
- [f] assumes trivalent (Cr^{+3}) and hexavalent (Cr^{+6}) in the same proportions as the U.S. EPA Region IX PRG for total chromium
- [g] maximum (saturated) concentration, not included in hazard sum
- [h] PRG is for parenthetical chemical because measured chemical has no PRG
- [i] DDE – dichlorodiphenyldichloroethene

assumption makes chromium the primary risk driver. Hexavalent chromium is an unstable, highly oxidized form of chromium. In the presence of organic material, such as sewage sludge, it is readily reduced to a lower valence state (i.e., trivalent chromium). Thus, it is unlikely that there is any hexavalent chromium associated with the sludge disposed at Site 3.

Lead was also found at concentrations exceeding its noncarcinogenic PRG. Lead is also considered a probable carcinogen (U.S. EPA 1993b); however, a cancer potency factor for lead has not been developed. The beryllium UL value is 1.1 mg/kg and the highest measured concentration was 1.2 mg/kg. Because the UL is the 95th percentile of the background, the highest measured concentration of 1.2 mg/kg was also judged to be from the background population. Arsenic was evaluated both for carcinogenic and noncarcinogenic effects because there are PRGs for both types of effects. These chemicals and others that were detected in the soil are shown in Tables 2-4 and 2-5 with their respective PRGs, highest measured concentrations, incremental risk in the case of carcinogens, and hazard indices (in the case of noncarcinogens).

Using the U.S. EPA Region IX PRG for total chromium, the total cancer risk presented by all of the carcinogens was 5.5×10^{-5} (Table 2-4). The primary risk driver for this case was arsenic. Using the Cal-EPA-modified PRG for hexavalent chromium and assuming that the reported concentrations for the total chromium are 100 percent hexavalent chromium, the total cancer risk was 6.9×10^{-4}. Hexavalent chromium is the primary risk driver in this case.

The total hazard index for noncarcinogenic effects is approximately 3.9 (Table 2-5). Lead was the only chemical with a hazard index exceeding 1.0. Therefore, lead is considered a COC for Site 3.

2.10.2 Health Effects Produced by Chemicals That May Present a Significant Risk

Brief descriptions of the toxicity of the five chemicals that contribute to the total estimated risk are presented below.

- Arsenic is a known human carcinogen, as well as a classic poison. The fatal oral dose for arsenic trioxide is about 120 milligrams in an adult human. For a 70-kilogram person, that amount is equivalent to a dose of 1.7 mg/kg. The toxicity of arsenic is due to its ability to interfere with cellular metabolism by enzyme inhibition. Chronic exposure to arsenic can cause liver and kidney damage, heart failure, anemia, and weight loss.
- Cadmium is a gastrointestinal irritant at high doses. Acute symptoms of cadmium poisoning include nausea, vomiting, abdominal pain, and cramps. Similar symptoms occur with chronic exposure. In addition, chronic ingestion of cadmium is believed to cause severe back pain and demineralization of bone. Cadmium is classified as a probable human carcinogen.

- Chlordane is a synthetic pesticide. In humans, the effects most frequently observed involve the central nervous system and the blood. Symptoms of central nervous system involvement include irritability, salivation, convulsions, and muscle tremors. Effects on the blood include anemia and leukemia. Chlordane has been reported to cause cancer in laboratory animals. The organ that it attacks is the liver.
- Chromium is most commonly found in the forms of trivalent and hexavalent chromium. Trivalent chromium compounds are less soluble in water than hexavalent chromium compounds, and they are less toxic. Chromium has been reported to cause contact dermatitis, liver and kidney damage, lung congestion, and lung cancer in humans. Hexavalent chromium also appears to be a cause of lung cancer.
- Lead affects the central and peripheral nervous system, the blood system, the cardiovascular system, and the male reproductive tract. Its effects on the central nervous system are of particular concern. Lead is particularly toxic to children; exposure to very low levels can result in mental and developmental retardation in children. The U.S. EPA classifies lead as a probable human carcinogen.

2.10.3 Potential Exposure Pathways

The sludge burial area was reportedly covered with a 2-foot-thick soil cover (Ogden 1993a). The site is covered with scattered vegetation. Human contact with the chemical in soils could occur only if the site is disturbed. Because the groundwater is at a shallow depth of about 10 feet bgs, potential for groundwater contamination exists.

2.10.4 Sensitive Populations

Site 3 is located approximately 2 miles from the main area of operation along the north boundary of NAF El Centro. The site is not frequently used by base personnel. Property adjacent to the site is used for agricultural purposes; however, these activities do not involve Site 3. Thus, given the current use of the site, there do not appear to be any human populations sensitive to the COCs at this time. If the site usage changes in the future, or if the site soil is disturbed, human exposure to the COCs may result.

The Ecological Scoping Assessment (ESA) (Section 2.11) identified the potential for four California species of special concern to use the site. These species include the burrowing owl, Colorado valley wood rat, Yuma clapper rail, and the flat-tailed horned lizard. The flat-tailed horned lizard has also been proposed for inclusion on the federal threatened and endangered species list. These species may be impacted by the COCs at the site. In addition, if the COCs are left in place they may migrate to groundwater. Since the groundwater below the site is designated for beneficial use, users of the groundwater may be impacted.

The risk screening discussed in this section was performed using U.S. EPA Region IX PRGs for a residential exposure scenario (U.S. EPA 1995). This exposure scenario is unlikely to occur given the current site usage. Thus, PRGs for an industrial exposure scenario may be more appropriate for risk screening.

2.11 ECOLOGICAL SCOPING ASSESSMENT

An ESA of Site 3 was performed as part of this EE/CA. Unlike human-health risk assessments, ESAs focus on communities of plants and animals that are actually present on a site and/or in the surrounding area. Ecological communities can consist of several species of plants and animals.

The ESA was performed to evaluate the need for additional risk screening or site remediation. The assessment was performed according to the guidance issued by the Cal-EPA DTSC (1994).

A site visit was made by a biologist and a toxicologist on 20 April 1995 to inspect the site and identify habitats that are most likely to occur on-site. Potential exposure routes were also identified during the site visit. The data collected during the site visit and existing chemical data were evaluated to identify if potentially complete exposure pathways exist at Site 3; it was concluded that they do.

Details of the ESA are included in Appendix B – Ecological Scoping Assessment.

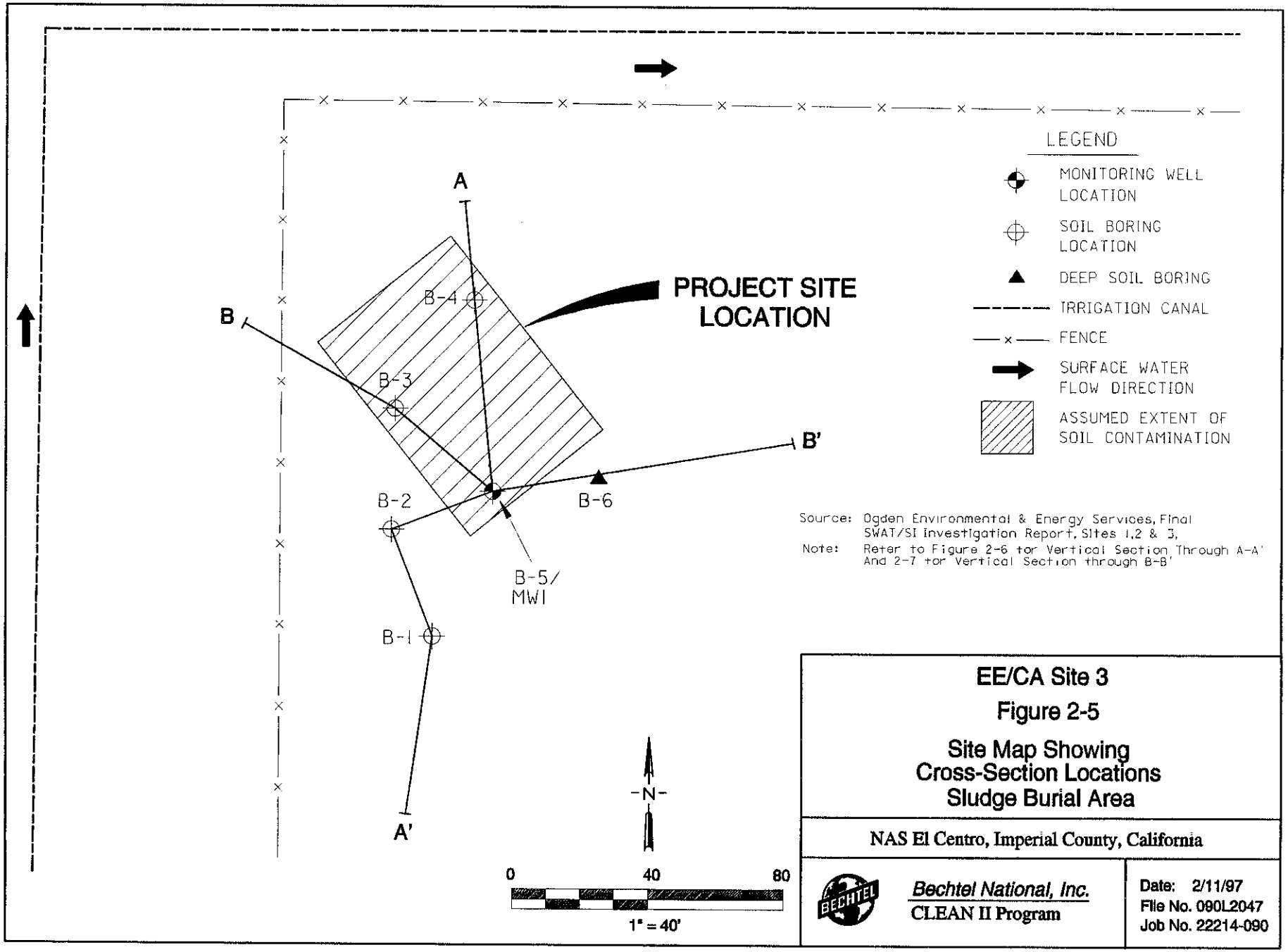
2.12 SOURCE, NATURE, AND EXTENT OF CONTAMINATION

Previous investigations performed at the site (Ogden 1993a; NEESA 1987) were focused on evaluating the presence and potential impacts of contaminants due to burial of sewage sludge at the site. These investigations did not result in a complete characterization of the nature and extent of soil contamination. Therefore, certain assumptions were made to quantify the nature and extent of contamination present at the site. The assumptions and the estimated extent of contamination are described below.

The location of sludge burial pit shown in the NEESA (1987) report appears to differ from the Ogden (1993a) soil boring locations. Base representatives indicated (SWDIV 1995) that the Ogden borings were drilled at the vicinity of the sludge burial pit, and the location shown in the NEESA report (1987) was at variance. It is assumed that the Ogden soil borings were drilled within the vicinity of the sludge burial pit.

Based on the streamlined risk screening described in Section 2.10, the primary COCs for Site 3 are arsenic, cadmium, chlordane, chromium, and lead. Chromium is included as a COC based on the assumption that the reported concentrations for total chromium (Ogden 1993a) are hexavalent chromium (see Section 2.10.1).

The results of the soil sample analyses for Site 3 (Figure 2-5; Ogden 1993a) indicate the presence of petroleum hydrocarbons, cyanide, organochlorine pesticides, and metals at the site. The available data are not sufficient to assess the extent of these contaminants. Figures 2-6 and 2-7 show cross sections of the site. The available data for COCs are plotted in the figures indicating the depth at which the soil sample containing these chemicals was collected. Based on these data, it appears that the soil contamination extends vertically to a depth of at least 6 feet (see soil boring EC3-B3). The lateral extent of soil contamination does not appear to extend southward beyond soil boring EC3-B5.



Source: Ogden Environmental & Energy Services, Final SWAT/SI Investigation Report, Sites 1,2 & 3.

Note: Refer to Figure 2-6 for Vertical Section Through A-A' And 2-7 for Vertical Section through B-B'

EE/CA Site 3

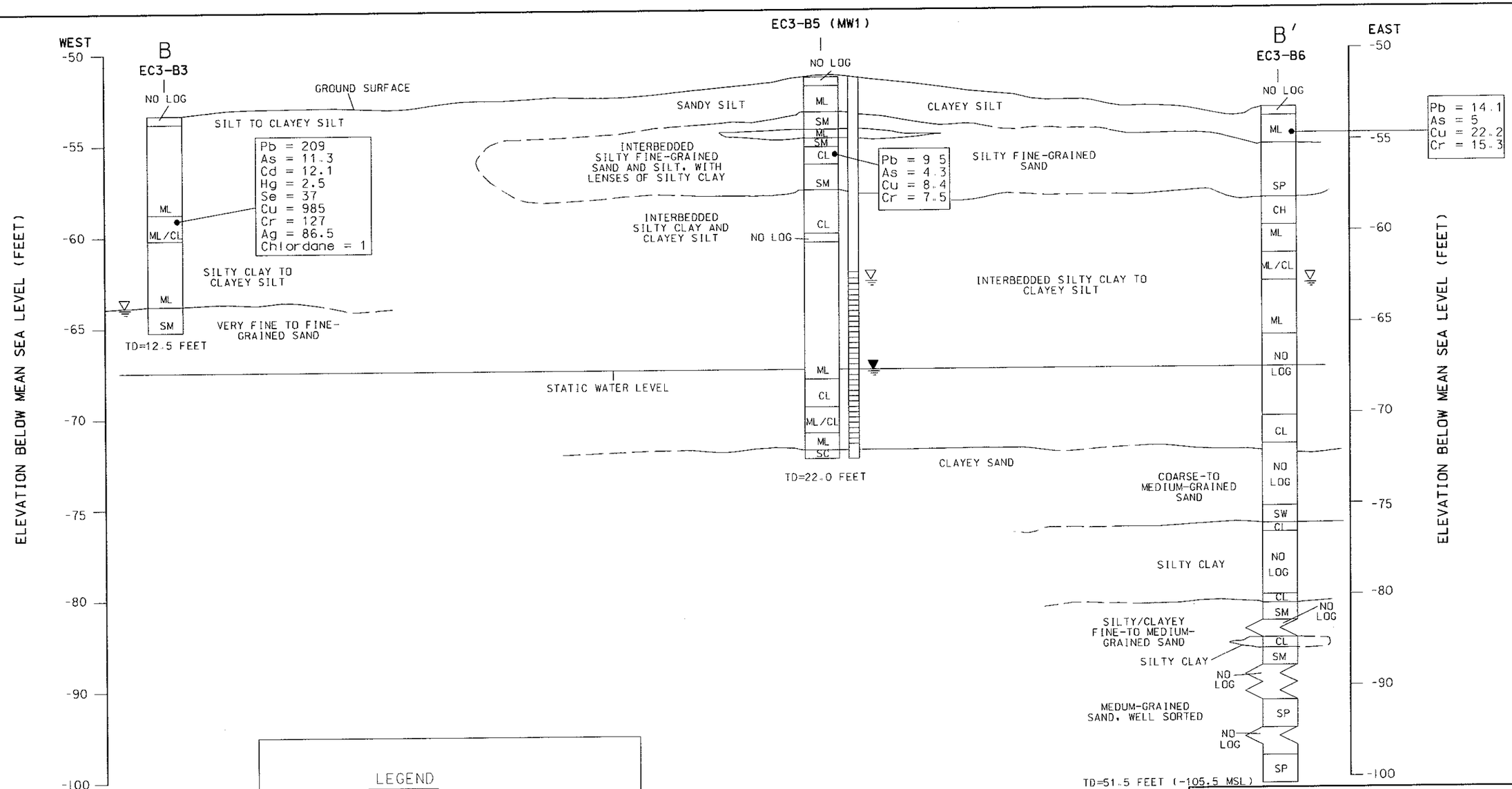
Figure 2-5

Site Map Showing Cross-Section Locations Sludge Burial Area

NAS El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/11/97
File No. 090L2047
Job No. 22214-090



LEGEND

- FIRST ENCOUNTERED GROUNDWATER DURING DRILLING OF BORING (8/5/91)
- STATIC WATER LEVEL MEASURED IN WELL (11-7-91)
- MONITOR WELL SCREENED INTERVALS
- GEOLOGIC CONTACT
- Pb=100 — ANALYTE CONCENTRATION IN mg/kg AT LOCATION AS INDICATED

0 6

FEET
HORIZONTAL SCALE
VERTICAL EXAGGERATION 2X

SEE FIGURE 2-5 FOR LOCATION OF B-B'

SOURCE: OGDEN ENVIRONMENTAL AND ENERGY SERVICES 1993, FINAL SWAT/SI INVESTIGATION REPORT, SITES 1, 2 AND 3.

EE/CA Site 3

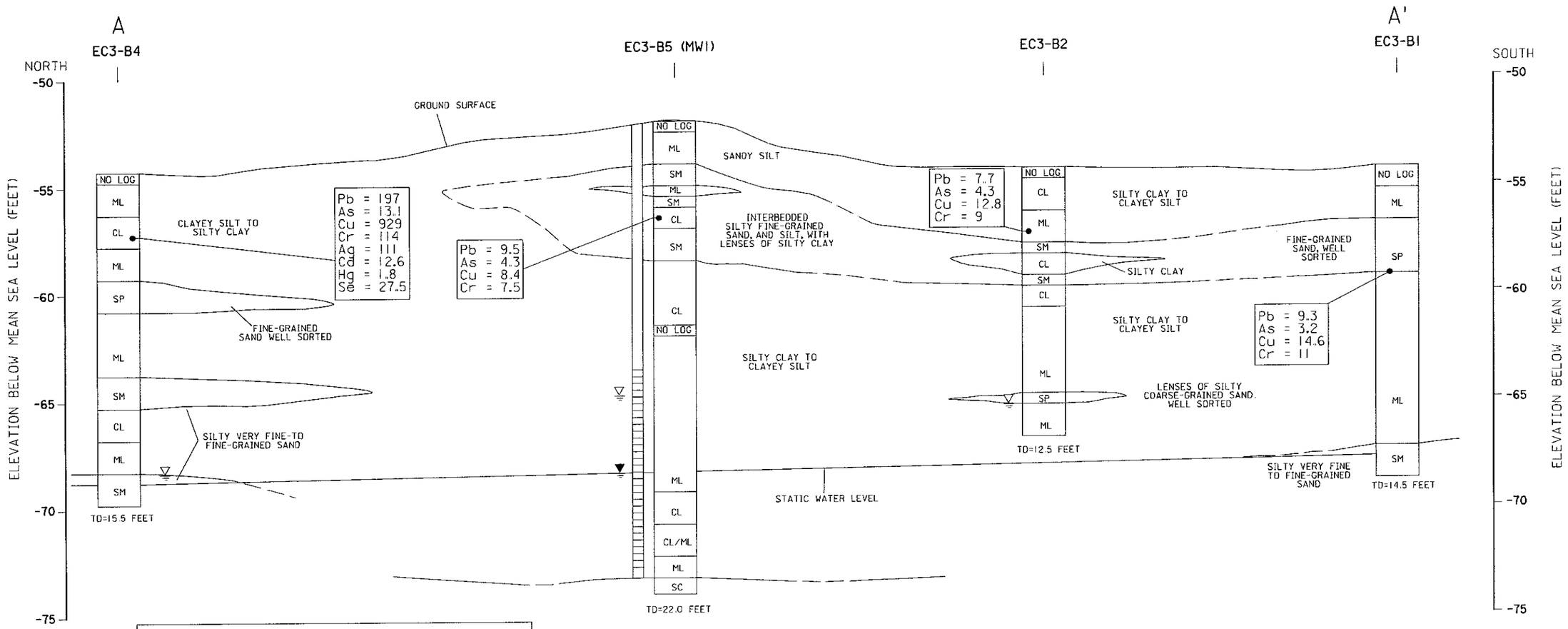
Figure 2-7

Cross-Section B-B'
Sludge Burial Area

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No. 090X2044
Job No. 22214-090



LEGEND

- FIRST ENCOUNTERED GROUNDWATER DURING DRILLING OF BORING (8/5/91)
- STATIC WATER LEVEL MEASURED IN WELL (11-7-91)
- MONITOR WELL SCREENED INTERVALS
- GEOLOGIC CONTACT
- Pb=100 METAL CONCENTRATION IN mg/kg AT LOCATION AS INDICATED

0 10

FEET

HORIZONTAL SCALE

VERTICAL EXAGGERATION: 2X

SEE FIGURE 2-5 FOR LOCATION OF A-A'

SOURCE: OGDEN ENVIRONMENTAL AND ENERGY SERVICES 1993, FINAL SWAT/SI INVESTIGATION REPORT, SITES 1, 2 AND 3.

EE/CA Site 3

Figure 2-6

Cross-Section A-A'
Sludge Burial Area

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No. 090X2045
Job No 22214-090

The north, east, and west boundaries of the soil contamination have not been established; however, the soil contamination does appear to occur in soil borings EC3-B3 and EC3-B4. Thus, the soil contamination may extend beyond the original sludge disposal pit dimensions of 20 by 10 feet and 5 feet deep (Ogden 1993a).

Following is a summary of assumptions made in preparation of this EE/CA.

1. It is assumed that the SWAT/SI (Ogden 1993a) soil borings were drilled in the vicinity of the sludge burial pit.
2. The extent of contamination is assumed to encompass an area of 50 by 70 feet to a depth of 8 feet (approximately 1,040 cubic yards in place). However, boundaries of the contaminated area are not clearly defined.
3. The available data were not sufficient to determine whether the contaminated soil is Resource Conservation and Recovery Act (RCRA) or Cal-EPA hazardous waste, or nonhazardous waste. In the absence of this information, disposal options were developed to address both scenarios.

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SECTION 3

IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

Section 3
IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

This section identifies the removal action scope and objectives at Site 3. The removal action objectives are based on CERCLA, the NCP, the streamlined risk screening (Section 2.10), the ESA (Section 2.11), and applicable or relevant and appropriate requirements (ARARs). These objectives are used in Section 4 to develop removal action alternatives.

3.1 STATUTORY FRAMEWORK

This removal action is taken pursuant to CERCLA and the NCP under the delegated authority of the Office of the President of the United States by Executive Order (EO) 12580. This order provides the DON with authorization to conduct and finance removal actions. This removal action is non-time-critical because a six-month planning period was available from the time a removal action was determined to be necessary before the initiation of removal actions. The mandated public comments on the EE/CA provide opportunity for public input to the cleanup process.

Additionally, the Ca-HSC specifies the preparation of necessary documentation, which depends upon the costs of the removal action. The Ca-HSC requires development of either: an RAP for removal actions that cost $1 million or greater; or an RAWP for removal actions that cost less than $1 million. Further, the Ca-HSC authorizes DTSC to waive the RAP requirements, in favor of an RAWP or an RAP-equivalent document, for removal actions when an imminent and/or substantial endangerment determination exists. DTSC may also waive the RAP-requirements if an RAP-equivalent document that meets the requirements of Ca-HSC 25356.1(h) (3) is prepared.

This EE/CA complies with the requirements of CERCLA, Superfund Amendments and Reauthorization Act, NCP at 40 CFR Part 300, Defense Environmental Restoration Program at 10 *United States Code* §2701, et seq., and EO 12580. This EE/CA is being pursued under 40 CFR Part 300.415 (b)(2)(iv).

3.2 DETERMINATION OF REMOVAL SCOPE

The scope of this removal action is to reduce human and ecological exposure to contaminated soils at the site. The removal action involves an area of approximately 50 by 70 feet to a depth of 8 feet. The extent was defined based on the data collected during the SWAT/SI (Ogden 1993a). Although the data collected during SWAT/SI are limited, there is enough information to suggest that metals and chlordane are the COCs.

This removal action addresses only the soil contamination at the site. Available data are not sufficient to assess if groundwater at the site is impacted. Installation and monitoring of additional groundwater monitoring wells is recommended to further characterize groundwater at the site and to assess the need for additional activities. The removal action alternatives considered in this EE/CA are intended to result in a no further action (NFA) status for soil at the site. The removal action alternatives are discussed in Section 4.

3.3 DETERMINATION OF REMOVAL SCHEDULE

Factors that may affect the removal action schedule include availability of services and weather. As part of the EE/CA removal action evaluation process, the availability of services is considered. Due to the extreme summertime temperatures in the Imperial Valley, removal actions executed during the summer months may require additional time or nighttime work. Rain is not expected to be a major consideration in the execution of any removal action.

Since the activities of several other removal actions at NAF El Centro will be coordinated with the removal action at Site 3 for on-base reuse of inert waste at the Magazine Road Landfill (Site 1), the schedule for removal action at Site 3 will also depend on the work schedules of the other sites.

This EE/CA was available for public review and comment for 30 days. No public comments were received during the review period. The DON will also prepare an Action Memorandum providing a written record of the decision to select an appropriate removal action. Once the DON awards the removal contract, the removal action is expected to be completed within 12 months.

3.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The NCP states, "Removal actions . . . shall to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (40 CFR 300.415[j]). The evaluation of ARARs for this EE/CA is presented in Appendix C. The following sections provide an overview of the ARARs process and a summary of the potential ARARs that most significantly affect the development of removal action objectives.

3.4.1 Applicable or Relevant and Appropriate Requirements Overview

Identification of ARARs is a site-specific determination that involves a two-part analysis. First, it must be determined whether a given requirement is applicable. Second, if a requirement is not applicable, it must be determined whether it is relevant and appropriate. A requirement is deemed applicable if the specific terms of the law or regulation directly address the COCs, remedial action, or place involved at the site. If the jurisdictional prerequisites of the law or regulation are not met, a legal requirement may nonetheless be relevant and appropriate if the site circumstances are sufficiently similar to circumstances in which the law otherwise applies, and it is well suited to the conditions of the site.

A requirement must be substantive to constitute an ARAR for activities conducted on-site. Procedural or administrative requirements, such as permits and reporting requirements, are not ARARs for on-site activities.

In addition to ARARs, the NCP provides that where ARARs do not exist, agency advisories, criteria, or guidance are "to be considered" (TBC) useful "in helping to determine what is protective at a site or how to carry out certain actions or requirements" (55 *Federal Register* 8745). The NCP preamble states, however, that provisions in the TBC category "should not be required as cleanup standards because they are, by definition, generally neither promulgated nor enforceable, so they do not have the same status under CERCLA as do ARARs."

As the lead federal agency, the DON is primarily responsible for identifying federal ARARs at Site 3. As the lead state agency, Cal-EPA has the responsibility for identifying state ARARs. In a letter dated 13 April 1995, the DON requested that Cal-EPA identify potential ARARs for the NAF El Centro IRP sites, including Site 3. On 21 June 1995, Cal-EPA submitted a letter to the DON listing potential state ARARs for the NAF El Centro IRP sites. The ARARs analysis presented in this EE/CA has incorporated the information provided by Cal-EPA to the extent that it applies to the removal action alternatives considered for Site 3.

3.4.2 Applicable or Relevant and Appropriate Requirements Affecting Removal Action Objectives

ARARs and TBCs are generally divided into three categories: chemical-specific, location-specific, and action-specific requirements. The potential ARARs considered for this EE/CA are discussed in Appendix C.

In general, the federal and state hazardous waste management regulations promulgated in the *California Code of Regulations* (CCR) Title 22 will be the controlling ARARs for the removal action at Site 3. These regulations specify the characterization of the hazardous nature of the excavated material and specify how it must be managed and disposed after excavation, if it is hazardous. If the excavated soil is not hazardous, the controlling ARARs for soil management will be the State Water Resources Control Board waste discharge to land requirements (CCR Title 23, Chapter 15). Additionally, various rules and regulations of the Imperial County Air Pollution Control District (ICAPCD) promulgated pursuant to the Clean Air Act will be potential ARARs for soil excavation activities at Site 3.

3.5 REMOVAL ACTION OBJECTIVES

This section is intended to satisfy portions of RAP requirements, as defined in Ca-HSC 25356.1.

Based on the CERCLA, NCP, risk assessment, ESA, and identified ARARs, the removal action objectives for contaminated soil at Site 3 are as follows:

- reduce the potential for human and ecological exposure to contaminants potentially present in the soil at the site;

- mitigate contaminated soils that have the potential to contaminate the groundwater; and
- achieve an NFA status for soil at the site.

To achieve those objectives, the cleanup levels for the site were established by comparing each PRG to the UL of the background concentration, and selecting the greater of the two. The cleanup levels for the COCs are summarized in Table 3-1.

Table 3-1
Proposed Soil Cleanup Levels
(units reported in milligrams per kilogram)

Chemicals of Concern	Residential PRG[a]	UL[b] of Background Concentration	Highest Detected Concentration	Cleanup Levels
Arsenic	0.32	6.3	13.1	6.3
Cadmium	9[c]	4.6	12.6	9
Chlordane	0.34	0	1.0	0.34
Chromium, hexavalent	0.2[d]	—	—	0.2[e]
Chromium, total	210	17	127	210
Lead	130	17	209	130

Notes:
[a] PRG – U.S. EPA Region IX preliminary remediation goal
[b] UL – upper limit
[c] Cal-EPA-modified PRG for cadmium
[d] the soil cleanup level will be the Cal-EPA-modified PRG; if a laboratory detection limit equal to or less than the Cal-EPA-modified PRG is not available, the lowest available detection limit will be used as the cleanup level

SECTION 4

IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Section 4
IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Based on the removal action objectives presented in Section 3, eight removal action alternatives were developed and subject to a preliminary screening. These alternatives included:

- Alternative 1 - characterization, excavation, and disposal;
- Alternative 2 - excavation, on-site treatment using solidification/stabilization, and on-site disposal;
- Alternative 3 - excavation, on-site treatment using solidification/stabilization, and off-site disposal;
- Alternative 4 - excavation, on-site treatment using soil washing, and on-site disposal;
- Alternative 5 - excavation, on-site treatment using soil washing, and off-site disposal;
- Alternative 6 - *in situ* stabilization/solidification;
- Alternative 7 - on-site containment (capping);
- Alternative 8 - no action.

During the preliminary screening, each alternative was evaluated for overall effectiveness at achieving the removal action objectives, general technical and administrative feasibility, and cost effectiveness. Based on this evaluation, Alternative 2 through 7 were eliminated from further considerations. Alternative 8 was retained for detailed evaluation as required by the NCP. The rationale for elimination of these alternatives is described in the following paragraphs.

Alternatives 2 and 3 involve excavation of the contaminated soil, on-site treatment using solidification/stabilization, and disposal either on-site at Site 1 of off-site at an appropriate disposal facility. Based on discussion with the RWQCB, Colorado River Basin Region, only "inert" wastes could be disposed at Site 1. Contaminated soil treated using solidification/stabilization would not be considered inert waste since the treatment process does not reduce the toxicity or volume of COCs in the soil. Alternative 2 was eliminated from further consideration because it did not appear administratively feasible to implement based on RWQCB definition of inert. Alternative 3 was eliminated from further consideration because the anticipated volume of soil requiring treatment did not justify the mobilization and setup costs associated with an on-site treatment system. It was concluded that soil requiring treatment prior to disposal could be treated more cost effectively off-site at a disposal facility.

Alternatives 4 and 5 involve excavation of the contaminated soil, on-site treatment using soil washing and disposal either on-site at Site 1 or off-site at an appropriate disposal facility. During the soil-washing process, contaminated soil is mixed with a wash solution and subjected to intense attrition scrubbing to disintegrate soil aggregates and scour contaminants from the surface of the coarse fraction (i.e., sand and gravel). The washed coarse fraction is then mechanically separated from the wash solution containing suspended fines (i.e., silt and clay) and dewatered. The coarse fraction is generally uncontaminated and can be recycled. The suspended fines, still containing contaminants, are precipitated, dewatered, and disposed at an

appropriate waste disposal facility. Further treatment of the fine fraction is typically not feasible due to the tendency of contaminants to form strong chemical or physical bonds with the silt and clay particles. For this reason, soil washing is generally only effective for soils containing a minor fraction of fine-grained material. The soils at Site 3 have been characterized (Ogden 1993a) as primarily fine-grained (i.e., silt, silty clay, and clayey silt). Thus, it was concluded that soil washing would not be an effective treatment option for Site 3. Alternatives 4 and 5 were eliminated from further consideration based on this conclusion.

Because of the removal action objective of NFA for soil and the DON preference for unrestricted land use following the removal action, Alternatives 6 and 7 were eliminated from further consideration. These alternatives would reduce the COC mobility but would not reduce the COC toxicity or volume. Following the removal action, institutional controls would likely be necessary to restrict future uses and potential exposure to the remaining COCs, or additional action would likely be required if unrestricted land use was desired.

The following sections include a technical description of Alternatives 1 and 8 and an evaluation of each alternative with respect to effectiveness, implementability, and cost.

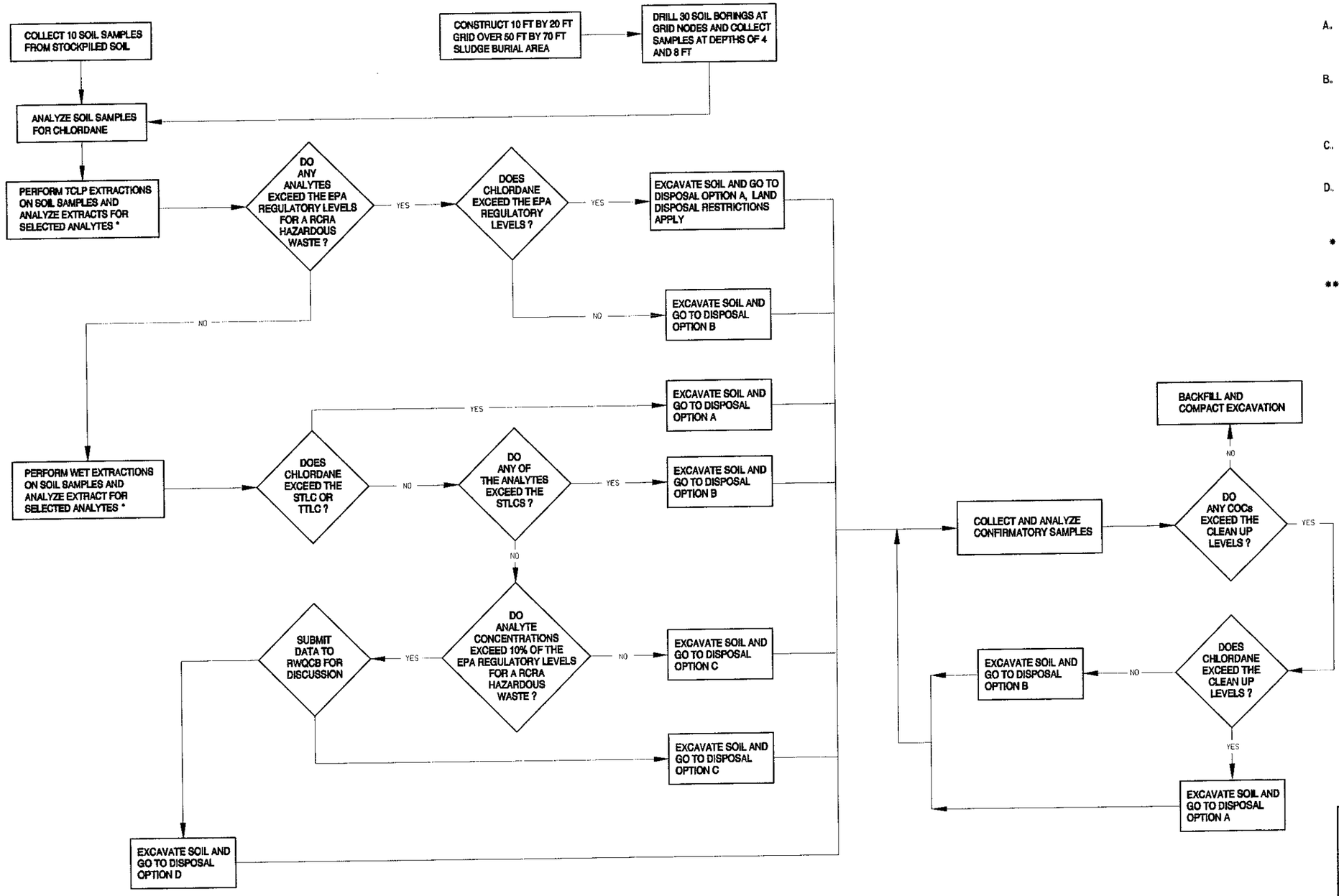
4.1 ALTERNATIVE 1 - CHARACTERIZATION, EXCAVATION, AND DISPOSAL

This section is intended to satisfy RAP requirements, as defined in Ca HSC 25356.1.

Because of the apparent limited extent of contaminated soil and the long-term objective of NFA for the site, excavation and disposal was considered to be an effective means for addressing the contaminated soil. At this time, the soil has not been sufficiently characterized to select a single disposal option. Further soil characterization is required prior to excavation and is included as part of this alternative; however, it may be conducted independently of the removal actions. Once the soil is characterized, it will be classified, and one of the four following disposal options will be selected (Figure 4-1).

- Soil characterized as inert by the RWQCB will be reused at Site 1.
- Soil characterized as nonhazardous by the DTSC will be disposed at a Class II or III facility.
- Soil characterized as RCRA or California hazardous waste will be disposed at a Class I facility.
- Soil characterized as RCRA hazardous for chlordane will be incinerated.

The purpose for further characterization and classification of the soil is the potential for significant cost savings during disposal. Soil classified as something other than hazardous (i.e., nonhazardous or inert) can be disposed at an alternate, significantly less costly facility.



DISPOSAL OPTIONS

A. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR CHLORDANE. EXCAVATE AND TRANSPORT OFF-SITE FOR INCINERATION **

B. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR ANALYTE OTHER THAN CHLORDANE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL AT A CLASS I FACILITY **

C. SOIL CLASSIFIED AS INERT. EXCAVATE AND TRANSPORT TO SITE I FOR DISPOSAL.

D. SOIL CLASSIFIED AS DESIGNATED OR NON-HAZARDOUS SOLID WASTE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL **

* ANALYTES INCLUDE: ARSENIC, CADMIUM, CHROMIUM (TOTAL), HEXAVALENT CHROMIUM, LEAD AND CHLORDANE

** ONLY SOIL FROM AREAS CLASSIFIED AS CONTAINING HAZARDOUS, DESIGNATED, OR NON-HAZARDOUS SOLID WASTE WILL BE TRANSPORTED OFF-SITE.

Engineering Evaluation/Cost Analysis

Figure 4-1

Characterization, Excavation, and Disposal Decision Flow Diagram Site 3

NAF El Cento, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 2/12/97
File No: 090C2042
Job No: 22214-090
Rev A

4.1.1 SITE PREPARATION

Prior to beginning the removal activities, a biologist will inspect the site for the presence of the burrowing owl, Colorado valley wood rat, Yuma clapper rail, and the flat-tailed horned lizard (California species of special concern). If active owl burrows are identified, and it is not mating season, (i.e., March through June), the burrowing owl residents will be moved to an off-site burrow. Removal action activities will not be performed during the mating season if active burrows are observed on-site. Any flat-tailed horned lizards or wood rats observed on the site will be relocated prior to the removal action.

Once the site has been inspected by a biologist, the site will be cleared of vegetation. After it is cut, the vegetation will be removed from the site and disposed at a construction debris landfill or similar facility.

4.1.2 SITE CHARACTERIZATION

The approximate size of the original sludge burial pit was 20 by 10 feet by 5 feet deep (Ogden 1993a). Site characterization activities are included in the removal action activities; however, they may be conducted prior to the removal action construction activities. The limited data collected during the SWAT/SI indicates that the extent of contamination may encompass an area approximately 70 by 50 feet by 8 feet deep. The following procedure will be used to characterize the site.

- A total of 10 samples will be collected from the construction wastes currently stockpiled on the site.
- A 10- by 20-foot grid will laid out over the estimated area (70 by 50 feet) affected by the buried sludge (see Figure 2-5). Samples from 4 and 8 feet bgs will be collected from soil borings drilled at each of the 30 grid nodes. A total of 60 soil samples will be collected.
- Each of the 70 samples (10 samples from the stockpiled construction wastes plus 60 samples from the soil borings) will be submitted to an off-site laboratory for analysis of chlordane. In addition, toxicity characteristic leaching procedure (TCLP) extractions will be obtained from each sample and the extracts will be analyzed for the COCs listed in Table 3-1. If any analytes exceed the U.S. EPA regulatory levels for a RCRA hazardous waste, the sample will be classified as RCRA hazardous. If chlordane exceeds the U.S. EPA regulatory level for a RCRA hazardous waste, the sample will be classified as RCRA hazardous with land-disposal restrictions (LDRs).
- The Cal-EPA Waste Extraction Test (WET) will be performed on samples that do not contain COCs exceeding the EPA regulatory levels for a RCRA hazardous waste. The extracts will be analyzed for the COCs listed in Table 3-1. If any of the analytes exceed the soluble threshold limit concentrations (STLCs), the sample will be classified as California hazardous. If chlordane exceeds the STLC or the total threshold limit concentration (TTLC) the sample will be classified as California hazardous with LDR.

- Samples that do not contain COCs exceeding the STLCs or the chlordane TTLC and that do not contain COCs in the TCLP extract exceeding ten percent of the U.S. EPA regulatory levels for a RCRA hazardous waste, will be classified as inert.
- Samples that do not contain COCs exceeding the STLCs or the chlordane TTLC, but do contain COCs in the TCLP extract exceeding ten percent of the U.S. EPA regulatory levels for a RCRA hazardous waste will be submitted to the RWQCB with supporting data for classification as inert or nonhazardous.
- Based on the results of the site characterization, the site will be segregated into areas containing hazardous soil, nonhazardous soil, and inert soil.

4.1.3 Excavation

The contaminated areas (as defined in the characterization stage) will be excavated and placed on-site in stockpiles according to classification. Additional excavation will be performed to remove potentially contaminated soil based on visual evidence (i.e., unusual discoloration) and analytical results. The excavation activities will continue until the contaminants are removed.

During the excavation and soil stockpiling and backfilling activities, water will be sprayed on the stockpiled soil and around the excavated area, as needed, to control dust.

4.1.4 Disposal

After the soil is excavated and stockpiled according to classification, it will be disposed of as follows.

- Soil classified as inert will be transported to Site 1 for disposal. Site 1 is an existing, inactive landfill that received waste from NAF El Centro between 1965 and 1983.
- Soil classified as nonhazardous will be transported to a licensed Class II or III facility for disposal.
- Soil classified as hazardous will be transported to a licensed Class I facility for disposal.
- Soil classified as hazardous with LDR will be transported to a licensed incineration facility for disposal.

4.1.5 Confirmatory Sampling

Confirmatory sampling will be performed to check for remaining COCs following excavation. The following procedure will be used.

- A minimum of six confirmatory samples will be collected (two from the bottom and one from each sidewall) from the final excavation and submitted to an off-site laboratory for analysis.

- The confirmatory samples will be analyzed for arsenic, cadmium, total chromium, hexavalent chromium, and lead using U.S. EPA 6000/7000 series methods and for chlordane using U.S. EPA Method 8080.
- The results of the confirmatory sample analyses will be compared to the cleanup levels in Table 3-1. If any results exceed the cleanup levels, the soil in the vicinity of the sample will be excavated and disposed in a Class I facility.
- If additional excavation is performed, confirmatory sampling will be performed again in the newly excavated area.

4.1.6 Backfilling

When the results of the confirmatory sample analyses indicate that the soil containing COCs at concentrations exceeding the soil cleanup levels has been removed from the site, clean fill material will be imported to the site, and the excavation will be backfilled and compacted.

4.1.7 Effectiveness

The effectiveness of Alternative 1 has been assessed in terms of its compliance with the ARARs; its ability to reduce toxicity, mobility, and volume; its short-term effectiveness; and its long-term effectiveness. Alternative 1 complies with the ARARs. Excavation of the contaminated soil effectively reduces the toxicity, mobility, and volume of the COCs at the site. Following is a more detailed discussion of the effectiveness of Alternative 1.

4.1.7.1 COMPLIANCE WITH ARARs

The primary ARARs for this alternative include the federal and state hazardous waste management regulations, as well as the State Water Resources Control Board requirements for disposal of designated wastes on land. Applicability of these requirements extends to the hazardous characteristics of the excavated wastes and the disposal of the wastes. Soil exhibiting a hazardous characteristic for toxicity will be disposed of at a permitted Class I facility.

Provisions of the ICAPCD rules promulgated under the federal Clean Air Act pertaining to particulate emissions during earth-moving activities are also considered ARARs for Alternative 1. It is anticipated that ICAPCD will require dust-control measures to be implemented during the execution of the fieldwork. This alternative includes provisions for dust control.

4.1.7.2 REDUCTION OF TOXICITY, MOBILITY, AND VOLUME

Physical removal of contaminated soil by excavation will effectively reduce the toxicity, mobility, and volume of the COCs at the site. Excavation and disposal of the contaminated soil will reduce the potential for future human and ecological exposure to the COCs. Excavation of the contaminated soil will also reduce the potential for migration of the COCs.

4.1.7.3 SHORT-TERM EFFECTIVENESS

According to U.S. EPA guidance (U.S. EPA 1993a); during implementation of the alternative, the short-term effectiveness must be addressed before the removal objectives have been met. Protection of the community, protection of workers, and environmental impacts during the period between the implementation and achievement of removal objectives—these are the primary considerations of this criterion.

During the excavation activities, measures will be taken to reduce fugitive dust emissions and the associated impacts on workers and the surrounding community. The COCs are nonvolatile; thus, volatile emissions from the site during the implementation of this alternative are not expected. Workers will not be required to directly handle contaminated soil.

The potential for exposure to the contaminated soil exists during the transport of the soil to the off-base landfill as a result of spillage from the trucks or a traffic accident. Spillage from the trucks can be limited by covering the trucks with tarps and limiting the load height.

4.1.7.4 LONG-TERM EFFECTIVENESS

Because the contaminated soil will be excavated and removed from the site, this alternative is effective with respect to long-term removal of exposure pathways at the site.

4.1.8 Implementability

The implementability of Alternative 1 has been assessed in terms of its technical and administrative feasibility; the availability of services and materials; and the anticipated state and community acceptance. Alternative 1 is technically and administratively feasible. The permits and approvals necessary to implement Alternative 1 are obtainable. The services and materials required for Alternative 1 are readily available. State and community acceptance will be evaluated following the public comment period. Following is a discussion of the implementability of Alternative 1.

4.1.8.1 TECHNICAL FEASIBILITY

Conventional earth-moving equipment can be used to excavate the contaminated soil, transport the soil to Site 1 or to an off-base facility, and backfill the excavation with clean, imported fill. The site is open, accessible, and relatively flat. Therefore, there are no apparent site characteristics that will preclude the performance of the work.

Due to the low precipitation in the Imperial Valley, there is no restriction on the time of year when the work can be performed. However, due to the extreme summer temperatures in the Imperial Valley, it may be preferable to avoid work in the summer.

4.1.8.2 ADMINISTRATIVE FEASIBILITY

ICAPCD may require permits for dust control during the excavation activities. These activities will be coordinated with ICAPCD, and the appropriate permits will be obtained. Provisions for dust control have been incorporated into this alternative.

Because this alternative may involve the handling of hazardous waste, it will be necessary to comply with federal and state hazardous waste management regulations.

4.1.8.3 AVAILABILITY OF SERVICES AND MATERIALS

Local construction contractors with experience working at hazardous waste sites can be used to perform the excavation and other earth-moving activities. The materials and laboratory services necessary to implement this alternative are readily available from a variety of vendors in California and the southwest.

There is a Class I landfill approximately 25 miles from the site that will accept RCRA hazardous waste, Cal-EPA non-RCRA hazardous waste, and nonhazardous solid waste. Soil contaminated with chlordane at concentrations triggering LDRs will be taken to an appropriate incineration facility. Transportation of the contaminated soil to these facilities can be provided by an appropriately licensed independent trucking company.

4.1.8.4 STATE AND COMMUNITY ACCEPTANCE

This EE/CA has been reviewed and accepted by Cal-EPA DTSC and the California RWQCB, Colorado River Basin Region. Comments from these agencies have been incorporated into this document. No public comments were received during the public comment period.

4.1.9 Cost

The cost estimate for Alternative 1 was developed based on the data provided in the SI report (Ogden 1993a), other available information provided by DON at the time this EE/CA was performed, and the scope of work described above. In developing the cost estimate, it has been assumed that an area of approximately 3,500 square feet (70 by 50 feet) will be excavated to a depth of approximately 8 feet, and that only one confirmatory sampling and analysis event (consisting of six soil samples) will be performed following the excavation activities. The total in-place volume of contaminated soil to be removed is assumed to be 1,040 cubic yards (1,500 tons). Table 4-1 presents a summary of the estimated costs for Alternative 1 for the four different disposal options.

The cost estimate provided in Table 4-1 was calculated as if all of the soil excavated is disposed in only one disposal option. It is anticipated that only a minimal amount of soil will be sent off-base for incineration and that the overall project will cost less than $1 million. However, this EE/CA was prepared to satisfy the RAP requirements as a contingency in the event that the removal action costs exceed $1 million.

Table 4-1
Alternative 1 Cost Estimates[a]

Cost Category	Cost (disposal at Site 1)	Cost (off-base disposal at a Class II or III facility)	Cost (off-base disposal at a Class I facility)	Cost (off-base incineration)
Direct Costs				
Excavation and backfill	$24,000	$24,000	$24,000	$24,000
Transport to Site 1	7,000	not applicable	not applicable	not applicable
Transport and disposal at off-site landfill/incinerator	not applicable	137,000	221,000	1,133,000
Sampling and analysis	45,000	45,000	45,000	45,000
Professional labor (project oversight)	5,000	6,000	6,000	6,000
Total Direct Costs	**$81,000**	**$212,000**	**$296,000**	**$1,208,000**
Indirect Costs	49,000	88,000	123,000	504,000
Escalation[b]	15,000	34,000	47,000	193,000
Contingency[c]	31,000	67,000	93,000	381,000
TOTAL	**$176,000**	**$401,000**	**$559,000**	**$2,286,000**

Notes:
[a] costs for each disposal option were estimated assuming 100 percent of the excavated soil will go to that option; depending on the site characterization, each option may receive a portion of the excavated soil
[b] escalation modifies the costs in the RACER database from January 1992 to the assumed project start date of August 1996
[c] a 20-percent contingency has been added to cover cost increases that may occur as a result of unforeseen conditions and changes that typically occur on remediation projects

The cost estimate was performed using the Remedial Action Cost Engineering Requirements (RACER) system developed by the U.S. Air Force. RACER cost models are based on generic engineering solutions for environmental projects, technologies, and processes. These solutions are derived from historical project information, government laboratories, construction management agencies, vendors, contractors, and engineering analysis. RACER cost estimates are made site-specific through the modification of geographic and project-specific factors.

4.2 ALTERNATIVE 8 - NO ACTION

This section is intended to satisfy portions of RAP requirements, as defined in Ca-HSC 25356.1.

This alternative consists of leaving the contaminated soil in place.

4.2.1 Effectiveness

This alternative would not reduce the risk from exposure to the contaminated soil at the site and would not meet cleanup objectives. The toxicity, mobility, and volume of the COCs would not be reduced.

4.2.2 Implementability

Evaluation of implementability for this alternative primarily regards state and community acceptance. No action is not an acceptable alternative to the Cal-EPA DTSC and the California RWQCB, Colorado River Basin Region.

4.2.3 Cost

There are no costs associated with this alternative.

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SECTION 5

COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

Section 5
COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section is intended to satisfy portions of RAP requirements, as defined in Ca-HSC 25356.1.

In this section, the removal action alternatives described and evaluated in Section 4 are compared with respect to effectiveness, implementability, and cost.

5.1 EFFECTIVENESS OF ALTERNATIVES

Alternative 1 has a high level of long-term effectiveness with respect to the removal of the contaminated soil from the site and reduction of potential for exposure to the COCs. Alternative 8 has a comparatively low level of long-term effectiveness because it does not meet the NFA goals; the contaminated soil will be left in place; and the toxicity, mobility, and volume of the COCs would not be reduced.

5.2 IMPLEMENTABILITY OF ALTERNATIVES

Alternative 1 is technically feasible, and the required services are generally readily available. Alternative 8 has a high level of implementability because it will require no site activity or coordination. However, no action is not an acceptable alternative to the Cal-EPA DTSC and the California RWQCB, Colorado River Basin Region.

5.3 COST OF ALTERNATIVES

A summary of the total estimated cost to implement each alternative is provided in Table 5-1.

Table 5-1
Total Costs of Removal Action Alternatives*

Alternative	Cost
Alternative 1 (characterization, excavation and disposal)	
On-base reuse	$176,000
Disposal at a Class II or III facility	$401,000
Disposal at a Class I facility	$559,000
Disposal at an incineration facility	$2,286,000
Alternative 8	
No action	0

Note:
* costs for each disposal option were estimated assuming 100 percent of the excavated soil will go to that option; depending on the site characterization, each option may receive a portion of the excavated soil

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SECTION 6

RECOMMENDED REMOVAL ACTION ALTERNATIVES

Section 6
RECOMMENDED REMOVAL ACTION ALTERNATIVE

This EE/CA was performed in accordance with current U.S. EPA and U.S. Navy guidance documents for a non-time-critical removal action under CERCLA. The purpose of this EE/CA was to identify and analyze alternative removal actions to address contaminated soil at Site 3. Two alternatives were identified and evaluated: Alternative 1 – characterization, excavation and disposal; and Alternative 8 – no action.

Based on comparative analysis of the removal action alternatives completed in Section 5, Alternative 1 (characterization, excavation, and disposal) is the recommended alternative because it has a high level of long-term effectiveness. Alternative 8 is not recommended because it will not reduce the risk from exposure to the contaminated soil on-site and would not meet cleanup objectives.

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SECTION 7

REFERENCES

Section 7
REFERENCES

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APPENDIX A

BACKGROUND METALS CONCENTRATIONS

Bechtel

401 West A Street
Suite 1000
San Diego, CA 92101-7905

CLEAN II Program
Bechtel Job 22214
Contract No. N68711-92-D-4670
File Code: 0306

IN REPLY REFERENCE: CTO-0090/0033

5 May 1995

Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5187

Attention: Dave Dawson (Code 1821.DD)
Remedial Project Manager

Subject: CTO-090: *EE/CAs and Action Memoranda at NAF El Centro*
Estimation of Background Metals Concentrations

Dear Mr. Dawson:

Bechtel National Inc. (BNI) had earlier proposed and documented two methods (BNI 1995a and b) for determination of background metal concentrations at Naval Air Facility (NAF) El Centro. These methods were discussed in the meeting held on 13 April 1995 with California Department of Toxic Substance Control (DTSC) and the Regional Water Quality Control Board (RWQCB), Colorado River Basin Region. Subsequent to the meeting, DTSC provided additional guidance and recommendations in a draft memorandum from Babara Renzi of the Office of Scientific Affairs (OSA) to Tizita Bekele of the Site Mitigation Branch. In summary, OSA recommended the following procedure for estimating background concentrations for metals in soils at NAF El Centro:

1. Combine data from background and site samples for each analyte;
2. Prepare a cumulative frequency probability plot;
3. Check normality of data;
4. Graphically identify the upper limit of the background populations as an inflection point on the highest part of the probability plot;
5. Extract the background data points from the combined population;
6. Evaluate the extracted data for anomalies (e.g., data points below the inflection point but an obvious deviation from the linear plot, a coefficient of variation greater than 100%, or a range greater than two orders of magnitude); and
7. Use the 95th percentile of the acceptable, extracted background data points to estimate the background concentration for each analyte.

It was also indicated that if anomalies are present in the data set, OSA may recommend a different or more conservative approach for estimating the background concentration such as 80 percent lower confidence limit on the 95th percentile of the background samples.

Based on the OSA recommendations, BNI evaluated the available data from NAF El Centro sites. The procedure and the results of our evaluation are documented in the following sections of this letter report.

Analytical Data

The metal concentrations in soil samples collected from ten sites and eight background locations at NAF El Centro during Site Investigation/Solid Waste Water Assessment Tests (SI/SWAT) (Ogden 1993a, 1993b) were used to form a combined data set for evaluation. The analytical data considered in the evaluation were collected from the sites listed below:

- Site 1- Magazine Road Landfill
- Site 2 - Patrol Road Landfill
- Site 3 - Sludge Disposal Area
- Site 4 - Fourth Street Fire Fighting Training Area
- Site 5 - Fire Fighting Training Area East of Hangar Number Three
- Site 6 - Northwest Fire Fighting Training Area
- Site 7 - Abandoned Fuel Farm
- Site 8 - Scrapyard
- Site 9 - Transformer Storage Yard
- Site 11 - Runway Burn Area

The eight background locations were reportedly selected in areas at the base that were considered to be unaffected by past base operations. These locations are described in the SI/SWAT reports (Ogden 1993a and b).

The combined data sets were used for evaluation only when at least half of the samples analyzed have detectable concentrations of the analyte. When a result is reported by the laboratory as less than the detection limit, a value of one half of the detection limit is substituted for the concentration. This is a common assumption and is based on United States Environmental Protection Agency (U.S.EPA) risk assessment guidance (U.S. EPA 1989).

A review of laboratory data in Ogden reports indicates that chemical concentrations of four metals (Mercury, Antimony, Selenium, and Thallium) in a majority of soil samples collected from the sites and background locations were below the detection limits. Therefore, background concentrations for these metals were not determined.

The combined data sets (sites and background) are included in Attachment 1.

Frequency Probability Plot

The combined data set was used to prepare a cumulative frequency probability plot for each analyte. The plots were generated using the computer program GEO-EAS 1.2.1, an U.S. EPA program for geostatistical environmental assessment (U.S. EPA 1991). The plots are included in Attachment 2 (Figures 2-1 through 2-9).

The frequency probability plot for each analyte was used to visually identify an inflection point in the upper part of the plot which is the upper limit of the background population. The background population was then extracted from the combined data set and a cumulative frequency probability plot of the background population was prepared for each analyte. These plots are included in Attachment 3 (Figures 3-1 through 3-9).

Coefficient of Variation

The frequency probability plots contain information on coefficient of variation of the data sets. The coefficient of variations for background populations of the analytes range from approximately 30 to 95 percent. These variations are less than the acceptable limit of 100 percent recommended in the DTSC draft memorandum (DTSC, 1995). A summary of the coefficient of variation for each analyte is included in Table 1.

Check for Normality

A majority of the frequency probability plots for background populations are linear indicating normal distribution. The plots for Cadmium, Copper and Silver appear to be nonlinear indicating potentially non-normal distribution. In order to accept or reject the hypothesis that the given data set is normally distributed, the test developed by D'Agostino (Gilbert 1987) was used. This test can be used to test the null hypothesis of normality or lognormality when the sample population is greater than 50 (Gilbert 1987). For all data sets except Cadmium, hypothesis of a normal distribution cannot be rejected. Therefore, for those metals except Cadmium, background data are judged to be normally distributed.

The Cadmium data set was tested also for lognormal distribution using the D'Agostino test. The logarithm of the concentration is used in place of actual concentration to check for lognormality of the data distribution. The test indicated that Cadmium data are lognormally distributed. Cadmium data were plotted on a log-probability plot included in Figure 3-3b in Attachment 3. The log-probability plot for Cadmium is linear supporting the results of the D'Agostino test.

Background Concentration

The background concentration for each analyte, except Cadmium, was calculated as the 95th percentile of normal distribution of the background population. The mean and the standard deviation of the background distribution were used to calculate the 95th percentile using the following equation:

$$X_{95} = m + Z\,S$$

where:

X_{95} = 95th percentile value of the background population

m = arithmetic mean

Z = factor for the 95th percentile which is equal to 1.646 for normal distribution (obtained from Table A1, Gilbert 1987)

S = standard deviation

The values of the mean, the standard deviation and the background concentration as the 95th percentile of the population for each analyte are summarized in Table 2. The background concentration for Cadmium is calculated as the 95th percentile of the lognormal distribution for the data population.

In an earlier letter (BNI 1995b), BNI proposed an alternative background concentration based on an Upper Tolerance Limit (UTL). The UTL with a 95 percent confidence limit for 95th percentile ($UTL_{95,95}$) was selected as the upper threshold for background concentration. The $UTL_{95,95}$ values for three metals (Arsenic, Beryllium and Chromium) were determined using combined data sets and documented in the letter. Those $UTL_{95,95}$ values are also included in Table 2 for comparison.

Conclusions

Background metals concentration data collected from locations at NAF El Centro are normally distributed, except for Cadmium. The 95th percentile of the normal distribution of the background population of each analyte was calculated as the background concentration. Background data for Cadmium can be approximated by a lognormal distribution. The background concentration for Cadmium was based on the 95th percentile of the lognormal distribution of the population.

The background concentrations determined using the current procedure closely agree with the earlier reported $UTL_{95,95}$ values. The $UTL_{95,95}$ values are only slightly higher. Therefore, we conclude that either method can be used to estimate background metals concentrations at NAF El Centro.

We hope this letter satisfies your current project needs. Please contact Mahi Galagoda at (619) 687-8860 if you have any questions regarding this letter.

Very truly yours,

David Umstot, P.E., C.E.G.
Project Manager

Attachments
DU/MG/mj

cc: J. Rogers (Code 18C2)
P. Kennedy (Code 0233)
W. Kitchin (Code 1852.WK)
M Galagoda
C. Barr
DCC File

References

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Table 1

Coefficient of Variation of the extracted data sets

Analyte	Coefficient of Variation, %
Arsenic	39
Beryllium	43
Cadmium	95
Chromium	31
Copper	43
Lead	44
Nickel	35
Silver	55
Zinc	41

Table 2. Background Concentration using 95th Percentile of the Normal Distribution

Analyte	Mean (mg/kg)	Standard Deviation (mg/kg)	Background Concentration as 95th percentile (mg/kg)**	$UTL_{95,95}$ from previous work (mg/kg)***
Arsenic	3.84	1.49	6.3	6.6
Beryllium	0.67	0.28	1.1	1.2
Cadmium	(-0.28)*	(1.1)*	4.6	nc
Chromium	11.12	3.42	17	18
Copper	14.57	6.29	25	nc
Lead	9.86	4.37	17	nc
Nickel	12.89	4.5	20	nc
Silver	0.3	0.16	0.6	nc
Zinc	41.64	17.10	70	nc

Notes:
- * Mean and Standard deviation of log (concentration)
- ** Values rounded off to two significant digits
- *** $UTL_{95,95}$ values reported in BNI letter dated 12 April 1995
- nc not calculated

Table 1
Combined Data Set Used for Statistical Evaluation
NAF El Centro (Units in mg/Kg)

Sample	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Silver	Zinc
EC1-B1-S2-D3 5	2.7	0.77	0 5	13.1	38.9	15 6	11 6	0.47	58.4
EC1-B1-S4-D6 5	1 7	0.44	0.2	10.3	145	4 3	7 4	< 0 29	174
EC1-B1-S5-D8	5	0.85	0 4	15	286	7 7	14 9	0 37	170
EC1-B2-S2-D2	2.7	0.52	0.3	8.4	19.1	7.2	7.5	< 0.33	34.6
EC1-B2-S3-D5	2	0 65	0 4	12.6	525	8 1	11 3	< 0 33	418
EC1-B2-S5-D8	3 5	0.82	0 4	15	538	8 6	14	0.35	266
EC1-B3-S2-D3 5	3.5	0 84	0.4	11 8	14 6	8.8	12.5	0 32	42.2 J
EC1-B3-S3-D5	3.5	0.83 J	0.4	11.8	13.8	9.3	12.6	< 0.32	36.2 J
EC1-B3-S4-D6.5	< 0 6	0.15 J	< 0.1	4 5	3 4	1 8	4 2	< 0 29	11.6 J
EC1-B5-S1-D2	2 5	0 52 J	0 2	8 3	8 3	5 5	9 1	< 0 25	23 1 J
EC1-B5-S2-D3 5	5	1 1 J	0 5	13.6	21	10.3	15.1	< 0 29	46.2 J
EC1-B5-S4-D6.5	3.1	0.39 J	0.2	5.8	4	3.2	5.4	< 0.29	14.9 J
EC1-B6-S1-D2	5 9	1.1	1.1	20.6	37.4	68 8	16 8	1.1 J	95.5
EC1-B6-S3-D5	2.7	0.45	< 0 1	6.4	5.8	5 5	6 4	0.36 J	18.3
EC1-B6-S4-D6 5	2.5	0 42	0 2	7 3	5 5	4 5	20.3	0.43	20.3
EC1-B6-D4-D6.5	3.7	0.69	0.2	9.3	8.9	7.2	29.7	0.46	29.7
EC1-B7-S1-D2	11	0.78	0 9	15 5	30	157	36.2	0 83 J	36.2
EC1-B7-S2-D3 5	6.7	0.61	0 2	8 1	8 5	6	27	0 36 J	27
EC1-B7-S3-D5 0	3 2	0.79	0 2	13.1	12.8	9 1	37.2	0.36 J	37 2
EC1-B8-S1-D2	5.7	0.85	0.3	11.6	17.3	10	14	0.43 J	42.5
EC1-B8-S3-D5	2.4	0.23	< 0.1	4 2	3.2	3.6	4 4	< 0 24	12.9
EC1-B8-S3-D5	2.1	0.34	< 0 1	3 7	2 7	2 7	3.2	0.33	9 8
EC1-B8-S4-D6 5	6.4	1.1	0.3	13.6	20.3	13.3	15.6	0.46 J	49.7
EC1-B9-S1-D2	5.6	1.2	0.3	14.7	21	15.2	15.8	0.49 J	56.5
EC1-B9-S2-D3 5	11 J	0.6	0.9	44.1	215	45 5	60.2	0 83 J	11600
EC1-B9-S4-D6.5	1.7	0.32	< 0.1	4 5	3 2	4 4	4 2	< 0 25	17 3
EC2-B1-S1-D2.0	4 5 J	1.1	1	13.6	21.1	11.6	17.5	< 0 25	51.4
EC2-B1-S3-D5.0	2.6 J	0.61	2	8.8	7.4	4.4	6.5	4	19.5
EC2-B1-S7-D10.5	3.2 J	0.7	1 7	13.3	20.5	9.9	15.1	0 37	44.7
EC2-B2-S2-D3 5	2 9 J	0 36	0 7	7 3	7 5	4 7	7 7	< 0 25	22
EC2-B2-S4-D6 5	2.4 J	0 57	1 2	9	12.8	7 7	11.1	< 0 26	35.2
EC2-B2-S5-D8.0	2.2 J	0.25	1.3	7.8	5.4	4.7	5.8	< 0.26	18.8
EC2-B3-S1-D2.0	6.9 J	1.3	2	15.6	22.7	13.6	18	< 0.27	59.4
EC2-B3-S7-D11 0	5 2	< 0.06	1.4	11.5	16 8	9 3	12.8	< 0 3	42.7
EC2-B3-S9-D14 0	1 9	0.65	0 5	5	5 3	1.7	4 9	< 0.3	15 6
EC2-B4-S3-D5.0	1.9	0.15 J	0.3 J	5.3	3.5	3.7	5.5	< 0.24	15.6
EC2-B4-S6-D9 5	2.1	0 16 J	< 0.5 J	6 3 J	5	5	6.8	< 0 26 R	20.7
EC2-B4-S8-D12.5	4	0 84 J	0 8 J	12	17.3	9 8	14.5	0.68	47.7
EC2-B5-S2-D3.0	9 1	0.57 J	3 7 J	17	66 8	194	17 3	7 2	321
EC2-B5-S4-D6.0	2.7	0.49 J	0.7 J	9.6	12.4	16.3	11.8	0.35 R	46
EC2-B5-S5-D7 5	2	0 16 J	0 4 J	4	3	4 2	4.3	< 0 26	14
EC2-B6-S1-D5.0	6	0 81	4 4	14 9 J	18 8	56 2	16.7	< 0 29 R	58.5
EC2-B6-S11-D20 0	7 J	0 88	1 6	13 9	20.1	9 8	16.3	< 0.31	47.4
EC2-B6-S7-D14.0	6.5	0.61	1.5	11.5	15.6	9	13	< 0.3	37.7
EC2-B6-D7-D14 0	5 5	0.92	1.6	13 1	20	10 6	16.5	< 0 28	47.2
EC2-B7-S2-D3 0	3 5	0.8	1.4	12.1	18 1	9 1	14 8	< 0 28	42 2
EC2-B7-S3-D4 5	4 7	0.94	4 5	13.9 J	21 3	16.8	17	0 36 J	53.7
EC2-B7-D3-D4.5	3.7	1.2	4.7	14.1 J	21.8	19.8	18.3	0.38 J	56.6
EC2-B7-S5-D7 5	1.6	1.2	1 7	13 1	22.3	13 1	17 5	< 0 31	57.5
EC2-B8-S2-D3 0	3 4	0.57	352	37.9	1390	476	131	17.7	768
EC2-B8-S3-D4 5	1	< 0.06	3 2	110000 J	41 1	84 5	8 4	4 7 J	123
EC2-B8-D3-D4.5	4.4	0.68	5.1	406 J	17.9	42.9	12.4	0.69 J	78.1
EC2-B8-S5-D7.5	1 4	0.64	1 3	13.6	17 1	10.3	12.5	< 0 29	37.9
EC2-B9-S1-D2.0	7 2	0 97	1 1	20.8	22.6	14 8	19 3	0.33	68.9
EC2-B9-S3-D5 0	4	0 56	0 7	12.8	15.6	9 6	14 5	0 36	42 7
EC2-B9-D3-D5.0	3.5	0.36	0.6	9.6	9.9	7.4	10.5	0.42	31.1
EC2-B9-S10-D17.0	1.2	0.05	0.1	2.5	1.6	< 1.2	2.5	0.34	7.3

Table 1
Combined Data Set Used for Statistical Evaluation
NAF El Centro (Units in mg/Kg)

Sample	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Silver	Zinc
EC2-B10-S1-D2.0	5.5	0.75	0.8	12.8	17.7	10.1	15.6	0.49	48.1
EC2-B10-S13-D20.0	6.5	0.98	1	16.6	20.3	13.1	17.8	0.44	63
EC2-B10-S14-D24.5	2.4	0.25	0.3	7.2	7.4	4.8	6.9	0.47	21.7
EC2-B11-S1-D2.0	4.4	1	1.7	14.1	19.2	12.6	15.8	< 0.26	51.5
EC2-B11-S5-D7.5	2.4	0.58	0.9	8.6	16	7.2	11.8	< 0.27	32
EC2-B11-S6-D9.5	2.2	0.44	0.9	7.7	10	6.5	8.8	< 0.26	26.8
EC3-B1-S3-D5.0	3.2	0.79	0.5	11	14.6	9.3	13	< 0.3	41.4
EC3-B2-S2-D3.0	4.3	0.57	1.2	9	12.8	7.7	11.1	< 0.26	35.2
EC3-B3-S4-D6.0	11	0.63	12	127	985	209	20.8	86.5	772
EC3-B3-D4-D6.0	5.2	0.71	0.6	11.6	15.6	10.6	13.6	0.34	42.7
EC3-B4-S2-D3.0	13	0.51	13	114	929	197	28.2	111	735
EC3-B5-S3-D4.5	4.3	0.53	0.4	7.5	8.4	7.2	9.5	< 0.28	29.5
EC3-B6-S1-D1.5	5	1.2	2	15.3	22.2	14.1	17.6	< 0.28	54.7
EC4-B2A-S1-D2.5	3.4	0.47	0.7	9.3	10.2	8.1	10.6	0.37	28.5
EC4-B2-S1-D2.5	3.4	0.71	1.1	13.6	14.6	11.1	14.1	0.32	44
EC4-B2-S2-D3.5	4	0.45	0.9	9.5	11.9	8.5	11.8	0.28	32.2
EC5-B1-S1-D2.0	4.5	1.1	1.3	14.8	21.3	16	17	0.46	59.2
EC5-B2-S1-D2.0	4	0.91	1.3	14.8	22.7	19.5	15.6	0.55	71
EC5-B3-S3-D5.0	4.8	0.83	1	13.9	18.8	10	16.5	0.46	45.6
EC5-B3-D3-D5.0	3.4	0.55	1	12	14.6	9.3	14.5	0.34	38.2
EC5-B4-S1-D2.0	4.3	1.1	1.3	15.1	22.5	14.3	18.5	0.49	64
EC6-B1-S4-D6.0	3.4	0.69	1.3	11.1	17.3	11.1	15	< 0.32	41.4
EC6-B4-S1-D2.0	5.7	1.1	1.6	13.9	20.8	14.3	17.8	< 0.3	57.1
EC6-B5-S2-D3.5	6	1	1.6	12.8	19.5	9.1	16	< 0.3	45.4
EC7-B1-S7-D11.0	2.9	0.48	0.2	6	7	7.4	6.7	< 0.42	20.8
EC7-B2-S6-D9.5	5	0.98	0.4	10.1	17.6	81.4	13.1	< 0.59	45
EC7-B2-D6-D9.5	3.9	0.74	0.3	10.3	15.4	90.8	12.4	0.37	40.2
EC7-B3-S5-D8.0	5.7	0.88	0.3	11	18.3	10.5	14	< 0.58 J	44.5
EC7-B3-D5-D8.0	5	0.73	0.2	9.4	14.4	8.6	11.4	0.66 J	34.4
EC7-B4-S7-D11.0	3.4	0.56	0.2	8.4	9.4	465	9.1	< 0.54 J	26.7
EC7-B6-S6-D11.0	5.2	0.75	0.4	10.6	14.5	15.1	12.4	< 0.3	43.3
EC7-B7-S6-D9.5	3	0.55	0.4	7.5	7.5	6.3	8.4	< 0.3	25
EC7-B9-S7-D11.0	3.2	0.6	0.5	8.3	9.9	7.2	10.4	< 0.3	30.6
EC8-T1-S2-D1.0	5.5	1.1 J	2.4	14.5	20.2	9.2	19.1	< 0.37	54.4
EC8-T2-S1-D0.3	4	0.75	2.7	13.3	21.2	15	15.6	0.63	58.2
EC8-T3-S2-D0.5	5.2	0.73	3.7	11.8	22.1	13.5	15.6	0.78	58.2
EC8-T4-S2-D0.2	3.9	0.84	62	16	239	33.4	16.8	0.7	217
EC8-T5-S2-D0.3	4	0.67	2.7	24.5	28.3	24	16.3	0.38	74.9
EC8-T6-S1-D0.2	323	0.48	14	16.5	204	371	16.5	4	204
EC8-T7-S2-D1.5	2.6	0.42 J	1.4	9	10.9	7.4	11.3	< 0.25	33.2
EC8-T8-S2-D0.6	4.5	0.74 J	2.2	12.5	20	15	15.9	0.37	66.8
EC8-T9-S2-D0.2	3.7	0.75 J	5.2	13.3	22.7	14.6	15.9	0.51	62.5
EC8-T9-D2-D0.2	14	0.61	2.2	12.4	18	11.5	15.6	0.57	55.6
EC8-T10-S1-D0.4	4	0.72 J	2.4	23.7	19.6	11.1	21.6	0.25	55
EC9-T2-S1-D0.5	3.2	0.8 J	2.2	12.8	19.7	18	15.4	0.3	56.7
EC9-T5-S1-D0.2	3.3	< 0.74 J	2.9	14.5	19.9	15.2	16.4	0.56 J	58.5
EC9-T5-D1-D0.2	2.7	0.73 J	2.7	13.9	20.3	15.8	16.8	0.63 J	58.2
EC9-T9-S1-D0.2	1.8 J	< 0.23 J	< 1.1 J	6.5	5.5	10.9	5.7	0.56 J	19.8
EC10-B4-S1-D1.5	3.5	0.64	2.7	9.1	11.1	12.1	10.9	0.33	32.2
EC10-B4-S3-D4.5	3.2	0.6	2.2	9.1	9.9	11.3	10.1	0.45	30.3
EC11-B1-S2-D2.5	4.4	0.61	2.7	15 J	20.8	12.1	17.3	0.46 J	56.2
EC11-B2-S4-D4.5	4.4	0.56	2.2	12.6 J	15.5	10.6	13.9	0.29 J	46.2
EC11-B4-S1-D0.5	4.4	0.26	1.4	11.9 J	5.6	9.2	6.4	0.27 J	35.8
EC11-B5-D2-D3.5	5.2	0.85	2.1	13.5 J	20	11.9	16.8	< 0.31	52.7
EC11-B5-S2-D3.5	5.4	0.62	2.2	14.4	18.6	12.6	15.3	0.42 J	54.2
EC15-B6-S2-D3.0	4.4	1.1	2.2	44.1	20.3	11.3	40.6	0.32	51.2

Note:
Qualifier R indicates that the result was rejected in data validation process (not used in background concentration evaluation).
Qualifier J indicates that the result was estimated.

Figure 2-1

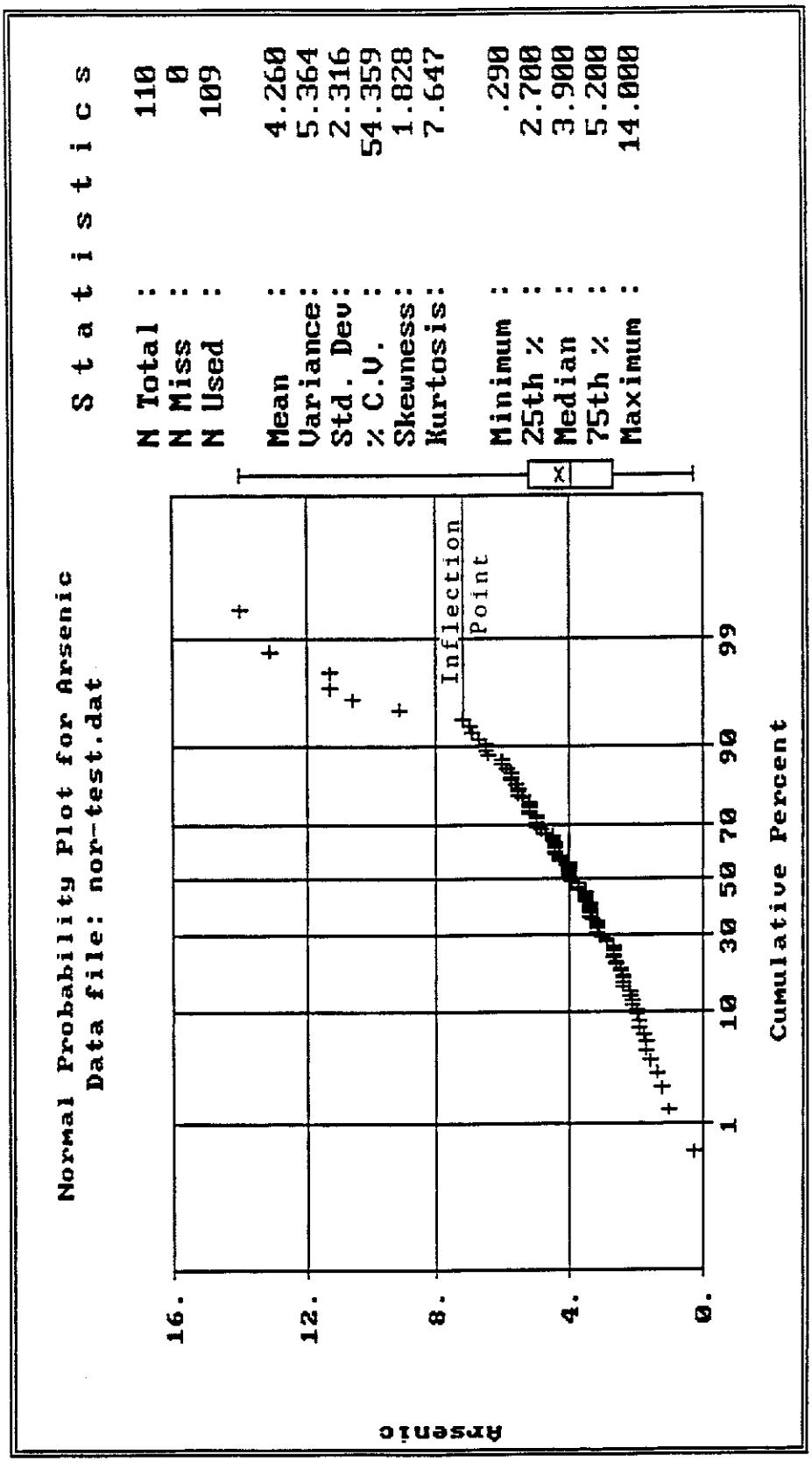

Normal Probability Plot for Arsenic
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 109
Mean : 4.260
Variance : 5.364
Std. Dev : 2.316
% C.V. : 54.359
Skewness : 1.828
Kurtosis : 7.647
Minimum : .290
25th % : 2.700
Median : 3.900
75th % : 5.200
Maximum : 14.000
Inflection Point
Arsenic
16.
12.
8.
4.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 2-2

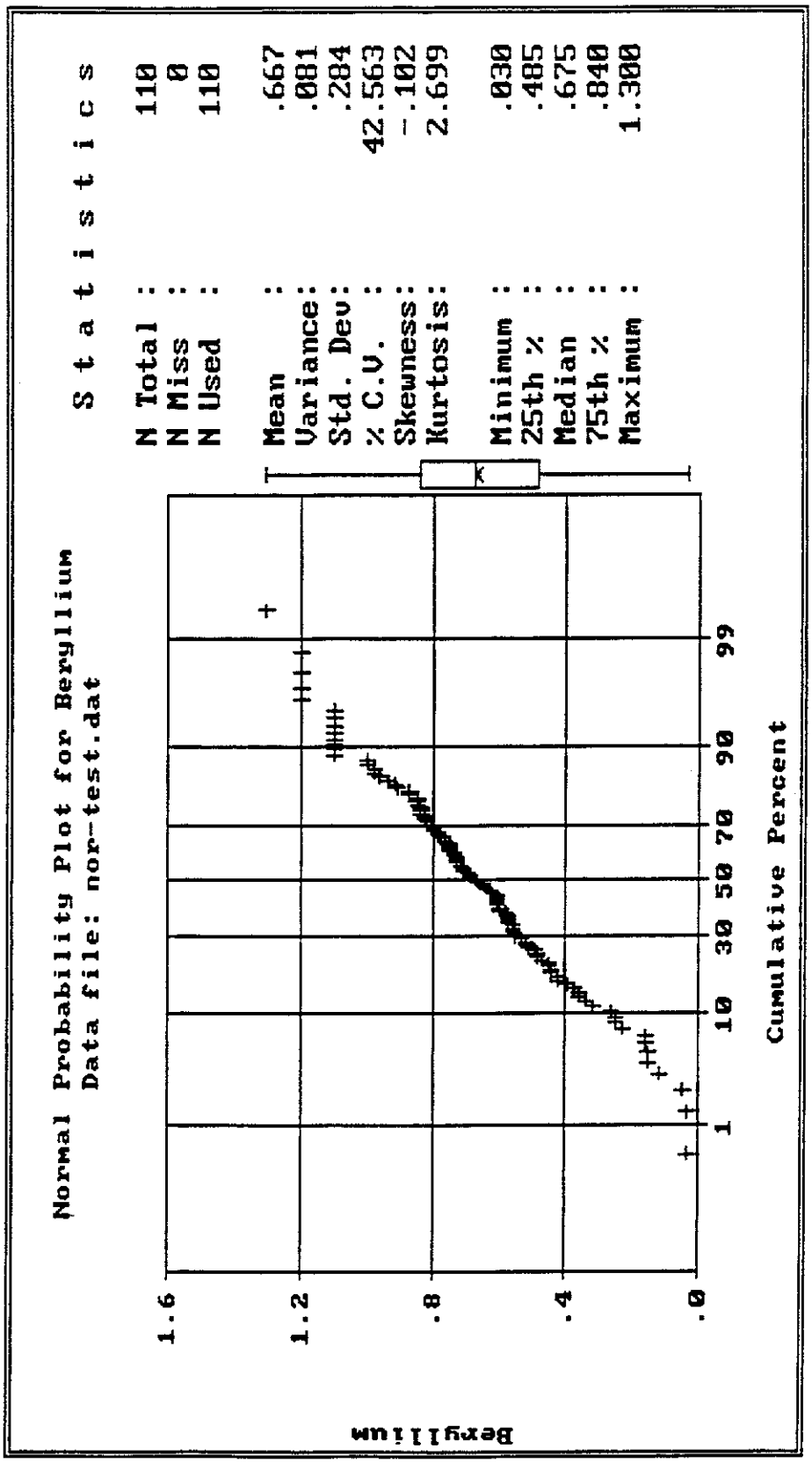

Normal Probability Plot for Beryllium
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 110
Mean : .667
Variance : .081
Std. Dev : .284
% C.V. : 42.563
Skewness : -.102
Kurtosis : 2.699
Minimum : .030
25th % : .485
Median : .675
75th % : .840
Maximum : 1.300
1.6
1.2
.8
.4
.0
Beryllium
1
10
30
50
70
90
99
Cumulative Percent

Figure 2-3

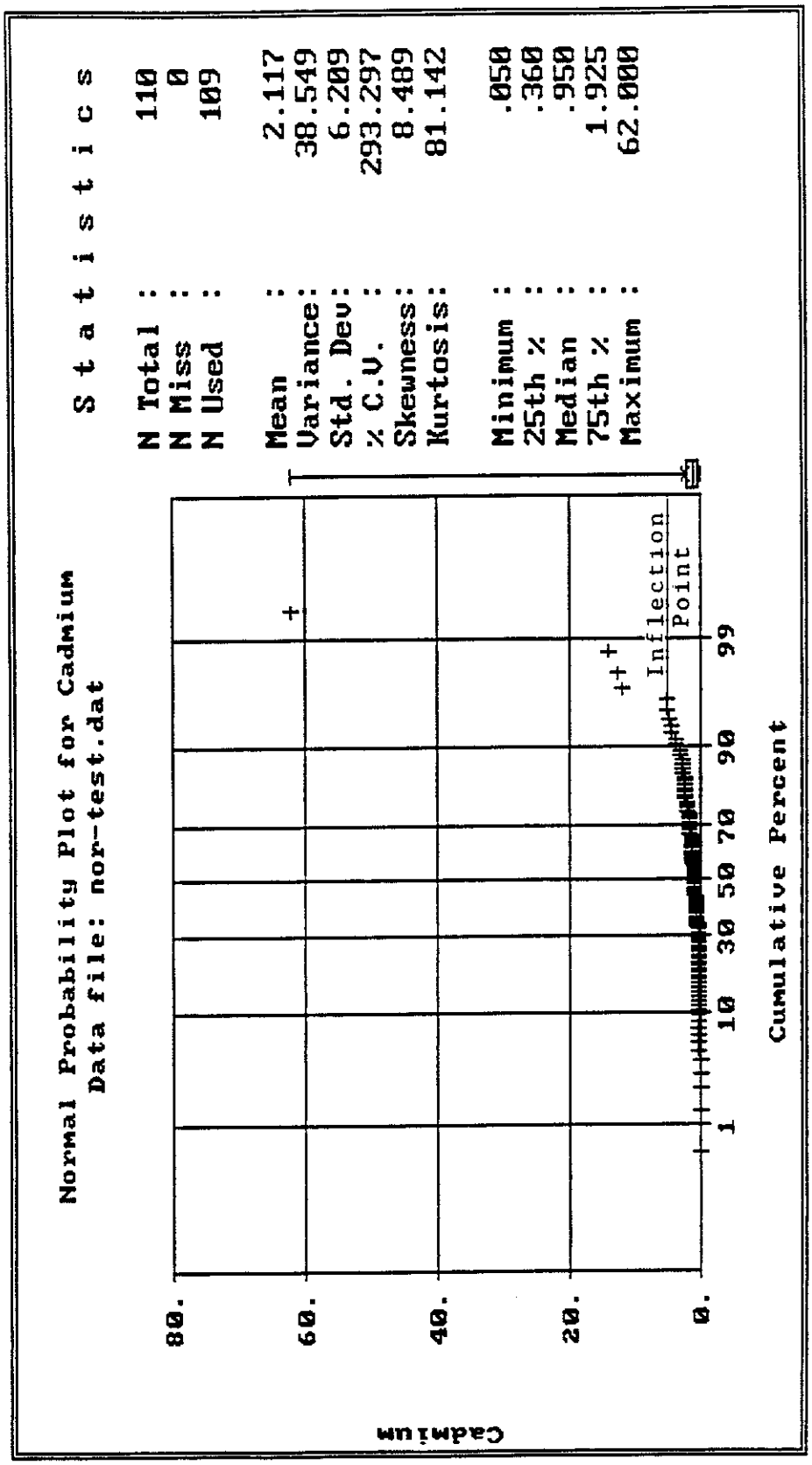

Normal Probability Plot for Cadmium
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 109
Mean : 2.117
Variance : 38.549
Std. Dev : 6.209
% C.V. : 293.297
Skewness : 8.489
Kurtosis : 81.142
Minimum : .050
25th % : .360
Median : .950
75th % : 1.925
Maximum : 62.000
Inflection Point
Cadmium
80.
60.
40.
20.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 2-4

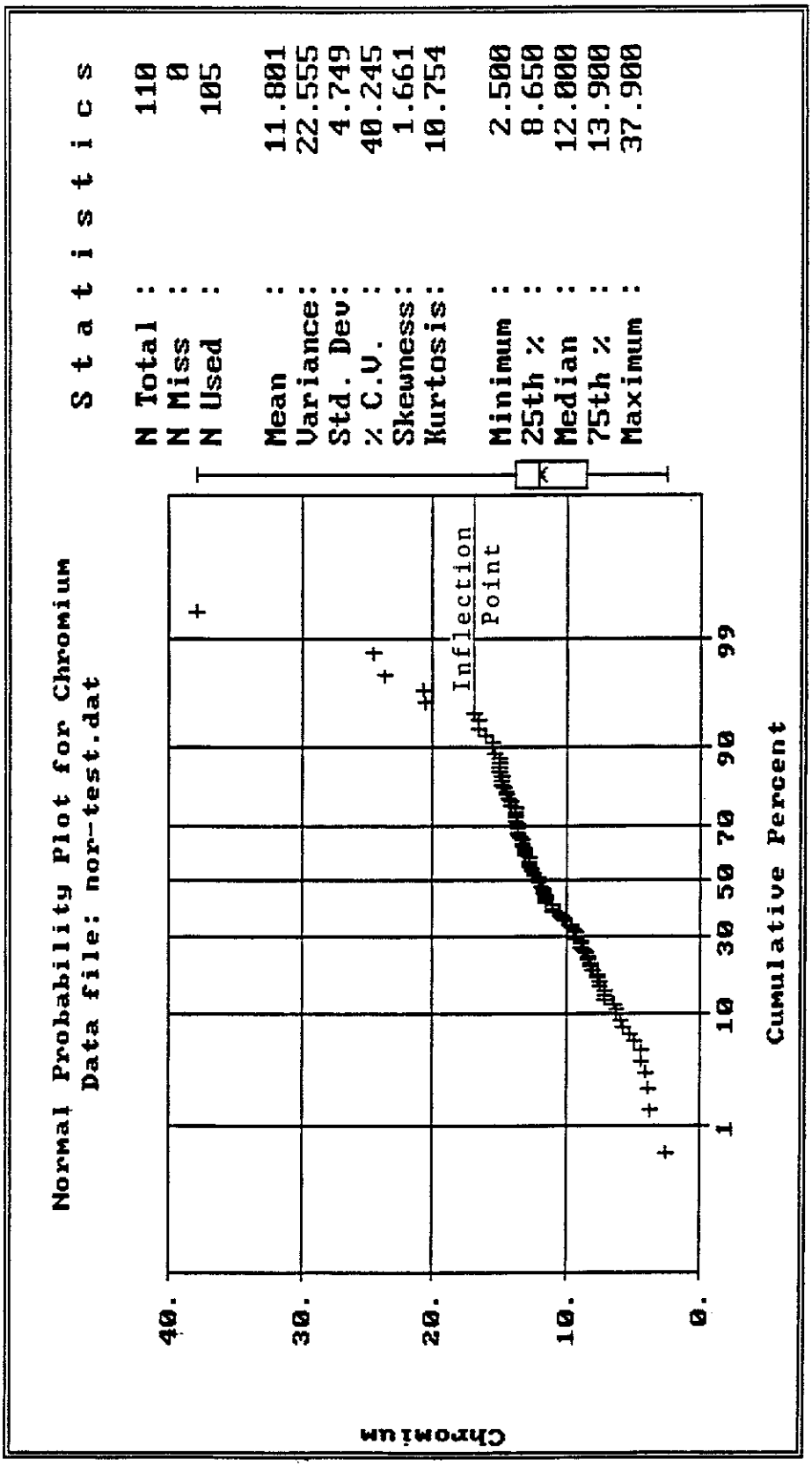
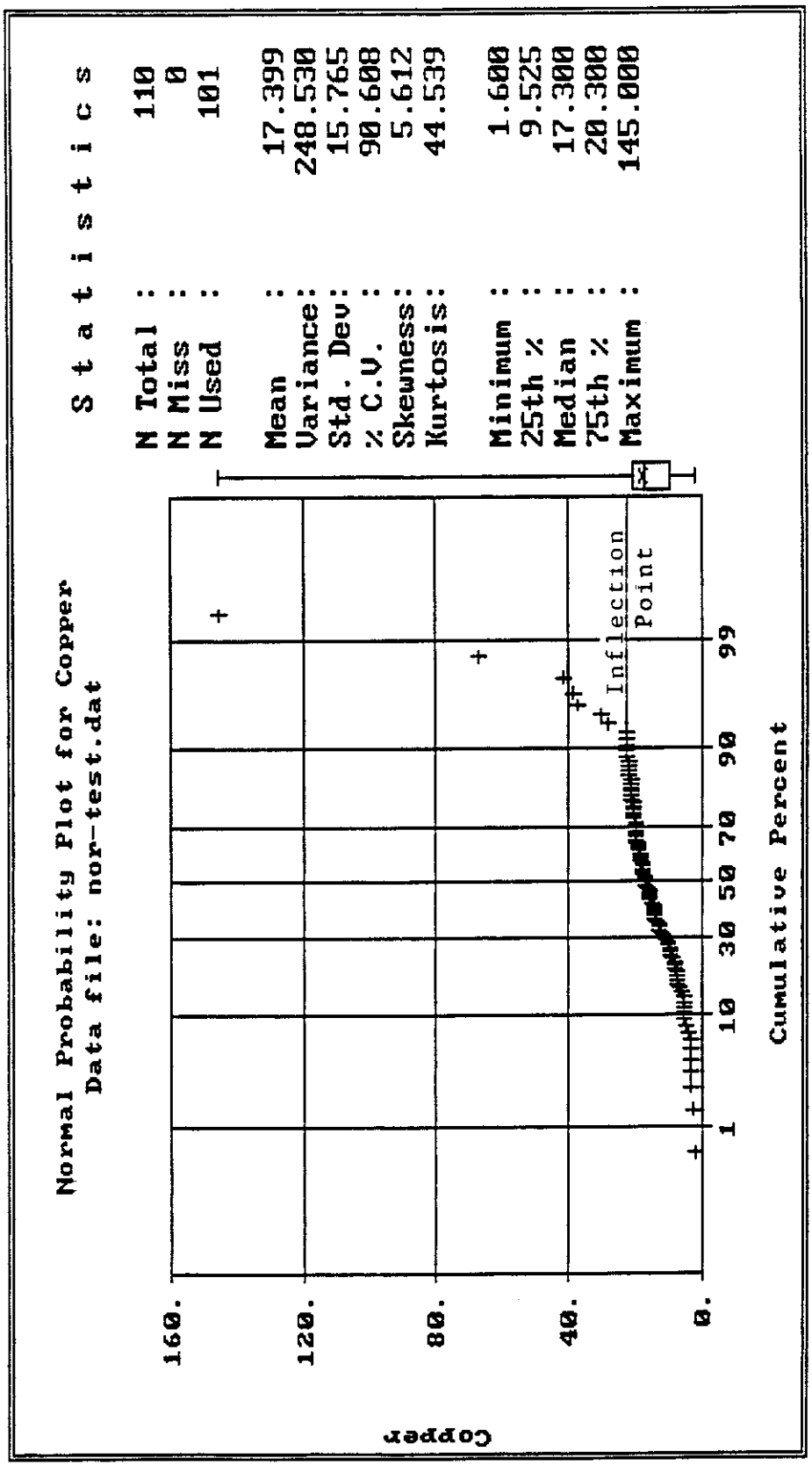

Normal Probability Plot for Chromium
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 105
Mean : 11.801
Variance : 22.555
Std. Dev : 4.749
% C.V. : 40.245
Skewness : 1.661
Kurtosis : 10.754
Minimum : 2.500
25th % : 8.650
Median : 12.000
75th % : 13.900
Maximum : 37.900
Inflection Point
Chromium
40.
30.
20.
10.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 2-5


Normal Probability Plot for Copper
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 101
Mean : 17.399
Variance : 248.530
Std. Dev : 15.765
% C.V. : 90.608
Skewness : 5.612
Kurtosis : 44.539
Minimum : 1.600
25th % : 9.525
Median : 17.300
75th % : 20.300
Maximum : 145.000
Inflection Point
Copper
160.
120.
80.
40.
0.
1
10
30
50
70
90
99
Cumulative Percent

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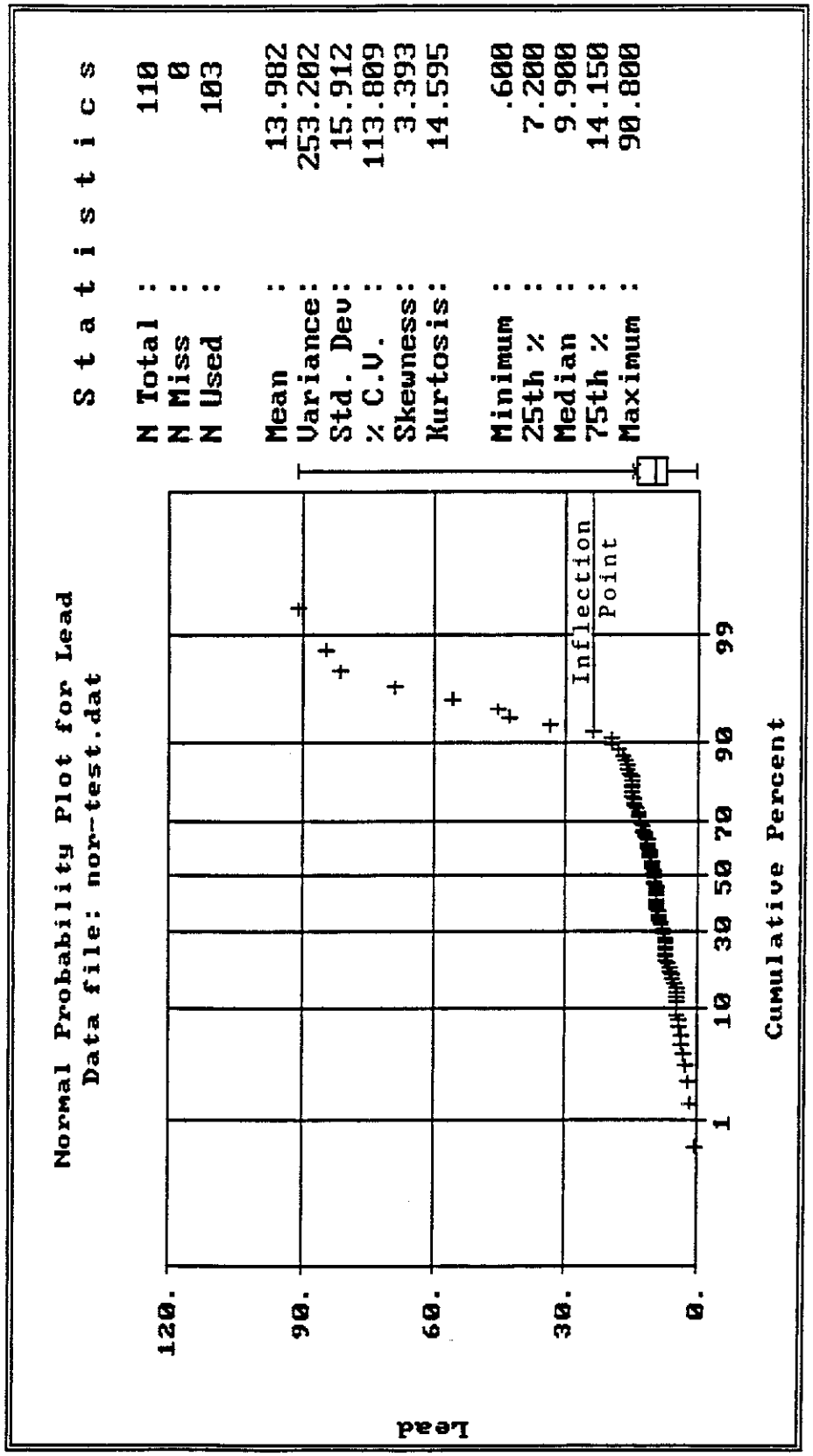
5 May 1995
Attachment 2

Figure 2-6



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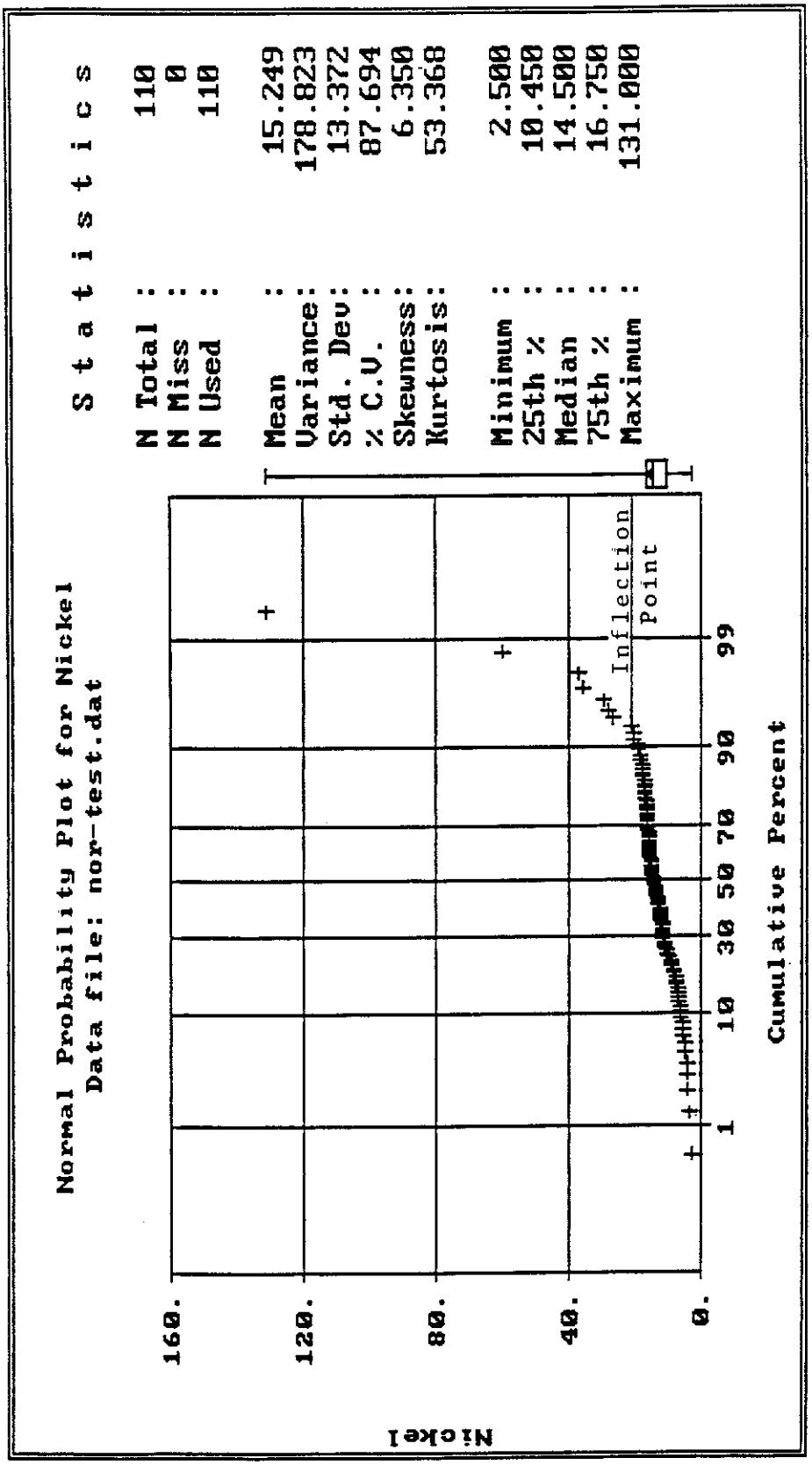
Attachment 2

Figure 2-7



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Attachment 2

Figure 2-8

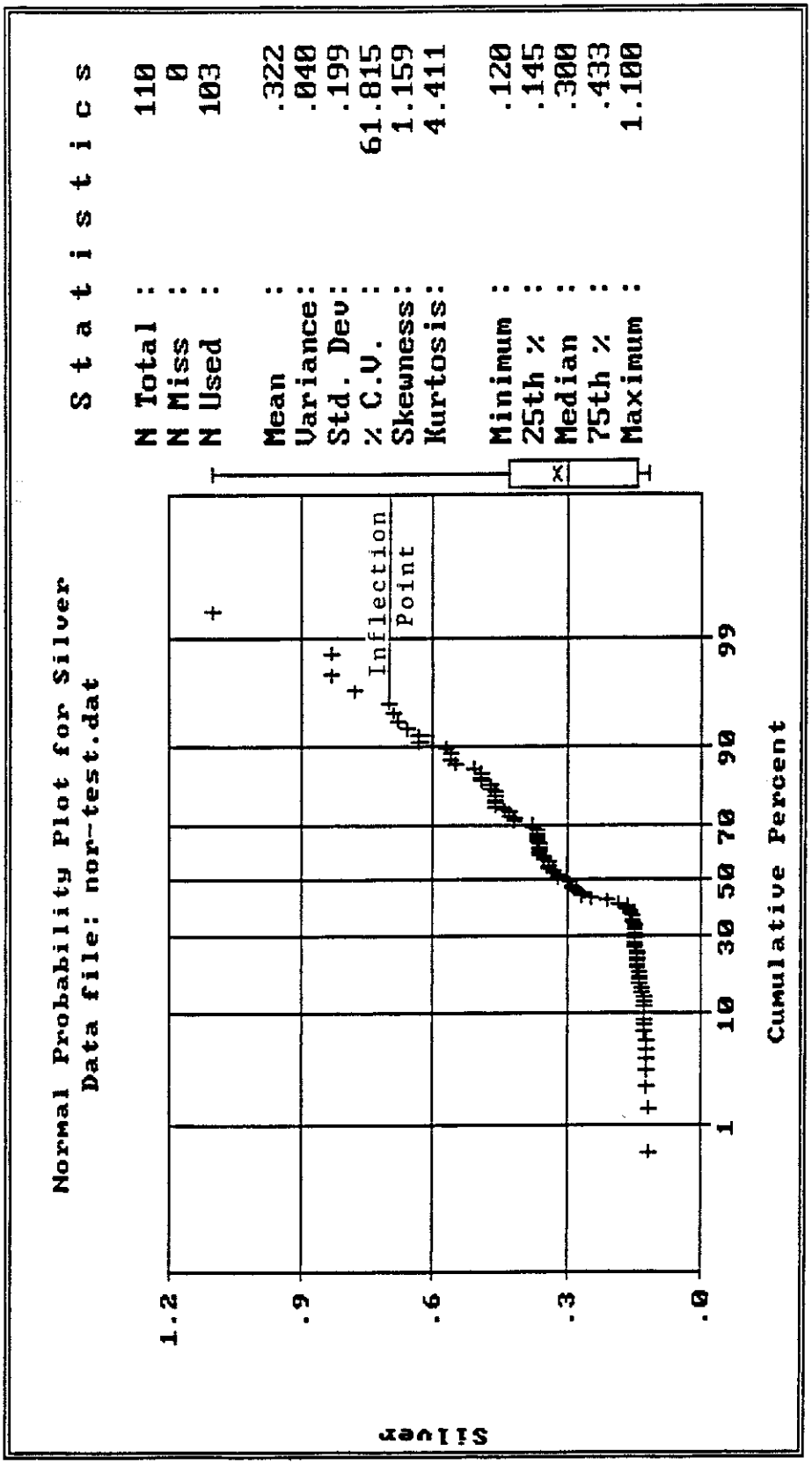


Figure 2-9

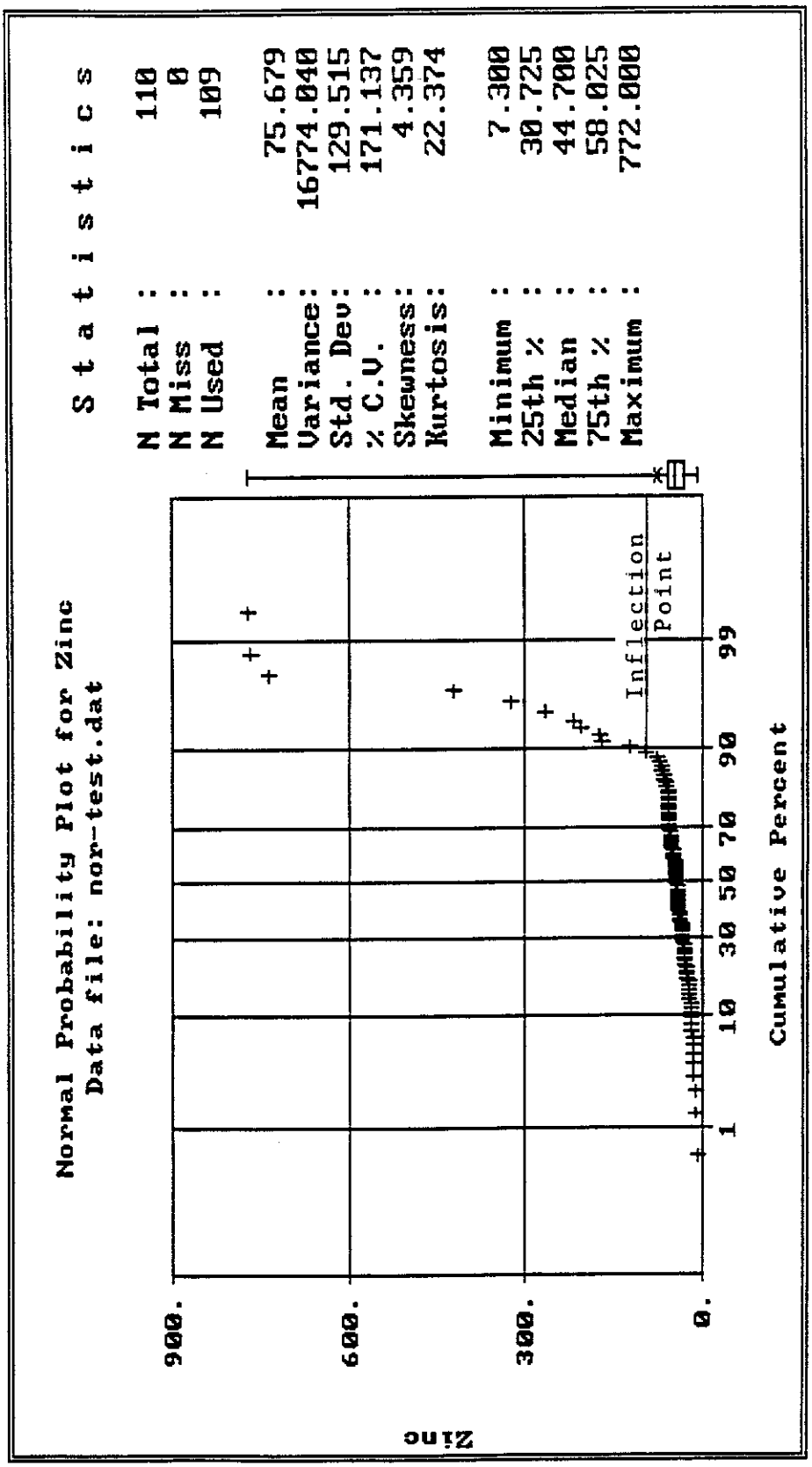

Normal Probability Plot for Zinc
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 109
Mean : 75.679
Variance : 16774.040
Std. Dev : 129.515
% C.V. : 171.137
Skewness : 4.359
Kurtosis : 22.374
Minimum : 7.300
25th % : 30.725
Median : 44.700
75th % : 58.025
Maximum : 772.000
Inflection Point
Zinc
900.
600.
300.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 3-1

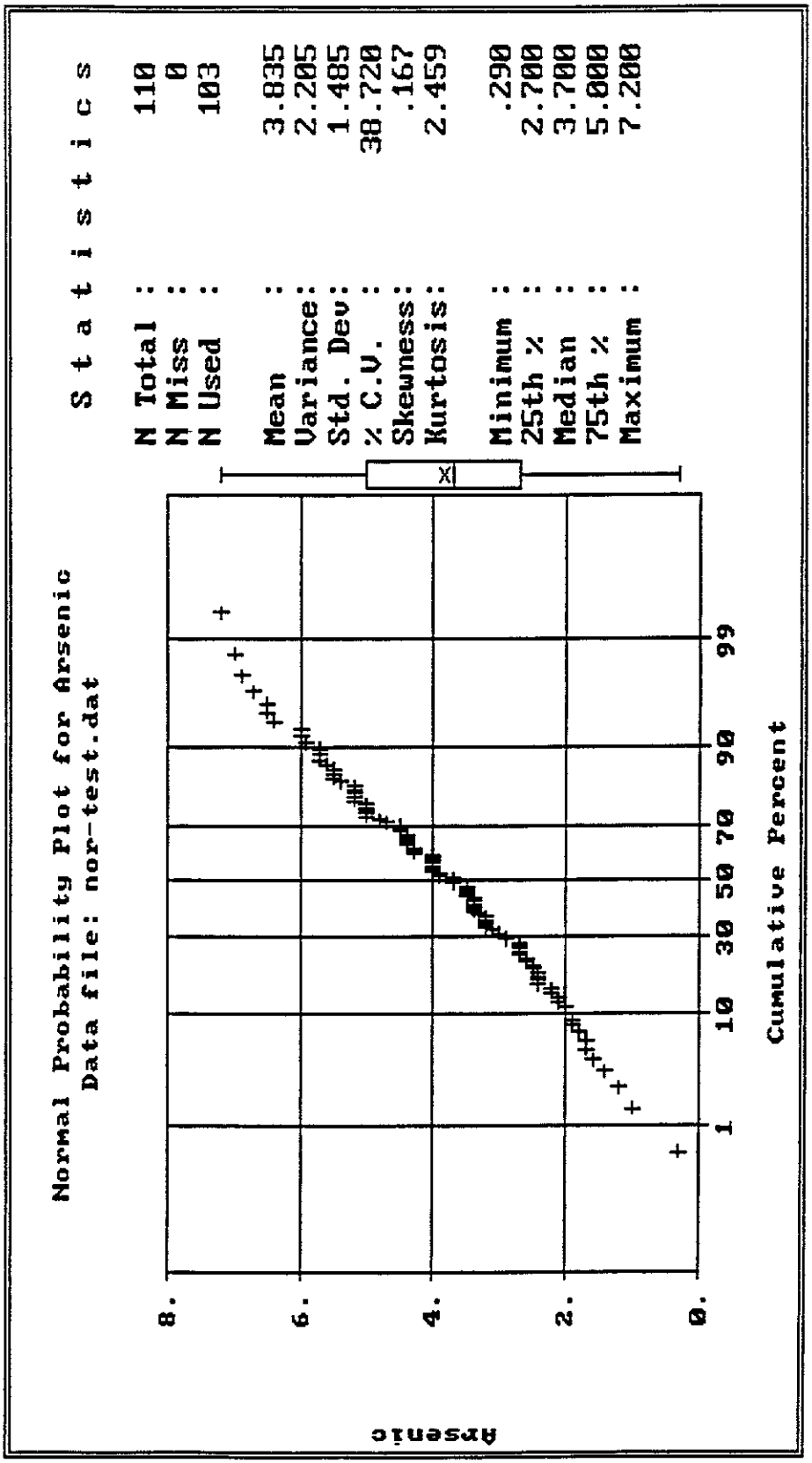
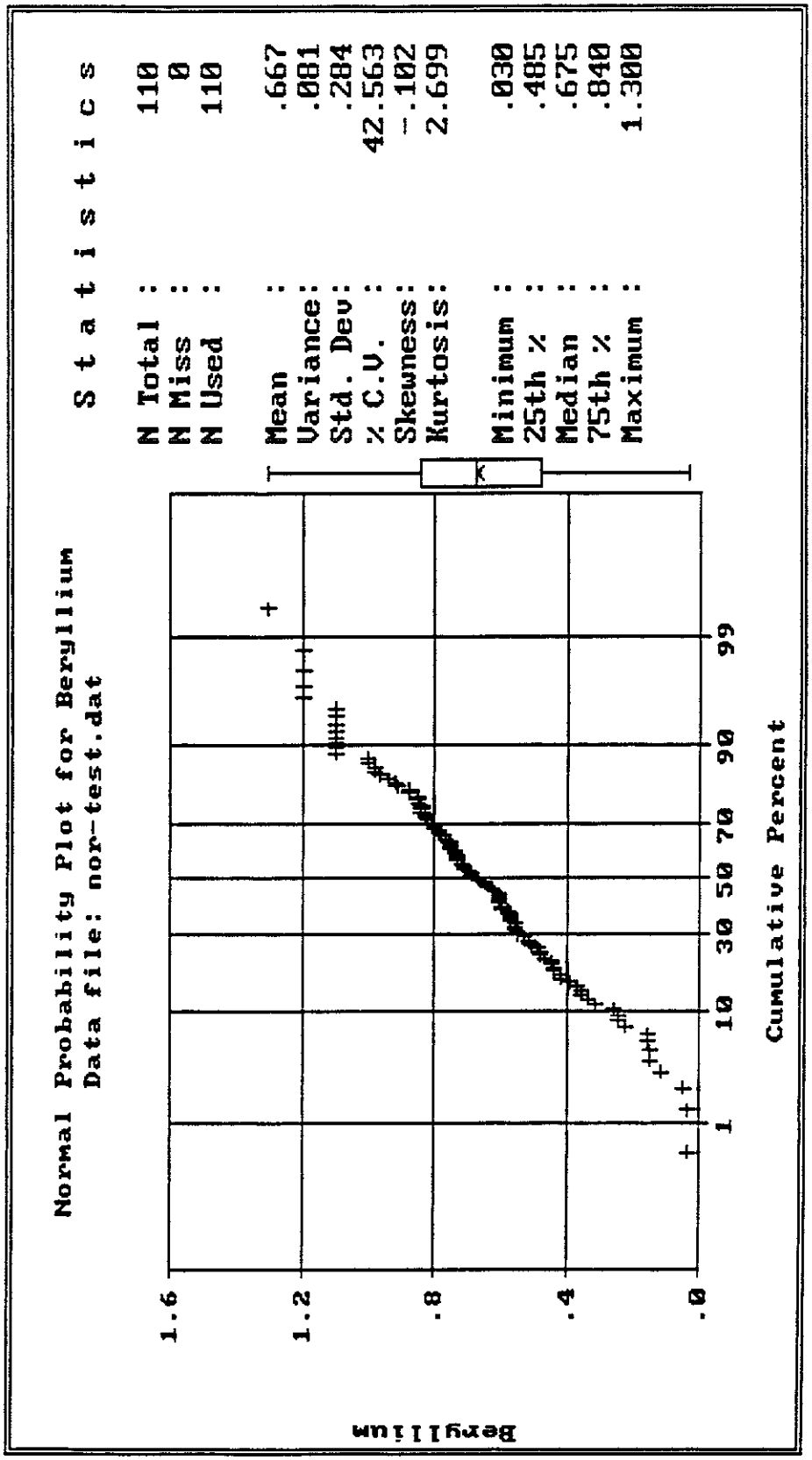

Normal Probability Plot for Arsenic
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 103
Mean : 3.835
Variance: 2.205
Std. Dev: 1.485
% C.V. : 38.720
Skewness: .167
Kurtosis: 2.459
Minimum : .290
25th % : 2.700
Median : 3.700
75th % : 5.000
Maximum : 7.200
Arsenic
8.
6.
4.
2.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 3-2


Normal Probability Plot for Beryllium
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 110
Mean : .667
Variance : .081
Std. Dev : .284
% C.V. : 42.563
Skewness : -.102
Kurtosis : 2.699
Minimum : .030
25th % : .485
Median : .675
75th % : .840
Maximum : 1.300
1.6
1.2
.8
.4
.0
Beryllium
1
10
30
50
70
90
99
Cumulative Percent

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5 May 1995
Attachment 3

Figure 3-3a

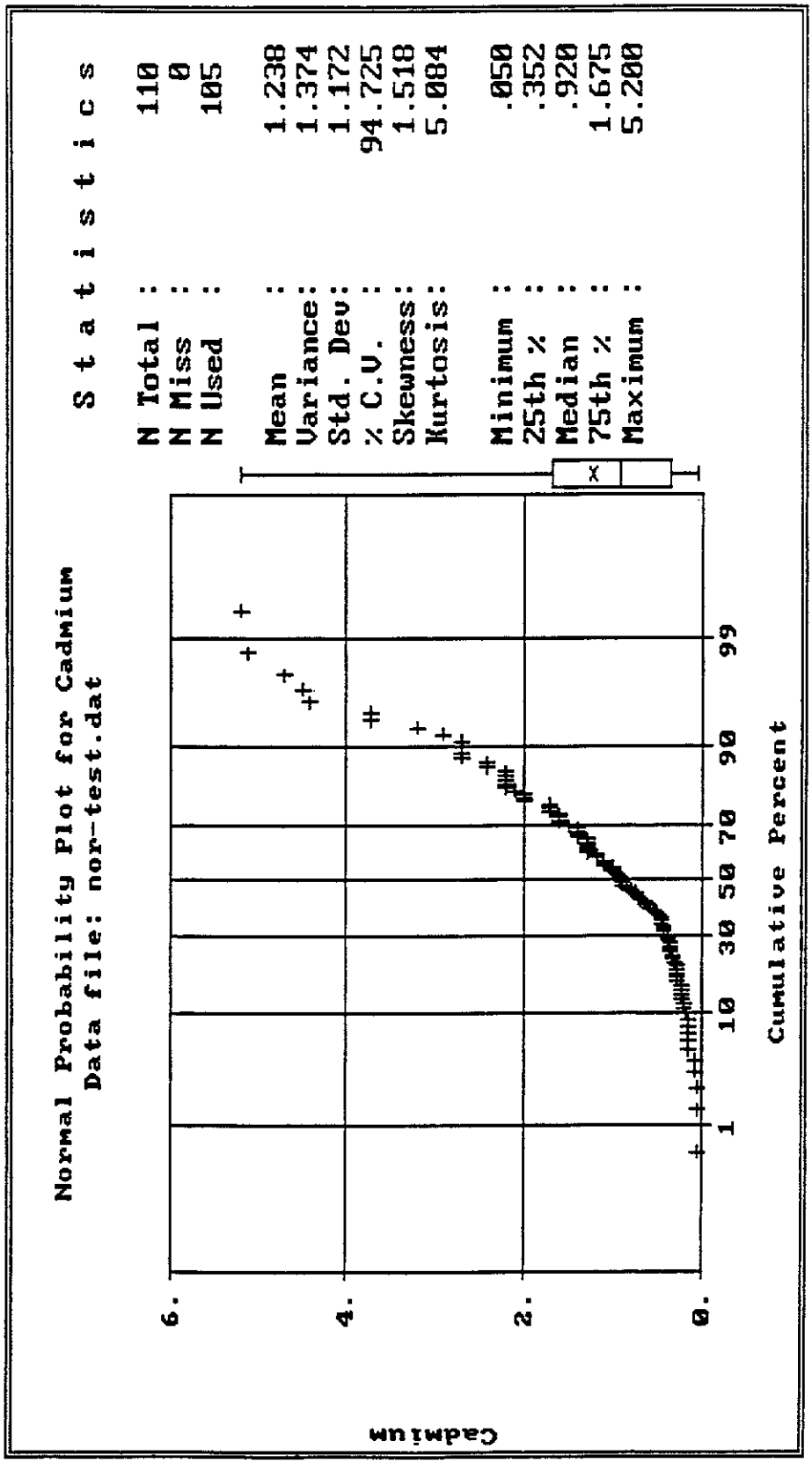

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Figure 3-3b

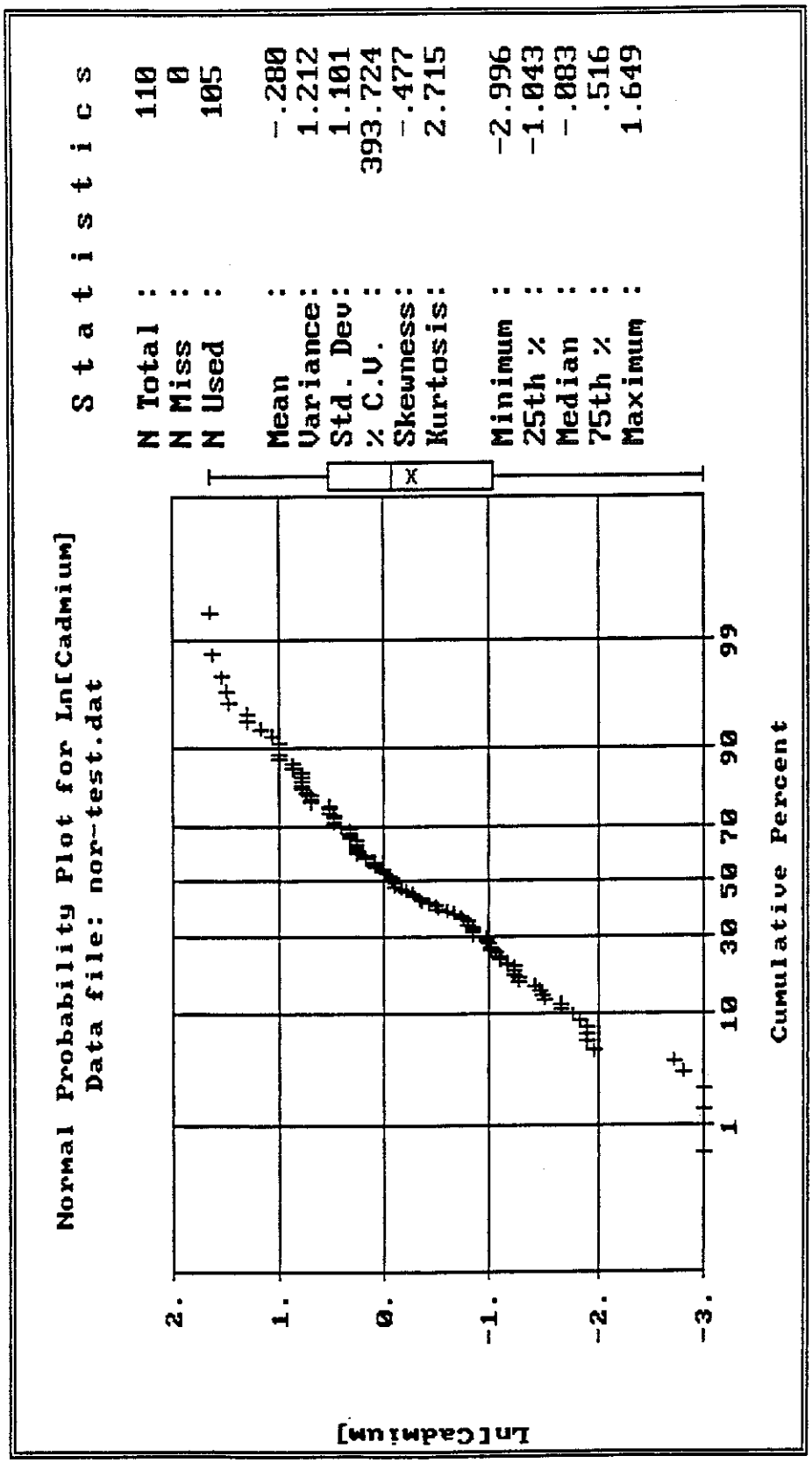

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Figure 3-4

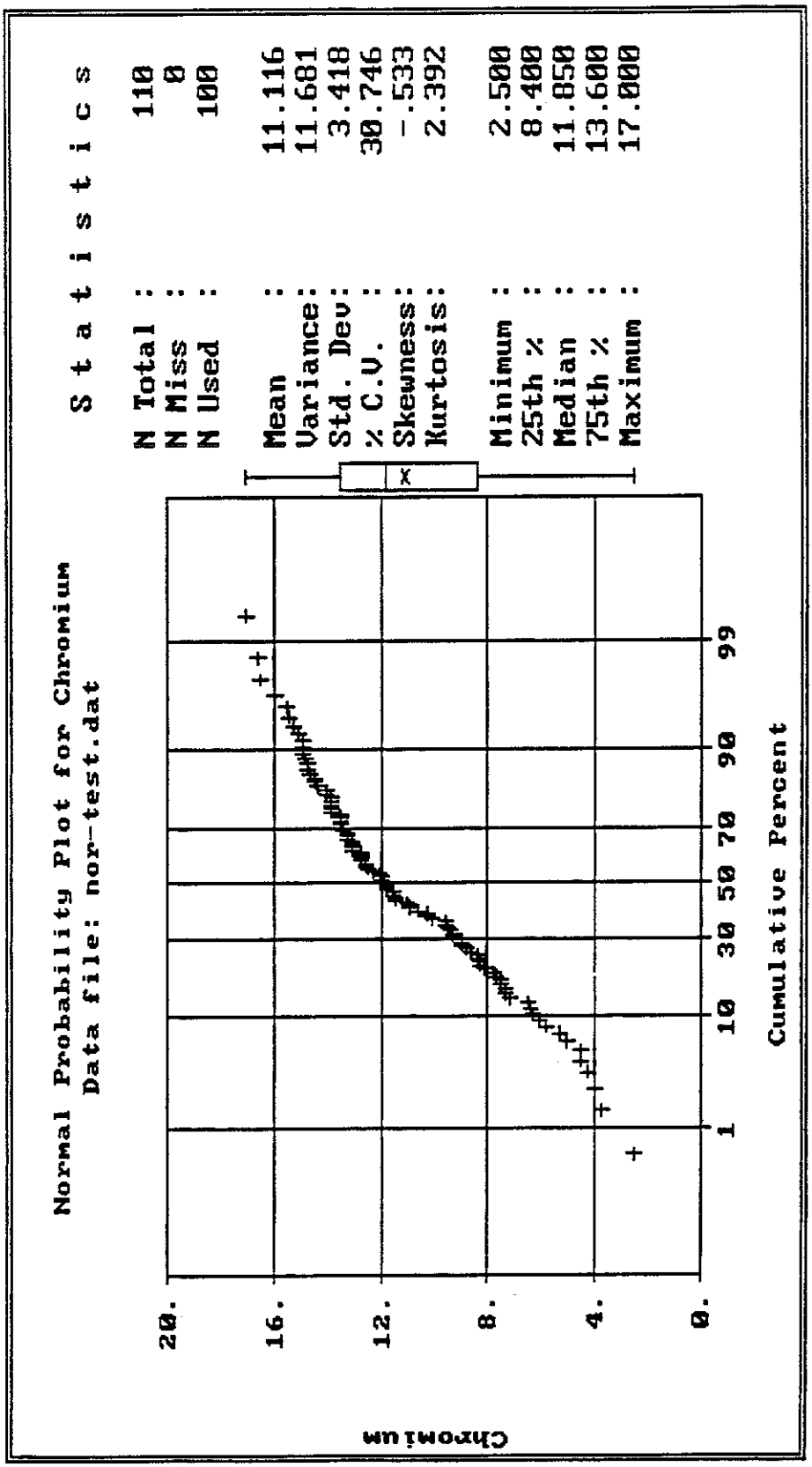


Figure 3-5

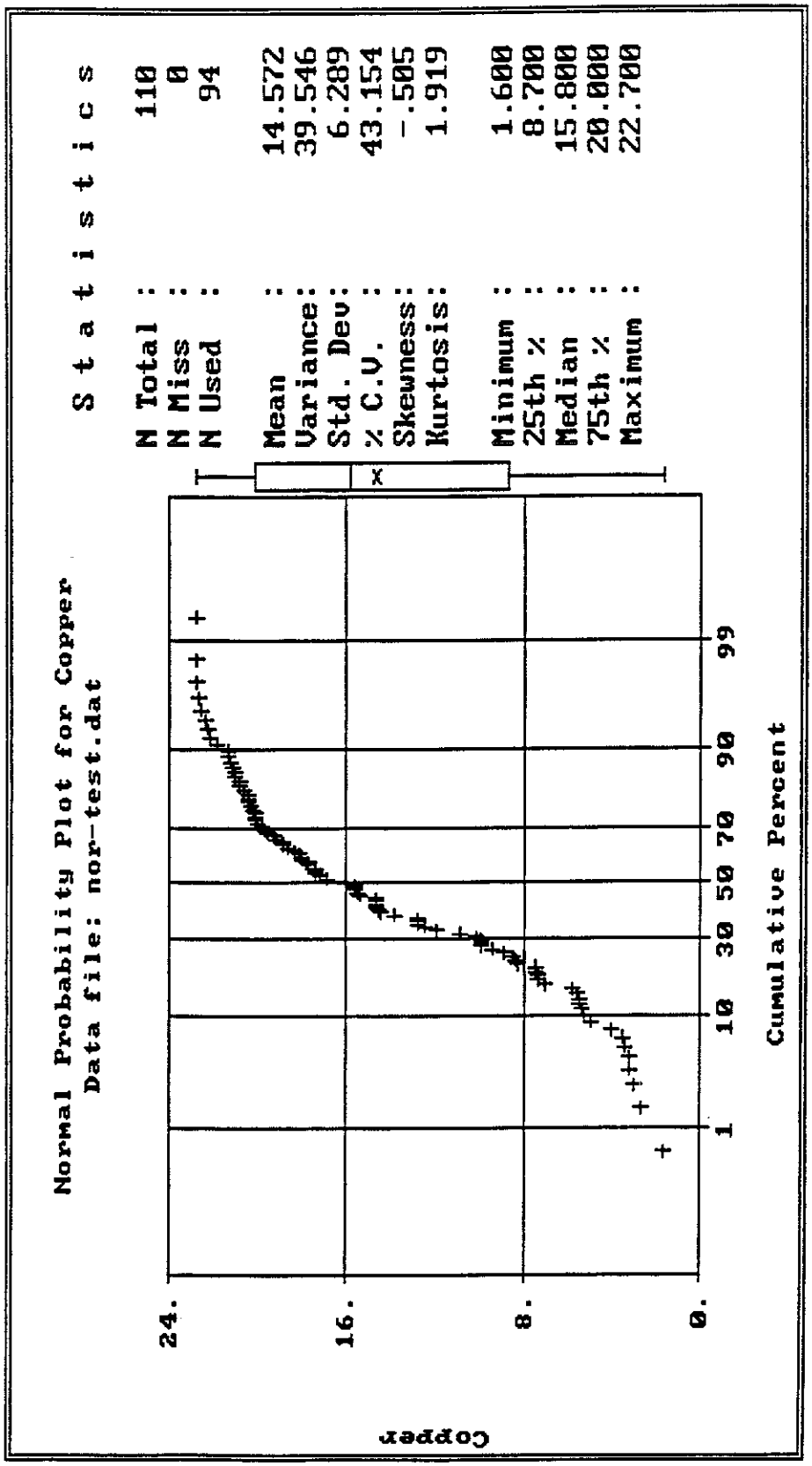

Normal Probability Plot for Copper
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 94
Mean : 14.572
Variance : 39.546
Std. Dev : 6.289
% C.V. : 43.154
Skewness : -.505
Kurtosis : 1.919
Minimum : 1.600
25th % : 8.700
Median : 15.800
75th % : 20.000
Maximum : 22.700
Copper
24.
16.
8.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 3-6

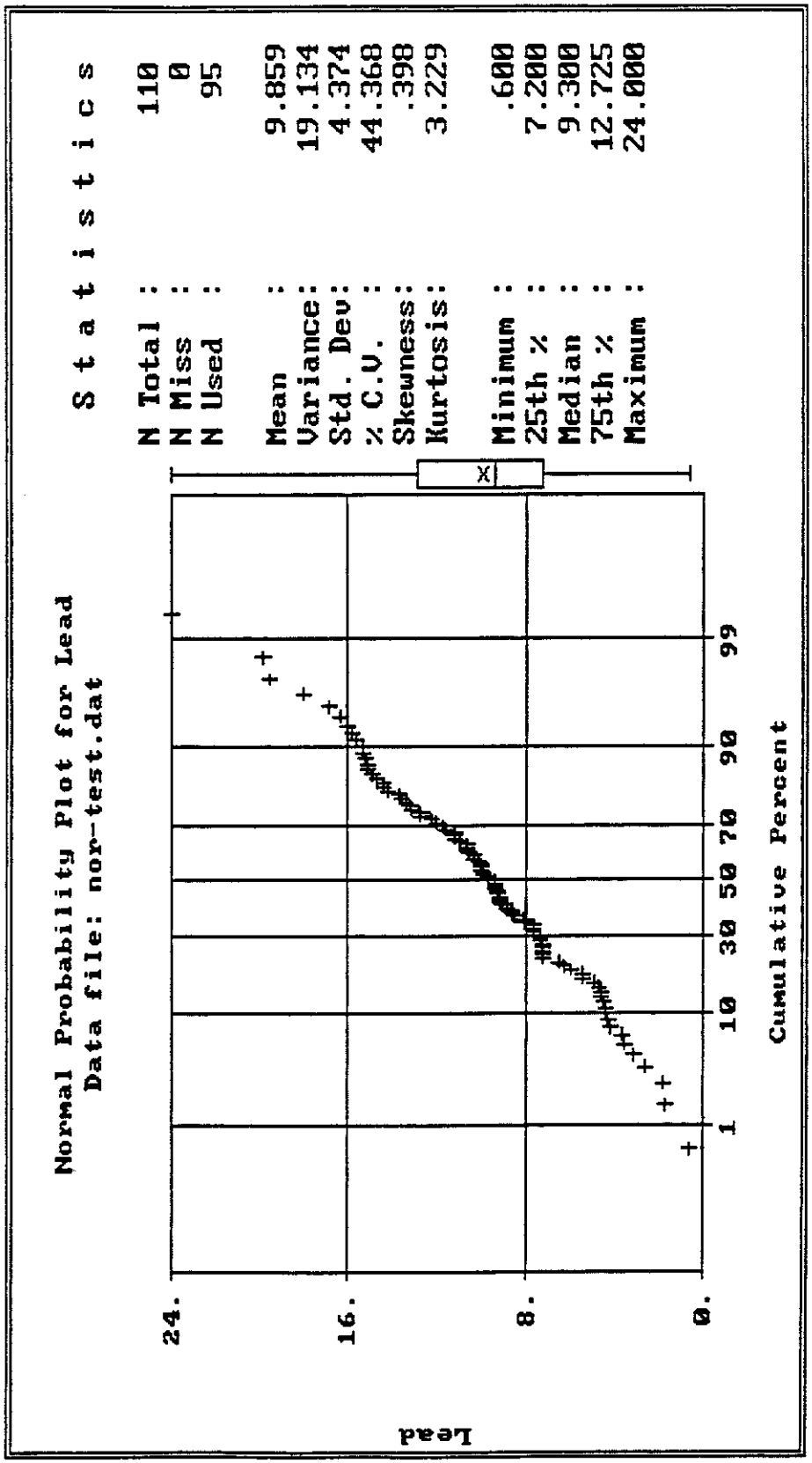
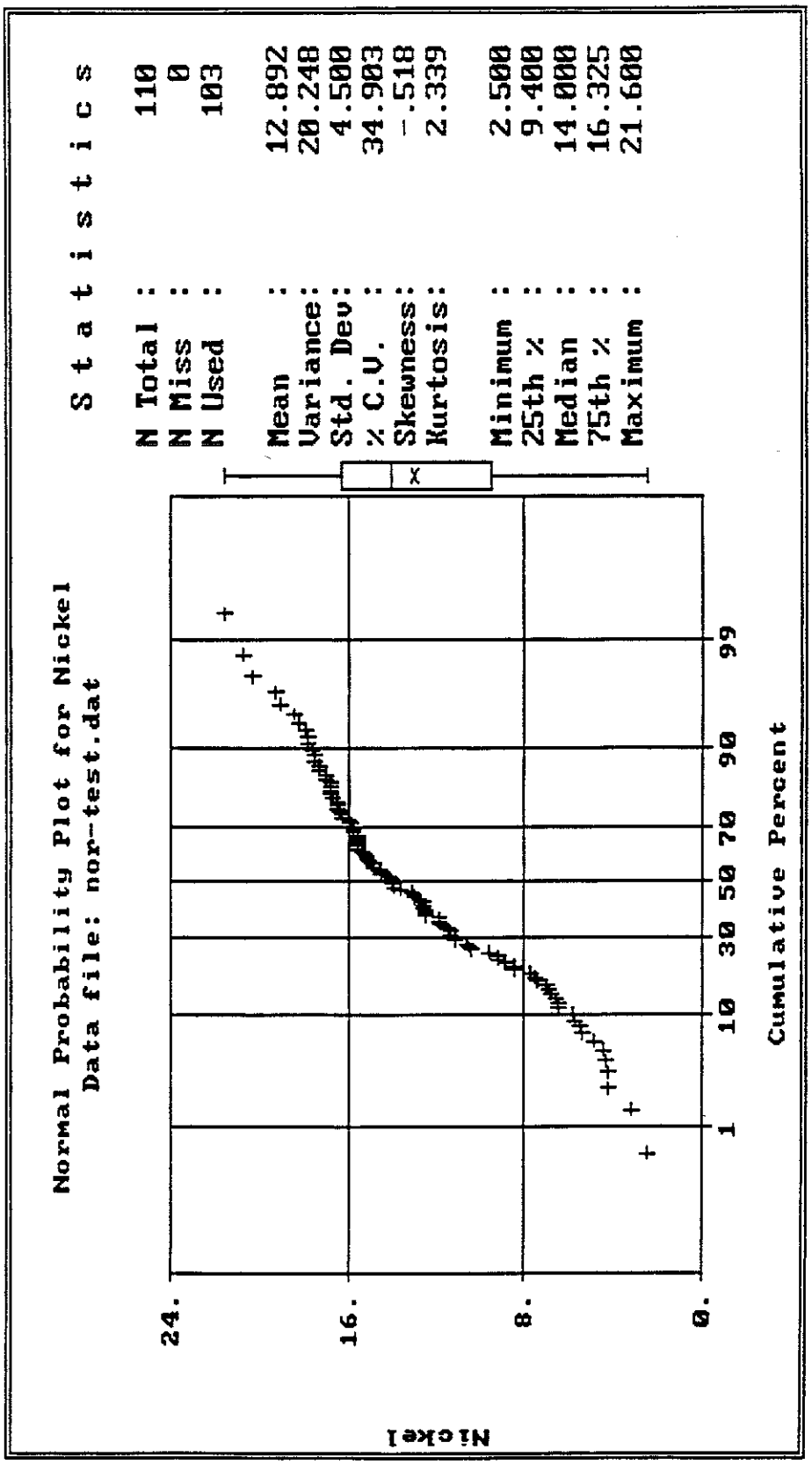

Normal Probability Plot for Lead
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 95
Mean : 9.859
Variance : 19.134
Std. Dev : 4.374
% C.V. : 44.368
Skewness : .398
Kurtosis : 3.229
Minimum : .600
25th % : 7.200
Median : 9.300
75th % : 12.725
Maximum : 24.000
Lead
24.
16.
8.
0.
1
10
30
50
70
90
99
Cumulative Percent

Figure 3-7


Normal Probability Plot for Nickel
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 103
Mean : 12.892
Variance : 20.248
Std. Dev : 4.500
% C.V. : 34.903
Skewness : -.518
Kurtosis : 2.339
Minimum : 2.500
25th % : 9.400
Median : 14.000
75th % : 16.325
Maximum : 21.600
Nickel
24.
16.
8.
0.
1
10
30
50
70
90
99
Cumulative Percent

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5 May 1995
Attachment 3

Figure 3-8

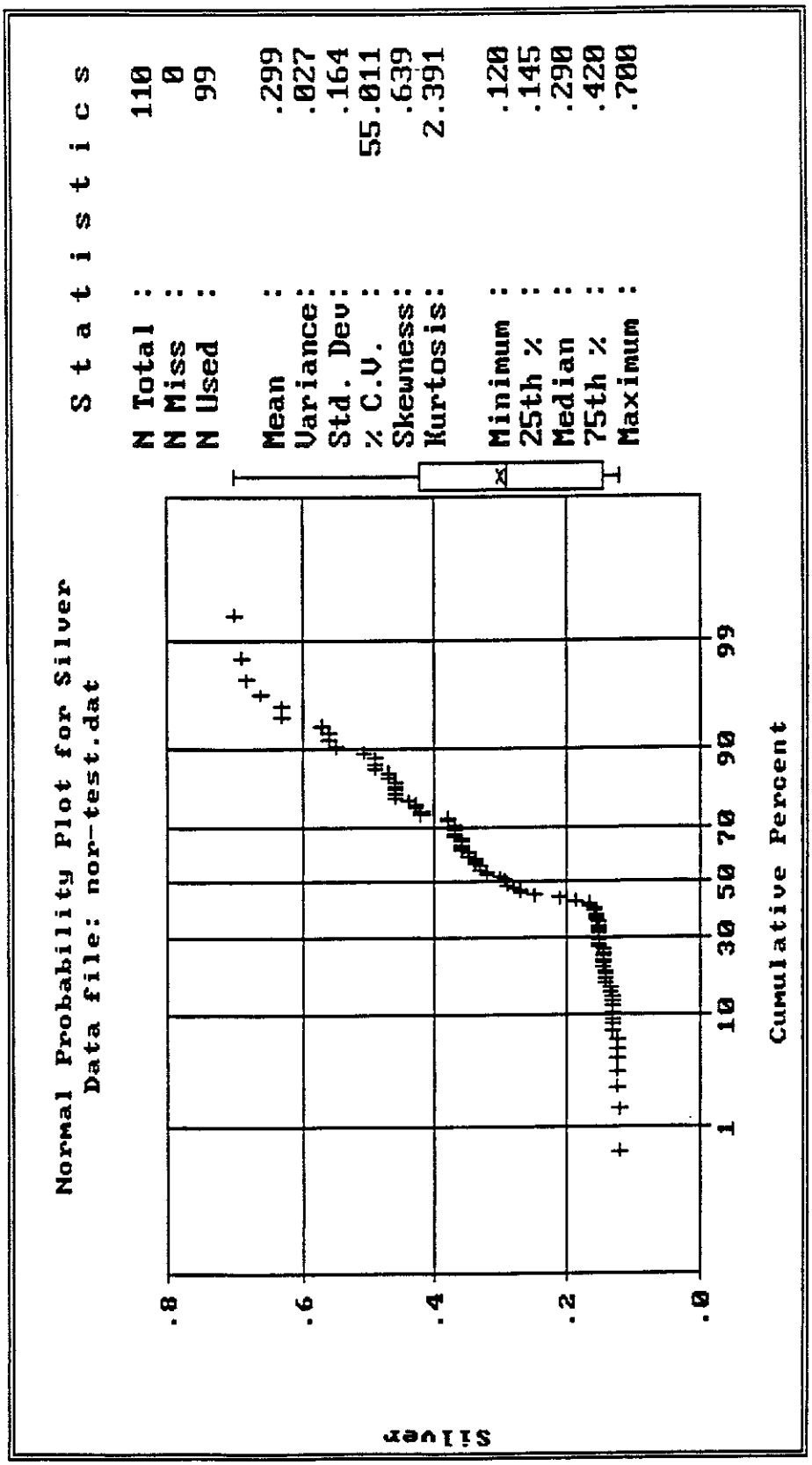
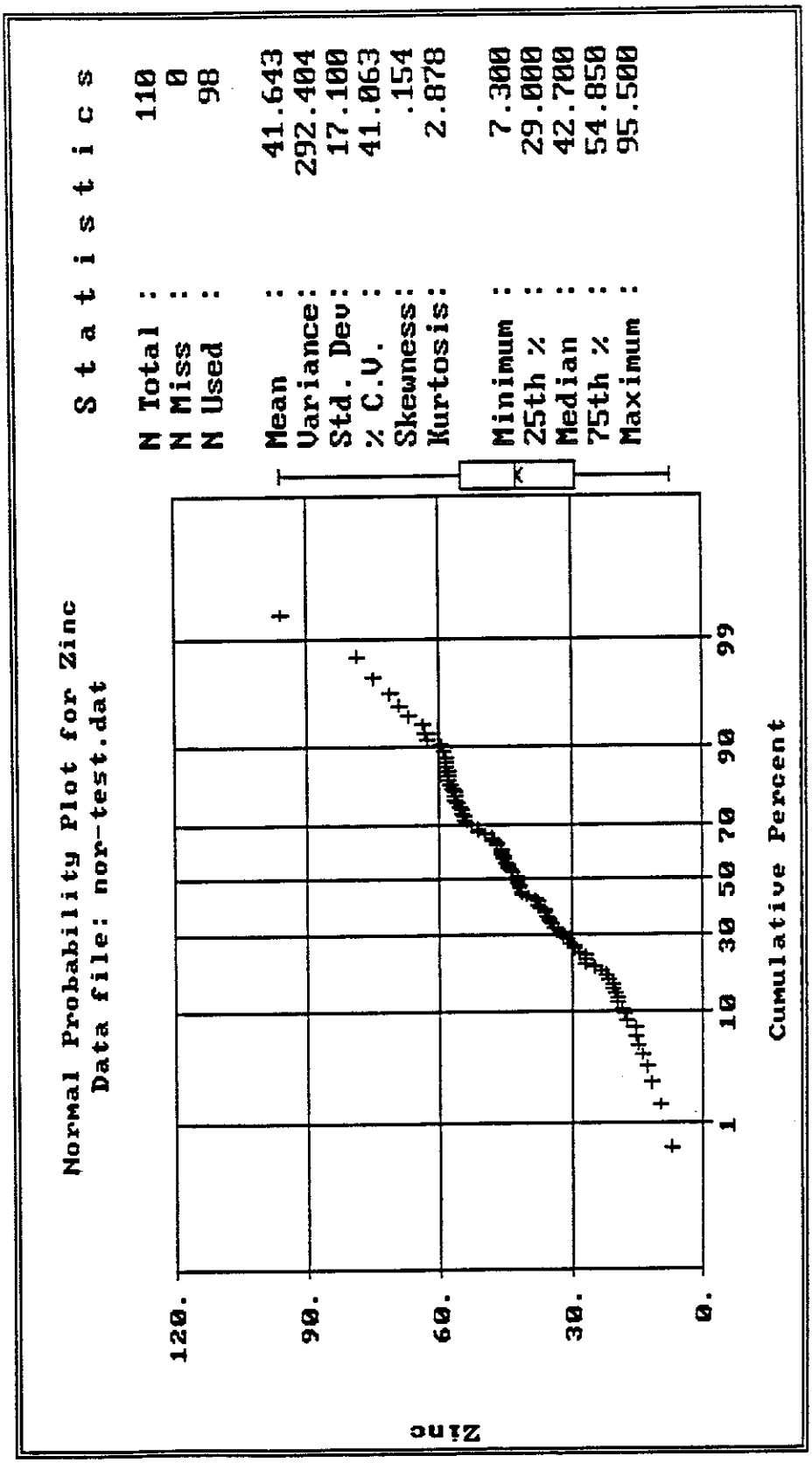


Figure 3-9


Normal Probability Plot for Zinc
Data file: nor-test.dat
Statistics
N Total : 110
N Miss : 0
N Used : 98
Mean : 41.643
Variance : 292.404
Std. Dev : 17.100
% C.V. : 41.063
Skewness : .154
Kurtosis : 2.878
Minimum : 7.300
25th % : 29.000
Median : 42.700
75th % : 54.850
Maximum : 95.500
Zinc
120.
90.
60.
30.
0.
1
10
30
50
70
90
99
Cumulative Percent

APPENDIX B

ECOLOGICAL SCOPING ASSESSMENT

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

APPENDIX B
FINAL
ECOLOGICAL SCOPING ASSESSMENT
SITE 3, SLUDGE BURIAL AREA
NAVAL AIR FACILITY
EL CENTRO, CALIFORNIA
CTO-0090/0280

February 1997

Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

Signature: _____ Date: 12-Feb-97
Gregory A. Cagle, R.G., CTOL

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ACRONYMS/ABBREVIATIONS

Cal-EPA	California Environmental Protection Agency
CLEAN	Comprehensive Long-Term Environmental Action Navy
COPC	chemical of potential concern
CTO	Contract Task Order
DTSC	(Cal-EPA) Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
°F	degrees Fahrenheit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mph	miles per hour
MSL	mean sea level
µg/L	micrograms per liter
NAF	Naval Air Facility
NEESA	Naval Energy and Environmental Support Activity
SI	Site Investigation
SWAT	Solid Waste Water Quality Assessment Test
TRPH	total recoverable petroleum hydrocarbons
VOC	volatile organic compound

ACRONYMS/ABBREVIATIONS (continued)

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Section B1
INTRODUCTION

This ecological scoping assessment has been prepared under the Comprehensive Long-Term Environmental Action Navy (CLEAN) II contract, Contract Task Order (CTO)-0090, in support of an Engineering Evaluation/Cost Analysis (EE/CA) performed for the Sludge Burial Area (Site 3) located at Naval Air Facility (NAF), El Centro. The EE/CA is being prepared to evaluate removal action alternatives to address soil contaminated with metals and chlordane. The purpose of this scoping assessment is to characterize potential ecological receptors and complete exposure pathways at the site. The results of this scoping assessment are used in the EE/CA to evaluate the need for removal actions or additional ecological risk screening. Much of the information used in this scoping assessment was obtained from the reports of previous investigations performed at the site. The reports include:

- Preliminary Assessment/Site Inspection of Naval Air Facility El Centro, California (NEESA 1987);
- Final Solid Waste Water Quality Assessment Test (SWAT)/Site Investigation (SI) Report for Site 1 – Magazine Road Landfill, Site 2 – Patella Road Landfill and Site 3 – Sludge Disposal Area; Engineering Services for Installation Restoration Studies for the Naval Air Facility El Centro, California (Ogden 1993); and
- Letter Report of Quarterly Groundwater Sampling Results at the Magazine Road Landfill, Patrol Road Landfill, Sludge Disposal Area, Fourth Street Fire-Fighting Training Area, Fire-Fighting Training Area East of Hangar Number Three, Northwest Fire-Fighting Training Area, Abandoned Fuel Farm, and Runway Burn Area (Ogden 1992).

The general outline of this report is consistent with the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) guidance (Cal-EPA DTSC 1994).

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Section B2
SITE BACKGROUND

This section includes a brief site description and a summary of climate, topography, and hydrology at NAF El Centro. Specific information on Site 3 is included as necessary.

B2.1 SITE DESCRIPTION

The NAF El Centro is a fully operational facility located approximately 7 miles northwest of El Centro, California, in Imperial County (Figure B2-1). The mission of NAF El Centro is to maintain and operate facilities and provide services and materials to support naval operations such as aviation activities and other activities designated by the Chief of Naval Operations. Tasks and functions conducted at NAF El Centro include:

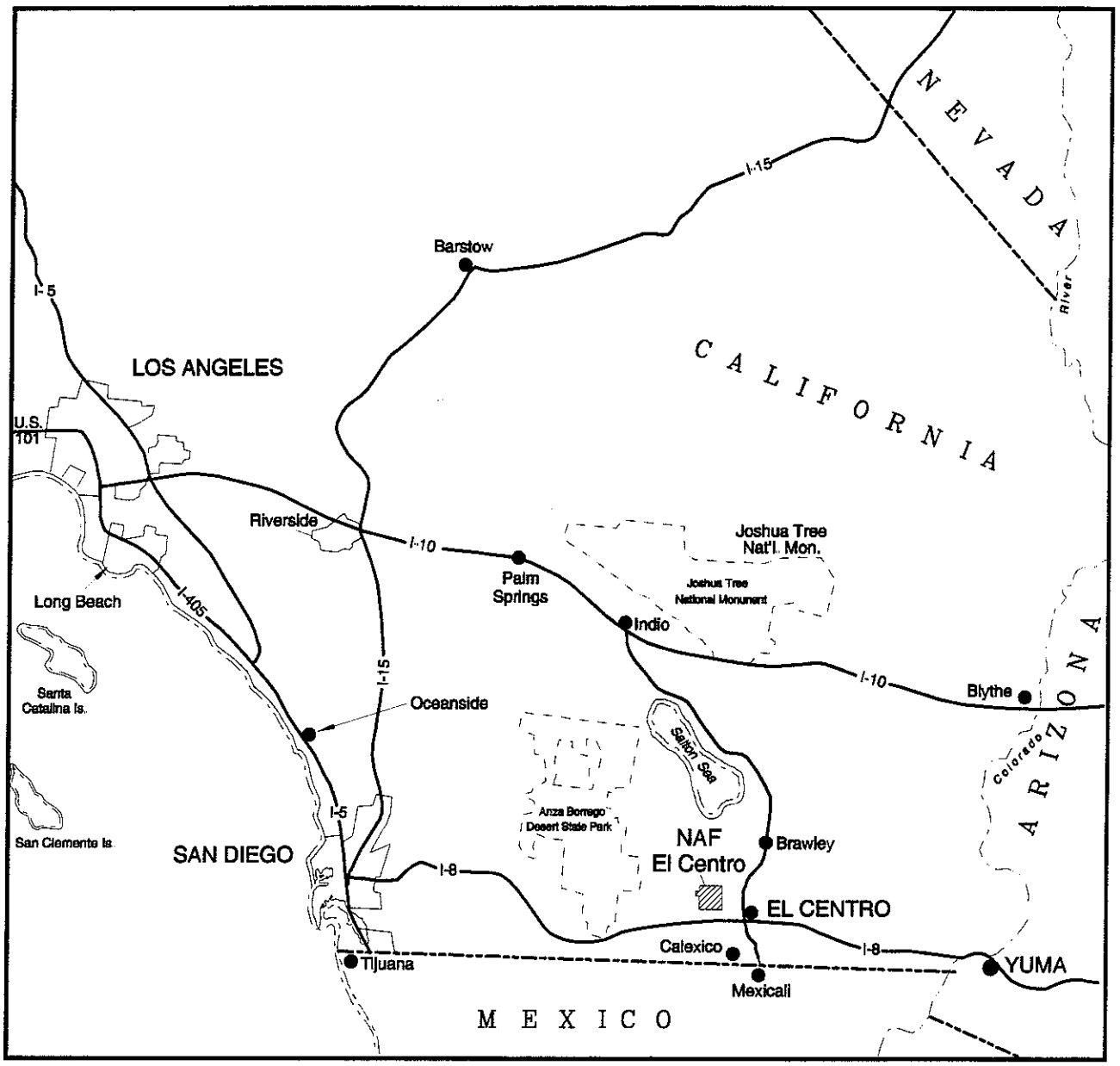
- operations and training,
- administration,
- general engineering support and mission operations,
- personnel support,
- medical and dental support,
- maintenance of material,
- maintenance of real property and utility operations, and
- supply operations.

The NAF El Centro was first commissioned in 1942 as a Marine Corps Air Station (NEESA 1987). Since 1942, NAF El Centro has served various functions and has been known variously as NAF, Naval Auxiliary Landing Field, Naval Air Station, Naval Auxiliary Air Station, and National Parachute Test Range. The facility has been used as a Naval Air Facility since July 1979.

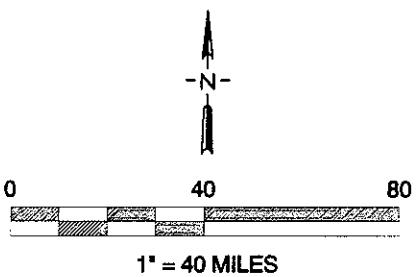
Site 3 is located in the northwest corner of NAF El Centro. This site was used as a sewage sludge disposal area in 1986. Sludge was reportedly deposited in a pit approximately 20 by 10 feet and 5 feet deep (NEESA 1987). During a site visit on 20 April 1995, CLEAN II Program personnel observed piles of dirt in an area approximately 100 by 100 feet around the former sludge disposal area. According to NAF personnel, the piles consist of soils stockpiled by a contractor during construction in this area. Vegetation is currently growing on the piles.

B2.2 CLIMATE

The climate at NAF El Centro and the surrounding area is arid. Daily summer temperatures average 92 degrees Fahrenheit (°F) with high temperatures often reaching 115°F (NEESA 1987). Daily winter temperatures average approximately 55°F. Mean annual rainfall in the area is approximately 2.4 inches. Prevailing winds are westerly in the winter and spring, and are from the southeast in the summer. Wind speeds at NAF



SOURCE: Master Plan - NAF El Centro 1988



Attachment B-ESA

Figure B2-1

Regional Location Map

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

El Centro range from approximately 1.4 to 17.1 miles per hour (mph) with an average annual wind speed of 8.8 mph (California Air Resources Board 1984).

B2.3 TOPOGRAPHY

The ground surface at NAF El Centro is relatively flat, with surface elevations ranging from 45 feet below mean sea level (MSL) to 50 feet below MSL (NEESA 1987). The area surrounding NAF El Centro is also relatively flat, with the exception of bluffs adjacent to the New River located west of NAF El Centro (Figure B2-2).

B2.4 HYDROLOGY

The NAF El Centro is located near the center of Imperial Valley. The Colorado River is the primary water source within Imperial Valley and is used for agricultural, industrial, and domestic purposes (Ogden 1993). The Alamo River and the New River are the two main drainage basins within the valley. There are several artificial drains and irrigation canals running through and around NAF El Centro that flow into the New River west of the facility. Water quality in the New River is considered poor due to discharges of contaminated water from Mexico as well as various agricultural sources (NEESA 1987). New River flows generally northward and discharges into the Salton Sea, which is located in the northern part of Imperial Valley. The Salton Sea is the largest lake in California. It is an artificial saline lake that formed in the early 1900s as a result of flooding of the Colorado River into the Salton Sea Basin.

Groundwater monitoring data indicate that groundwater elevations range from 50 to 70 feet below MSL at NAF El Centro (Ogden 1993). The groundwater flow direction at NAF El Centro is to the northwest, toward the New River. Groundwater quality in the vicinity of El Centro is generally poor, due to high concentrations of total dissolved solids; the groundwater is not considered usable for domestic or agricultural purposes (NEESA 1987).

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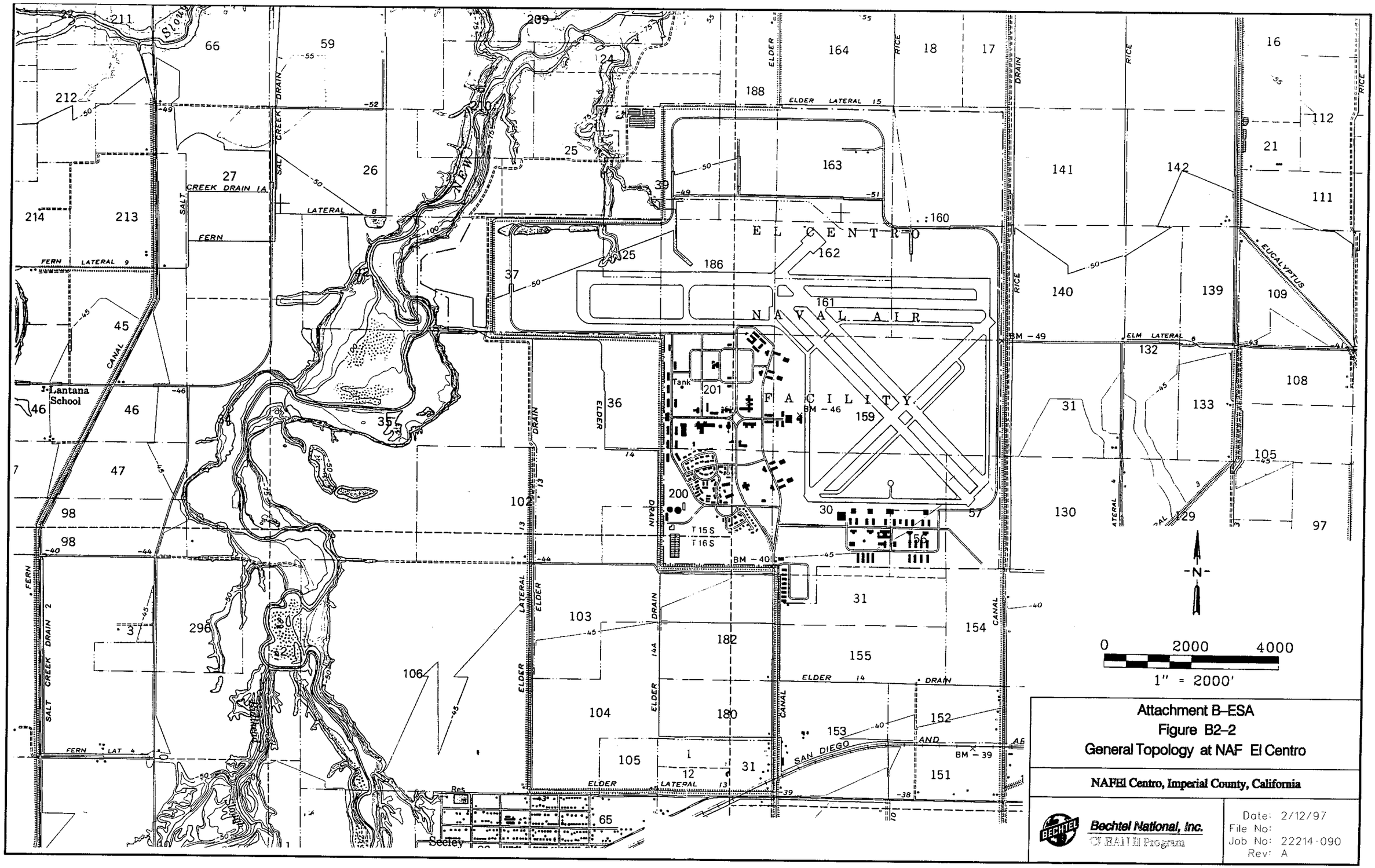

Attachment B–ESA
Figure B2–2
General Topology at NAF El Centro

NAFEl Centro, Imperial County, California

Bechtel National, Inc.
CERCLA II Program

Date: 2/12/97
File No:
Job No: 22214-090
Rev: A

Section B3
PREVIOUS SITE INVESTIGATIONS

A Preliminary Assessment/Site Inspection of sixteen sites at NAF El Centro, including Site 3, was conducted (NEESA 1987) under the Navy Installation Restoration Program. Based on NEESA recommendations, a SWAT/SI was performed at Site 3 (Ogden 1993). Soil, groundwater, and surface water samples collected during the SWAT/SI were analyzed for a variety of organic and inorganic chemicals. A summary of the analysis performed on these samples and the results of the analyses are provided in Tables B3-1 and B3-2.

Thirteen metals, two organochlorine pesticides, and total recoverable petroleum hydrocarbons (TRPH) were detected at least once in soil samples collected at Site 3. The maximum concentrations of arsenic, cadmium, chromium, copper, lead, nickel, and zinc at Site 3 exceeded their background concentrations (Table B3-1).

Twelve metals were detected at least once in groundwater samples collected at Site 3 during quarterly groundwater monitoring conducted by Ogden (1992). The results of these sample analyses are summarized in Table B3-2.

Water samples were collected upstream and downstream of Site 3 in the New River and Elder Canal. Surface water quality was found to be similar at upstream and downstream locations in both water bodies (Ogden 1993), indicating that surface water quality has not been impacted by contaminants observed at Site 3.

Table B3-1
Summary of Soil Analytical Data at Site 3
(in milligrams per kilogram)

Analysis (U.S. EPA[a] Method)	Number of Analyses	Number Detected	Minimum Concentration	Maximum Concentration	Background[b] Concentration
Total recoverable petroleum hydrocarbons (418.1)	7	5	1	1,100	—[c]
Total fuel hydrocarbons (8015)	7	0	—	—	—
Aromatic volatile organic compounds (8010/8020)			—	—	—
Total phenols (9066)	3	0	—	—	—
Total cyanide (9012)	3	0	—	—	—
Ethylene dibromide (504)	3	0	—	—	—
Volatile organic compounds (8240)	3	0	—	—	—
Semivolatile compounds (8270)	3	0	—	—	—
Pesticides and PCBs[d] (8080)			—	—	—
2,4-DDE[e]	3	1	0.093	0.093	—
Chlordane	3	1	1	1	
Metals					
Antimony	7	2	0.96	1.1	—
Arsenic	7	7	3.2	13.1	6.3
Beryllium	7	7	0.51	1.2	1.1
Cadmium	7	7	0.35	12.6	4.6
Chromium	7	7	7.5	127	17
Copper	7	7	8.4	929	25
Lead	7	7	7.2	209	17
Mercury	7	2	1.8	2.5	—
Nickel	7	7	9.5	28.2	20
Organic Lead	3	0	—	—	—
Selenium	7	2	0	37	—
Silver	7	3	0.34	111	0.6
Thallium	7	1	1.2	1.2	—
Zinc	7	7	35.2	735	70

Source: Ogden 1993

Notes:
[a] U.S. EPA – United States Environmental Protection Agency
[b] background concentration represents 95th percentile of the entire background population
[c] — – not calculated or not applicable
[d] PCB – polychlorinated biphenyl
[e] DDE – dichlorodiphenyldichloroethene

Table B3-2
Summary of Groundwater Analytical Data at Site 3

Analysis (U.S. EPA[a] Method)	Units	MW1 (Monitoring Well) Number of Analyses	Number Detected	Minimum Concentration	Maximum Concentration
Total fuel hydrocarbons (8015)	mg/L[b]	4	0	—[c]	—
Total phenols (9066)	mg/L	1	0	—	—
Total cyanide (9012)	mg/L	4	0	—	—
Ethylene dibromide (504)	µg/L[d]	1	0	—	—
Volatile organic compounds (8240)	µg/L	1	0	—	—
Semivolatile organic compounds (8270)	µg/L	1	0	—	—
Polyaromatic hydrocarbons (8310)	µg/L	3	0		
Aromatic volatile organic compounds(8010/8020)	µg/L	3	0	—	—
Pesticides and PCBs[e] (8080)	µg/L	1	0	—	—
Hexavalent chromium (unfiltered)	mg/L	2	1	0.06	0.06
Metals					
Antimony	µg/L	3	0	—	—
Arsenic	µg/L	3	0	—	—
Barium	µg/L	3	3	21.3	24.9
Beryllium	µg/L	3	1	1.4	1.4
Cadmium	µg/L	3	1	2.7	2.7
Chromium	µg/L	3	0	—	—
Cobalt	µg/L	3	0	—	—
Copper	µg/L	3	3	10.9	29.4
Lead	µg/L	4	0	—	—
Manganese	µg/L	3	4	10	30.6
Molybdenum	µg/L	3	3	102	163
Mercury	µg/L	3	0	—	—
Nickel	µg/L	3	0	—	—
Selenium	µg/L	3	3	65.5	127
Silver	µg/L	3	3	10.3	12.4
Thallium	µg/L	3	0	—	—
Vanadium	µg/L	3	2	5.4	6.7
Zinc	µg/L	3	3	13.3	18.1

Sources: Ogden 1992 and 1993

(table continues)

Table B3-2 (continued)

Notes:
[a] U.S. EPA – United States Environmental Protection Agency
[b] mg/L – milligrams per liter
[c] — – not calculated or not applicable
[d] µg/L – micrograms per liter
[e] PCB – polychlorinated biphenyl

Section B4
BIOLOGICAL CHARACTERIZATION

This section contains a general description of the habitats at NAF El Centro and potential receptors. Specific floral (plant) and fauna (wildlife) species observed in Site 3 are discussed in the following sections. Information in this section and following sections is based on observations made during a site visit by CLEAN II Program personnel on 20 April 1995. The approximate size of various areas is based on field observations only, and the measurements are estimates rather than actual measurements.

B4.1 IDENTIFICATION OF HABITATS AT NAF EL CENTRO

The undeveloped portions of NAF El Centro consist almost entirely of graded, cleared land. The developed areas of the base are landscaped with lawns and nonnative shrubs and trees. There are a few large flood-irrigated fields of alfalfa, which are fallowed during some years. Site 3 is not associated with landscaped or agricultural areas. There are a few small open areas that were previously disturbed, but have now been invaded by a mixture of native and exotic shrubs. These open areas, along with the few short sections of windrow athel trees, provide the only significant upland habitat for birds, mammals, reptiles, and amphibians at NAF El Centro. Open agricultural drainage and irrigation ditches provide limited aquatic habitat. The berms/levees of the ditches, roads, and agricultural fields are commonly used by round-tail ground squirrels and burrowing owls.

B4.2 IDENTIFICATION OF POTENTIAL RECEPTORS

Potential receptors at NAF El Centro, and more specifically at Site 3, are identified in this section. Potential receptors are defined as flora or fauna species, including special-status species, that are known or expected to occur in the areas of potential concern. Special-status species include the following:

- California species of special concern,
- state or federally listed rare, threatened, or endangered species, and
- species that are proposed or recommended for state or federal listing.

The identification of potential receptors at NAF El Centro was based on observations made during the 20 April 1995 site visit. Potential receptors at Site 3 are discussed in the following sections.

B4.2.1 Flora

The flora described for NAF El Centro includes only terrestrial vascular plants. Native shrubs, such as four-wing saltbush (*Atriplex canescens*) and Torrey's sea-blight (*Suaeda moquinii*) with exotic tamarisk (*Tamarix ramosissimum*), are the most prevalent species on NAF El Centro. Understory herbaceous species are mostly nonexistent, even in the small shrubland parcels. When present, the understory contains annual grasses, salt heliotrope (*Heliotropium curassavicum* ssp. *oculatum*), alkali mallow (*Sida hederacea*),

and goosefoot (*Chenopodium* sp.). There is an active vegetation-control program for most of the open areas of NAF El Centro by which tractors scrape away the vegetation and maintain cleared flat fields. There are some alfalfa fields on the facility, but none are associated with Site 3. Rows of athel (*Tamarax atheli*) trees were previously planted as windbreaks at some locations in NAF El Centro.

Small mounds of soil material were located in the area adjacent to Site 3. A facility representative indicated that the soil was placed by a contractor working at the facility. Four-wing saltbush up to 4 feet tall dominate Site 3 and the adjacent area with a lesser shrub component of Torrey's sea-blight. There are a few saltbush seedlings as an understory. There is no standing water on or near this site.

B4.2.2 Fauna

The fauna at NAF El Centro considered in this assessment include mammal, bird, amphibian, reptile, and invertebrate taxa common to the desert in Imperial County. A thorough survey of the fauna was not conducted on 20 April 1995, but the site was inspected for evidence of faunal use (e.g., scat, burrows, tracks, bones, shells, or positive sightings). All areas of NAF El Centro could be visited at any time by the bird species present in the El Centro area as well as by some wide-ranging mammals such as coyote. The present assessment includes a general discussion of observations made in NAF El Centro and any specific information related to Site 3. The assessment considers those species that are most likely to occupy or consistently use Site 3; it does not attempt to record every occasional or incidental wildlife occurrence.

Most of the wildlife species that occur at NAF El Centro are native, but a few exotic bird species (e.g., European starling and house sparrow) have been introduced. There are also a few feral house cats on the base. It is unknown if shells from clams found near the irrigation canal on the northern half of the base near Magazine Road Landfill are native or exotic.

Bird species observed on NAF El Centro during the 20 April 1995 site visit include the western kingbird, red-wing blackbird, European starling, white-winged dove, turkey vulture, black phoebe, Gambel's quail, yellow warbler, bittern, red-tailed hawk, roadrunner, raven, cliff swallow, house sparrow, and burrowing owl. Species not observed by CLEAN II Program personnel but reported by others include ring-necked pheasant, white-crowned sparrow, western meadowlark, American crow, American kestrel, great horned owl, and northern harrier. Several other common bird species might be expected to occur at NAF El Centro. There is a sizable population of burrowing owls (a California species of special concern) resident on NAF El Centro. At least five different areas containing active burrows or burrow complexes were observed during the 20 April 1995 site visit. Base personnel reported that burrowing owls also occur at other areas of the facility that were not inspected. The burrowing owls commonly inhabit abandoned ground squirrel holes in levees or open areas, and they forage in open areas, including adjacent agricultural fields. No burrowing owl burrows were discovered in Site 3 or any of the areas inspected during the site visit.

Mammal species observed or expected to occur at NAF El Centro include coyote, desert cottontails, black-tailed jackrabbits, and round-tail ground squirrels. There also was evidence of small burrows of kangaroo rats, deer mice, or harvest mice.

Reptiles and amphibians that might be present include the western whiptail lizard, side-blotched lizard, and flat-tailed horned lizard (designated by California as species of special concern). One toad carcass, species unknown, was observed at the mouth of a burrowing owl burrow.

Invertebrate species that were common at some sites include dragonflies and large red ants. Shells of an unidentified species of freshwater clam were observed next to a drainage ditch in the northern part of the base near Magazine Road Landfill; however, these shells may have come from a nearby irrigation ditch.

Rabbit scat was commonly observed at Site 3. There could be rabbit burrows hidden under the relatively dense shrub community. Rodent holes were common, and there was coyote scat and skeletons of round-tail ground squirrels and rabbits on or near the site. The shrubs provide nesting and perching opportunities for several types of birds, and raptors and owls undoubtedly hunt in the area. Active colonies of large red ants were observed at Site 3 during the 20 April 1995 site visit.

B4.2.3 Summary of Potential Receptors

Based on the observations made during the site visit, the following list of flora and fauna species are expected to be present at Site 3.

- **Mammals**

  coyote, mice/kangaroo rats, Colorado valley wood rat (a California species of special concern), desert cottontail, black-tailed jackrabbit, and round-tail ground squirrel.

- **Birds**

  burrowing owl (a California species of special concern), roadrunner, and red-tailed hawk.

- **Invertebrates**

  red ant.

- **Reptiles**

  flat-tailed horned lizard (a California species of special concern).

- **Plants**

  four-wing saltbush and Torrey's sea-blight.

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Section B5
CHEMICALS OF POTENTIAL CONCERN

Chemicals of potential concern (COPCs) include metals detected above their background concentrations or organic chemicals detected at least once in soil or groundwater samples collected from Site 3. If background data for specific metals detected in soil or groundwater were not available, the detected metals were included as COPCs in this assessment. The analytical data for unfiltered groundwater samples (Ogden 1992) were used to identify metals as COPCs in this assessment. This is a conservative approach because most metals adsorb readily to total dissolved solids, which are known to be high in the groundwater at NAF El Centro; therefore, metals are generally detected more frequently and at higher concentrations in unfiltered samples than in filtered samples.

Based on the analytical information that is summarized in Tables B3-1 and B3-2, the COPCs identified at Site 3 are metals, organic pesticides, and TRPH in soil; and only metals in groundwater (Ogden 1993).

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Section B6
POTENTIALLY COMPLETE EXPOSURE PATHWAYS

Potentially complete exposure pathways at Site 3 are discussed in this section. An exposure pathway may be defined as the course that a chemical or physical agent takes from the source of contamination to potentially exposed receptors. Exposure pathways generally include the following components:

- primary source of contamination,
- chemical release mechanisms,
- secondary source of contamination,
- potential receptors, and
- exposure routes.

A general description of these components is provided in the following sections. Based on the conditions observed at Site 3, potentially complete exposure pathways are summarized in Table B6-1.

B6.1 PRIMARY SOURCES OF CONTAMINATION

The primary source of contamination at Site 3 is the soil in which the COPCs have been detected.

B6.2 POTENTIAL RELEASE MECHANISMS

Release mechanisms refer to the fate and transport of chemicals in the environment that result in the contamination of secondary sources. Release mechanisms depend on the chemical and physical characteristics of the COPCs as well as the characteristics of the environmental media in which COPCs are detected.

To be conservative, the release mechanisms discussed below do not consider the attenuation or natural degradation of COPCs in the environment, which generally results in lower concentrations of COPCs in both primary and secondary sources.

COPCs may be released from their primary sources at Site 3 by various means. Metals and other chemicals that adsorb readily to soil (e.g., the organochlorine chemicals) may be released to air in windblown dust or during human activities that disturb the soil (e.g., soil scraping). Since groundwater at Site 3 is relatively shallow, some of the COPCs in soil, particularly water-soluble COPCs, may leach downward through soil to groundwater. If the soil containing the COPCs is removed, this potential release mechanism will be eliminated.

B6.3 SECONDARY SOURCES OF CONTAMINATION

If the soil containing COPCs remains in place, potential secondary sources of contamination may include those media into which COPCs may be released: air, groundwater, and surface water.

B6.4 POTENTIAL RECEPTORS

Potential receptors at Site 3 were discussed previously in Section B4.2.

B6.5 EXPOSURE ROUTES

Exposure routes are the means by which plant or animal receptors absorb chemicals from environmental media. Potential exposure routes for receptors may include the following:

- direct uptake of COPCs from primary or secondary sources of contamination by plants;
- dermal absorption of COPCs in primary or secondary sources of contamination by wildlife receptors;
- ingestion of COPCs in contaminated food or water sources; and
- inhalation of COPCs in air (secondary exposure route).

Direct uptake of COPCs by plants may occur as a result of root or leaf uptake of COPCs in soil, groundwater, or air (e.g., from fugitive dust). Dermal absorption of COPCs may occur in wildlife receptors that contact contaminated media directly with their skin, such as burrowing animals (e.g., rodents, birds, reptiles). Ingestion of COPCs in contaminated food or water sources may occur as a result of plant or wildlife uptake of COPCs followed by the consumption of these plants or wildlife by other receptors. Although inhalation of COPCs in air is listed as a potential exposure route, this route is considered a secondary route of exposure for receptors.

Potentially complete exposure pathways that exist at Site 3 are summarized in Table B6-1.

Table B6-1
Summary of Potentially Complete Exposure Pathways at Site 3, NAF El Centro

Primary Sources of Contamination[a]	Potential Release Mechanisms	Secondary Sources of Contamination[b]	Plant Receptors[c]	Wild Life Receptors[c]	Do Potential Complete Exposure Pathways exist?
Soil: metals, O-C pesticides[d], VOCs[e] and TRPH[f]	Windblown, dust, vapors	Air	Yes	Yes	Yes
	Leaching of chemicals to groundwater	Groundwater			

Notes:
[a] primary sources of contamination are the environmental media in which chemicals of potential concern were detected
[b] assuming soil containing chemicals of potential concern is left in place
[c] receptors include plants or animals that were observed in or around the site or for which evidence of occurrence was noted
[d] O-C – organochlorine (including polychlorinated biphenyls)
[e] VOC – volatile organic compound
[f] TRPH – total recoverable petroleum hydrocarbons

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Section B7
SUMMARY AND CONCLUSIONS

Potential ecological receptors, COPCs, and potentially complete exposure pathways were evaluated for Site 3 at NAF El Centro in this assessment. Potential ecological receptors include plants or animals that were observed during the site inspection conducted by CLEAN II Program personnel on 20 April 1995 or that would be expected to occur in the habitats at NAF El Centro. Much of the land at NAF El Centro has been developed for various uses, including NAF activities, landscaping, and agricultural use. Therefore, the habitats at NAF El Centro have been disturbed. Metals, organic pesticides, and TRPH were identified as COPCs in soil at Site 3. Potential exposure routes include direct uptake of COPCs in soil by plants, dermal absorption of COPCs in soil by wildlife receptors, and ingestion of COPCs in contaminated food by plant or wildlife receptors. Potentially complete exposure pathways were identified for Site 3. Due to potentially complete exposure pathways, further evaluation of Site 3 or site remediation to prevent occurrence of complete exposure pathways is recommended.

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Section B8
REFERENCES

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California Air Resources Board, Aerometric Data Division. 1984. California Surface Wind Climatology. June.

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NEESA. *See* Naval Energy and Environmental Support Activity.

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_____. 1993. Final Solid Waste Water Quality Assessment Test (SWAT)/Site Investigation (SI) Report - Site 1 Magazine Road Landfill, Site 2 Patrol Road Landfill, and Site 3 Sludge Disposal Area; Engineering Services for Installation Restoration Studies for the Naval Air Facility, El Centro, California. May.

Ogden. *See* Ogden Environmental and Energy Services, Incorporated.

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APPENDIX C

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Southwest Division
Naval Facilities Engineering Command
Contracts Department
1220 Pacific Highway, Room 135
San Diego, California 92132-5187

Contract No. N68711-92-D-4670

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY

CLEAN II

APPENDIX C
FINAL
APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
SITE 3, SLUDGE BURIAL AREA
NAF EL CENTRO, CALIFORNIA

CTO-0090/0280

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Prepared by:

BECHTEL NATIONAL, INC.
401 West A Street, Suite 1000
San Diego, California 92101

Signature: _____ Date: 12-Feb-97
Gregory A. Cagle, R.G., CTO Leader

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ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
ACL	alternate concentration limit
CAA	Clean Air Act
Ca-HSC	California Health and Safety Code
Cal-EPA	California Environmental Protection Agency
CAMU	corrective action management unit
CCR	*California Code of Regulations*
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CWA	Clean Water Act
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
EE/CA	Engineering Evaluation/Cost Analysis
ESA	Ecological Scoping Assessment
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
HSWA	Hazardous and Solid Waste Amendments
HWCA	Hazardous Waste Control Act
ICAPCD	Imperial County Air Pollution Control District
LUFT	(California) Leaking Underground Fuel Tank (Field Manual)
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
NAAQS	National Ambient Air Quality Standards
NAF	Naval Air Facility
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NFA	no further action
NPDES	National Pollutant Discharge Elimination System
PCB	polychlorinated biphenyl
ppm	parts per million
PRG	preliminary remediation goal

ACRONYMS/ABBREVIATIONS (continued)

RAP	Remedial Action Plan
RAWP	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RWQCB	(California) Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SIP	State Implementation Plan
SMCL	secondary maximum contaminant levels
SWAT	Solid Waste Assessment Test
SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resources Control Board
TBC	to be considered
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
USC	*United States Code*
U.S. EPA	United States Environmental Protection Agency

Section C1
INTRODUCTION

This report was prepared as an attachment to the Engineering Evaluation/Cost Analysis (EE/CA) prepared for Site 3 at Naval Air Facility (NAF) El Centro by the Southwest Division Naval Facilities Engineering Command (SWDIV) to evaluate applicable or relevant and appropriate requirements (ARARs).

C1.1 PURPOSE

The purposes of this document is to identify and evaluate potential federal and state ARARs and set forth the Department of the Navy (DON) determinations regarding those potential ARARs for removal alternatives addressed in the EE/CA.

This evaluation is the first step toward identifying potential ARARs from the universe of regulations, requirements, and guidance that may be pertinent to this site as identified by the DON or state agencies. It includes an initial determination of whether the potential ARARs actually qualify as ARARs pertinent to the site, and a comparison for stringency to identify the controlling ARARs. The identification of ARARs is an iterative process, and the final determination of ARARs will be made by the DON in the Action Memorandum, after public review, as part of the selection of the response action.

C1.2 SUMMARY OF CERCLA AND NCP REQUIREMENTS

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 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 that are 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 ARARs, the United States Environmental Protection Agency (U.S. EPA) has promulgated a requirement in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) mandating that CERCLA removal actions " . . . shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws" (40 *Code of Federal Regulations* [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.

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. If the requirement is not legally applicable, 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 sufficiently similar to the circumstances of the proposed response action and are well suited to the conditions of the site (U.S. EPA 1988). The criteria for determining relevance and appropriateness are listed in 40 CFR 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; and
- any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

Tables included in this attachment present each potential ARAR with a determination of its status (i.e., applicable or relevant and appropriate). 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 remedial 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. Negative determinations are documented in the tables of this attachment and will be discussed in the text only for specific cases.

In order to qualify as a state ARAR under CERCLA and the NCP, a state requirement must be:

- state law,
- 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, and
- consistently applied.

In order to constitute an ARAR, a requirement must be substantive. Therefore, only substantive provisions of requirements identified as ARARs in this analysis shall be considered ARARs. Section 121(e)(1) of CERCLA 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." Permits are considered procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that are determined to be procedural or nonenvironmental, including permit requirements, are not considered to be ARARs.

Nonpromulgated guidance or advisories issued by federal or state government are not legally binding and do not have the status of ARARs. Such requirements may, however, be useful and are to be considered. "To be considered" (TBC) 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 U.S. EPA guidance, 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; however, some potential ARARs do not fall precisely into one group or another.

ARARs are identified on a site basis for remedial actions where CERCLA authority is the basis for cleanup. As the lead federal agency, the DON has primary responsibility for identification of federal ARARs at NAF El Centro. The California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC) is the lead agency for identifying potential state ARARs. Potential federal and state ARARs that have been identified for Site 3 are discussed below.

C1.3 DESCRIPTION OF METHODOLOGY

In preparing this ARARs analysis, the DON undertook ARAR evaluation measures consistent with CERCLA and the NCP. These measures included:

- identifying federal ARARs for the site and for each removal action alternative addressed in the EE/CA;
- preliminarily identifying potential state ARARs;
- evaluating and comparing federal ARARs and their state counterparts in order to determine which state ARARs are more stringent or are in addition to the federal ARARs; and
- determining which federal and state ARARs were the most stringent and/or "controlling" ARARs for each alternative.

Site 3 was used for sewage sludge disposal during 1986. Analytical results indicate that the contaminated soil may contain hazardous concentrations of metals and chlordane. The objective of the removal action is to:

- reduce the potential for human and ecological exposure to contaminants potentially present at the site;
- mitigate contaminated soils that have the potential to contaminate groundwater; and
- attain a no further action (NFA) status for the site.

In view of these objectives, waste will not be left in place at Site 3.

C1.4 IDENTIFICATION AND EVALUATION OF STATE ARARS

In a letter dated 13 April 1995, the DON requested that the Cal-EPA DTSC identify potential state ARARs for NAF El Centro Installation Restoration Program sites, including Site 3. A reply was received on 21 June 1995. State ARARs listed in the Cal-EPA DTSC letter were considered for their applicability or relevance to the site conditions and objectives of the removal action at Site 3. Those that met the evaluation criteria are identified in this document as potential state ARARs.

C1.5 GENERAL APPROACH TO REQUIREMENTS OF FEDERAL RESOURCE CONSERVATION AND RECOVERY ACT

The Resource Conservation and Recovery Act (RCRA) was enacted in 1976 as a federal statute to meet three goals: the protection of human health and the environment, the reduction of waste and the conservation of energy and natural resources, and the prevention of hazardous waste generation as expeditiously as possible. The Hazardous and Solid Waste Amendments of 1984 significantly expanded the scope of RCRA by adding new corrective action requirements, land-disposal restrictions, and technical requirements. RCRA, as amended, contains several provisions that are potential ARARs for CERCLA sites. Substantive RCRA requirements are applicable to response actions on CERCLA sites if the following conditions are met.

- The waste is a RCRA hazardous waste, and either:
  - the waste was initially treated, stored, or disposed after the effective date of the particular RCRA requirement; or
  - the activity at the CERCLA site constitutes treatment, storage, or disposal, as defined by RCRA (U.S. EPA 1988).

State regulations that are a component of a federally authorized or delegated state program are generally considered federal requirements and potential federal ARARs for the purposes of ARAR analysis (55 *Federal Register* 8742). The state of California received approval for its base RCRA hazardous waste management program on 23 July 1992 (57 *Federal Register* 8742). The California "Environmental Health Standards for the Management of Hazardous Waste" set forth in Division 4.5 of Title 22 of the *California Code of Regulations* (CCR) were approved by the U.S. EPA as a component of the federally authorized California RCRA program.

The regulations at Division 4.5, Title 22 CCR are, therefore, a source of potential federal ARARs for CERCLA response actions. The exception is a state regulation that is "broader in scope" than the corresponding federal RCRA regulations. In that case, such regulations are not considered part of the federally authorized program or potential federal ARARs. Instead, they are state law requirements and potential state ARARs.

A key threshold question for this ARAR analysis is whether the contaminants at Site 3 constitute hazardous waste as defined under RCRA and the state-authorized program, or whether they qualify as nonhazardous waste. Analytical results of soil samples taken at Site 3 during the Site Investigation (SI) (Ogden 1993) indicate that the soil may contain concentrations of some metals at levels that would make it hazardous according to the definitions under CCR Title 22. A conclusive determination cannot be made at this time since the analysis was for total metals and not for the soluble concentration using either the toxicity characteristic leachate procedure, as required for a RCRA hazardous waste determination, or the Cal-EPA Waste Extraction Test, as required for a non-RCRA hazardous waste determination.

Based on the maximum concentrations detected at Site 3, the soil may be RCRA-hazardous for chromium (as hexavalent chromium) and lead, and non-RCRA, Cal-EPA-regulated hazardous waste for cadmium, chromium, and lead. These determinations are made by comparing the maximum total chemical concentrations detected in soil samples collected at Site 3 during the Solid Waste Assessment Test (SWAT)/SI to 20 times the regulatory level for RCRA and 10 times the soluble threshold limit concentration for non-RCRA, Cal-EPA-regulated hazardous waste. This methodology gives a conservative estimate of which contaminants may be present at hazardous regulated levels.

For the purpose of ARARs, it is concluded that the waste at Site 3 has the potential to be a hazardous waste. Thus, once this waste has been disturbed, generator, transporter, and land-disposal restrictions may be applicable to the management of site wastes. Other Subtitle C requirements may be applicable or relevant and appropriate as this site appears to be similar to a type of RCRA-regulated unit.

C1.6 CALIFORNIA CANCER POTENCY FACTORS

In a letter dated 28 June 1993, Dr. John Christopher of DTSC indicated that ". . . Cal-EPA interprets its published cancer potency factors to meet the criteria for designation as <u>potential</u> chemical-specific ARAR criteria . . . [emphasis added]" (Cal-EPA DTSC 1993). In a letter dated 24 September 1993 from James R. Pawlisch of the DON to John Scandura of the DTSC, the DON posed a number of questions to the DTSC concerning its position on the ARARs status of state cancer potency factors (SWDIV 1993).

The DON has conducted independent research and concluded that the state cancer potency factors do not constitute ARARs because they were not "promulgated" as required under 40 CFR Section 300.400(g)(4). This conclusion is based upon the following findings.

- The cancer potency factors have not been promulgated under the provisions of the State of California Administrative Procedures Act. The cancer potency factors have not been adopted as a regulation as required for a rule or policy as a regulation as provided in Government Code Section 11342. The cancer potency factors themselves are not published in the CCR as regulations (Government Code Section 11344).
- The State of California Administrative Procedures Act provides that no state agency may enforce any "guideline, criterion, bulletin, manual, instruction, order, standard of general application, or other rule" unless it has been adopted as a regulation (Government Code Section 11342).
- Because the state cancer potency factors were not promulgated as regulations, they are not enforceable by the state.
- Section 300.400(g)(4) of the NCP requires that state standards must be "promulgated" in order to be constitute state ARARs. In order to be "promulgated" they must be of "general applicability" and "legally enforceable." Because the state cancer potency factors were not promulgated and are not legally enforceable under state law, they are not ARARs.

On 31 March 1994, the DTSC responded to a letter from the DON concerning California cancer potency factors and concurred that these factors are not ARARs; however, the DTSC maintained that they are TBCs (Cal-EPA DTSC 1994). As lead federal agency, the DON will consider utilizing the state cancer potency factors that are more "stringent" than or in addition to U.S. EPA cancer potency factors as TBCs in risk assessments on a site-by-site, chemical-by-chemical basis, as appropriate (40 CFR Section 300.400[g][3]).

C1.7 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The U.S. EPA and the DON have determined that the requirements of the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) are no more stringent than the requirements for environmental review under CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA). Pursuant to the provisions of CERCLA, the NCP, and other federal environmental impact evaluation requirements, selecting a remedial action with feasible mitigation measures and providing for public review are designed to assure that the proposed action provides for the short-term and long-term protection of the environment and public health and, hence, perform the same function as and are substantially parallel to, the state requirements under CEQA.

Therefore, NEPA and CEQA are not ARARs for this site.

Section C2
CHEMICAL-SPECIFIC ARARs

Chemical-specific ARARs are generally health- or risk-based numerical values or methodologies applied to site-specific conditions that result in the establishment of numerical values. Many potential ARARs associated with particular remedial alternatives can be characterized as action-specific ARARs, but because they include numerical values or methodologies, they fit into both categories of ARARs. To simplify the comparison of numerical values, action-specific ARARs with numerical values are discussed in this section.

Conclusions for ARAR determinations that address numerical values are presented by media: groundwater, surface water, soil, and air. A more detailed discussion of the ARARs for each medium follows. Potential chemical-specific ARARs are listed in Tables C2-1 and C2-2.

C2.1 GROUNDWATER ARARs

The objective of this removal action is to reduce the immediate human health and ecological risk posed by the contaminated soil present at Site 3. Groundwater at the site has not been characterized to determine if it is currently impacted by the contaminated soil. Future consideration of groundwater at Site 3 will include characterization, monitoring, and remedial action, as appropriate. Additional chemical-specific ARARs for groundwater may be identified at that time.

C2.2 SURFACE WATER ARARs

The objective of the removal action is to reduce the immediate human health and ecological risk posed by contaminated soil at Site 3. Discharges to surface water are not anticipated by any of the proposed removal action alternatives. No chemical-specific ARARs are identified for surface water at this time.

C2.3 SOIL ARARs

Due to the potentially hazardous concentrations of metals in the soil at Site 3, the RCRA and DTSC hazardous waste management regulations appear to be the controlling chemical-specific ARARs for soil.

C2.3.1 Federal ARARs

Based on the maximum concentrations detected in soil samples at Site 3 (Ogden 1993), the soil may be a RCRA hazardous waste by its toxicity characteristics for chromium and lead. The requirements that determine whether a waste is a RCRA hazardous waste are described in 22 CCR 66261.100. The applicable chemical-specific standards of RCRA include the maximum concentrations of contaminants for the toxicity characteristic (22 CCR 66261.24a[1]). Other RCRA requirements that may apply or be relevant and appropriate are addressed in Section C4 according to the action that precipitates the requirement.

Table C2-1
Potential Federal Chemical-Specific ARARs[a,b,c] by Media

Requirement	Prerequisite	Citation	ARAR Determination	Comments
GROUNDWATER				
Resource Conservation and Recovery Act				
Groundwater protection standards: owners/operators of RCRA[d] treatment, storage, or disposal facilities must comply with conditions in this section that are designed to assure that hazardous constituents entering the groundwater from a regulated unit do not exceed the concentration limits for contaminants of concern set forth under Section 66264.94 in the uppermost aquifer underlying the waste management area beyond the point of compliance.	Uppermost aquifer underlying a waste management unit beyond the point of compliance; RCRA hazardous waste, treatment, storage, or disposal.	22 CCR[e] 66264.94, except 66264.94(a)(2), and 94(b)	Not an ARAR	Groundwater is not being addressed in this removal action; this regulation is potentially relevant and appropriate in the future after characterization of groundwater at Site 3 is complete.
Comprehensive Environmental Response, Compensation, and Liability Act				
Alternate concentration	There are known and projected points of entry of groundwater to surface water; there is no statistically significant increase of hazardous constituents from groundwater in surface water at point of entry; and there are enforceable institutional controls to preclude human exposure at any point between the facility boundary and the point of entry to surface water.	CERCLA[f] Section 121(d)(2)(B)(ii)	Not an ARAR	The removal action at Site 3 will address contaminated soil, not groundwater.

(table continues)

Table C2-1 (continued)

Requirement	Prerequisite	Citation	ARAR Determination	Comments
SURFACE WATER				
Safe Drinking Water Act, 42 USC[g] 300				
National primary drinking water standards are health-based standards for public water systems, including MCLs[h] MCLGs[i].	Public water system	40 CFR[j] 141.11 - 141.16, excluding 141.11(d)(3); 40 CFR 141.60-141.63	Not an ARAR	MCLGs that have nonzero values are relevant and appropriate for surface water determined to be a current or potential source of drinking water (NCP[k] Section 300.430[e][2][i][B] through [D]). The NCP also defines MCLs as relevant and appropriate for surface water determined to be a current or potential source of drinking water in cases where MCLGs are not ARARs. The proposed removal action does not involve nearby surface water bodies (New River and Elder Canal).
National secondary drinking water regulations are standards for the aesthetic qualities of public water systems (SMCLs[l]).	Public water system	40 CFR 143	Not an ARAR	SMCLs are nonenforceable federal contaminant levels intended as guidelines for the states. Because federal SMCLs are nonenforceable, they are not ARARs. The proposed removal action does not involve nearby surface water bodies (New River and Elder Canal).

(table continues)

Table C2-1 (continued)

Requirement	Prerequisite	Citation	ARAR Determination	Comments
SURFACE WATER (continued)				
Clean Water Act, 33 USC 1251 et seq.				
Water quality standards	Discharges to waters of the United States	33 USC 1313 and 57 Federal Register 60920-60921	Not an ARAR	No discharges to surface waters are anticipated as part of the Site 3 removal action.
SOIL				
Resource Conservation and Recovery Act				
Definition of RCRA hazardous waste.	Waste soil	Title 22 CCR Sections 66261.21, 66261.22(a)(1) and (2) 66261.23, 66261.24(a)(1), and 66261.100	Applicable	Applicable for determining whether excavated soil is hazardous waste.
Toxic Substances Control Act				
Regulates use and manufacture of toxic substances and storage and disposal of PCBs[m]	Soils, debris, sludge, or dredged materials contaminated with PCBs at concentrations greater than 50 parts per million.	40 CFR 761.60, excluding 761.60(a)(B and D), 761.60(a)(3)(iii)(3), 761.60(e), 761.60(f), 761.65(a and b), 761.65(c), except 761.65(c)(9), 761.65(e)(6)(ii and iii), 761.65(e)(7 and 8), 761.79; 15 USC 2601, et seq.	Not an ARAR	PCBs were not detected at Site 3. TSCA[n] requirements are neither applicable nor relevant and appropriate.

(table continues)

Table C2-1 (continued)

Requirement	Prerequisite	Citation	ARAR Determination	Comments
Federal Insecticide, Fungicide, and Rodenticide Act				
Procedures recommended for all pesticide storage and disposal activities.	Recommendations for the disposal of organic pesticides, metal-organic pesticides, organic mercury, lead, cadmium, arsenic, and all inorganic pesticides.	40 CFR 165.8	Not an ARAR	Not applicable because FIFRA[o] contains nonbinding recommendations for storage and disposal of excess pesticides and pesticide containers at non-U.S. EPA[p] sites. At this time, these procedures are not potential ARARs for CERCLA cleanup actions, but should be considered when developing a protective remedy that involves disposal of pesticide waste or soils and debris highly contaminated with pesticides. Waste soil at Site 3 is not highly contaminated with pesticides.
AIR				
Clean Air Act, 40 USC 7401 et seq.				
National Ambient Air Quality Standards: Primary and secondary standards for ambient air quality to protect public health and welfare (including standards for particulate matter and lead).	Contamination of air affecting public health and welfare.	40 CFR 50.4 - 50.12	Not an ARAR	Not directly enforceable and therefore not an ARAR.
Provisions of State Implementation Plan approved by U.S. EPA under Section 110 of CAA[q].	Major sources of air pollutants	40 USC 7410; portions of 40 CFR 52.220 applicable to Imperial County Air Pollution Control District.	Not an ARAR	Point source emission of air pollutants regulated by SIP[r] is not relevant or appropriate to current conditions at Site 3. Emissions that would be part of the removal action should be evaluated under the action-specific requirements.

(table continues)

Table C2-1 (continued)

Requirement	Prerequisite	Citation	ARAR Determination	Comments
RCRA Air Emissions Requirements				
Air emission standards for process vents or equipment leaks	Equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight or process vents associated with specified operations that manage hazardous wastes with organic concentrations of at least 10 parts per million by weight.	22 CCR 66264.1030 through 1034, excluding 1030(c),1033(j), 1034(c)(2), 1034(d)(2); 22 CCR 66264.1050 through 1063, excluding 1050(c,d), 1057(g)(2), 1061(d), 1063(d)(3)	Not an ARAR	Soil at Site 3 does not contain volatile organic compounds in excess of 10 percent by weight. Waste management operations affected by these regulations are not planned for the removal action at Site 3.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

[c] Chemical-specific concentrations used for removal action alternative evaluation may not be ARARs indicated in this table, but the concentrations may be based upon other factors. Such factors may include the following:

- human-health risk-based concentrations (risk-based PRGs; 40 CFR 300.430[e][A][1] and [2])
- ecological risk-based concentrations (40 CFR 300.430[e][G])
- practical quantitation limits of contaminants (40 CFR 300.430[e][A][3])

Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

[d] RCRA – Resource Conservation and Recovery Act

[e] CCR – *California Code of Regulations*

[f] CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

[g] USC – *United States Code*

[h] MCL – maximum contaminant level

[i] MCLG – maximum contaminant level goal

[k] NCP – National Oil and Hazardous Substances Pollution Contingency Plan

[j] CFR – *Code of Federal Regulations*

[l] SMCL – secondary maximum contaminant level

[m] PCB – polychlorinated biphenyl

[n] TSCA – Toxic Substances Control Act

[o] FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act

[p] U.S. EPA – United States Environmental Protection Agency

[q] CAA – Clean Air Act

[r] SIP – State Implementation Plan

Table C2-2
Potential State Chemical-Specific ARARs[a,b,c]

Requirement	Prerequisites	Citation	ARAR Determination	Comments
GROUNDWATER, SURFACE WATER AND SOIL				
California Environmental Protection Agency Department of Toxic Substances Control				
Definition of non-RCRA[d] hazardous waste	Waste soil	22 CCR[e] 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C), or 66261.3(a)(2)(F)	Applicable	Applicable for determining whether excavated soil is a non-RCRA hazardous waste.
State maximum contaminant level list	Public water system	22 CCR 64435 and 64444.5	Not an ARAR	See comment under Federal Safe Drinking Water Act, Table C2-1.
State secondary maximum contaminant level list	Public water system	22 CCR 64473	Not an ARAR	See comment under Federal Safe Drinking Water Act, Table C2-1.
State and Regional Water Quality Control Board				
Authorizes the state and regional Water Boards to establish in Water Quality Control Plans beneficial uses and numerical and narrative standards to protect both surface and groundwater quality; authorizes regional water boards to issue permits for discharges to land, surface water, or groundwater that could affect water quality, including National Pollutant Discharge Elimination System permits, and to take enforcement action to protect water quality.	Existence of surface water or groundwater	California Water Code, Division 7, Section 13241, 13243, 13263(a), and 13360 (Porter-Cologne Water Quality Control Act)	Not an ARAR	Removal action will not affect surface water quality or address groundwater.
		Other provisions of Porter-Cologne Water Quality Control Act	Not an ARAR	
Describes the water basins in Colorado River Basin region; establishes beneficial uses of ground and surface waters; establishes water quality objectives, including narrative and numerical standards; establishes implementation plans to meet water quality objectives and protect beneficial uses and incorporates statewide water quality control plans and policies.	Existence of surface water or groundwater	Comprehensive Water Quality Control Plan for the Colorado River (Water Code 13240)	Not an ARAR	Substantive provisions would be ARARs for removal actions affecting water quality. The removal action at Site 3 will not affect surface water quality or address groundwater.

(table continues)

Table C2-2 (continued)

Requirement	Prerequisites	Citation	ARAR Determination	Comments
Incorporated into all regional Board Basin Plans; designates all ground and surface waters of the State as drinking water except where the total dissolved solids are greater than 3,000 parts per million, the well yield is less than 200 gallons per day from a single well, the water is a geothermal resource or in a water conveyance facility, or the water cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices.	Existence of surface water or groundwater	State Water Resources Control Board Resolution No. 88-63 (Sources of Drinking Water Policy)	Not an ARAR	Not applicable because the removal action at Site 3 will not affect surface water quality or address groundwater.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes in their entirety or policies as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs.

[c] Chemical-specific concentrations used for the removal action alternative evaluation may not be ARARs indicated in this table, but the concentrations may be based upon other factors. Such factors may include the following:

- human health risk-based concentrations (risk-based PRGs) [40 CFR 300.430(e)(A)(1) and (2)]
- ecological risk-based concentrations [40 CFR 300.430(e)(G)]

practical quantitation limits of contaminants [40 CFR 300.430(e)(A)(3)]

Many potential action-specific ARARs contain chemical-specific limitations and are addressed in the action-specific ARAR tables.

[d] RCRA – Resource Conservation and Recovery Act

[e] CCR – California Code of Regulations

C2.3.2 State ARARs

Based on the maximum concentrations of chemicals of concern detected at Site 3, the soil may be non-RCRA, state-regulated hazardous waste for cadmium and lead. Thus, Title 22 is applicable, and its chemical-specific requirements for characterization of the excavated soil include the list of inorganic persistent and bioaccumulative toxic substances (22 CCR 66261.24[a][2][A]) and the list of organic persistent and bioaccumulative toxic substances (22 CCR 66261.24[a][2][B]).

C2.4 AIR ARARs

Site 3 is not a source of emissions of any regulated pollutants or volatile organic compounds. Thus, no federal or state chemical-specific ARARs have been identified for Site 3.

C2.4.1 Federal ARARs

The Clean Air Act (CAA) establishes the National Ambient Air Quality Standards (NAAQS). NAAQS are not enforceable in and of themselves. NAAQS are translated into source-specific emissions limitations by the state. Site 3 does not appear to contain volatile organic compounds or other criteria pollutants. Possible particulate emissions in the form of fugitive dust due to construction activity are addressed in Section C4.2.1 below because they do not have a chemical-specific standard of control.

RCRA establishes air emission requirements for process vents and equipment leaks. These requirements do not apply to the intended removal action at Site 3.

C2.4.2 State ARARs

There are no requirements of the Imperial County Air Pollution Control District (ICAPCD) that present chemical-specific standards applicable or relevant to Site 3.

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Section C3
LOCATION-SPECIFIC ARARs

Location-specific ARARs restrict proposed removal activities at Site 3 based upon various attributes of the site location and conditions. Potential federal and state location-specific ARARs are summarized in Tables C3-1 and C3-2.

C3.1 FEDERAL LOCATION-SPECIFIC ARARs

Pertinent and substantive provisions of the following environmental laws and regulations were reviewed to determine whether they were potential federal ARARs for Site 3:

- 22 CCR 66264.18 (a), (b), and (c) (Hazardous Waste Control Act)
- CFR Part 6, 6.302 and Appendix A (excluding Sections 6(a)(2), 6(a)(4), and 6(a)(6) (Executive Order 11988, Protection of Floodplains, and Executive Order 11990, Protection of Wetlands)
- CFR Part 65 (National Archaeological and Historical Preservation Act)
- CFR Part 800 (National Historic Preservation Act, Section 106)
- United States Code (USC) Section 1536(a) (Endangered Species Act of 1973)
- CFR 230.10, 231, 231.1, 231.2, 231.7, and 231.8 (Clean Water Act, Section 404)
- CFR Section 35.1 et seq. (Wilderness Act)
- USC Section 662 (Fish and Wildlife Coordination Act)
- USC 1271 et seq. and Section 7(a) (Wild and Scenic Rivers Act)
- USC 461-467 (Historic Site, Buildings, and Antiquities Act)
- USC 403 (Rivers and Harbors Act of 1890)
- USC Section 703 (Migratory Bird Treaty Act of 1972)

Site 3 is not an identified wetland, historic, or archeological area. In addition, there are no endangered fish, or wild and scenic rivers. A basewide archeological survey performed as part of a Historical and Archeological Resources Plan for NAF El Centro (KEA 1994) did not identify archeological sites proximate to Site 3.

The Ecological Scoping Assessment (ESA) performed as part of this EE/CA identified the potential for the flat-tailed horned lizards and burrowing owls to be present at the site. Both of these species are considered California species of special concern. In addition, the flat-tailed horned lizard is proposed as a threatened species for the federal endangered species list. Based on this assessment, the Endangered Species Act of 1973 is identified as a potential ARAR because the removal actions will involve excavation of potential habitats.

Table C3-1
Potential Federal Location-Specific ARARs[a,b]

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Hazardous Waste Control Act					
Within 61 meters (200 feet) of a fault displaced in Holocene time	New treatment, storage, or disposal of hazardous waste prohibited	Treatment, storage, or disposal of hazardous waste	22 CCR[c] 66264.18(a)	Not an ARAR	Site 3 is not known to be located within 61 meters of a fault.
Within 100-year floodplain	Facility must be designed, constructed, operated, and maintained to avoid washout of hazardous waste	Treatment, storage, or disposal of hazardous waste	22 CCR 66264.18(b)	Not an ARAR	Site 3 is not located within a 100-year floodplain.
Within salt dome formation, underground mine, or cave	Placement of noncontainerized or bulk liquid hazardous waste prohibited	Hazardous waste placement	22 CCR 66264.18(c)	Not an ARAR	Site 3 does not contain any known salt domes, mines or caves. Also the removal action does not involve placement of noncontainerized or bulk liquid hazardous waste in salt domes, mines and caves.
Executive Order 11988, Protection of Floodplains					
Within floodplain	Actions taken should avoid adverse effects, minimize potential harm, and restore and preserve natural and beneficial values	Action that will occur in a floodplain (i.e., lowlands) and relatively flat areas adjoining inland and coastal waters and other flood-prone areas	40 CFR[d] 6, Appendix A excluding Sections 6(a)(2), 6(a)(4), 6(a)(6); 40 CFR 6.302	Not an ARAR	Site 3 is not located within the floodplain of the New River.
National Archaeological and Historical Preservation Act					
Within area where action may cause irreparable harm, loss, or destruction of significant artifacts	Construction on previously undisturbed land would require an archaeological survey of the area	Alteration of terrain that threatens significant scientific, prehistoric, historic, or archaeological data	Substantive requirements of 36 CFR 60	Not an ARAR	An archeological survey previously performed in the vicinity of Site 3 did not identify any archeological sites in close proximate to Site 3.

(table continues)

Table C3-1 (continued)

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
National Historic Preservation Act 1992, as amended, Section 106					
Historic project owned or controlled by federal agency	Action to preserve historic properties; planning of action to minimize harm to properties listed on or eligible for listing on the National Register of Historic Places	Property included in or eligible for the National Register of Historic Places	Substantive requirements of 36 CFR 800	Not an ARAR	The areas to be disturbed during the response action at Site 3 are not known to be eligible for the National Register of Historic Places No buildings exist at the site.
Endangered Species Act of 1973					
Critical habitat upon which endangered species or threatened species depend	Action to conserve endangered species or threatened species, including consultation with the Department of the Interior	Determination of effect upon endangered or threatened species or its habitat	16 USC[e] 1536(a)	Relevant and appropriate	Relevant and appropriate because the Ecological Scoping Assessment conducted for Site 3 indicates species proposed for inclusion on the national endangered species list have the potential to use the site.
Executive Order 11990, Protection of Wetlands					
Wetland	Action to minimize the destruction, loss, or degradation of wetlands	Wetland as defined by Executive Order 11990 Section 7	40 CFR 6, Appendix A, excluding Sections 6(a)(2). 6(a)(4), 6(a)(6); 40 CFR 6.302	Not an ARAR	There are no wetlands in the immediate vicinity of Site 3, and there will be no discharges to surface water.
Clean Water Act, Section 404					
Wetland	Prohibits discharge of dredged or fill material into wetland without permit	Wetland as defined by Executive Order 11990 Section 7	40 CFR 230.10; 40 CFR 231 (231.1, 231.2, 231.7, 231.8)	Not an ARAR	No discharge of dredged or fill material to a wetland is planned as part of the removal action at Site 3.
Wilderness Act					
Wilderness area	Area must be administered in such a manner as will leave it unimpaired as wilderness and preserve its wilderness character	Federally owned area designated as wilderness area	50 CFR 35.1 et seq.	Not an ARAR	Site 3 is not located in a federally owned wilderness area.

(table continues)

Table C3-1 (continued)

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
National Wildlife Refuge System					
Wildlife refuge	Only actions allowed under the provisions of 16 USC Section 668 dd(c) may be undertaken in areas that are part of the National Wildlife Refuge System	Area designated as part of National Wildlife Refuge System	50 CFR 27	Not an ARAR	Site 3 is not part of the National Wildlife Refuge System.
Fish and Wildlife Coordination Act, Section 662					
Area affecting stream or other water body	Action taken should protect fish or wildlife	Diversion, channeling or other activity that modifies a stream or other water body and affects fish or wildlife	16 USC 662	Not an ARAR	This removal action does not modify a stream or other water body and does not affect fish or wildlife.
Wild and Scenic Rivers Act					
Within area affecting national wild, scenic, or recreational river	Avoid taking or assisting in action that will have direct adverse effect on scenic river	Activities that affect or may affect any of the rivers specified in Section 1276(a)	16 USC 1271 et seq. and Section 7(a)	Not an ARAR	This removal action does not impact wild, scenic, or recreational rivers. There are no such rivers in the vicinity of Site 3.
Coastal Zone Management Act					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs	Activities affecting the coastal zone, including lands thereunder and adjacent shore land	Section 307(c) of 16 USC 1456(c); also see 15 CFR 930 and 923.45	Not an ARAR	Site 3 is not near a coastal area.
Coastal Barrier Resources Act, Section 3504					
Within designated coastal barrier	Prohibits any new federal expenditure within the Coastal Barrier Resource System	Activity within the Coastal Barrier Resource System	16 USC 3504	Not an ARAR	Site 3 is not near a coastal area.
Historic Sites, Buildings, and Antiquities Act					
Historic sites	Avoid undesirable impacts on landmarks	Areas designated as historic sites	16 USC 461-467	Not an ARAR	The areas to be disturbed during the removal action are not known to be eligible for designation as historic sites.

(table continues)

Table C3-1 (continued)

Location	Requirement	Prerequisite	Citation	ARAR Determination	Comments
Rivers and Harbors Act of 1890					
Navigable waters	Permits required for structures or work in or affecting navigable waters	Activities affecting navigable waters	33 USC 403	Not an ARAR	Removal action at Site 3 will not affect navigable waters.
Migratory Bird Treaty Act of 1972					
Migratory bird area	Protects almost all species of native birds in the U.S. from unregulated "take," which can include poisoning at hazardous waste sites	Presence of migratory birds	16 USC Section 703	Not an ARAR	The Ecological Scoping Assessment did not indicate the presence of migratory birds at Site 3.
Marine Mammal Protection Act					
Marine mammal area	Protects any marine mammal in the U.S. except as provided by international treaties from unregulated "take"	Presence of marine mammals	16 USC 1372(2)	Not an ARAR	Site 3 is located inland, and therefore, marine mammals are not present.
Magnuson Fishery Conservation and Management Act					
Fishery under management	Provides for conservation and management of specified fisheries within specified fishery conservation zones	Presence of managed fisheries	16 USC 1801, et seq.	Not an ARAR	Site 3 is located inland, and is therefore not within a specified fishery conservation zone.

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statues or policies in their entirety as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific citations are considered potential ARARs.

[c] CCR – *California Code of Regulations*

[d] CFR – *Code of Federal Regulations*

[e] USC – *United States Code*

Table C3-2
Potential State Location-Specific ARARs[a,b]

Location	Requirement	Prerequisites	Citation	ARAR Determination	Comments
Fish and Game Code					
Endangered species habitat	No person shall import, export, take, possess, or sell any endangered or threatened species or part or product thereof	Threatened or endangered species determination on or before 1 January 1985 or a candidate species with proper notification	Fish and Game Code Section 2080	Relevant and Appropriate	Ecological Scoping Assessment identified potential for two California species of special concern to use the site. One of these species (the flat-tailed horned lizard) has been proposed as a threatened species for inclusion on the federal threatened and endangered species list.
Endangered species habitat	Department policy and legislative findings and definitions for significant natural areas		Fish and Game Code Sections 2050-2068	Not an ARAR	Procedural; not a "cleanup standard, standard or control," or "other substantive requirement, criteria, or limitation."
Endangered species habitat	Assures that action taken will not jeopardize the survival and reproduction of any threatened or endangered species		Fish and Game Code Sections 2090-2096	Not an ARAR	Not effective after 1 January 1994.

Notes:
[a] ARAR – applicable or relevant and appropriate requirement
[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as potential ARARs. Specific potential ARARs follow each general heading; only substantive requirements of the specific citations are considered potential ARARs.

C3.2 STATE LOCATION-SPECIFIC ARARs

Provisions of the California Fish and Game Code pertaining to actions that may jeopardize the survival and reproduction of endangered species are potential state location-specific ARARs, because 1) the ESA identified the potential for California species of special concern and proposed threatened and endangered species (i.e., the flat-tailed horned lizard) to use the site, and 2) the removal action will disturb the site and potential habitats. No other state location-specific ARARs were identified.

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Section C4
ACTION-SPECIFIC ARARs

Potential action-specific ARARs are addressed according to actions anticipated in executing the removal at Site 3. The proposed removal action alternative includes characterization, excavation, and disposal of the contaminated soil. The contaminated soil will be stockpiled on-site (i.e., in waste piles) before disposal. Disposal of the soil may involve the reuse of the material as part of the landfill cover at the Magazine Road Landfill (Site 1), disposal of the material at an off-base Class II or III landfill, disposal of the material at a Class I landfill, or disposal of the material at an incinerator. It has not yet been determined if the contaminated soil at Site 3 is hazardous, nonhazardous, or inert. As such, potential ARARs for each case are considered.

Potential action-specific ARARs are listed in Tables C4-1 and C4-2.

C4.1 REMOVAL ACTION

Ca-HSC 253561.1.(b) states that except as provided in subdivision (h), a Remedial Action Plan (RAP) shall be prepared for a site where a removal action is planned. Ca-HSC 25356.1(h)(1) states that an RAP is not required if the conditions present at a site present an imminent or substantial endangerment to the public health and safety or to the environment, or if the estimated cost of the removal action is less than $1 million. However, a Removal Action Work Plan (RAWP) must be prepared if a nonemergency removal action is proposed and an RAP is not required. The planned removal action is estimated to cost less than $1 million; therefore, the EE/CA is intended to meet the requirements of the RAWP. The RAWP as defined in Ca-HSC 25323.1 includes a detailed engineering plan for conducting the removal action, a description of the on-site contamination, the goals to be achieved by the removal action, and discussion of any alternative removal options that were considered and rejected and the basis for that rejection.

C4.2 EMISSIONS

During execution of the removal action, fugitive dust emissions may occur, and fuel-burning equipment may be used. These activities may be subject to potential ARARs as discussed below.

C4.2.1 Fugitive Dust Emissions

Fugitive dust may be generated during the excavation and handling of the contaminated soil. The applicable provisions of the ICAPCD Regulation VIII and Rule 404 are considered potential ARARs for these activities. ICAPCD Regulation VIII requires that reasonably available control measures be applied to prevent fugitive dust emissions. Rule 404 limits the discharge of particulate matter from point sources.

Table C4-1
Potential Federal Action-Specific ARARs[a,b]

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
Resource Conservation and Recovery Act 42 USC[f] 6901 et seq.							
On-site waste generation	Person who generates waste shall determine if that waste is a hazardous waste.	Generation of waste in California.	22 CCR[g] 66262.10(a), 66262.11	1,2			Applicable for any operation where waste is generated. Determination of hazardous waste status should be documented.
Hazardous waste accumulation	Generator may accumulate waste on-site for 90 days or less or must comply with requirements for operating a storage facility.	Accumulation of hazardous waste.	22 CCR Section 66262.34	1,2			Accumulation of hazardous wastes on-site for longer than 90 days would be subject to requirements for storage facilities.
Waste pile	Design and operating requirements for waste piles. Use a single liner and leachate collection system, unless exempted. Controls for run-on, runoff, and fugitive emissions required.	Noncontainerized accumulation of solid, nonflammable hazardous waste that is used for treatment or storage.	22 CCR 66264.251 (except (j) and (I)1).		1,2		Relevant and appropriate to removal action alternatives that require temporary storage of excavated soil prior to treatment and disposal.
Closure of waste piles	At closure, owner shall remove or decontaminate all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate; owner shall manage all such waste as hazardous waste.	Waste pile used to store hazardous waste.	22 CCR 66264.258(a) and (b) except references to procedural requirements		1,2		Relevant and appropriate for closure of areas used for temporary storage of excavated soil.
Closure with no postclosure care (e.g., clean closure)	General performance standard requires elimination of need for further maintenance and control; elimination of postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products; removal or decontamination of all waste residues, contaminated containment system components, contaminated subsoils, and structures and equipment contaminated with waste and leachate; and management of all such waste as hazardous waste, as necessary.	Land-based unit containing hazardous waste. Hazardous waste placed at site after the effective date of the requirements, or placed into another unit. Cleanup to health-based standards that will not require long-term management. Not applicable to material treated, stored, or disposed only before the effective date of the requirements, or if treated *in situ*, or consolidated within area of contamination.	22 CCR 264.111 and 22 CCR 264.114 except for cross-references to procedural requirements such as preparation and submittal of closure plans and other notifications		1,2		Requirement relevant and appropriate for sites where clean closure or no further response action planned is a removal action objective. This is the case at Site 3.

(table continues)

Table C4-1 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination			Comments
				A[c]	RA[d]	TBC[e]	
RCRA[h] corrective action	An area at a RCRA facility may be designated as a CAMU[i]. Placement of remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes nor creation of a unit subject to minimum technology requirements.	RCRA corrective action management unit.	40 CFR[j] 264.552				Site 3 will not be used as a CAMU. Not an ARAR
Treatment of hazardous excavated soil	Establishes requirements for the owners and operators of facilities that treat hazardous waste by chemical, physical, or biological methods in other than tanks, surface impoundments, and land treatment facilities.	Hazardous waste treatment.	22 CCR 66264.600 - 603	1,2			Applicable to Alternatives 1 and 2 which involve treatment by solidification/stabilization.
Placement of waste in land-disposal unit	Attain land-disposal treatment standards before putting waste into landfill in order to comply with land-ban restrictions.	Placement of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, or underground mine or cave.	22 CCR 66268.40; 22 CCR 66268.105	1			Applicable if restricted hazardous waste is excavated at Site 3 and disposed of at Site 1.
Shipment of hazardous waste to off-site landfill	Generator notification and certification requirements.	Shipment of hazardous waste subject to land-disposal restrictions.	22 CCR 66268.7	2			Applicable if restricted hazardous waste from Site 3 is sent to off-site landfill with or without treatment.
Use of equipment that contacts hazardous waste with organic concentrations greater than 10 percent by weight	Air emission standards for process equipment leaks.	Specified equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight.	22 CCR 66264.1050 through 1063 (excluding 1050[c], 1050(d), 1057[g][2], 1061(d), 1063[d][3])				Waste at Site 3 contains organic compounds at concentrations less than 10 percent by weight. Not an ARAR

(table continues)

Table C4-1 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
Discharge to groundwater from regulated unit	Owners/operators of hazardous waste treatment, storage, or disposal facilities must comply with groundwater protection standards designed to assure that hazardous constituents entering the groundwater from a regulated unit do not exceed the concentration limits for chemicals of potential concern in the uppermost aquifer underlying the waste management area beyond the point of compliance.	Uppermost aquifer underlying a waste management unit beyond the point of compliance; hazardous waste, treatment, storage, or disposal.	22 CCR 66264.94(a),(b), (c), (d), (e), (f), and (g)				There will not be any discharges to groundwater from the removal action. This removal action will not be addressing existing groundwater conditions at Site 3. Not an ARAR
Toxic Substances Control Act 15 USC 2601 et seq							
On-site disposal of PCB[k] contaminated soil or debris	Nonliquid PCBs at concentrations of 50 ppm[l] or greater in the form of contaminated soil, rags, or other debris shall be disposed in a TSCA[m] approved incinerator or in a TSCA-approved chemical waste landfill or by a TSCA-approved alternative disposal method.	Soil containing greater than 50 ppm PCBs.	40 CFR 761(a)(4), 761.60(e)				PCBs were not detected at Site 3. Not an ARAR
Federal Insecticide, Fungicide, and Rodenticide Act							
Disposal of pesticides	Unacceptable disposal methods include: • those inconsistent with the label, • open dumping, • open burning, and • disposal into any body of water. Chemically deactivate pesticide and recover heavy metals. If chemical deactivation facilities are not available, encapsulate the pesticide and bury it. Store pesticide if neither deactivation nor burial are available.	Treatment recommended for organic mercury, lead, cadmium, arsenic, and all inorganic pesticides.	40 CFR 165.7 and 165.8				Not an enforceable requirement. Removal actions do not involve open dumping, open burning, or discharge to water of regulated pesticides. Not an ARAR

(table continues)

Table C4-1 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination			Comments
				A[c]	RA[d]	TBC[e]	
Clean Air Act 40 USC 7401 et seq.							
Discharge to air	Provisions of State Implementation Plan approved by U.S. EPA[n] under Section 110 of CAA[o]	Major sources of air pollutants.	40 USC Section 7410; portions of 40 CFR Section 52.220 applicable to ICAPCD[p]				Specific pertinent rules are listed below. Not an ARAR
Fugitive dust emissions	Persons engaging in the handling, transport, or disposition of bulk materials shall apply reasonably available control measures to prevent fugitive dust emissions.	Engaging in nonexempt handling, transport, or disposition of bulk materials.	ICAPCD Regulation VIII	1,2			Removal actions will involve nonexempt handling, transport, and disposition of bulk materials.
Fuel-burning equipment	A person shall not build, erect, install, use, or expand any nonmobile fuel burning equipment unless the emissions meet specific criteria for sulfur compounds, nitrogen oxides, and combustion contaminants derived from fuel.	Must build, erect, install, use, or expand nonmobile fuel-burning equipment.	ICAPCD Rule 400	1,2			May be applicable if Alternative 1 or 2 involves installation or use of nonmobile fuel-burning equipment.
Opaque emissions	Release or discharge to the atmosphere from a single source of emission air contaminant for a period or periods of more than three minutes in any hour that registers darker than No. 1 on the Ringleman chart.	Discharge of opaque emissions.	ICAPCD Rule 401	1,2			May be applicable to emissions from fuel-burning equipment.
Particulate mater emissions	Discharge in one hour of particulate matter in total quantities in excess of the amount shown in referenced table.	Discharge of particulate emissions.	ICAPCD Rule 404	1,2			Excavation and handling of soil may result in discharge of particulate matter.
Combustion emission	Combustion contaminants limited to 0.2 grams per cubic foot of stack gas except during start-up.	Discharge of combustion emissions.	ICAPCD Rule 406	1,2			May be applicable if Alternatives 1 and 2 involves installation or use of nonmobile fuel-burning equipment.

(table continues)

Table C4-1 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
U.S. Department of Transportation, 49 USC 1802, et seq.							
Hazardous materials transportation	No person shall represent that a container or package is safe unless it meets the requirements of 49 USC 1802, et seq., or shall represent that a hazardous material is present in a package or motor vehicle if it is not.	Interstate carriers transporting hazardous waste and substances by motor vehicle. Transportation of hazardous material under contract with any department of the executive branch of the federal government.	49 CFR 171.2(f)	2	1		Substantive portions of these requirements would be ARARs for transport of hazardous materials on-site. Off-site transport must comply with both substantive and administrative requirements. Soil at Site 3 is potentially hazardous waste.
Hazardous materials marking, labeling, and placarding	Each person who offers hazardous material for transportation or each carrier that transports it shall mark each package, container, and vehicle in the manner required.	Person who offers hazardous material for transportation; carries hazardous material; or packages, labels, or placards hazardous material.	49 CFR 172.300, et. seq.	1,2			Soil at Site 3 is potentially hazardous waste.
	Each person offering nonbulk hazardous materials for transportation shall mark the proper shipping name and identification number (technical name) and consignee's name and address.		49 CFR 172.301	1,2			Soil at Site 3 is potentially hazardous waste.
	Hazardous materials for transportation in bulk packages must be labeled with proper ID[g] number, specified in 49 CFR 172.101 table, with required size of print. Packages must remain marked until cleaned or refilled with material requiring other marking.		49 CFR 172.302	1,2			Soil at Site 3 is potentially hazardous waste.
	No package marked with a proper shipping name or ID number may be offered for transport or transported unless the package contains the identified hazardous material or its residue.		49 CFR 172.303	1,2			Soil at Site 3 is potentially hazardous waste.
	The markings must be durable, in English, in contrasting colors, unobscured, and away from other markings.		49 CFR 172.304	1,2			Soil at Site 3 is potentially hazardous waste.

(table continues)

Table C4-1 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination A[c]	RA[d]	TBC[e]	Comments
Hazardous materials marking, labeling, and placarding (continued)	Labeling of hazardous material packages shall be as specified in the list.		49 CFR 172.400	1,2			Soil at Site 3 is potentially hazardous waste.
	Nonbulk combination packages containing liquid hazardous materials must be packed with closures upward, and marked with arrows pointing upward.		49 CFR 172.312	1,2			Soil at Site 3 is potentially hazardous waste.
	Each bulk packaging or transport vehicle containing any quantity of hazardous material must be placarded on each side and each end with the type of placards listed in Tables 1 and 2 of 49 CFR 172.504.		49 CFR 172.504	1,2			Soil at Site 3 is potentially hazardous waste.
Criteria for Classification of Solid Waste Disposal Facilities and Practices, 40 CFR Part 257							
Solid waste disposal	A facility or practice shall not contaminate an underground drinking water source beyond the solid waste boundary or a court- or state-established alternative.	Solid waste disposal facility and practices except agricultural wastes, overburden resulting from mining operations, land application of domestic sewage, location and operations of septic tanks, solid or dissolved materials in irrigation return flows, industrial discharges that are point sources subject to permits under CWA[f], source special nuclear or by-product material as defined by the Atomic Energy Act, hazardous waste disposal facilities that are subject to regulation under RCRA subtitle C, disposal of solid waste by underground well injection, and municipal solid waste landfill units.	40 CFR 257.3-4 and Appendix I				Groundwater at Site 3 is not addressed by this removal action. Not an ARAR

(table continues)

Table C4-1 (continued)

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs. Specific potential ARARs are addressed in the table below each general heading.

[c] A – applicable

[d] RA – relevant and appropriate

[e] TBC – to be considered

[f] USC – *United States Code*

[g] CCR – *California Code of Regulations*

[h] RCRA – Resource Conservation and Recovery Act

[i] CAMU – correction action management unit

[j] CFR – *Code of Federal Regulations*

[k] PCB – polychlorinated biphenyl

[l] ppm – parts per million

[m] TSCA – Toxic Substances Control Act

[n] U.S. EPA – United States Environmental Protection Agency

[o] CAA – Clean Air Act

[p] ICAPCD — Imperial County Air Pollution Control District

[q] ID – identification

[r] CWA – Clean Water Act

Table C4-2
Potential State Action-Specific ARARs[a,b]

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination			Comments
				A[c]	RA[d]	TBC[e]	
State Water Resources Control Board and Regional Water Quality Control Board							
Excavation of contaminated soil	Establishes policies and procedures for the oversight of investigations and cleanup and abatement activities resulting from discharges of waste that affect or threaten water quality. It requires cleanup of all waste discharged and restoration of affected water to background conditions. Requires actions for cleanup and abatement to conform to Resolution 68-16 and applicable provisions of Title 23 CCR[f], Division 3, Chapter 15 as feasible.	Prior discharge of waste	SWRCB[g] Resolution 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code §13304) (Water Code §13307)				Invalidated by California office of Administrative law in September 1993. Not an ARAR
Excavation of contaminated soil	Prohibits discharge of known human carcinogens or reproductive toxins to source of drinking water or on land where it could pass into a source of drinking water. Chemicals and applicable regulatory levels are listed in Title 22, CCR §12000 et seq.		Safe Drinking and Toxic Enforcement Act of 1986 (Proposition 65), California Health and Safety Code, Division 20				Not an ARAR
Excavation of contaminated soil	Guidance on allowable TPH[h] levels in soil.	TPH in soil	SWRCB, Leaking Underground Fuel Tank (Field Manual) (SWRCB 1989)			1,2	TBC for TPH remaining in soil following the removal.
California Code of Regulations, Title 23, Chapter 15							
Disposal of excavated soil in a land-based unit	Regulates siting, design, construction, operation, closure, and monitoring of waste discharges to land for treatment, storage, or disposal, including landfills, surface impoundments, waste piles, and land treatment facilities. Wastes regulated include hazardous waste, designated waste, nonhazardous waste, and inert waste.	Waste management unit	Title 23 CCR, Division 3, Chapter 15 (Discharges of Waste to Land), Article 1, Section 2511(d), Article 2, Sections 2520-2524	1,2			Applicable because Site 3 wastes are potential hazardous and/or designated waste.

(table continues)

Table C4-2 (continued)

Alternatives: 1 – Soil excavation, stabilization/solidification (if necessary), on-base reuse at Magazine Road Landfill, backfill the excavation; 2 – Soil excavation, stabilization/solidification (if necessary), off-base disposal, backfill the excavation.

Action	Requirement	Prerequisites	Citation	ARAR Determination			Comments
				A[c]	RA[d]	TBC[e]	
Waste pile	New waste piles shall comply with Article 4, Construction Standards.	Waste pile used to store hazardous or designated waste	Section 2540(d)		1,2		Relevant and appropriate for removal alternatives that require temporary storage of excavated soil prior to treatment and disposal.
Waste pile	Class I and Class II waste piles shall be covered as necessary to prevent percolation of precipitation through waste.	Waste pile used to store hazardous or designated waste	Section 2544(c)	1,2			Applicable because removal action at Site 3 potentially involves temporary storage of hazardous or designated waste in a waste pile.
Waste pile	Closure requirements for surface impoundments, waste piles and land treatment facilities.		Sections 2582, 2583, and 2584				Not more stringent than Federal ARARs at 22 CCR 66264.258. Not an ARAR
Use of contaminated soil in the foundation layer of a landfill cover	Contaminated soil may be used in the foundation layer of a landfill cover provided it has appropriate engineering properties.		Section 2581	1			

Notes:

[a] ARAR – applicable or relevant and appropriate requirement

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the Department of the Navy accepts the statutes or policies in their entirety as potential ARARs. Specific potential ARARs are addressed in the table below each general heading; only substantive requirements of the specific actions are considered potential ARARs.

[c] A – applicable

[d] RA – relevant and appropriate

[e] TBC – to be considered

[f] CCR – *California Code of Regulations*

[g] SWRCB – (California) State Water Resources Control Board

[h] TPH – total petroleum hydrocarbons

C4.2.2 Fuel-Burning Equipment

The requirements of ICAPCD Rule 401 prohibit air contaminant emissions from fuel-burning equipment darker than No. 1 on the Ringleman chart for more than 3 minutes total in any hour.

C4.3 WASTE PILES

The substantive provisions of 22 CCR 66262.34 are potential ARARs for waste accumulation proposed in Alternative 1. The requirements of 22 CCR 66264.251 (except Subsections [c], [j], and [l]1) are potential ARARs for waste pile design, construction, and monitoring. The provisions of 22 CCR 66264.258 (a) and (b), which pertain to the closure of waste piles, are also identified as potential ARARs.

C4.4 ON-SITE WASTE CLASSIFICATION

Generators of waste are required by 22 CCR 66262.10 (a) and 66262.11 to characterize the waste and determine if it is hazardous. These regulations are considered potential ARARs for the excavated soil produced in Alternative 1.

C4.5 TRANSPORT OF HAZARDOUS WASTES

Substantive portions of 49 CFR 171.2 (f) are considered potential ARARs for on-site transport of hazardous wastes. Off-site transport must comply with both substantive and administrative requirements. Substantive portions of 40 CFR 172.300, 172.301, 172.302, 172.303, 172.400, 174.312, and 172.504, which involve hazardous waste marking, labeling, and placarding, are also potential ARARs for on-site transport. Off-site disposal of soil classified as hazardous waste must also meet the manifesting requirements of 22 CCR 66262.20 Administrative and substantive requirements of these regulations are potential ARARs for off-site transport.

C4.6 PLACEMENT OF WASTE IN LAND-DISPOSAL UNIT

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 66264.300-310. Additionally, if classified as a RCRA hazardous waste, the soil will be subject to the land-disposal restrictions established in 22 CCR 66268.40 (for RCRA hazardous waste) or 22 CCR 66268.105 (for non-RCRA hazardous waste). These standards must be attained before land disposal of the waste. The waste analysis, record-keeping, notification, and certification provisions of the land-disposal restrictions (22 CCR 66268.7) are also potential ARARs for off-site landfill disposal of soil classified as RCRA or non-RCRA hazardous.

If the soil is determined to be nonhazardous but contains pollutants that could be released and cause degradation of groundwater, state regulations regarding waste discharge to land (23 CCR Division 3, Chapter 5) may be ARARs. Section 2522 of these regulations require designated waste to be discharged only to approved Class I or Class II waste

management units. However, Section 2581 allows for the foundation layer of final landfill covers to contain contaminated soil.

C4.7 CLOSURE

The ultimate objective of the removal action at Site 3 is to attain a NFA status for the site. The substantive portions of 22 CCR 66264.111 and 22 CCR 66264.114, which involve closure of hazardous waste management facilities, are identified as potential ARARs for this objective. These regulations establish the general performance standard for clean closure.

Section C5
SUMMARY

Potential ARARs have been identified in the text of this attachment for each media, location, or proposed removal action. Because it is unclear whether Site 3 contains hazardous waste or solid waste, controlling ARARs are identified for both scenarios. The removal action objective is to eliminate the risk to human health and the environment due to exposure to contaminated soil.

In general, the requirements of federal and state hazardous waste management regulations are the controlling ARARs should Site 3 be determined to contain RCRA or non-RCRA hazardous waste. Since the objective of the removal action is NFA for soil and not clean closure, the closure requirements of RCRA are not applicable, but may be relevant and appropriate. If Site 3 is determined to contain only nonhazardous waste, the State of California regulations in Title 23, Chapter 15, would be the controlling ARARs for management and closure of the site.

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Section C6
REFERENCES

Cal-EPA DTSC. See California Environmental Protection Agency, Department of Toxic Substances Control.

California Environmental Protection Agency Department of Toxic Substances Control. 1993. Letter from Dr. John Christopher to Southwest Division Naval Facilities Engineering Command: identified California cancer potency factors as potential ARARs. 28 June.

———. 1994. Letter to Southwest Division Naval Facilities Engineering Command: Use of California cancer potency factors for Marine Corps Base Camp Pendleton. 31 March.

California State Water Resources Control Board. 1989. Leaking Underground Fuel Tank Field Manual: Guidelines for Site Assessment, Cleanup, and Underground Storage Tank Closure. State of California Leaking Underground Fuel Tank Task Force. October.

DON. *See* Department of the Navy.

KEA Environmental, Inc. 1994. Historical and Archeological Resources Protection Plan for the Naval Air Facility El Centro. Prepared for the U.S. Department of the Navy. October.

Ogden Environmental and Energy Services, Inc. (Ogden) 1993. Final Solid Waste Water Quality Assessment (SWAT), Site Investigation (SI) Report; Site 1, Magazine Road Landfill, Site 2, Patrol Road Landfill, Site 3, Sledge Disposal Area.

Southwest Division Naval Facilities Engineering Command. 1993. Letter to Cal-EPA: request for response to question of whether California cancer potency factors were duly promulgated. 24 September.

SWDIV. See Southwest Division Naval Facilities Engineering Command.

SWRCB. See California State Water Resources Control Board.

U.S. Environmental Protection Agency. 1986. Guidelines for Groundwater Classification Under the EPA Groundwater Protection Strategy.

———. 1988. CERCLA Compliance with Other Laws Manual, Draft Guidance. EPA/540/G-89/006. Office of Emergency and Remedial Response. Washington, DC. August.

U.S. EPA. See U.S. Environmental Protection Agency.

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APPENDIX D

RESPONSES TO REGULATORY COMMENTS
(Previously Submitted on 31 July 1996 and 17 October 1996)

Responses to regulatory comments previously submitted follow. Some of the responses were subsequently modified based on discussions with the regulatory agencies, and do not necessarily reflect the actual changes made in the removal action documents.

Responses to
16 April 1996 DTSC Comments
on
November 1995 Draft Engineering Evaluation/Cost Analysis for
Site 3, Sludge Burial Area
Naval Air Facility El Centro, California

Comment	Response
GENERAL COMMENTS	
This EE/CA is based on limited data collected during the SWAT/SI (Ogden 1993a) and indicates that the exact area of contamination is not known and the boundaries of the contaminated area are not clearly defined. The previous investigations performed at the site focused on evaluating the presence and potential impacts of contaminants due to burial of sewage sludge. These investigations did not result in a complete characterization of the nature and extent of contamination. Soil contamination may extend beyond the original sludge disposal pit dimensions of 20 feet in length, 10 feet in width, and 5 feet in depth. The extent of contamination is assumed to encompass an area of 70 feet in length, 50 feet in width and 8 feet in depth.	
1. The department recommends that the confirmatory samples that will be taken during the excavation be thoroughly analyzed to ensure that this process of excavation using an observational approach ascertains the removal of contaminated soil since the lateral and vertical extent of contamination was not originally defined	The excavation plan presented in Section 4.1.1.1 includes confirmatory sampling of the bottom and side walls of the excavation following removal of the contaminated soil (see paragraph 3, bullets 9 and 10). The confirmatory samples will be analyzed for the chemicals of concern, including arsenic, cadmium, total chromium, hexavalent chromium, lead and chlordane. If these analytes are detected in the confirmatory samples at concentrations exceeding the proposed soil cleanup levels (see Table 3-1), additional soil will be excavated.
2. Prior to stockpiling soil that is potentially hazardous under the Resource Conservation and Recovery Act (RCRA) or the State Hazardous Waste Control Laws, NAFEC must make a preliminary hazardous waste determination based on knowledge and existing information. RCRA hazardous waste cannot be stored in a stockpile unless the waste pile meets the requirements of Title 22, California Code of Regulations (CCR), Article 12, starting with Section 66264.250. Non-RCRA hazardous wastes that will be treated by an authorized treatment method may be temporarily stored according to the remediation waste staging requirements described in comment #5. Please include this step in the EE/CA.	The excavation plan presented in Section 4.1.1.1 will be revised to include characterization of the soil at Site 3 prior to excavation eliminating the need to stockpile and store soil on-site. Soil classified as Resource Conservation and Recovery Act hazardous waste or California hazardous waste will be excavated and transported directly to a Class I disposal facility or incineration if land disposal restrictions apply(see attached decision flow diagram) rather than treated on-site and disposed at Site 1. Section 4 will be revised to reflect this modification.

Comment	Response
3. During the verification step to determine if the excavated soil is hazardous or non-hazardous, NAFEC must first rule out the possibility that the excavated soil is a RCRA listed waste or that it fails the characteristics of RCRA hazardous wastes including toxicity characteristic by the Toxicity Characteristic Leaching Procedure (TCLP). If the results fail the TCLP, the waste must be managed as a RCRA hazardous waste prior and during treatment. Waste Extraction Testing will not be necessary if the soil is TCLP hazardous (Ref comment #4 below).	Section 4 will be revised to incorporate the decision flow diagram. Please see the attached decision flow diagram
4. If the results show that the soil is not TCLP hazardous, NAFEC must determine whether it is non-RCRA hazardous using the WET test. If it is non-RCRA hazardous and will be treated by an authorized treatment method, the remediation waste staging requirements described in comment #5 may be followed.	Section 4 will be revised to incorporate the decision flow diagram. Please see the attached decision flow diagram.
5. The amendments to Section 25123.3 of the Health and Safety Code (SB 1291, effective 1/1/96) need to be added to the ARARs section. The following are action-specific requirements for remediation waste staging applicable to the temporary accumulation of non-RCRA contaminated soil that is generated and held onsite, and that is accumulated for the purpose of onsite treatment pursuant to a certified, authorized or permitted treatment method, such as a transportable treatment unit. Health and Safety Code (H&SC) Section 25123.3(a)(2) (A) The hazardous waste being accumulated does not contain free liquids. (B) The hazardous waste is accumulated on an impermeable surface, such as high density polyethylene (HDPE) of at least 20 mils that is supported by a foundation, or high density polyethylene of at least 60 mils that is not supported by a foundation. (C) The generator provides controls for windblown dispersion and precipitation runoff and run-on and complies with any storm water permit requirements issued by a regional water quality control board. (D) The generator has the accumulation site inspected weekly and after storms to ensure that the controls for windblown dispersion and precipitation runoff and run-on are functioning properly. (E) The staging area is certified by a registered engineer for compliance with the standards specified in subparagraphs (A) to (D), inclusive.	5. Since non-RCRA hazardous wastes (California hazardous waste) will no longer be temporarily stored or treated on-site, the provisions of Health and Safety Code Section 25123.3 (a)(2) are no longer applicable.

Comment	Response
6. This removal action is also subject to and must comply with all requirements of the H&SC, Chapter 6.8. Under the California H&SC, a Removal Action Workplan (RAW) (or an equivalent document) is required for a removal action estimated to cost less than $1.0 million Pursuant to H&SC, Section 25358.9, actions carried out onsite under a RAW and meet all other requirements, may be excluded from the hazardous waste facility permit requirements of H&SC, Section 25201.	Comment noted.
7. The off-site laboratory used for soil sample analysis should be certified by the Department of Health and Services. Please indicate which laboratory will be used and if it is certified or not	Selection of a laboratory during implementation of the selected removal action is beyond the scope of this Engineering Evaluation/Cost Analysis. These activities will be performed as part of the removal action.

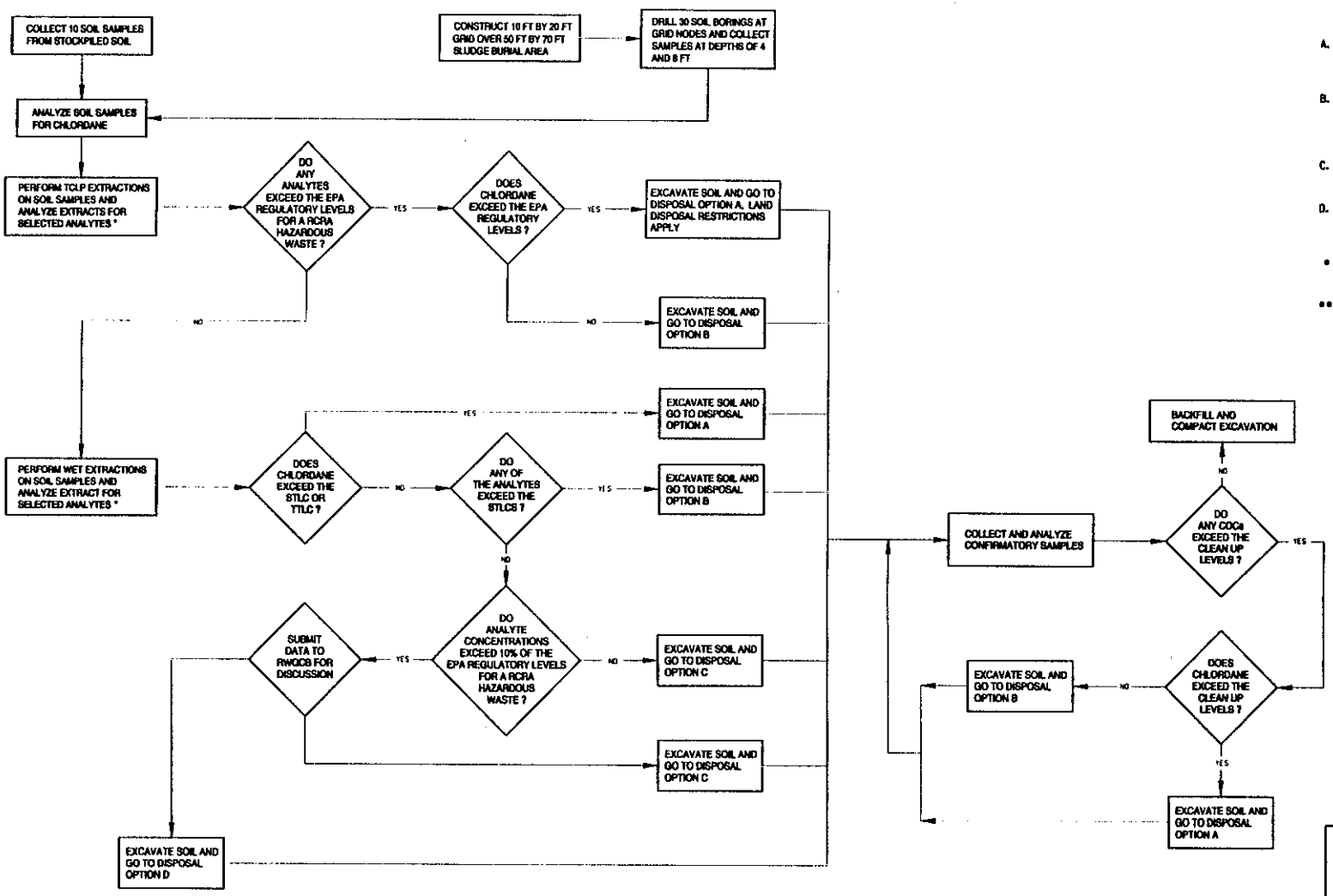
Comment	Response
SPECIFIC COMMENTS	
EXECUTIVE SUMMARY 1. Please indicate the source of the imported soil that will be used for backfill. Will it be from areas within the base or will it be imported from areas outside the base? Also, the EE/CA does not provide information that the backfill will be verified as clean. Please explain what methods will be used for verification.	Evaluation and certification of sources for clean backfill material is not within the scope of an Engineering Evaluation/Cost Analysis. These issues will be addressed in the removal action work plan.
SECTION 4.1.1.1 EXCAVATION 2. The first sentence of the second paragraph which states "the construction wastes currently stockpiled on the site will be sampled". It is not clear where the stockpiled soil came from. Please indicate the source of this soil and whether or not it is related to any site activities on or around Site 3.	According to base personnel, the stockpiled soil at Site 3 are remnants of construction activities at NAF El Centro unrelated to Site 3. The exact source is unknown.
3. The third bullet states that the top two feet of soil will be removed from the sampled area and set aside. The soil will be removed without sampling. The Department recommends that some samples be taken to confirm that the top soil layer is clean.	Please see the attached flow diagram for the revised sampling and excavation plan.
4. The volume of the contaminated area is estimated to be 70 feet in length, 50 feet in width, and 8 feet in depth. The last bulleted item on this page states that after the removal of the top 2 feet of soil, the next layer of 2 feet will be excavated. If it is intended to excavate down to 8 feet, does this include or exclude the top layer of 2 feet. Please revise this paragraph to explain in more detail the soil depth sampling strategy.	Please see the attached flow diagram for the revised sampling and excavation plan.
5. The fourth bulleted paragraph states that confirmation samples will be collected from the bottom and sidewalls of the final excavation. It does not state how many samples will be taken. The Department recommends a total of six samples be taken from the pit. Two samples from the bottom and one sample from each side wall.	Section 4.1.1.1, paragraph 3, bullet 9 will be modified to indicate that a minimum of six confirmatory samples, two from the bottom and one from each side wall, will be collected from the excavation.
SECTION 4.1.1.2 ON-SITE SOLIDIFICATION/STABILIZATION 6. The Department would like to review the treatability study that will be performed before treatment to test potential binders and evaluate their performance with respect to the treatment objectives. Please submit the treatability study to the Department prior to any removal action activities.	On-site treatment of hazardous wastes will no longer be performed. Please see attached decision flow diagram.
7. Please specify the frequency for testing of the stabilized effluent to verify that it no longer exhibits RCRA and non-RCRA hazardous characteristics and that the effluent meets the Regional Water Quality Control Board definition of an "inert" waste.	On-site treatment of hazardous wastes will no longer be performed. Please see attached decision flow diagram.

Comment	Response
SECTION 4.1.4 COST 8. In this paragraph it is stated that only one confirmatory sample will be taken from the total volume of excavated soil of 1,500 tons. Please revise this section to agree with section 4.1.1.2 where it is stated that 16 samples will be collected for analysis from the total volume of the excavated soil.	Section 4.1.4 indicates that the cost estimate is based on one confirmatory sampling event. One confirmatory sampling event consists of 16 soil samples. Section 4.1.4 will be modified to clarify this
ATTACHMENT B: ECOLOGICAL SCOPING ASSESSMENT 9. Refer to Site 1, specific comment number 9. Those comments are also applicable to the Site 3 removal action. Please address those comments in the Site 3 EE/CA.	The removal action at Site 3 may disturb plants, reducing cover and foraging opportunities for wildlife. In addition, the removal may destroy rodent or reptile burrows. These disturbances are not likely to result in long-term effects on the ecological receptors. Two of the species identified in the Ecological Scoping Assessment are California Species of Special Concern, the burrowing owl and the flat-tailed horned lizard. The flat-tailed horned lizard is also proposed as a threatened species under the federal Endangered Species Act. Although burrowing owls were observed in several areas at NAF El Centro during the 20 April 1995 site inspection, no active burrows were observed at Site 3. For the protection of burrowing owls, a biologist will inspect the site for the presence of burrows prior to the initiation of removal action activities. If active burrows are identified, and it is not mating season, (i.e. March through June), the burrowing owl residents will be moved to an off-site burrow. Removal action activities will not be performed during the mating season if active burrows are observed on-site. The site will also be inspected for flat-tailed horned lizards prior to initiation of the removal action activities. Any flat-tailed horned lizards observed on the site will be relocated prior to the removal action. Section 4.1.1.1 will be modified to address the above considerations
ATTACHMENT C: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS-SECTION 1.7-CALIFORNIA ENVIRONMENTAL QUALITY ACT 10. DTSC has the responsibility to comply with CEQA when exercising its discretionary decision authority to approve removal actions. As such, CEQA compliance is a State action that should be identified. Please make the corrections to this paragraph to include CEQA as an ARAR, and delete reference to "CEQA" from the last sentence of the section which states that "Therefore, NEPA and CEQA are not ARARs for this site.	As the lead agency for the proposed actions at Site 3, the Department of the Navy has determined that California Environmental Quality Act is not an Applicable, Relevant or Appropriate Requirement. Attachment C, Section 1.7 will remain unchanged

Responses to
RWQCB Comments
on
Draft Engineering Evaluation/Cost Analysis Documents for
Sites 1, 3, and 8
Naval Air Facility El Centro, California

Comment	Response
GENERAL COMMENTS	
1 ARARs for these EE/CAs include Title 22, Chapter 15, regulating waste discharge to land. Pursuant to Article 1 of Chapter 15, existing (abandoned, inactive) landfills at NAFEC are defined as "unclassified Waste Management Units (WMUs)" As such, the only waste they are allowed to receive must meet criteria required under Chapter 15 for an INERT designation (See Article 2, Section 2524 of this Chapter). Contaminated soils may only be discharged to classified, permitted WMUs (under active Waste Discharge Requirements) This includes contaminated soils intended for use as part of a final cap. Soils contaminated to Hazardous Waste Concentrations that have been rendered INERT through solidification/stabilization processes and confirmed to be Non-Hazardous according to DTSC waste classification requirements may be considered for discharge to an unclassified WMU pursuant to Article 2, Section 2524 of Chapter 15.	Comment noted. Please see attached decision flow diagram for Sites 3 and 8 for waste classification and disposal criteria.
2 These EE/CAs do not address groundwater contamination found at Sites 1 and 3 as well as further groundwater characterization needed at all three sites. These issues will be addressed in the Groundwater Monitoring Work Plan which was received April 2, 1996 and is currently under review by staff.	Comment noted.
SPECIFIC COMMENTS	
SITE 1: MAGAZINE ROAD LANDFILL 1 The proposed monolithic cap is an acceptable removal action alternative for this site. Post closure maintenance and groundwater monitoring will be required pursuant to Chapter 15 regulations	Comment noted.
SITE 3: FORMER SLUDGE BURIAL AREA 1. Contaminants of Concern (COCs) at this site include Arsenic, Cadmium, Chromium, Lead, and Chlordane. The EE/CA reports these COCs may be at Hazardous Waste concentrations. Extensive characterization and treatability studies will be necessary to obtain sufficient data to allow regulatory approval of the proposed removal action, to stabilize/solidify the waste to meet the criteria for confirmation as non-hazardous according to DTSC waste classification requirements and allow the disposal of the waste pursuant to Chapter 15 as part of the cap for Site 1.	The handling of soil classified as Resource Conservation and Recovery Act or California hazardous has been revised (please see attached decision flow diagram). Soil samples will be collected and submitted to a laboratory for classification prior to excavation. Soil in areas classified as hazardous will be excavated and transported to a Class I disposal facility or incinerated at a licensed facility if land disposal restrictions apply. On-site treatment of hazardous materials is no longer proposed.

Comment	Response
2. Figure 4-1; Removal Action Alternatives-This flow chart is not accurate. As stated above in the General Comments, nonhazardous contaminated soil cannot be discharged to the Site 1 Landfill. Only soils classified as INERT by the Regional Board may be placed on an unpermitted WMU such as Site 1.	Please see attached decision flow diagram for revisions.
3. Section 4.1.1 EXCAVATION- Composite sampling for site characterization is not acceptable. Please revise this portion of the EE/CA to provide for discrete samples to be taken for both the construction waste sampling and for characterization of potentially hazardous waste.	The sampling plan will be revised to include discrete sampling of the stockpiled construction wastes and the sludge burial area prior to excavation. See attached decision flow diagram.
SITE 8: SCRAPYARD 1. The COCs at this site include Arsenic, Cadmium, Chromium, Lead, and PCBs all at potentially hazardous concentrations. The proposed site characterization, soils removal, treatment, and disposal are the same as for Site 3. RWQCB staff comments for Site 3 therefore also apply to Site 8 regarding disposal of contaminated soil and discrete sampling for site characterization.	The handling of soil classified as Resource Conservation and Recovery Act of California hazardous has been revised (please see attached decision flow diagram). Discrete soil samples will be collected and submitted to a laboratory for classification prior to excavation. Soil in areas classified as hazardous will be excavated and transported to a Class I disposal facility. On-site treatment of hazardous materials is no longer proposed.
2. The sampling and excavation plan shown in Figure 4-2 appears acceptable, providing discrete samples are taken rather than composite samples.	Please see response to Specific Comment No. 1.



DISPOSAL OPTIONS

A. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR CHLORDANE. EXCAVATE AND TRANSPORT OFF-SITE FOR INCINERATION **

B. SOIL CLASSIFIED AS A RCRA OR CALIFORNIA HAZARDOUS WASTE FOR ANALYTE OTHER THAN CHLORDANE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL AT A CLASS I FACILITY **

C. SOIL CLASSIFIED AS INERT. EXCAVATE AND TRANSPORT TO SITE 1 FOR DISPOSAL.

D. SOIL CLASSIFIED AS DESIGNATED OR NON-HAZARDOUS SOLID WASTE. EXCAVATE SOIL AND TRANSPORT OFF-SITE FOR DISPOSAL **

* ANALYTES INCLUDE: ARSENIC, CADMIUM, CHROMIUM (TOTAL), HEXAVALENT CHROMIUM, LEAD AND CHLORDANE

** ONLY SOIL FROM AREAS CLASSIFIED AS CONTAINING HAZARDOUS, DESIGNATED, OR NON-HAZARDOUS SOLID WASTE WILL BE TRANSPORTED OFF-SITE.

Engineering Evaluation/Cost Analysis

Figure 4-1

Characterization, Excavation, and Disposal Decision Flow Diagram Site 3

NAF El Centro, Imperial County, California

Bechtel National, Inc.
CLEAN II Program

Date: 6/26/96
File No: site3-1
Job No: 22214-090
Rev: A

Responses to
DTSC Comments on the
Draft for Public Review Action Memorandums for Non-Time-Critical Removal Actions at Site 1- Magazine Road Landfill, Site 3- Sludge Burial Area, and Site 8- Scrap Yard
Naval Air Facility
El Centro, California
CTO-0090

Issac Hirbawi; Remedial Project Manager- DTSC	
Comment	Response
Comment 1); The removal actions for Site 1 (Magazine Road Landfill) and Site 8 (Scrap Yard) are subject to and must comply with all requirements of the H&SC, Chapter 6.8, Sections 25323.1 and 25356.1(h)(1). Under the California H&SC, a Removal Action Workplan (RAW) (or an equivalent document) is required for a removal action estimated to cost less than $1.0 million. The removal action for Site 3 (Sludge Burial Area) is subject to and must comply with all the requirements of the H&SC, Chapter 6.8, Sections 25323.1. Under the California H&SC, a Removal Action Plan (RAP) is required for a removal action estimated to cost more than $1.0 million. In addition, these removal actions should be conducted in accordance with Title 40, Code of Federal Regulations (CFR), Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Please revise the Engineering Evaluation/Cost Analysis (EE/CAs) and Action Memorandum (AMs) accordingly.	The Engineering Evaluation/Cost Analyses and Action Memoranda were developed in accordance with guidance developed by the Department of Navy (DON) and the Department of Toxic Substances Control (DTSC). As stated in Section 1, Introduction, of both the Action Memorandum and Engineering Evaluation/Cost Analysis for each site, these documents have been prepared to meet the requirements of a Remedial Action Workplan or a Remedial Action Plan, as appropriate. DON believes that these documents contain the required information and that no modifications are necessary.
Comment 2); On July 24, 1996, the Department faxed the Navy information regarding institutional controls. The Department requested information on how the institutional controls of restricting access or limiting use of Site 1 will be documented. The Navy's response was that "land use restrictions are beyond the scope of these EE/CAs." The Department is requesting to include the following language in the EE/CAs and AMs: "The proposed removal action for Site 1 is an interim action. The Navy will submit a separate document that describes the final remedy for Site 1. The final remedy will address groundwater contamination, verification of the lateral extent of contamination, and institutional controls if hazardous wastes or substances are left in place."	The requested language will be added to the final documents as modified below: "The proposed removal action for Site 1 is an interim action. DON will submit a separate document that describes the final remedy for Site 1. The final remedy will address groundwater contamination (if present) and institutional controls if hazardous wastes or substances are left in place."

Issac Hirbawi; Remedial Project Manager- DTSC	
Comment	Response
Comment 3); APPLICABLE AND RELEVANT AND APPROPRIATE REQUIREMENTS-SECTION 1.7-CALIFORNIA ENVIRONMENTAL QUALITY ACT The Department submitted comments regarding "CEQA being a State ARAR" on April 16, 1996 (EE/CA comments) and on May 28, 1996 (AM comments). The Navy's response to our comments was received on July 31, 1996. The Navy is still insisting that CEQA is not an ARAR. If the Navy does not want to recognize CEQA as a State ARAR, then this paragraph should be revised as follows: "The Navy and DTSC have differences in opinion with respect to CEQA applicability to Navy response actions. DTSC has the responsibility to comply with CEQA when exercising discretionary decision authority to approve removal actions under H&SC, Chapter 6.8. As such, CEQA compliance is a State action that should be identified for these removal actions. The Navy chooses not to accept the CEQA as an ARAR" Please revise these documents accordingly.	DON does not believe the requested language is appropriate for inclusion in the Engineering Evaluation/Cost Analyses.
Comment 4); Implementation of field activities are contingent on the availability of funds for the removal actions. If funding problems occur (partial funding) during the removal actions period, please discuss how this would impact the other removal actions since they are scheduled within the same time frame.	Discussion of contingencies for conditions arising out of hypothetical funding scenarios is beyond the scope of an Engineering Evaluation/Cost Analysis.
Comment 5); The permanent population of NAF El Centro consists of approximately 600 officers, enlisted personnel, and civilians. For purposes of health and safety of base personnel, please clarify how many are civilian workers; if there are any base housing, schools or day care centers, and what is the transient population. Please include the approximate distance of these receptors to the removal action sites.	Sites 1, 3, and 8 are located in a restricted area approximately one mile from base residential areas, offices, and schools. A health and safety plan designed to protect base personnel and workers will be developed prior to removal action implementation. In addition, protection of the community and workers during implementation of the removal action are considerations discussed under short-term effectiveness in Section 4 of each Engineering Evaluation/Cost Analysis document.

Issac Hirbawi; Remedial Project Manager- DTSC	
Comment	Response
Comment 6); For Site 1 - Magazine Road Landfill, the EE/CA/Action Memorandum identifies the landfill waste as comprising of approximately 60 percent of household rubbish (i.e., municipal waste), with the remainder comprising industrial wastes. Spent cartridges were identified as being disposed at the landfill. For purposes of unexploded ordnance, please provide information on the types (grenades, bombs,.....) and quantities of any cartridges that were disposed of without actually being spent. Is there a procedure that eliminated the disposal of any live ammunition?	There are no available records which provide more explicit detail on ordnance disposal at Site 1. The waste disposal practices cited in the Engineering Evaluation/Cost Analysis were referenced from the Preliminary Assessment/Site Inspection performed at the site in 1987 (NEESA 1987). The information contained in these documents was obtained from available base documents and personnel interviews. The recommended removal action for Site 1 involves containment of the waste in place. This action will not require subsurface disruption of the landfill that would result in encounters with ordnance, if present.
Comment 7); Additional information is requested to support the Navy's decision that the Site 1 landfill is not producing landfill gas. Based on limited data collected during the Solid Waste Assessment Test/Site Investigation (SWAT/SI), the lateral extent, identification and characterization of potential soil contamination were not adequately assessed. The Navy concluded that Site 1 fill materials are unlikely to produce landfill gas without any real data. It is important to determine the level of methane being generated, because once the cap is installed any methane production will be trapped and can create an explosion. The department is recommending that a test be done for methane generation to support your decision.	Based on the results of previous investigations, correspondence with the Imperial County Air Pollution Control District, and land use in the vicinity of the site, DON does not believe that additional investigation at the site for landfill gas is warranted. Evidence of organic wastes or methane gas generation have not been observed during the previous investigations conducted at the site. Soil borings drilled during the Solid Waste Water Quality Assessment Test/Site Investigation did not encounter significant organic material. During the April 1996 groundwater sampling event, existing groundwater monitoring wells with screens extending above the groundwater surface were screened with an organic vapor analyzer capable of detecting methane. No organic vapors were detected in the wells. On August 7, 1996 a telephone conference was held between the Department of Toxic Substances Control (DTSC), DON, and Mr. Fisher of the Imperial County Air Pollution Control District. Mr. Fischer indicated that burning of waste was common practice with most of the landfills in the area at the time Site 1 was operational. It was his experience that only landfills located near the water table (within the New River Valley) generated landfill gas. The water table is below the interpreted bottom of the landfill at Site 1. (continued on following page)

Issac Hirbawi; Remedial Project Manager- DTSC	
Comment	Response
	(continued from previous page) In the unlikely event that landfill gases were generated from the Site 1 waste material, the potential impacts are limited. Site 1 is located in a limited access area on the northern portion of the base. There are no structures within one-half mile of the site where landfill gases could collect and there are no regular base activities conducted within one mile of the site that might result in personnel exposure. The recommended removal action for Site 1 is a permeable monolithic cap. Unlike multiple layer caps which include an impermeable layer, landfill gas will not build up beneath the monolithic cap. Concerning the lateral extent of the landfill, historic aerial photographs indicate that the landfill occupies a former borrow pit. The lateral extent of the landfill is limited by the boundaries of this pit which are currently manifested as a surface depression. Interviews with base personnel support this observation.
Comment 8); The Department previously requested information on the source of the backfill that will be used. The determination of where the imported fill will come from have not been made to this point. It is important to know which areas of the base will this soil be borrowed or if it will come from an outside source. Are there any procedures the base has in place to ensure that the source is clean? Please provide this information in the revised document.	With the exception of inert material from Sites 3 and 8, the source of the fill has not been identified. Identification and evaluation of borrow sources is beyond the scope of these Engineering Evaluation/Cost Analyses. This issue will be addressed in the pre-implementation workplan.
Comment 9); In addition to the technical requirements, removal actions, such as Site 3, that cost $1.0 million or greater must also meet public notification requirements. This includes but is not limited to the public meeting requirements of H&SC 25356.1(e)(3). Please specify the public notification activities for the removal actions in the appropriate sections of the EE/CA and AM.	As indicated in the Section 1 of both the Engineering Evaluation/Cost Analyses and the Action Memoranda, DON intends to comply with the requirements of Chapter 6.8, California Health and Safety Code. This includes placing the documents into an informantion repository, establishing a point of contact and notifying the public via the local newspaper. A public meting may be scheduled at the discretion of the DTSC.

Responses to
12 September 1996 California Integrated Waste Management Board
Comments on Draft Engineering Evaluation/Cost Analysis
Site 1, Magazine Road Landfill (June 1996)
Naval Air Facility, El Centro, California

John P. Clinkenbeard; Associate Engineering Geologist	
Comment	**Response**
1. The second sentence of the third paragraph of page 1-1 appears to be incomplete. The same omission appears to have been made in paragraph 4 on page 3-1.	The referenced sentences are correct in the Draft for Public Review dated August 1996.
2. The first paragraph of page 2-9 indicates that the total dissolved solids in shallow ground water at the site are high and exceed the U.S. EPA secondary maximum contaminant level (MCL) of 500 mg/L and the California agricultural water quality goal of 450 mg/L. This paragraph also indicates that the ground water in the vicinity of Site 1 is currently designated for beneficial use. If the ground water does not meet either standard, what is the beneficial use for which it is designated? Does the designation for beneficial use apply to a deeper aquifer? The statements in this paragraph appear contradictory and should be clarified.	The 1994 Regional Water Quality Control Board, Water Quality Control Plan, Colorado River Basin designates the groundwater in the Imperial Valley Planning Area as beneficial for municipal and industrial uses. The Imperial Valley Planning Area is a large region that includes NAF El Centro. This designation is based on limited data and does not account for local variations in groundwater quality. The local groundwater at NAF El Centro is unsuitable for beneficial use due to high total dissolved solids concentrations. A sentence to clarify this will be put into the final documents.
3. Title 14, California Code of Regulations (CCR), Division 7, Chapter 3, Article 7.8, Section 17783.17 allows for exemption from the gas monitoring and control requirements of 14 CCR section 17783 if there is no potential for adverse impacts on public health and safety and the environment, based upon but not limited to: the size, nature, and age of refuse; projected gas generation: and remoteness of the facility. Section 3.2 concludes that the Site 1 fill materials are unlikely to produce landfill gases and indicates that mitigation of landfill gases is not included in the scope of the proposed removal action. It does not appear that any of the previous investigations at the site tested for the presence of landfill gas. While it is likely that, if the waste was periodically burned as indicated, landfill gas generation will not be a problem, a determination should be made that the landfill is not producing landfill gas to qualify for the exemption from landfill gas monitoring and control measures. Given the site conditions and history, a preliminary investigation could be made by penetrating the existing cover in several places with a bar-hole punch and monitoring with a combustible gas meter. If no methane is detected in the landfill in such sampling, this would support a request for an exemption.	Based on the results of previous investigations, correspondence with the Imperial County Air Pollution Control District, and land use in the vicinity of the site, DON (the Department of the Navy) does not believe that additional investigation at the site for landfill gas is warranted. Evidence of organic wastes or methane gas generation have not been observed during the previous investigations conducted at the site. Soil borings drilled during the Solid Waste Water Quality Assessment Test/Site Investigation did not encounter significant organic material. During the April 1994 groundwater sampling event, existing groundwater monitoring wells with screens extending above the groundwater surface were screened with an organic vapor analyzer capable of detecting methane. No organic vapors were detected in the wells. On August 7, 1996 a telephone conference was held between DTSC, the DON, and Mr. Fischer of the Imperial County Air Pollution Control District. Mr. Fischer indicated that burning of waste was common practice with most of the landfills in the area at the time Site 1 was operational. It was his experience that only landfills located near the water table (within the New River Valley) generated landfill gas. The water table is below the interpreted bottom of the Site 1 landfill. Site 1 is located in a limited access area on the northern portion of the base. There are no structures within one-half mile of the site where landfill gases could collect and there are no regular base activities conducted within one mile of the site that might result in personnel exposure.

John P. Clinkenbeard; Associate Engineering Geologist	
Comment	**Response**
4. The EE/CA indicates that in Alternative 1, the multi-layer cap, the cap surface will have a minimum slope of 3 percent but that in Alternative 2, the monolithic cap, the cap surface would have a minimum slope of only 1 percent. What is the reason for this variation? One of the goals of capping the landfill is to convey water off of the cap and to prevent ponding and a slope of 3 to 5 percent is generally used to accomplish this goal.	The monolithic cap uses soil to absorb rainfall and prevent deep percolation below the evaporative zone. Conveyance of water off the landfill surface is not an objective in this case. A slope of one percent was used for the monolithic cap to prevent ponding which might result in local over saturation of the cap.
5. The cost estimates for Alternatives 1 and 2 indicate that Alternative 2 (the monolithic cap) is approximately $1,000,000 less expensive that Alternative 1 (the multi-layer cap). The cost estimates provided lack of detail and seem to be high compared to cost estimates for similar closure activities at landfills in the region. A summary of closure cost estimates for landfills in the region is included as Attachment 1. These estimates were taken from closure plans submitted to the CIWMB by owner/operators for facilities in the region. Some of these plans are approved, and some are under review. A review of the data indicates that the cost ($27,188 to $81,690 per acre) for a clay cap similar to the multi-layer cap proposed in Alternative 1 appears to be significantly less than the proposed cost (approximately $334,909 per acre) for Alternative 1 or the proposed cost (approximately $151,454 per acre) of Alternative 2. If the relative costs of Alternatives 1 and 2 are to be considered in selecting the Alternative to be implemented, then a more realistic estimate of the costs for each alternative should be developed.	Site 1 is currently depressed approximately four feet below the surrounding grade. The removal action alternatives evaluated for the site include filling of this depression to the surrounding grade in addition to cap construction. Transport, placement, and compaction of this additional fill material may account for the greater cost of the Site 1 alternatives as compared to those listed in the referenced table provided by the California Integrated Waste Management Board (attached). In any case, the cost estimates provided in the Engineering Evaluation/Cost Analysis are intended to be used only for comparative purposes in evaluating the alternatives. With this purpose in mind, it is only necessary that the cost estimates for each alternative be developed using the same methodology. The cost estimates presented for the Site 1 landfill caps were developed using the Remedial Action Cost Engineering Requirements (RACER) model developed specifically for this purpose by the US Air Force.

Responses to
DTSC Comments on the
Draft for Public Review Action Memorandums for Non-Time-Critical Removal Actions at Site 1- Magazine Road Landfill, Site 3- Sludge Burial Area, and Site 8- Scrap Yard
Naval Air Facility
El Centro, California
CTO-0090

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Scope of Risk Assessment and Review, Paragraph 1; The human health risk assessments presented for Sites 1, 3, and 8 are screening level evaluations which utilize the U.S. EPA Region IX Preliminary Remediation Goals (PRGs) for the residential exposure scenario. Ecological assessments, reportedly attached to the EE/CA reports, were not initially provided to HERD for review and will be reviewed in separate memorandum. Although space within the text was reserved, many figures and tables referenced were not provided with the working drafts, particularly in the Site 1 EE/CA report. Therefore, HERD referred to data presented in the 1993 Site investigation reports, and presumes no additional data were available.	The Action Memorandum and Engineering Evaluation Cost Analysis documents provided to DTSC in June 1996 were courtesy copies provided so that DTSC could review the changes made following their review of the draft documents submitted in November and December of 1995. Only those portions of these documents modified to address DTSC comments were submitted in June 1996. Complete versions of the Draft Action Memorandum and Engineering Evaluation/Cost Analysis for Public Review were submitted to DTSC on or about August 10 and September 4, 1996. These documents contained all referenced figures, tables and the Ecological Scoping Assessment.
Scope of Risk Assessment and Review, Paragraph 2; Risk assessments for Sites 1, 3, and 8 were limited to site soils; contaminated groundwater was excluded from the evaluation of risks associated with the sites. Therefore, the screening evaluation may underestimate total risk associated with each site. HERD recommends that risk associated with groundwater be evaluated and reported.	The removal action at Sites 1, 3, and 8 are intended to address soil contamination only. Groundwater at these sites has not yet been fully characterized. Therefore, the screening evaluations were only performed for the soil. Assessment of risk associated with potential groundwater contamination will be addressed by future actions. Currently, a basewide quarterly groundwater monitoring program intended to further characterize groundwater conditions at the base is in progress.
Scope of Risk Assessment and Review, Paragraph 3; The human health risk screening calculations are presented in Section 2.8.2.5 of the Site 1 EE/CA, Section 2.10.1 of the Site 3 EE/CA , and Section 2.10.1 of the Site 8 EE/CA. (continued on following page)	DON has decided to perform a non-time-critical removal action at Sites 1, 3, and 8 based on data collected during the Solid Wastewater Quality Assessment Tests and Site Investigations. Within this decision framework, the US EPA Region IX Preliminary Remediation Goals were

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
(continued from previous page) HERD does accept conditional use of the U.S. EPA Region IX PRGs for screening sites at open military facilities such as NAF EC. However, HERD continues to recommend that the Preliminary Endangerment Assessment Guidance Manual (PEA Manual; DTSC, January 1994) be used to screen sites for "no further action." Therefore, the statement in the EE/CA reports that "Cal/EPA has adopted the U.S. EPA Region IX PRGs as screening concentrations...." is not entirely correct and should not be applied to all contaminated sites. HERD did not receive a protocol specifying how the PRGs would be used prior to the submittal of the EE/CA reports.	used to identify chemicals of concern and to establish cleanup levels for the removal actions. They were not used to screen the sites for "no further action," since a removal action was already planned for the site. The referenced statement in the Engineering Evaluation/Cost Analyses was intended to indicate that The Preliminary Remediation Goals published by US EPA Region IX in September 1995 were used for screening assessments rather that the Preliminary Endangerment Assessment (PEA) screening levels included in PEA Guidance prior to 1994. The text within the Final Engineering Evaluation/Cost Analyses will be modified to more effectively convey this intent.
Scope of Risk Assessment and Review, Paragraph 4; HERD acceptance of human health risk assessments utilizing U.S. EPA Region IX PRGs is limited to screening sites for further action. Sites which fail this screening process require further investigation (e.g., refinement of risk estimates, further characterization, etc.) Furthermore, as stated by U.S. EPA Region IX in the disclaimer for the PRGs, "PRGs do not consider impact to groundwater or address ecological concerns. PRGs are specifically not intended as a stand-alone decision-making tool, (2) as a substitute for EPA guidance for preparing baseline risk assessments, or (3) a rule to determine if waste is hazardous under RCRA" (Region IX Preliminary Remediation Goals (PRGs) Second Half 1995), Stanford Smucker, Technical Support Section, U.S. EPA Region IX, September 1, 1995). Risk-based preliminary remediation goals are intended to be used as "long-term targets...during analysis and selection of remedial alternatives" (Risk Assessment Guidance for Superfund: Volume I. Part B; Development of Risk-Based Preliminary Remediation Goals, U.S. EPA, October 1991). Therefore, HERD does not endorse the use of PRGs as cleanup levels.	The recommended removal actions at Sites 3 and 8 involve excavation of soil at the site within the potentially impacted area. The residual risk of the chemicals of concern following the removal actions will not exceed the risk represented by the Preliminary Remediation Goals or background concentrations, which ever is greater. The recommended removal action for Site 1 involves containment of the wastes in place, the US EPA presumptive remedy for landfills. This remedy presumes that there are contaminants present which pose a risk; however, this risk is mitigated by isolating the contaminants from potential receptors. Therefore, complete assessment of risk is not necessary. Based on the anticipated future use of Sites 3 and 8 (i.e., active military facility), DON believes that the use of the US EPA Region IX Preliminary Remediation Goals for residential soils as cleanup goals is reasonable since the exposure scenario represented by these goals is likely more conservative than the anticipated exposure scenario. Thus, cleanup levels established using the anticipated exposure scenario would likely be higher than the US EPA Region IX Preliminary Remediation Goals for residential soils.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Site Characterization The EE/CA reports state that the evaluations were based on preliminary site investigation data [emphasis added]. Apparently, further investigation of these sites indicated by the Navy in its response to HERD comments (August 31, 1995, letter from David Dawson, to Tizta Bekle) was not conducted. The EE/CA reports for Sites 1, 3, and 8 state (p. 1-1, each report), "A complete site characterization, which defined the nature, extent and background concentrations of contaminants at the site, has not been performed." Therefore, because the sites have not been fully characterized, and because the sites fail the PRG screening human health risk assessment, HERD reiterates its recommendations (March 21, 1995 and November 1, 1995 memoranda) for further characterization of the sites.	Further site characterization of Sites 3 and 8 will be performed as part of the recommended removal actions. Please see Section 4.1.2 of each Engineering Evaluation/Cost Analysis. Further characterization of Site 1 is not necessary to implement the recommended removal action. The recommended removal action for Site 1 is containment of the landfill waste in place. This recommendation is consistent with the U.S. EPA Presumptive Remedy for CERCLA Municipal Landfills sites. This remedy presumes that the landfill contains contaminants that pose a threat to human health and the environment, and that mitigation of these risks is most appropriately achieved by isolating the landfill materials from potential receptors. To implement this remedy, it is not necessary to assess the nature of, and the risk posed by the contaminants within the landfill boundaries. It is only necessary to know the location of the landfill boundaries.
Background Concentration of Inorganics, Paragraph 1; Background concentrations of inorganic chemicals of concern (metals) are determined during site investigations for several purposes. One purpose is to determine whether the human health risks and/or ecological risks associated with a chemical at a site maybe be attributed to background levels of the chemical. The background concentration of a chemical also may be used in development of remediation goals and evaluation of remedial action alternatives. If background concentrations of a chemical pose a significant risk, the remedial project manager may consider the risk separately.	Comment noted.
Background Concentration of Inorganics, Paragraph 2; HERD previously discussed and reviewed the determination of background concentrations of inorganics for the NAF EC (memoranda dated April 25, 1995 and June 7, 1995). HERD indicated that the 95th percentile values of normally distributed data extracted from pooled data graphically identified as background concentrations appeared reasonable, based on a brief review of the concentration data. (continued on following page)	The methodology used to determine background concentrations at NAF El Centro were discussed with DTSC in a meeting held on April 13, 1995. Subsequent to this meeting, DTSC provided additional recommendations for estimating background concentrations at NAF El Centro in a Draft Memorandum dated April 21, 1995.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
(continued from previous page) HERD has further examined the cumulative probability plots of the extracted data for this review, and recommends that data for cadmium, chromium, copper, and silver be re-evaluated for determination of background (see additional discussion below). Also, due to the high percentage of "nondetect" data for mercury, antimony, selenium, and thallium, background concentrations for these chemicals were not determined. Since the previous review, HERD has developed guidelines for determining background concentrations, including methods for data sets with a high percentage of nondetect data (see attachment). For the purpose of risk assessment, it is desirable to minimize Type II error--a false negative by which concentrations of a metal are identified as being within the range of background conditions, and therefore excluding the metal as a chemical of concern, when the concentrations of the metal actually represent contamination. A Type I error--a false negative by which concentrations of a metal are identified as contamination when the concentrations are actually with the range of background would simply result in the inclusion of the chemical in the risk assessment whereby associated risks may be found to be insignificant or only slightly greater than ambient, which may then be addressed by risk management.	The background concentrations presented in the Engineering Evaluation/Cost Analysis were calculated according to these recommendations, which were acceptable to DTSC at the time. Therefore, DON does not believe it is appropriate to re-evaluate this issue.
Detection Limits, **Paragraph 1;** To evaluate the adequacy of analytical detection limits for use in the human health risk assessments, the EE/CA reports present comparisons of analytical detection limits achieved for soil samples with U.S. EPA Region IX PRGs for residential exposures. HERD emphasizes the detection limits meeting the human health based PRGs may not be adequate for ecological risk assessment. Ecological assessment may require additional evaluation of detection limits.	An Ecological Scoping Assessment was performed at Sites 1, 3, and 8, as part of the Engineering Evaluation Cost Analyses to evaluate potential ecological receptors and potentially complete exposure pathways. Several potential ecological receptors and potentially complete exposure pathways were identified at each site. The Ecological Scoping Assessment for Sites 1 and 3 recommended that either additional evaluation be conducted or that remediation be performed to prevent occurrence of complete exposure pathways. The Ecological Scoping Assessment for Site 8 concluded that although potentially complete exposure pathways were identified at the site, significant exposure was unlikely due to sparse food source at the site. Since removal actions are planned for Sites 1, 3, and 8, DON does not believe that further evaluation of ecological risk or detection limits is appropriate.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Detection Limits, Paragraph 2; At Site 1, analytical detection limits for benzo(a)pyrene and dibenz(a,h)anthracene in soil were greater than their respective residential PRGs. Benzo(a)pyrene and dibenz(a,h)anthracene, as well as other PAHs, reasonably may be expected to be present in the area due to burning of landfill materials, and therefore should be quantitatively evaluated in the risk assessment at one half their respective detection limits. (The sentence on p:2-25 regarding PAHs at NAF EC is not applicable to this site and should be deleted.) For Site 1, HERD recommends that the following chemicals be evaluated in the risk assessment at one-half their respective detection limits in site soils if they have been detected in site ground water or at other nearby NAF EC sites: vinyl chloride and N-nitrodimethylamine, possible transformation products of landfill contaminants; and bis(2-chloro-ethyl)ether, a fumigant possible associated with agricultural use in adjacent areas, and a possible landfill contaminant resulting from disposal.	The recommended removal action for Site 1 is containment of the landfill waste in place. This recommendation is consistent with the U.S. EPA Presumptive Remedy for CERCLA Municipal Landfill sites. This remedy presumes that the landfill contains contaminants that pose a threat to human health and the environment, and that mitigation of these risks is most appropriately achieved by isolating them from potential receptors. To implement this remedy, it is not necessary to assess the nature of, and the risk posed by the contaminants within the landfill boundaries. It is only necessary to know the location of the landfill boundaries. The concentration units for Table 2-3 of the Engineering Evaluation/Cost Analysis are milligrams per kilogram. These units will be added to the table in the final documents.
Detection Limits, Paragraph 3; Although the screening human health risk estimate for PCBs at Site 8 will not be affected, HERD recommends that PCBs be evaluated at one-half their respective detection limits for the ecological assessment.	An Ecological Scoping Assessment was performed at Site 8 as part of the Engineering Evaluation/Cost Analysis to evaluate potential ecological receptors and potentially complete exposure pathways. Several potential ecological receptors and potentially complete exposure pathways were identified for Site 8. However, the Ecological Scoping Assessment concluded that although potentially complete exposure pathways were identified, significant exposure was unlikely due to sparse food source at the site. Since a removal action is planned for Site 8, DON does note believe that further evaluation of either ecological risk or detection limits is appropriate.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Site 1, Magazine Road Landfill, Paragraph 1; The EE/CA for Site 1 states, (p.i): "The available data are not adequate to assess the lateral extent of potential soil contamination, or to identify and characterize the extent of potential hot spot contamination within the fill materials. However, the existing information is sufficient for selection and design of the removal action alternatives because a presumptive remedy has been selected." and, "Available data are not sufficient to assess if groundwater at the site is impacted by the landfill. Evaluation of potential groundwater impacts at the site is beyond the scope of the proposed removal action. Installation and monitoring of additional groundwater monitoring wells is recommended to further assess the potential impact of the landfill on groundwater." Therefore, the recommendation by the Site 1 EE/CA report for the presumptive remedy, construction of a cap on the landfill , is made in lieu of complete site characterization, and apparently without consideration of all available information. Due to the reported routine burning of wastes in the preparation of the landfill, HERD previously recommended (March 21, 1995 memorandum) that Site 1 also be evaluated for PAHs, PCDDs, and CDFs. HERD also has concerns regarding the presence of PCBs, and chlorinated pesticides/herbicides at the site. HERD emphasizes that burning of landfill wastes likely resulted in the emission and surface deposition of contaminants and particular material, to which contaminants were sorbed, in areas outside the landfill footprint. Also, contamination was reported in the one location selected for background sampling at Site 1 (B-9/MW5); the Navy apparently has not yet determined the source of the contamination at that location. HERD recommends that the source of contamination be further investigated	As noted above under Detection Limits, Paragraph 2, it is not necessary to fully characterize Site 1 to select and implement the presumptive remedy. Characterization of soil outside the boundaries of the landfill for particulate contamination deposited as the result of waste burning is beyond the scope of this removal action. Further characterization of the area in the vicinity of boring B-9/MW5 was performed in April 1996 as part of a data gaps study. Petroleum hydrocarbons exceeding the laboratory detection limits and concentrations of metals exceeding the US EPA Region IX Preliminary Remediation Goals for residential soils were not observed in soil samples collected within five feet of B-9/MW5 during this investigation. These results indicate that the extent of chemicals of potential concern observed in the soil samples collected from soil boring B-9/MW5 is limited to the one sample from boring B-9 at 3.5 feet below grade.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Site 1, Magazine Road Landfill, Paragraph 2; Although the landfill contents reportedly are not being further investigated due to the presumptive remedy, the areas around the landfill and downwind should be investigated for contamination (including, but not limited to PAHs, PCDDs/PCDFs, organochlorine pesticides and chlorinated herbicides, and metals, including hexavalent chromium), and included in the risk assessment (human health and ecological). The EE/CE statement on p.2-27 par.3) regarding the sufficiency of the data should be removed, or revised to clarify that the conclusion refers only to the selection of the presumptive remedy for the landfill (i.e., not a complete assessment of the risk, or an assessment of the area around the landfill).	Characterization of soil outside the boundaries of the landfill for particulate contaminants deposited as the result of waste burning is beyond the scope of this removal action. The intended meaning of the referenced statement on page 2-27 was that the quality of the data collected during the SWAT/SI was sufficient to perform risk screening for the purpose of this removal action. It was not intended to imply that there was a sufficient quantity of data to perform a complete risk assessment. To avoid confusion, the last sentence of Section 2.8.2.4 will be deleted in the final documents.
Site 1, Magazine Road Landfill, Paragraph 3; Landfill contents may become saturated at times due to rising shallow ground water influenced by local agricultural irrigation. The Site 1 EE/CA states (p.2-11), "...the potential for contaminants to migrate through the groundwater to adjacent cultivated field or off-base to irrigation ditches is high." Due to the lack of adequate characterization of landfill contents and potential migration of contaminants in groundwater, HERD concurs with the recommendation for installation and monitoring of additional groundwater monitoring wells along the perimeter of the landfill and in the larger areas around the landfill, and recommends consultation with the DTSC Geologic Support Unit. Although the water quality of the shallow aquifer reportedly is generally poor and has high concentrations of dissolved solids, the EE/CA report also states that the ground water in the vicinity of Site 1 is designated for beneficial use. Therefore, HERD recommends that the risks associated with domestic use of groundwater be evaluated Other uses of site ground water (agricultural, industrial) should be qualitatively addressed.	Considerations related to characterization of groundwater and the assessment of risks associated with contaminants in the groundwater are beyond the scope of this Engineering Evaluation/Cost Analysis. These considerations will be addressed by future activities. Currently, a basewide quarterly groundwater monitoring program intended to further characterize groundwater conditions at the base is in progress.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Site 1, Magazine Road Landfill, Paragraph 4; HERD recommends that the NAF EC provide supporting documentation (e.g., adequately conducted soil vapor survey, and/or soil sampling and analysis with sufficiently sensitive detection limits) that no landfill gases or vapors are migrating laterally or upward from the landfill, soil or groundwater at the site (Section 3.2, p. 3-2). Vapor migration may be an important potential exposure pathway that should be addressed by the selected remedy if risks are determined to be significant. HERD reiterates the previous recommendation that nearby surface waters be further characterized with respect to potential contamination associated with NAF EC. (This is particularly important for assessing potential impacts to ecological receptors.)	Based on the results of previous investigations, correspondence with the Imperial County Air Pollution Control District, and land use in the vicinity of the site, DON does not believe that additional investigation at the site for landfill gas is warranted. Evidence of organic wastes or methane gas generation have not been observed during the previous investigations conducted at the site. Soil borings drilled during the Solid Waste Water Quality Assessment Test/Site Investigation did not encounter significant organic material and methane has not been detected in groundwater monitoring wells screened above the groundwater surface at the site. On August 7, 1996 a telephone conference was held between DTSC, DON, and Mr. Fisher of the Imperial County Air Pollution Control District, Mr. Fischer indicated that burning of waste was common practice with most of the landfills in the area at the time Site 1 was operational. It was his experience that only landfills located within the water table (within the New River Valley) generated landfill gas. The water table is below the interpreted bottom of the landfill at Site 1. In the unlikely event that landfill gases were generated from the Site 1 waste material, the potential impacts are limited. Site 1 is located in a limited access area on the northern portion of the base. There are no structures within one-half mile of the site where landfill gases could collect and there are no regular base activities conducted within one mile of the site that might result in personnel exposure. Characterization of surface water is beyond the scope of this Engineering Evaluation/Cost Analysis.
Site 3, Sludge Burial Area, **Paragraph 1;** Preliminary investigation of the site included collection of seven soil samples from six borings from the approximately 20 feet by 10 feet by 5 feet deep disposal pit. Although all samples were analyzed for metals, only two locations (one sample from each of two borings plus a duplicate for one of the samples for a total of three samples) were evaluated for volatile organics, semivolatile organics, and organochlorine pesticides and PCBs (continued on following page)	The wastes disposed at Site 3 (sludge from the waste water treatment facility) were placed in a confined area with discrete boundaries. Because of the origin of this waste, it is expected that the contaminants are uniformly distributed throughout the waste material. Therefore, it is anticipated that; 1) samples collected within the waste material will have relatively consistent characteristics (i.e., similar types and concentrations of contaminants) and 2) the characteristics of the samples collected within the waste material will be significantly different from the those collected outside of the waste material.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
(continued from previous page) The nature and extent of contamination have not been fully characterized, and further characterization, as previously recommended by HERD, is not planned for the site prior to the proposed removal action. Therefore, HERD recommends that confirmation soil samples (the number and location approved by the DTSC project manager as adequate) be analyzed for total concentrations of metals (including hexavalent chromium), PCBs, and chlorinated pesticides; analysis should not be limited to chemicals identified as major contributors to risk as determined by the screening analysis.	The samples collected from soil borings B3 (i.e., EC3-B3-S4-D6.0) and B4 (i.e., EC3-B4-S2-D3.0) exhibit significantly different characteristics than samples collected from other soil borings. For example, petroleum hydrocarbons were only detected in these samples and concentrations of cadmium, chromium, copper, lead, and zinc are more than and order of magnitude greater in these samples. In addition, other constituents typical of sludge such as nitrate were elevated in these samples. Thus, it appears that these samples were collected from within the waste material and are representative of the waste characteristics. Because PCBs, chlorinated pesticides (except chlordane) and metals other than arsenic, cadmium, chromium (total and hexavalent) and lead were not detected in samples collected from the waste material (i.e., samples EC3-B3-S4-D6.0 and EC3-B4-S2-D3.0) at concentrations that pose a significant risk, DON does not believe it is reasonable to expect that these constituents will be present in the soil following excavation of the waste material. The additional analyses of confirmation samples requested are not appropriate for this removal action.
Site 8, Scrap Yard, **Paragraph 1;** Fourteen soil samples were collected from 10 trenches at the 500-by-190-foot site and analyzed for PCBs and organochlorine pesticides. Additional analysis of subsets of the samples included priority pollutant metals, volatile organic compounds, semivolatile organic compounds, and petroleum hydrocarbons. PCBs, DDE, toluene, methylene chloride, metals, and fuel hydrocarbons were detected. HERD recommends that the EE/CA report clarify whether toluene and methylene chloride have been confirmed as laboratory contaminants for these samples (i.e., these chemicals were measured at concentrations less than ten times the concentrations measured in quality control samples-field and/or laboratory blanks--for that batch of samples). (continued on following page)	Methylene chloride and toluene have not been confirmed as laboratory contaminants based on the cited criteria. However, based on the volatility of these chemicals, the high ambient temperatures typical of the Imperial Valley, and the depth at which samples were collected (0.2 to 0.4 feet) it is unlikely that methylene chloride and toluene were present in the soil samples. Confirmation samples will be analyzed for the additional analytes (except asbestos) as requested. Because asbestos is not mobile in soil, the vertical extent of asbestos at the site, if present, is likely limited to within the upper few inches of soil. The recommended removal action will remove at least the upper six inches of soil and any associated asbestos.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
(Continued from previous page) Further characterization, as previously recommended by HERD, is not planned for the site prior to the proposed removal action. Therefore, HERD recommends that confirmation soil samples (the number and location as approved by the DTSC project manager as adequate) be analyzed for total concentrations of metals (including hexavalent chromium), PCBs, and chlorinated pesticides; analysis should not be limited to chemicals identified as major contributors to risk as determined by the screening analysis. Also, HERD recommends that confirmation sampling include analysis for asbestos.	
Risk Calculations **Paragraph 1;** Using the Region IX PRGs, estimated cancer risk and non-cancer risk (hazard) appeared to be correctly calculated and total risks were reported. However, not all detected chemicals of potential concern (COCs) were included in the calculation of risk. The EE/CA reports do not provide reasons for the exclusions. PCBs and PAHs were not included for Site 1, and DDE was excluded for Site 8. Therefore, screening values for total risk were underestimated. Non-cancer risk was not evaluated for some carcinogenic COCs (e.g., chromium, PCBs, chlordane). HERD recommends that the EE/CA risk screening evaluations be revised to include all the chemicals of concern detected at the sites, and include non-cancer risk for all carcinogens. (HERD recognizes that the U.S. EPA Region IX PRG table may not include values based on non-cancer risk for some carcinogens. Future screening risk assessments for other NAF EC sites should include, as a minimum, evaluation of noncancer risk for carcinogens which have a ca* or ca** designation in the PRG table). The EE/CA appropriately used the DTSC screening value of 130 mg/kg for lead in soil for human health risk. As recommended above, all detected (and reasonably expected to be present) chemicals of concern should be included in the analysis of confirmation samples	PCB and PAHs were not included in the in the risk screening calculations for Site 1 for the following reasons. 1) PCBs were not detected in any samples collected and analyzed using EPA Method 8080. 2) PAHs were only detected in samples collected from soil boring B-9 located outside the boundaries of the landfill. DDE was not included in the risk screening calculations because the highest detected concentration of DDE was more than an order of magnitude less than the US EPA Region IX Preliminary Remediation Goal residential soil. Inclusion of DDE with a carcinogen risk of approximately $1x10^{-8}$ in the risk screening of approximately $1x10^{-3}$ would not significantly change the total site risk calculation. Table 2-5 in Engineering Evaluation/Cost Analysis for Sites 1, 3, and 8 will be revised to include carcinogens listed in Table 2-4 for which there is a noncarcinogenic US EPA Preliminary Remediation Goal for residential soil.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Risk Calculations, **Paragraph 2;** HERD commends the NAF EC for the clear tabular presentation and comparison of total risk and incremental risk--the above background risk attributed to site contamination. The Site 1 EE/CA concluded (Section 2.9) that soil concentrations of chromium (assumed to be hexavalent chromium), arsenic and lead exceed their respective screening values (beryllium was present at concentrations determined to be below background). The Site 3 EE/CA concluded that soil concentrations of chromium (assumed to be hexavalent chromium), arsenic, chlordane, and lead exceed their respective screening values (beryllium was present at concentrations determined to be below background). The Site 8 EE/CA concluded that soil concentrations of chromium (assumed to be hexavalent chromium), arsenic, cadmium, PCBs, and lead exceed their respective screening values (beryllium was present at concentrations determined to be below background). In addition to those COCs which exceeded their respective screening values, it is important to note that other COCs which did not exceed their respective screening values contribute significantly to total risk and/or hazard at the sites: arsenic and thallium (noncancer risk) at Sites 1 and 8; cadmium (cancer risk), and arsenic, copper and cadmium (noncancer risk) at Site 3.	Comment Noted
Proposed Remedial Action Alternatives, **Paragraph 1;** The landfill cap and institutional controls proposed for Site 1 will prevent direct contact by potential human receptors with landfill contents. However, the remedy does not address potential vapor migration, groundwater contamination, or contamination outside the landfill footprint. HERD strongly recommends that the Site 1 EE/CA clearly define and describe the "inert" soils from Sites 3 and 8 that are proposed to be used as cover at Site 1. If those translocated soils are placed within the top several feet of the final cover, then the risks associated with chemicals of concern in those soils should be reported. Asbestos which may become airborne is a particular concern which should be addressed. Excavated soils which are not classified as regulated hazardous waste may still present a significant risk.	Please see response to Site 1, Magazine Road Landfill, Paragraph 1. Section 4 of the Engineering Evaluation/Cost Analysis documents for Sites 3 and 8 contains a decision flow diagram for determining if soil excavated from each site is inert. This decision flow diagram was developed in cooperation with DTSC and the Regional Water Quality Control Board, Colorado River Region. The soil transported from Sites 3 and 8 will be used as base material in the landfill cap at Site 1.

Barbara Renzi; Associate Toxicologist- DTSC	
Comment	**Response**
Proposed Remedial Action Alternatives, **Paragraph 2;** Excavation of contaminated soils and backfilling of the excavated areas with imported clean fill is the remedial action alternative recommended by the EE/CA reports for Site 3 (excavation to a depth of approximately 8 feet) and Site 8 (excavation to a depth of approximately 6 inches). Cleanup levels for risk drivers, as identified by the human health screening assessment, are based on either background concentration or the U.S. EPA Region IX PRG for residential exposures (see discussion above regarding misapplication of PRGs). As recommended above, confirmation sampling should include all previously detected COCs, and those COCs which reasonably may be expected to be or to have been present at the site. HERD cautions that cleanup levels based solely on U.S. EPA Region IX PRGs for human health may not be adequately protective of ecological receptors. (The adequacy of the ecological assessments conducted for the sites will be reviewed by HERD separately from the human health risk assessment).	Comment noted.
Proposed Remedial Action Alternatives, **Paragraph 3;** <u>None of the remedial action alternatives recommended by the EE/CA reports address ground water and potential risks associated with exposures to groundwater or to volatile contaminants migrating from ground water.</u>	Comment noted.

ATTACHMENT B

ADMINISTRATIVE RECORD INDEX

NAF EL CENTRO ADMINISTRATIVE RECORD FILE INDEX

UIC No. DOC.NO. / DOCUMENT.TYPE... / CONTR/GUID..NO.. / APPROX.#.OF.PAGES	PRC.DATE / DOC.DATE / CTO.NO.. / EPA.CAT#	FROM..... / FROM.SIGNATURE..... / TO..... / TO.SIGNATURE.....	.....SUBJECT.....	CLASSIFICATION	KEY WORDS	...Site...	....Location.....
N60042 000152 LTR 000000000000000 0005	12/08/94 00125 01.1	SOUTHWEST DIVISION S. TOWER CRWQCB PALM DESERT R. DIMENSTEIN	FUEL FARM CLEANUP PLAN IN ACCORDANCE WITH CLEANUP & ABATEMENT ORDER NO. 90-045 OF NOVEMBER 1, 1990 NAF EL CENTRO	ADMIN RECORD	C/A ORDER	FUEL FARM 14,15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000298 MISC 00000000000000 0002	02/10/95 01/01/01 00000 10.6	NAF EL CENTRO DISTRIBUTION	FACT SHEET NO. 2 ON THE NAF EL CENTRO REMOVAL ACTION PROGRAM (WRITTEN IN ENGLISH ONLY)	ADMIN RECORD INFO REPOSITORY	REMOVAL	B-157 B-165 B-361 B-362 B-484 B-565	SOUTHWEST DIVISION BRAWLEY LIBRARY NAF EL CENTRO EL CENTRO LIBRARY
N60042 000299 MISC 00000000000000 0002	02/10/95 01/01/01 00000 10.6	NAF EL CENTRO DISTRIBUTION	FACT SHEET NO. 3 ON THE NAF EL CENTRO REMOVAL ACTION PROGRAM (WRITTEN IN ENGLISH AND SPANISH)	ADMIN RECORD INFO REPOSITORY	MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION BRAWLEY LIBRARY EL CENTRO LIBRARY NAF EL CENTRO
N60042 000300 MISC 00000000000000 0004	02/10/95 01/01/01 00000 10.6	NAF EL CENTRO DISTRIBUTION	BROCHURE ON THE NAF EL CENTRO INSTALLATION RESTORATION PROGRAM (WRITTEN IN ENGLISH ONLY)	ADMIN RECORD INFO REPOSITORY	MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5 6,7,8,9,10 11,12,13 14,15,16 17	SOUTHWEST DIVISION BRAWLEY LIBRARY NAF EL CENTRO EL CENTRO LIBRARY
N60042 000047 RPT NEESA 13-106 0300	12/06/94 09/01/87 00000 01.3	NEESA PORT HUENEME SOUTHWEST DIVISION	NAF EL CENTRO PRELIMINARY ASSESSMENT SITE INSPECTION	ADMIN RECORD	PA SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,12,13, 14,15,16	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000011 RPT N6871188D5053 0250	12/05/94 02/27/90 00000 01.1	ERC CO. SOUTHWEST DIVISION	NAF EL CENTRO FINAL DRAFT SOLID WASTE QUAILTY ASSESSMENT TEST (SWAT) PROPOSAL SITE 1, MAGAZINE ROAD LANDFILL INSTALLATION RESTORATION STUDIES	ADMIN RECORD	SWAT MAG RD LANDFILL	1	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000014 RPT N871188D5053 0125	12/06/94 02/27/90 00000 01.1	ERCE SOUTHWEST DIVISION	NAF EL CENTRO HYDROGEOLOGICAL ASSESSMENT REPORT (HAR) FINAL DRAFT SITE 10 SEWAGE STABILIZTION PONDS INSTALLATION RESTORATION STUDIES (FINAL)	ADMIN RECORD	HAR	10	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000015 RPT N871188D5053 0125	12/06/94 02/27/90 00000 01.1	ERCE SOUTHWEST DIVISION	NAF EL CENTRO SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 3 SLUDGE DISPOSAL AREA INSTALLATION RESTORATION STUDIES (FINAL)	ADMIN RECORD	SWAT DISPOSAL SLUDGE WATER SLUDGE BUR AREA	3	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000037 RPT N6871188D5053 0175	12/06/94 02/27/90 00000 01.1	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO FINAL DRAFT SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 2, PATROL ROAD LANDFILL INSTALLATION RESTORATION STUDIES	ADMIN RECORD	SWAT LF IRP WATER DISPOSAL MW GW	2	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000051 PLAN N871188D5053 0250	12/07/94 02/27/90 00000 01.2	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO FINAL DRAFT SITE INSPECTION (SI) WORK PLAN INSTALLATION RESTORATION STUDIES	ADMIN RECORD INFO REPOSITORY	SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD DISPOSAL MW MONITORING WELLS	1,2,3,4,5, 6,7,8,9, 10,11,14 15,16,17	SOUTHWEST DIVISION BRAWLEY LIBRARY NAF EL CENTRO EL CENTRO LIBRARY
N60042 000262 PLAN N871188D5053 0325	12/28/94 02/27/90 DO 01 01.2	ERC ENVIRONMENTAL SOUTHWEST DIVISION	FINAL HEALTH AND SAFETY PLAN ENGINEERING SERVICES FOR SI FOR NAF EL CENTRO	ADMIN RECORD	H&SP MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000010 PLAN N6871188D5053 0150	12/05/94 03/12/90 00000 01.4	ERC CO. SOUTHWEST DIVISION	NAF EL CENTRO FINAL QUALITY CONTROL PLAN ENGINEERING SERVICES FOR THE SITE INVESTIGATION	ADMIN RECORD	QC SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000337 MEMO 000000000000000 0003	09/12/95 07/01/90 00000 01.6	SOUTHWEST DIVISION FILE	POINT PAPER ON EL CENTRO'S IRP FOR THE EVALUATION AND CLEAN UP OF SITES	ADMIN RECORD	IRP MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 7,8,9,10, 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000154 LTR 000000000000000 0005	12/08/94 11/01/90 00125 07.0	CRWQCB PALM DESERT P. GRUENBERG NAF EL CENTRO C. GUDMUNSON	CLEANUP AND ABATEMENT ORDER NO. 90-045 REGARDING FUEL FARM AT NAF EL CENTRO CONCERNING CONTAMINATION OF SOIL AND GROUNDWATER BY DIESEL FUEL	ADMIN RECORD	C/A ORDER GW FUEL	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000175 LTR 000000000000000 0001	12/09/94 11/07/90 00024 06.0	CRWQCB PALM DESERT P. GRUENBERG EPA SAN FRANCISCO C.J. DOUGLAS	FEDERAL FACILITY PRELIMINARY ASSESSMENT REVIEW FOR NAF EL CENTRO COMMENTS (EPA ID #CA6170090017)	ADMIN RECORD	FFA COMMENTS	10	SOUTHWEST DIVISION NAF EL CENTRO

NAF EL CENTRO ADMINISTRATIVE RECORD FILE INDEX

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N60042 LTR 000000000000000 0001	000163	12/09/94 12/20/90 00125 06.0	CRWQCB PALM DESERT P. GRUENBERG NAF EL CENTRO C. GUDMUNSON	EXTENSION REQUEST FOR CLEANUP & ABATEMENT ORDER NO. 90-045 (FUEL FARM) TANKS 605,606,607,608 AND FUEL TANK NEAR BLDG NO.533 NAF EL CENTRO	ADMIN RECORD	C/A ORDER	FUEL FARM B-533	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 RPT N871188D5053 0085	000054	12/07/94 01/01/91 00000 03.3	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO FINAL HYDROGEOLOGICAL ASSESSMENT REPORT (HAR) WORKPLAN SITE 17 FIRE FIGHTING TRAINING AREA INSTALLATION RESTORATION STUDIES	ADMIN RECORD	HAR WATER GW	17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 LTR 000000000000000 0001	000157	12/08/94 01/28/91 00125 01.6	CRWQCB PALM DESERT P. GRUENBERG NAF EL CENTRO C. GUDMUNSON	EXTENSION REQUESTED IN LTR OF DEC. 14, 1990 FOR WORK TO BE PERFORMED UNDER CLEANUP AND ABATEMENT ORDER NO. 90-045	ADMIN RECORD	C/A ORDER		SOUTHWEST DIVISION NAF EL CENTRO
N60042 RPT N871188D5053 0275	000258	12/28/94 03/07/91 DO 02 01.4	ERCE J.C. HERWIG SOUTHWEST DIVISION	FINAL REPORT SITE INVESTIGATION MILCON P-205 TANK FARM SOIL TESTING NAF EL CENTRO	ADMIN RECORD	SI	TANK FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 RPT N6871188D5053 0150	000033	12/06/94 03/27/91 00000 01.1	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO FINAL DRAFT SOLID WASTE WASTE QUALITY ASSESSMENT TEXT (SWAT) PROPOSAL SITE 3, SLUDGE DISPOSAL AREA INSTALLATION RESTORATION STUDIES	ADMIN RECORD INFO REPOSITORY	SWAT DISPOSAL SLUDGE SLUDGE BUR AREA MW MONITORING WELLS WATER	3	SOUTHWEST DIVISION BRAWLEY LIBRARY EL CENTRO LIBRARY NAF EL CENTRO
N60042 RPT N6871188D5053 0250	000036	12/06/94 03/27/91 00000 01.1	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO FINAL SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 1, MAGAZINE ROAD LANDFILL INSTALLATION RESTORATION STUDIES	ADMIN RECORD	SWAT MAG RD LANDFILL LF WATER DISPOSAL GW	1	SOUTHWEST DIVISION NAF EL CENTRO
N60042 LTR 000000000000000 0004	000166	12/09/94 05/02/91 00125 01.1	JACOBS ENGINEERING G. DOYLE SOUTHWEST DIVISION R. PARDY	SITE ASSESSMENT AT NAF EL CENTRO EXPLORATORY BORINGS AND MONITORING WELLS OBTAIN ADDITIONAL GROUND WATER LEVEL AND PRODUCT THICKNESS DATA	ADMIN RECORD	MONITORING WELLS GW		SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871189D9296 0080	000009	12/05/94 05/08/91 00125 03.1	JACOBS ENGINEERING G.N. DOYLE SOUTHWEST DIVISION	NAF EL CENTRO SITE ASSESSMENT STUDY SAMPLING AND ANALYSIS PLAN FINAL	ADMIN RECORD	SAP		SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000303 PLAN N6872289D9296 0075	03/02/95 05/08/91 00125 02.2	JACOBS ENGINEERING W. CRONE SOUTHWEST DIVISION	SITE ASSESSMENT STUDY SAMPLING AND ANALYSIS PLAN NAF EL CENTRO	ADMIN RECORD	SA SAP		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000153 LTR 000000000000000 0001	12/08/94 07/11/91 00125 01.4	NAF EL CENTRO D.L. HESS SOUTHWEST DIVISION CODE 18	CRWQCB CLEANUP AND ABATEMENT ORDER 90-045 FUEL FARM SITE INVESTIGATION	ADMIN RECORD	C/A ORDER SI	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000003 RPT N6871189D9296 0150	12/05/94 07/26/91 00125 00.0	JACOBS ENGINEERING G.N. DOYLE SOUTHWEST DIVISION	SITE ASSESSMENT STUDY SITE ASSESSMENT REPORT	ADMIN RECORD	MONITORING WELLS GW		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000179 LTR 000000000000000 0005	12/09/94 08/09/91 00125 01.6	NAF EL CENTRO D.L. HESS SOUTHWEST DIVISION CODE 18	CALIFORNIA REGIONAL WAATER QUALITY CONTROL BOARD (CRWQCB) CLEANUP AND ABATEMENT ORDER 90-045 FUEL FARM ENCL: SITE ASSESSMENT STUDY\REPORT NAF EL CENTRO	ADMIN RECORD	C/A ORDER	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000012 RPT 000000000000000 0450	12/05/94 10/30/91 00000 01.2	ERC CO. SOUTHWEST DIVISION	NAF EL CENTRO FINAL SITE INSPECTION (SI) FOR SITES 14, 15, AND 16 INSTALLATION RESTORATION STUDIES	ADMIN RECORD	SI	14,15,16	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000013 RPT 000000000000000 0250	12/06/94 10/30/91 00000 03.2	ERCE SOUTHWEST DIVISION	NAF EL CENTRO HYDROGEOLOGICAL ASSESSMENT REPORT (HAR) FINAL SITE 17 FIRE FIGHTING TRAINING AREA INSTALLATION RESTORATION STUDIES VOLUME II: ANALYTICAL LAB REPORTS	ADMIN RECORD	HAR	17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000050 RPT 000000000000000 0350	12/07/94 10/30/91 00000 03.2	ERC ENVIRONMENTAL K. WAHL SOUTHWEST DIVISION	NAF EL CENTRO HYDROGEOLOGICAL ASSESSMENT REPORT (HAR) SITE 10, SEWAGE STABILIZATION PONDS INSTALLATION RESTORATION STUDIES VOLUME II ANALYTICAL LAB REPORTS	ADMIN RECORD	HAR DATA	10	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000071 RPT 000000000000000 0250	12/07/94 10/30/91 00000 01.2	ERC ENVIRONMENTAL SOUTHWEST DIVISION	NAF EL CENTRO PRELIMINARY DRAFT SITE INSPECTION (SI) REPORT FOR SITES 14, 15, AND 16 INSTALLATION RESTORATION STUDIES VOLUME II APPENDICES	ADMIN RECORD	SI TPH METALS MW	14,15,16	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000397 LTR 000000000000000 0008	08/13/96 01/03/92 00000 01.6	SOUTHWEST DIVISION J. PAWLISCH NAF EL CENTRO	NOTIFICATION THAT THE FOLLOWING REGULATORY & NAVY REPS MET TO DISCUSS WHAT CRITERIA SHOULD BE USED TO PRIORITIZE DERA PROJECTS. (ENCL. MTG.AGDA DTD 1/9/92	ADMIN RECORD	DERA FUEL MTG MINS RI	FUELING FA	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000253 RPT 000000000000000 0450	12/28/94 01/24/92 00000 01.2	OGDEN ENVIRONMENTAL T.J. FITZPATRICK SOUTHWEST DIVISION	FINAL SITE INSPECTION (SI) REPORT FOR SITES 14,15 & 16 VOLUME III ANALYTICAL LAB REPORTS NAF EL CENTRO	ADMIN RECORD	SI	14,15,16	SOUTHWEST DIVISION NAF EL CNETRO

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N60042 000304 RPT 000000000000000 0250	03/27/95 01/24/92 00000 01.1	OGDEN SOUTHWEST DIVISION	FINAL HYDORGEOLOGICAL ASSESSMENT REPORT (HAR) SITE 10 SEWAGE STABILIZATION PONDS VOLUME I TECHNICAL REPORT AND APPENDICES	ADMIN RECORD	HAR	10	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000318 RPT 000000000000000 1000	07/27/95 01/24/92 00000 01.2	OGDEN J. HENRY SOUTHWEST DIVISION	FINAL SITE INSPECTION (SI) REPORT FOR SITES 14, 15 & 16 VOLUME I: TECHNICAL REPORT, VOLUME II: APPENDICES VOLUME III: ANALYTICAL LABORATORY REPORTS	ADMIN RECORD INFO REPOSITORY	SI	14,15,16	SOUTHWEST DIVISION NAF EL CENTRO BRAWLEY LIBRARY EL CENTRO LIBRARY
N60042 000319 RPT N71188D5053 1000	07/27/95 04/01/92 DO 01 01.2	OGDEN SOUTHWEST DIVISION	DRAFT SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) SITE INVESTIGATION (SI) SITES 1,2,3	ADMIN RECORD INFO REPOSITORY	SWAT SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3	SOUTHWEST DIVISION NAF EL CENTRO BRAWLEY LIBRARY EL CENTRO LIBRARY
N60042 000271 RPT 000000000000000 0030	12/28/94 05/29/92 00000 02.2	CES, INC. R.C. ORLANDO SOUTHWEST DIVISION	STATUS REPORT ON SOIL MITIGATION BY BIOREMEDIATION, FUEL FARM STOCKPILE, NAF EL CENTRO	ADMIN RECORD	BIOREMEDIATION	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000052 RPT 000000000000000 0100	12/07/94 07/24/92 00000 02.2	OGDEN ENVIRONMENTAL J.C. HERWIG SOUTHWEST DIVISION M. RADECKI	NAF EL CENTRO LETTER REPORT QUARTERLY GROUND WATER SAMPLING RESULTS AT SITES 10,14,15,16 & 17	ADMIN RECORD	GW DATA BTX&E SWAT MW MONITORING WELLS VOC TPH TFH	10,14,15 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000371 RPT 000000000000000 0450	05/23/96 08/07/92 00000 02.1	OGDEN ENVIRONMENTAL T.J. FITZPATRICK SOUTHWEST DIVISION	FINAL QUARTERLY SAMPLING ANALYTICAL LABORATORY REPORTS SITE INVESTIGATION (SI) AND HYDROGEOLOGICAL ASSESSMENT REPORT SITES 10, 14, 15, & 17 VOLUME I	ADMIN RECORD	DATA SI HAR	10,14,15, 17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000023 PLAN 000000000000000 0065	12/06/94 08/15/92 00000 03.3	GEOSERVICES SOUTHWEST DIVISION	NAF EL CENTRO FINAL HEALTH AND SAFETY PLAN (H&SP) PRECISION TANK TESTING	ADMIN RECORD	H&SP TANK HAZMAT MONITORING		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000267 PLAN N6871189D9296 0050	12/28/94 09/29/92 00218 01.1	JACOBS ENGINEERING G.P. JENNETT SOUTHWEST DIVISION	HEALTH AND SAFETY PLAN FOR NAF EL CENTRO	ADMIN RECORD	H&SP		SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000369 RPT 000000000000000 1500	05/23/96 10/01/92 00000 02.1	OGDEN ENIRONMENTAL K. WHAL SOUTHWEST DIVISION	FINAL QUARTERLY SMAPLING ANALYTICAL LABROATORY REPORTS SITE INVESTIGATION AND SOLID WATE ASSESSMENT TEST (SWAT) SITES 1,2,3,4,5,6,7, & 11 VOLUMES I & II	ADMIN RECORD	SI SWAT MAG RD LANDFILL SLUDGE BUR AREA	1,2,3,4,5, 6,7,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000034 RPT 000000000000000 0175	12/06/94 10/06/92 00000 02.2	OGDEN ENVIRONMENTAL J.C. HERWIG SOUTHWEST DIVISION M. RADECKI	LETTER REPORT OF QUARTERLY GROUND WATER SAMPLING RESULTS FOR SITES 1,2,3,4,5,6,7,,8,9 AND 11	ADMIN RECORD	GW DISPOSAL SLUDGE MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD MW BTX&E GC/MS LF PCB	1,2,3,4,5 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000070 RPT N6871191D0250 0150	12/07/94 02/04/93 00000 01.4	DAMES & MOORE J.C. WILSON SOUTHWEST DIVISION	NAF EL CENTRO FINAL REPORT SITE INVESTIGATION (SI) BUILDING 157 PAINT RINSE AREA	ADMIN RECORD	SI PESTICIDES PCB METALS VOC	B-157	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000041 RPT N6871189D9296 0350	12/06/94 03/12/93 00202 01.1	JACOBS ENGINEERING C. JOHNSON SOUTHWEST DIVISION	NAF EL CENTRO FINAL REPORT TREATABILITY STUDY OF FUEL FARM FREE PRODUCT PLUME	ADMIN RECORD	FUEL MONITORING WELLS MW GW	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000039 RPT N71188D5053 0450	12/06/94 05/01/93 00000 01.4	OGDEN ENVIRONMENTAL SOUTHWEST DIVISION CODE 0223	FINAL SITE INVESTIGATION (SI) REPORT SITE 4,5,6,7,8,9, AND 11 ENGINEERING SERVICES FOR RI/FS	ADMIN RECORD INFO REPOSITORY	SI RI SCRAPYARD FUEL GW DATA QA QC	4,5,6,7,8 9, 11	SOUTHWEST DIVISION BRAWLEY LIBRARY EL CENTRO LIBRARY NAF EL CENTRO
N60042 000040 RPT N71188D5053 0450	12/06/94 05/01/93 00000 01.4	OGDEN ENVIRONMENTAL SOUTHWEST DIVISION CODE 0223	NAF EL CENTRO FINAL SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) SITE INVESTIGATION REPORT (SI) SITE 1, 2, AND 3 VOLUME I	ADMIN RECORD	SWAT SI MAG RD LANDFILL SLUDGE BUR AREA WATER LF DISPOSAL SLUDGE	1,2,3	SOUTHWEST DIVISION NAF EL CENTRO BRAWLEY LIBRARY EL CENTRO LIBRARY

NAF EL CENTRO ADMINISTRATIVE RECORD FILE INDEX

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N60042 PLAN N6871191D0252 0100	000302	02/10/95 05/01/93 DO 14 10.2	BROWN AND CALDWELL SOUTHWEST DIVISION	REVISED COMMUNITY RELATIONS PLAN FOR NAF EL CENTRO	ADMIN RECORD	CRP MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 RPT N71188D5053 0450	000370	05/23/96 05/01/93 00000 01.4	OGDEN ENVIRONMENTAL SOUTHWEST DIVISION CODE 0223	FINAL SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) SITE INVESTIGATION REPORT (SI) FINA DATA VALAIDATION REPORT APPENDIX VOLUME II	ADMIN RECORD	SWAT SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871189D9296 0050	000029	12/06/94 08/31/93 00268 03.3	JACOBS ENGINEERING D. TURNER SOUTHWEST DIVISION	NAF EL CENTRO FINAL WORK PLAN DELINEATION OF FUEL FARM FREE PRODUCT PLUME	ADMIN RECORD	FUEL GW QA QC	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871189D9296 0030	000284	01/30/95 08/31/93 00268 03.3	JACOBS ENGINEERING D. TURNER SOUTHWEST DIVISION	WORK PLAN OF DELINEATION FUEL FARM FREE PRODUCT PLUME NAF EL CENTRO (COMMENTS WRITTEN ON DOCUMENT)	ADMIN RECORD		FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 RPT N6871192D4670 0040	000279	01/27/95 09/24/93 00005 01.1	BECHTEL NATIONAL D. UMSTOT SOUTHWEST DIVISION	DRAFT SOLID WASTE WATER QUALITY ASSESSEMNT TEST (SWAT) PROPOSAL SITE 2A, WEST PARTROL ROAD LANDFILL NAF EL CENTRO (NO LONGER BEING DONE) (SENT TO RWQCB)	ADMIN RECORD	SWAT	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871192D4670 0050	000354	02/01/96 10/05/93 00005 03.3	BECHTEL NATIONAL INC G.R. HASKINS SOUTHWEST DIVISION	DRAFT INVESTIGATION DERIVED WASTE MANAGEMENT PLAN SITE 2A, WEST PATROL ROAD LAND FILL SWAT/SI	ADMIN RECORD	IDWMP	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871192D4670 0025	000355	02/01/96 10/05/93 00005 01.2	BECHTEL NATIONAL INC D.B. MCCULLAR SOUTHWEST DIVISION	DRAFT SITE INSPECTION WORK PLAN ADDENDUM FOR SITE 2A WEST PATROL ROAD LANDFILL	ADMIN RECORD	SI	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871192D4670 0250	000356	02/01/96 10/05/93 00005 03.3	BECHTEL NATIONAL INC SOUTHWEST DIVISION	DRAFT SITE SPECIFIC HEALTH AND SAFETY PLAN SITE 2A WEST PATROL ROAD LANDFILL	ADMIN RECORD	H&SP	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 PLAN N6871193D1457 0250	000016	12/06/94 11/30/93 00000 03.3	GEOSERVICES L. MICHAELIAN SOUTHWEST DIVISION	NAF EL CENTRO FINAL HEALTH AND SAFETY PLAN	ADMIN RECORD INFO REPOSITORY	H&SP		SOUTHWEST DIVISION BRAWLEY LIBRARY EL CENTRO LIBRARY NAF EL CENTRO

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N60042 000285 RPT N6871189D9296 0250	01/30/95 12/15/93 00268 01.1	JACOBS ENGINEERING D. TURNER SOUTHWEST DIVISION	DRAFT SITE ASSESSMENT REMEDIAL ALTERNATIVES FUEL FARM TECHNICAL REPORT FOR NAF EL CENTRO	ADMIN RECORD	SA	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000196 LTR N6871192D4673 0008	12/13/94 01/19/94 00000 10.2	BROWN & CALDWELL B. SCHMUCKER SOUTHWEST DIVISION D. DUNBAR	COMMUNITY RELATIONS MAILING LIST FOR NAF EL CENTRO (MADE DISCLOSABLE)	ADMIN RECORD CONFIDENTIAL DOC INFO REPOSITORY	CRP MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO BRAWLEY LIBRARY EL CENTRO LIBRARY
N60042 000296 LTR N6871192D4673 0006	02/10/95 01/19/94 DO 22 10.2	BROWN & CALDWELL B. SCHMUCKER SOUTHWEST DIVISION D. DUNBAR	REVISED UPDATED MAILING LIST FOR THE COMMUNITY RELATIONS PROGRAM (PRIVIATE CITIZENS NAMES AND ADDRESSES HAVE BEEN BLANK OUT TO MAKE DISCLOSEABLE)	ADMIN RECORD CONFIDENTIAL DOC INFO REPOSITORY	MAILING LST MAG RD LANDFILL SLUDGE BUR AREA	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION BRAWLEY LIBRARY NAF EL CENTRO EL CENTRO LIBRAY
N60042 000019 RPT N6871192D4670 0095	12/06/94 02/04/94 00005 01.1	BECHTEL NATIONAL, INC J.S. HOYLE SOUTHWEST DIVISION	NAF EL CENTRO FINAL SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 2A WEST PATROL ROAD LANDFILL (NO LONGER BEING DONE)	ADMIN RECORD	SWAT LF WATER GW DISPOSAL WELLS MONITORING MW	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000021 PLAN N6871192D4670 0075	12/06/94 02/04/94 00005 03.3	BECHTEL NATIONAL, INC A.L. FRANKS SOUTHWEST DIVISION	NAF EL CENTRO FINAL INVESTIGATION DERIVED WASTE MANAGEMENT PLAN SITE 2A, WEST PATROL ROAD LANDFILL SWAT/SI (NO LONGER BEING DONE)	ADMIN RECORD	WMP LF HAZ WASTE	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000251 PLAN N6871192D4670 0017	12/28/94 02/04/94 00005 03.3	BECHTEL NATIONAL INC D. UMSTOT SOUTHWEST DIVISION	SITE INSPECTION (SI) WORK PLAN ADDENDUM SITE 2A WEST PATROL ROAD LANDFILL NAF EL CENTRO FINAL (NO LONGER BEING DONE)	ADMIN RECORD	SI	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000283 RPT N6871192D4670 0044	01/30/95 02/04/94 00005 01.1	BECHTEL NATIONAL INC J.S. HOYLE SOUTHWEST DIVISION	SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 2A, WEST PATROL ROAD LANDFILL NAF EL CENTRO (NO LONGER BEING DONE)	ADMIN RECORD	SWAT	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000020 PLAN N6871192D4670 0175	12/06/94 02/07/94 00005 03.3	BECHTEL NATIONAL, INC C.I. SHERMAN SOUTHWEST DIVISION	NAF EL CENTRO FINAL SITE SPECIFIC HEALTH AND SAFETY PLAN SITE 2A, WEST PATROL ROAD LANDFILL SWAT/SI (NO LONGER BEING DONE)	ADMIN RECORD	H&SP LF SWAT SI PCB PESTICIDES HAZ WASTE	2A	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000215 LTR 000000000000000 0003	12/13/94 03/21/94 00000 01.6	CRWQCB PALM DESERT S. CHAKLADAR SOUTHWEST DIVISION D. DUNBAR	COMMENTS ON DRAFTS OF SI FOR SITES 4, 5, 6, 11 AT NAF EL CENTRO	ADMIN RECORD	SI COMMENTS	4,5,6,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000216 LTR 000000000000000 0001	12/13/94 03/21/94 00000 01.6	CRWQCB PALM DESERT S. CHAKLADAR SOUTHWEST DIVISION D. DUNBAR	COMMENTS ON DRAFTS OF SI FOR SITES 7,8 & 9 AT NAF EL CENTRO	ADMIN RECORD	COMMENTS SI SCRAPYARD	7,8,9	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000219 LTR 000000000000000 0002	12/13/94 03/28/94 00000 01.6	CRWQCB PALM DESERT R. LUKENS SOUTHWEST DIVISION D. DUNBAR	NAF EL CENTRO FUEL FARM REMEDIATION REGIONAL BOARD CLEANUP & ABATEMENT ORDER NO. 90-045	ADMIN RECORD	C/A ORDER GW BTX&E WATER TPH	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000297 MISC 00000000000000 0004	02/10/95 04/01/94 00000 10.6	NAF EL CENTRO DISTRIBUTION	FACT SHEET NO. 1 ON THE NAF EL CENTRO INSTALLATION RESTORATION PROGRAM (WRITTEN IN ENGLISH AND SPANISH)	ADMIN RECORD INFO REPOSITORY	MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2A,2,3,4 5,6,7,8,9 10,11,12, 13,14,15 16,17	SOUTHWEST DIVISION BRAWLEY LIBRARY NAF EL CENTRO EL CENTRO LIBRARY
N60042 000030 RPT N6871189D9296 0450	12/06/94 04/22/94 00268 01.1	JACOBS ENGINEERING D. TURNER SOUTHWEST DIVISION	NAF EL CENTRO FINAL SITE ASSESSMENT REMEDIAL ALTERNATIVES FUEL FARM TECHNICAL REPORT REVISION 0	ADMIN RECORD	FUEL MW MONITORING WELLS GW DATA PA LUFT	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000229 LTR 000000000000000 0002	12/13/94 05/10/94 00000 01.6	CRWQCB PALM DESERT S. CHAKLADAR SOUTHWEST DIVISION D. DUNBAR	COMMENTS ON THE FINAL REPORT FOR PIPING AND UST PRECISION TESTING AT NAF EL CENTRO	ADMIN RECORD	COMMENTS UST	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000236 LTR 000000000000000 0001	12/13/94 05/24/94 00000 01.6	CRWQCB PALM DESERT S. CHAKLADAR NAF EL CENTRO D. HESS	COMMENTS ON THE FINAL SITE ASSESSMENT REMEDIAL ALTERNATIVES FOR THE FUEL FARM AT NAF EL CENTRO	ADMIN RECORD	COMMENTS	FUEL FARM	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000239 LTR 000000000000000 0002	12/13/94 06/02/94 00000 01.6	DTSC LONG BEACH M.C. GASLAN NAF EL CENTRO J.L. CROW	SITE 2 LANDFILL NAF EL CENTRO REMOVAL OF AND TREATMENT OF CONTAMINATED SOIL FOR USE	ADMIN RECORD	REMOVAL LF	2,15	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000072 LTR 000000000000000 0002	12/08/94 06/15/94 00000 01.4	CRWCB PALM DESERT S. GHAKLADAR NAF EL CENTRO D. HESS	NAF EL CENTRO COMMENTS ON PROPOSED INTERIM COVER TO BE PROVIDED ON SWAT SITE #2 AS PART OF CONTINUED REMEDIATION REVIEW OF THE FINAL SI SWAT OF APRIL 1992	ADMIN RECORD	COMMENTS SI SWAT ARAR LF	2	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000092 LTR 000000000000000 0002	12/08/94 07/14/94 00000 01.1	CRWQCB PALM DESERT S. CHAKLADAR NAF EL CENTRO E. GONZALEZ	NAF EL CENTRO COMMENTS ON DRAFT SOLID WASTE WATER QUALITY ASSESSMENT TEST (SWAT) PROPOSAL SITE 2A, WEST PATROL ROAD LANDFILL	ADMIN RECORD	COMMENTS SWAT LF	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000094 LTR 000000000000000 0001	12/08/94 07/15/94 00000 01.4	CRWQCB PALM DESERT S. CHAKLADAR NAF EL CENTRO E. GONZALEZ	NAF EL CENTRO COMMENTS ON INVESTIGATION DERIVED WASTE MANAGEMENT PLAN SITE 2A WEST PATROL ROAD LANDFILL SWAT/SI	ADMIN RECORD	SWAT WMP LF SI	2A	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000112 LTR 000000000000000 0026	12/08/94 08/25/94 00000 01.1	ERM WEST INC. F. ALLISON SOUTHWEST DIVISION D. DUNBAR	PROJECT UPDATE RESULTS OF THIRD SAMPLING OF SLUDGE DRYING BEDS AT NAF EL CENTRO SEWAGE TREATMENT PLANT	ADMIN RECORD	SLUDGE DATA		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000124 LTR 000000000000000 0001	12/08/94 09/13/94 00000 01.3	SOUTHWEST DIVISION D. DUNBAR DTSC LONG BEACH T. BEKELE	REPORT PROVIDED FOR REFERENCE FINAL PRELIMINARY ASSESSMENT SITE INSPECTION OF THE NAF EL CENTRO NEESA 13-106 9/87	ADMIN RECORD	PA SI		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000125 LTR 000000000000000 0001	12/08/94 09/14/94 00000 03.3	CRWQCB PALM DESERT S. CHAKLADAR NAF EL CENTRO E. GONZALEZ	DRAFT PROJECT WORK PLAN BUILDING DECONTAMINATION, NAF EL CENTRO (CRWQCB WILL NOT BE REVIEWING THIS PLAN)	ADMIN RECORD	COMMENTS		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000374 LTR 000000000000000 0001	07/31/96 12/21/94 00000 03.6	SOUTHWEST DIVISION D. DUNBAR EPA PALM DESERT L. CHAVEZ	ENCLOSURES AS REQUESTED FORWARDED. REF.DOC# 000034, 000052,& 000047.	ADMIN RECORD	SI GW MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5 6,7,8,9,10 11,12,13, 14,15,16, 17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000312 LTR 000000000000000 0002	05/18/95 02/09/95 00000 01.1	SOUTHWEST DIVISION D. DAWSON NAF EL CENTRO	REGINAL WATER QUALITY CONTROL BOARD AND DEPARTMENT OF TOXIC SUBSTANCES CONTROL SITE VISIT	ADMIN RECORD	MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000332 LTR 000000000000000 0002	09/12/95 02/15/95 00000 01.6	NAF EL CENTRO P.T. MADISON EPA SAN FRANCISCO	OPA 90 FACILITY RESPONSE PLAN AND EMERGENCY RESPONSE ACTION PLAN FOR NAF EL CENTRO	ADMIN RECORD			SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000316 MISC 000000000000000 0001	06/23/95 03/01/95 00000 10.3	THE SANDPAPER	NOTICE OF PUBLIC MEETING TO DISCUSS THE ENVIRONMENTAL IR PROGRAM AND FORMATION OF A RAB	ADMIN RECORD INFO REPOSITORY	PUBNOT RAB MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO BRAWLEY LIBRARY EL CENTRO LIBRARY
N60042 000310 LTR 000000000000000 0028	05/18/95 03/24/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENT ON FINAL SITE INVESTIGATION REPORT FOR SITES 1,2,3,4,5,6,7,8,9 & 11	ADMIN RECORD	COMMENTS SI MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000375 LTR 000000000000000 0003	03/31/95 03/31/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON NAF EL CENTRO TEAM	NAF EL CENTRO TEAM MEETING DRAFT AGENDA	ADMIN RECORD	ARAR MAG RD LANDFILL EE/CA(*) SLUDGE BUR AREA SCRAPYARD	1,2,3,4,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000376 MM 000000000000000 0001	07/31/96 04/05/95 00000 01.6	NAF EL CENTRO NAF EL CENTRO TEAM	AGENDA FOR PROGRESS MEETING EE/CA AM AND NFRAP SITES 1 ,3,4,5,8,12 AND 13 NAF EL CENTRO (NEED MTG MINS)	ADMIN RECORD	ACTMEMO EE/CA(*) MTG MINS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,3,4,5,8, 12,13	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000309 LTR 000000000000000 0002	05/18/95 04/06/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE FINAL SITE INSPECTION REPORT FOR SITES 14, 15 & 16 (SEE COMMENTS ON SITES 1,2,3,4,5,6,7 8, 9, & 11 LTR OF MARCH 24, 1995	ADMIN RECORD	COMMENTS SI	14,15,16	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000377 MM 000000000000000 0001	07/31/96 04/13/95 00000 01.6	NAF EL CENTRO NAF EL CENTRO TEAM	SIGN IN SHEET FOR MEETING OF 13 APRIL 1995 NAF EL CENTRO (REF DOC #000375)	ADMIN RECORD	MTG MINS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,8 5,6,7,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000341 MM 000000000000000 0003	10/19/95 04/17/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON ATTENDEES	NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	MTG MINS SI SWAT MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000308 LTR 000000000000000 0002	05/18/95 04/18/95 00000 04.5	SOUTHWEST DIVISION D. DAWSON DTSC LONG BEACH T. BEKELE	REQUEST FOR INDENTIFICATION OF POTENTIAL STATE CHEMICAL SPECIFIC ACTION SPECIFIC AND LOCATION SPECIFIC ARARs FOR AN INTERIM REMOVAL ACTION	ADMIN RECORD	ARAR MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000306 LTR 000000000000000 0002	05/18/95 04/24/95 00000 01.6	CRWQCB PLAM DESERT L. CHAVEZ NAF EL CENTRO E. GONZALEZ	COMMENTS ON IR SITES 1,2, AND 3 NAF EL CENTRO FINAL SITE INVESTIGATION REPORT	ADMIN RECORD	COMMENTS SI MAG RD LANDFILL SLUDGE BUR AREA	1,2,3,	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000325 LTR 000000000000000 0032	07/31/95 05/09/95 00090 02.7	SOUTHWEST DIVISION D. DAWSON DTSC LONG BEACH T. BEKELE	EE/CA AND ACTION MEMORANDA AT NAF EL CENTRO ESTIMATION OF BACKGROUND METALS CONCENTRATIONS	ADMIN RECORD	METALS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000326 LTR 000000000000000 0003	07/31/95 05/09/95 00000 01.6	SOUTHWEST DIVISION M. GONZALES DTSC LONG BEACH T. BEKELE	WRITTEN RESPONSE TO LETTER OF APRIL 16, 1995 ON THE FINAL SITE INSPECTION REPORT FOR SITES 14,15, & 16 COMMENTS WILL ADDRESS SITE 16	ADMIN RECORD	COMMENTS	16	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000324 LTR 000000000000000 0003	07/31/95 05/23/95 00000 01.6	CRWQCB PALM DESERT L. CHAVEZ SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE DRAFT FINAL SITE 15 FUEL FARM REMOVAL ACTION GENERAL SITE WORK PLAN AND DRAFT FINAL SITE 15 FULE FARM SAMPLING AND ANALYSIS PLAN	ADMIN RECORD	COMMENTS RA SAP	15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000345 MM 000000000000000 0003	10/19/95 05/31/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON ATTENDEES	SITE 15 (FUEL FARM) STRATEGY MEETING MINUTES	ADMIN RECORD	MTG MINS	15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000327 LTR 000000000000000 0002	07/31/95 06/08/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	REVIEW COMMENTS ON THE COMMUNITY RELATIONS PLAN FOR NAF EL CENTRO CONCURRED	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000342 MM 000000000000000 0003	10/19/95 06/14/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON ATTENDEES	NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	PRG MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,3,4,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000393 LTR 000000000000000 0004	07/31/96 06/14/95 0000 01.6	SOUTHWEST DIVISION D.DAWSON DTSC LONG BEACH T. BEKELE	REGARDING CERCLA STATUS OF SITE 14, 15, AT NAF EL CENTRO. NAVY REQUESTS THAT IR SITE 14 AND SITE 15 BE REMOVED FROM NAF EL CENTRO & PLACED UST.	ADMIN RECORD	CERCLA UST METALS	14,15	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000396 LTR 000000000000000 0004	08/13/96 06/14/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON DTSC LONG BEACH T. BEKELE	CERCLA STATUS OF SITE 14 & SITE 15 AT NAF, EL CENTRO. REQUEST THAT THE SITES BE REMOVED FROM IRP AND PLACED INTO THE UST PROGRAM.(ENCLS. NOT INCLUDED)	ADMIN RECORD	CERCLA IRA UST BACKGROUND	14 15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000317 LTR 000000000000000 0079	07/24/95 06/21/95 00000 04.1	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	RESPONSE TO ARAR's REQUEST FOR SITES 1,2,3,4, & 8	ADMIN RECORD	ARAR MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,8	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000322 LTR 000000000000000 0002	07/31/95 06/28/95 00099 02.7	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE EE/CA AND ACTION MEMORANDA AT NAF EL CENTRO ESTIMATION OF BACKGROUND METALS CONCENTRATIONS	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000321 LTR 000000000000000 0002	07/31/95 07/12/95 00099 02.7	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE EE/CA AND ACTION MEMORANDA AT NAF EL CENTRO OCCURENCE OF VOLATILE ORGANIC COMPOUNDS AT SITES 1 AND 4	ADMIN RECORD	VOC EE\CA ACTMEMO MAG RD LANDFILL	1,4	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000320 LTR 000000000000000 0035	07/31/95 07/17/95 00000 01.1	SOUTHWEST DIVISION J.R. PAWLISCH DTSC LONG BEACH T. BEKELE	REQUEST FOR CONCURRENCE TO REMOVE THE IR SITE #14 AND #15 FROM THE NAF EL CENTRO IRP AND PLACE IN THE UST PROGRAM	ADMIN RECORD	UST IRP	14,15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000340 LTR 000000000000000 0001	09/12/95 07/17/95 00000 01.6	NAF EL CENTRO P.T. MADISON SOUTHWEST DIVISION CODE 1822.MD	CORRECT LOCATION OR IR SITE 3 IS SHOWN IN REFERENCE(B)	ADMIN RECORD	SLUDGE BUR AREA	3	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000343 MM 000000000000000 0003	10/19/95 07/31/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON ATTENDEES	NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	VOC EE\CA MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,4,9,2,3, 8,12,13,15 16,14	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000378 MM 000000000000000 0003	07/31/96 07/31/95 00000 01.6	NAF EL CENTRO NAF EL CENTRO TEAM	31 JULY 1995 NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	MTG MINS EE\CA UST RAB MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,4,3,8,9, 12,13,15,2	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000336 LTR 000000000000000 0002	09/12/95 08/17/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	CONCURRENCE TO MOVE SITES 14 & 15 FROM THE IRP TO THE UST PROGRAM	ADMIN RECORD	IRP UST	14,15,16	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000339 LTR 000000000000000 0011	09/12/95 08/31/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON DTSC LONG BEACH T. BEKELE	GOVERNMENT RESPONSE TO DTSC GEOLOGIST AND TOXICOLOGIST COMMENTS ON FINAL SITE INVESTIGATION REPORTS FOR SITE 1-9 & 11 OF MARCH 24, 1995	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000379 MM 000000000000000 0002	07/31/96 09/06/95 00000 01.6	NAF EL CENTRO NAF EL CENTRO TEAM	6 SEPTERMER 1995 NAF EL CENTRO TEAM MEETING AGENDA	ADMIN RECORD	PCB REMOVAL CLOSURE GW MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5 6,7,8,9,11 12,13	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000344 MM 000000000000000 0003	10/19/95 09/18/95 00000 01.6	SOUTHWEST DIVISION D. DAWSON ATTENDEES	NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	MTG MINS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000380 MM 000000000000000 0004	07/31/96 09/18/95 01.6	SOUTHWEST DIVISION NAF EL CENTRO TEAM	15 SEPTEMBER 1995 NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	PCB MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD GW ORDNANCE	1,2,3,4,5, 6,7,8,9,10 11,12,13, 14,15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000381 MM 000000000000000 0005	07/31/96 09/18/95 00000 01.6	SOUTHWEST DIVISION NAF EL CENTRO TEAM	30 NOVEMBER 1995 NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	UST MAG RD LANDFILL GW SI EE\CA CLOSURE	10,11,12,1	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000348 RPT N6871192D4670 0200	11/28/95 11/01/95 00090 02.4	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION D. DAWSON	DRAFT ENGINEERING EVALUATION COST ANALYSIS (EE/CA) SITE 3 SLUDGE BURIAL AREA	ADMIN RECORD	EE\CA SLUDGE BUR AREA	3	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000349 LTR N6871192D4670 0200	11/28/95 11/01/95 00090 02.4	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION D. DAWSON	DRAFT ENGINEERING EVALUATION COST ANALYSIS SITE 8 SCRAP YARD	ADMIN RECORD	EE\CA SCRAPYARD	8	SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000350 LTR 000000000000000 0003	12/06/95 11/15/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE PRELIMINARY ASSESSMENT DOCUMENT FOR SITE 12 AND 13 (SEE DOC. NO N60042.000047)	ADMIN RECORD	PA	12,13	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000351 PLAN N68711924673 0042	12/06/95 11/20/95 DO 22 10.2	BROWN & CALDWELL B. SCHMUCKER SOUTHWEST DIVISION D. DAWSON	FINAL COMMUNITY RELATIONS PLAN (MADE DISCLOSABLE)	ADMIN RECORD CONFIDENTIAL DOC INFO REPOSITORY	CRP MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	4,5,6,7,8, 9,11,1,2,3 10,14,15, 16,17	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000352 LTR 000000000000000 0002	01/10/96 11/20/95 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	RESPONSE TO COMMENTS ON THE FINAL SITE INVESTIGATION FOR SITES 1-9 AND 11	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000382 MM 000000000000000 0001	07/31/96 11/21/95 00000 01.6	SOUTHWEST DIVISION NAF EL CENTRO TEAM	30 NOVEMBER 1995 NAF EL CENTRO TEAM MEETING MINUTES	ADMIN RECORD	CLOSURE EE\CA ACTMEMO SCRAPYARD WELLS WORK PLAN	12,13,8,10	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000347 PLAN N6871193D1459 0075	11/28/95 11/25/95 DO 09 03.3	OHM REMEDIATION B. LEFEVER SOUTHWEST DIVISION D. DAWSON	FLUID INJECTION WITH VACUUM EXTRACTION PILOT STUDY WORK PLAN SITE 15 - FUEL FARM REMEIDATION	ADMIN RECORD	FUEL	15	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000353 RPT N6871193D1459 0450	01/31/96 12/01/95 DO 09 03.3	OHM REMEDIATION J. PEPIN SOUTHWEST DIVISION	DRAFT ENGINEERING EVALUATION FOR CONSTRUCTION SITE 2	ADMIN RECORD		2	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000386 LTR 000000000000000 0001	07/31/96 01/04/96 00000 01.6	SOUTHWEST DIVISION D. DAWSON CAL EPA PALM DESERT L. CHAVEZ	TRANSMITTAL OF "DRAFT FUEL FARM PILOT TEST REPORT" NAF EL CENTRO, DATED 12/95.	ADMIN RECORD	FUEL		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000360 PLAN N6871192D4670 0250	03/08/96 01/17/96 00100 03.3	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION	DRAFT DATA GAP STUDY WORK PLAN SITES 4,10,12,13,17	ADMIN RECORD	DATA	4,10,12,13 17	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000384 LTR 000000000000000 0002	07/31/96 01/23/96 00000 01.6	SOUTHWEST DIVISION D. DAWSON DTSC LONG BEACH I. HIRBAWI	TRANSMITTAL OF DRAFT DOCUMENT "DATA GAPS STUDY WORK PL N FOR NAF EL CENTRO"	ADMIN RECORD	WORK PLAN		SOUTHWEST DIVISION NAF EL CENTRO

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N60042 000383 MM 000000000000000 0001	07/31/96 01/24/96 00000 01.6	SOUTHWEST DIVISION NAF EL CENTRO TEAM	6 FEBRUARY 1996 NAF EL CENTRO TEAM MEETING AGENDA	ADMIN RECORD	UST MAG RD LANDFILL SLUDGE BUR AREA EE\CA FUEL AAL	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000359 MEMO N6871192D4670 0100	03/05/96 02/01/96 00090 02.5	SOUTHWEST DIVISION NAF EL CENTRO	DRAFT ACTION MEMORANDUM FOR NON TIME CRITICAL REMOVAL ACTION AT NAF EL CENTRO SITE 1 MAGAZINE ROAD LANDFILL	ADMIN RECORD	ACTMEMO MAG RD LANDFILL	1	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000385 MM 000000000000000 0003	07/31/96 02/09/96 00000 01.6	SOUTHWEST DIVISION NAF EL CENTRO TEAM	6 FEBRUARY MEETING MINUTES FOR NAF EL CENTRO TEAM	ADMIN RECORD	MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD GW EE\CA SI CLOSURE	1,3,8,7,9	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000365 LTR 000000000000000 0004	05/23/96 02/14/96 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	COMMENTS ON THE PRELIMINARY DRAFT TECHNICAL MEMORANDUM BASEWIDE HYDROLOGY REPORT OF OCTOBER 25, 1995	ADMIN RECORD	COMMENTS TECH MEMO		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000357 MEMO N6871192D4670 0090	03/04/96 02/21/96 00090 02.5	SOUTHWEST DIVISION NAF EL CENTRO	DRAFT ACTION MEMORANDUM FOR NON TIME CRITICAL REMOVAL ACTION AT NAF EL CENTRO SITE 8	ADMIN RECORD	ACTMEMO SCRAPYARD	8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000358 MEMO N6871192D4670 0090	03/04/96 02/21/96 00090 02.5	SOUTHWEST DIVISION NAF EL CENTRO	DRAFT ACTION MEMORANDUM FOR NON TIME CRITICAL REMOVAL ACTION AT NAF EL CENTRO SITE 3	ADMIN RECORD	ACTMEMO SLUDGE BUR AREA	3	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000362 RPT N6871192D4670 0350	04/01/96 03/01/96 00090 01.1	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION	FINAL TECHNICAL MEMORANDUM BASEWIDE HYDROGEOLOGY (SIGNED 3/14/96)	ADMIN RECORD	TECH MEMO MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,10 11,12,13, 14,15,16, 17	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO BRAWLEY LIBRARY
N60042 000361 PLAN N6871192D4670 0450	03/11/96 03/06/96 00100 01.6	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION	DRAFT GROUNDWATER MONITORING WORK PLAN	ADMIN RECORD INFO REPOSITORY	GW MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,8,10,11, 17	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY

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N60042 000387 LTR 000000000000000 0001	07/31/96 03/13/96 0000 01.6	SOUTHWEST DIVISION M. GONZALES DTSC LONG BEACH I. HIRBAWI	SUBMITTAL OF THE "DRAFT GROUNDWATER MONITORING WORKPLAN FOR NAF, EL CENTRO FOR REVIEW. PROVIDE COMMENTS BY 3/29/96.	ADMIN RECORD	WORK PLAN GW		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000368 LTR 000000000000000 0012	05/23/96 03/14/96 00000 01.6	CRWQCB COLORADO N. KRULL VARIOUS AGENCIES	NOTICE PROPOSED NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT AND WASTE DISCHARGE REQUIREMENTS RICE DRAIN AND FUEL FARM	ADMIN RECORD	PUBNOT	16	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000388 LTR 000000000000000 0001	07/31/96 03/14/96 0000 01.6	SOUTHWEST DIVISION M. GONZALES DTSC LONG BEACH I. HIRBAWI	REQUEST FOR COMMENTS ON THE SITE 1, 3, AND 8 DRAFT ACTION MEMOS	ADMIN RECORD	ACTMEMO MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000363 LTR 000000000000000 0002	05/23/96 03/18/96 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION D. DAWSON	CONCURRENCE WITH PROPOSED SUPPLEMENTAL INVESTIGATIONS TO THE FINAL SITE INVESTIGATION REPORT SITES 1-9 & 11 AND RWQCB's VERBAL CONCURRENCE DRAFT DATA GAP WORKPLAN	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000367 LTR 000000000000000 0005	05/23/96 03/27/96 00000 01.6	DTSC LONG BEACH M.C. GASLAN SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE DRAFT DATA GAP STUDY WORK PLAN CAL/EPA AND DTSC COMMENTS	ADMIN RECORD	COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,7,8,9,11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000366 LTR 000000000000000 0002	05/23/96 04/01/96 00000 01.6	NAF EL CENTRO P.T. MADISON IMPERIAL ITTIGATION J. KELLY	GRANT AUTHORIZATED TO THE IMPERIAL IRRIGATION DISTRICT A RIGHT-OF-WAY FOR OPERATING AND MAINTAINING AN OVERHEAD POWER LINE ADJACENT TO THE FUEL FARM	ADMIN RECORD	AAL	16	SOUTWHEST DIVISION NAF EL CENTRO
N60042 000389 LTR 000000000000000 0006	07/31/96 04/16/96 0000 01.6	DTSC LONG BEACH I. HIRBAWI SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE DRAFT GROUNDWATER MONITORING PLAN OF MARCH 6, 1996 (CAL/EPA, DTSC, RWQCB COMMENTS)	ADMIN RECORD	COMMENTS		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000390 LTR 000000000000000 0012	07/31/96 04/16/96 0000 01.6	DTSC LONG BEACH M. GASLAN SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE DRAFT EE/CA FOR SITES 1,3, AND 8 (CAL/EPA, DTSC, RWQCB COMMENTS)	ADMIN RECORD	EE\CA COMMENTS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000372 PLAN N6871192D4670 0350	05/30/96 05/01/96 00100 03.3	BECHTEL NATIONAL INC M. GALAGODA SOUTHWEST DIVISION	FINAL GROUNDWATER MONITORING WORK PLAN (SIGNED MAY 15, 1996)	ADMIN RECORD	GW MONITORING MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,2,3,4,5, 6,8,10,11, 17	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO BRAWLEY LIBRARY

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N60042 000364 RPT N6871192D4670 0300	05/23/96 05/07/96 00100 01.1	BECHTEL NATIONAL INC D. UMSTOT SOUTHWEST DIVISION	TECHNICAL SPECIFICATION SECTIONS FOR NAF EL CENTRO IR SITES 11	ADMIN RECORD	FUEL	11	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000373 MM N6871192D4670 0003	05/30/96 05/15/96 00090 01.6	BECHTEL NATIONAL INC REGULATORY AGENCIES	MAY 5, 1996 CONFERENCE CALL MINUTES REGARDING CLARIFICATION REQUIREMENTS NECESSARY TO USE SOIL MATERIAL FROM SITES 3 & 8 TO COVER SITE 1	ADMIN RECORD	MTG MINS MAG RD LANDFILL SLUDGE BUR AREA SCRAPYARD	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000391 LTR 000000000000000 0005	07/31/96 05/28/96 0000 01.6	DTSC LONG BEACH M. GASLAN SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE DRAFT ACTION MEMORANDUM FOR NON-TIME CRITICAL REMOVAL ACTIONS AT SITE 1,3 AND 8	ADMIN RECORD	ACTMEMO MAG RD LANDFILL COMMENTS SLUDGE BUR AREA SCRAPYARD	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000392 LTR 000000000000000 0001	07/31/96 05/31/96 0000 01.6	NAF EL CENTRO P.T. MADISON APCD EL CENTRO B. FISHER	REGARDING LETTER DTD APRIL 12, 1996, NAF EL CENTRO, ENCLOSED REVISION TO THE HEALTH RISK ASSESSMENT. ENCL: REV. TO HRA, HRA APPENDIX E, & DISKETTES.	ADMIN RECORD	RA HRA		SOUTHWEST DIVISION NAF EL CENTRO
N60042 000394 LTR 000000000000000 0004	07/31/96 07/03/96 0000 01.6	DTSC LONG BEACH I. HIRBAWI SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE THE FINAL GROUNDWATER MONITORING PLAN OF MAY 1996 (CAL/EPA, DTSC, RWQCB COMMENTS)	ADMIN RECORD	GW COMMENTS SCRAPYARD	8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000395 LTR N6871192D4670 0023	08/12/96 07/31/96 0090 02.7	BECHTEL, SAN DIEGO D. UMSTOT SOUTHWEST DIVISION R. SELBY	RESPONSES TO REGULATORY COMMENTS ON DRAFT REMOVAL ACTION DOCUMENTS FOR SITES, 1,3, AND 8. (ENCLOSURES)	ADMIN RECORD	RESPONSE REMOVAL	1,3,8	SOUTHWEST DIVISION NAF EL CENTRO
N60042 000398 MEMO N6871192D4670 2000	08/19/96 08/01/96 00090 02.5	BECHTEL SAN DIEGO D. UMSTOT SOUTHWEST DIVISION R. SELBY	DRAFT ACTION MEMORANDUM FOR PUBLIC REVIEW NTCRA SITE 1 (W/REVISED PAGES)	ADMIN RECORD INFO REPOSITORY	ACTMEMO REMOVAL	1	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000401 MEMO N6871192D4670 0700	09/26/96 08/01/96 00090 02.5	BNI SAN DIEGO D. UMSTOT SOUTHWEST DIVISION R. SELBY	DRAFT FOR PUBLIC REVIEW ACTION MEMORANDUM FOR NTCRA, SITE 3 (W/REVISED PAGES)	ADMIN RECORD INFO REPOSITORY	ACTMEMO NTCRA	3	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
N60042 000399 LTR 000000000000000 0006	09/16/96 08/27/96 00000 10.0	DTSC LONG BEACH J. RICH NAF EL CENTRO F. RIVERA	PUBLIC PARTICIPATION REQUIREMENTS FOR THE UPCOMING REMOVAL ACTIONS AT SITES 1,3, AND 8	ADMIN RECORD INFO REPOSITORY	REMOVAL MAG RD LANDFILL SLUDGE SCRAPYARD	1 3 8	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY

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N60042 000402 RPT N6871192D4670 1050	09/26/96 09/10/96 00100 03.4	BNI SAN DIEGO G. CAGLE SOUTHWEST DIVISION	DRAFT GROUNDWATER MONITORING REPORT SECOND QUARTER 1996	ADMIN RECORD INFO REPOSITORY	GW MAG RD LANDFILL SCRAPYARD	1 2 3 4 5 6 8 10 11 17	SOUTHWEST DIVISION NAF EL CENTRO EL CENTRO LIBRARY BRAWLEY LIBRARY
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N60042 000407 XMTL N6871192D4670 0004	10/31/96 10/31/96 00090 10.5	BNI SAN DIEGO W. CLEMENTS SOUTHWEST DIVISION R. SELBY	OCTOBER 17, 1996 CONFERENCE CALL MINUTES REGARDING NAVY RESPONSE TO REGULATORY COMMENTS ON NAF REMOVAL ACTION DOCUMENTS FOR SITES, 1,3, & 8	ADMIN RECORD	MTG MINS RESPONSE COMMENTS REMOVAL	1 3 8	SOUTHWEST DIVISIS=
N60042 000408 RPT N6871192D4670 0700	11/12/96 11/06/96 00100 03.4	BNI SAN DIEGO W.CLEMENTS SOUTHWEST DIVISION R. SELBY	THIRD QUARTER 1996 GROUNDWATER MONITORING RESULTS	ADMIN RECORD	GW MONITORING	1 2 3 4 5 6 8 10 11 17	SOUTHWEST DIVISION
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N60042 000412 LTR 00000000000000 0009	01/22/97 12/17/96 00100 01.6	DTSC LONG BEACH Y. SANCHEZ SOUTHWEST DIVISION M. GONZALES	COMMENTS ON THE GROUNDWATER MONITORING REPORT SECOND QUARTER 1996 DTD SEPTEMBER 1996 & THIRD QUARTER DTD NOVEMBER 1996 W/ENCLS	ADMIN RECORD	COMMENTS GW MONITORING		SOUTHWEST DIVISION

ATTACHMENT C

RESPONSE TO SIGNIFICANT COMMENTS ON THE ENGINEERING EVALUATION/COST ANALYSIS AND ACTION MEMORANDUM

(See Appendix D of the Engineering Evaluation/Cost Analysis)

ATTACHMENT D

NAF EL CENTRO INSTALLATION RESTORATION PROGRAM FACT SHEETS

NAVAL AIR FACILITY EL CENTRO
INSTALLATION RESTORATION PROGRAM

FACT SHEET NO. 1 **APRIL, 1994**

INTRODUCTION

The Naval Air Facility El Centro (NAFEC) is located about 9 miles west of the City of El Centro, California. Like most military installations, activities at NAFEC require the use of substances defined as hazardous substances. As a branch of the federal government, the U. S. Navy is subject to the federal laws and regulations, such as **CERCLA** and **SARA**, covering the generation and disposal of **hazardous substances** at its facilities. Past hazardous waste disposal practices, although acceptable at the time, have frequently resulted in unexpected and long-term problems through the release of **contaminants** into soil and **groundwater**.

This fact sheet is the first in a series providing information about the environmental **cleanup** activities at the NAFEC. This fact sheet discusses past and proposed activities and identifies sources of additional information.

BACKGROUND

NAFEC has been established in its present location since 1942, when it was commissioned as a Marine Corps Air Station. Although its name and activities have varied since then, it has been in continuous use since World War II. Presently, NAFEC is the Navy's support facility for fleet air squadrons performing tactical air training, and is also the winter home of the Navy's elite Blue Angels precision flying team. Other tasks and functions include operations and training, administration, general engineering support, personnel support, medical and dental support, maintenance of material, maintenance of property and utility operations, and supply operations.

Installation Restoration Program

The **Department of Defense (DOD)**, of which the Navy is a part, developed the **Installation Restoration (IR) Program** to identify and investigate potentially hazardous disposal sites created by former hazardous material handling, storage, and disposal practices -- procedures once accepted and approved, but subsequently found to be improper and unsafe. The IR Program was modeled after the "**Superfund**" program established by **CERCLA**. As part of the IR Program, soil and groundwater investigations are underway at NAFEC.

The IR Program involves these five steps, which are defined in the glossary:

- **Preliminary Assessment (PA)**
- **Site Investigation (SI)**
- **Remedial Investigation (RI)**
- **Feasibility Study (FS)**; and
- **Remedial Action (RA)**

Past Site Activities

Years of activities at NAFEC involving hazardous substances and hazardous wastes have resulted in sites of potential contamination on the facility. In September 1987, a **Preliminary Assessment** (NEESA 13-106) was completed at NAFEC which identified areas of potential contamination (see figure, inside). Sixteen sites were originally identified. Two sites were later added to the IR Program, Sites 2A and 17, for a total of 18 sites.

As part of **Site Investigation**, studies have been conducted and others are underway to determine the nature and extent of possible contamination to soil, surface water, and groundwater at NAFEC. However, early results suggest that surface water quality does not appear to be affected by contamination by NAFEC IR sites.

(Words shown in bold type are defined in the glossary)

The kinds of substances or materials used and identified through studies at NAFEC include **petroleum hydrocarbons** (fuels, hydraulic fluids, motor oils), **solvents**, paints and thinners, photo chemicals, **heavy metals**, battery acids, **chlorinated pesticides**, asbestos, **polychlorinated biphenyls (PCBs)**, construction and demolition debris, household rubbish, and sewage sludge.

A number of SI studies, including groundwater and solid waste testing resulting in at least 20 reports, have been conducted for the IR Program sites at NAFEC. Additional investigative site work is on-going at the facility.

Other Activities

The IR Program focuses on past problems. Compliance with current laws and regulations in effect ensures that NAFEC handles its hazardous wastes properly and that no future problems will arise. Plans have been developed and implemented to establish proper waste identification, handling, and disposal procedures:

- Oil and Hazardous Substance Spill Contingency Plan
- Hazardous Waste Management Plan
- Oil Spill Prevention, Control and Counter-measures Plan
- Hazardous/Extremely Hazardous Materials Management Plan
- AB2588 "Hot Spots" Emission Inventory Plan

In addition, underground storage tanks containing fuel and other petroleum products, often a source of groundwater contamination, are being replaced at NAFEC with above-ground storage tanks. Having tanks above the ground allows better monitoring and prevention of potential leaks, which might otherwise go undetected for long periods of time.

Future Activities

The community will continue to be informed about and involved in cleanup activities at NAFEC. Future fact sheets, public meetings, and opportunities for public review and comment on proposed cleanup methods are a part of the IR Program's community relations activities.

A mailing list has been developed and will be continuously updated. Please add your name and address, and those of others interested in the NAFEC IR Program cleanup, by filling out the mail-in coupon on the back of this fact sheet.

COMMUNITY INFORMATION

A number of potentially interested parties were contacted and interviewed about this program. Interviewees also had the opportunity to ask questions. Their concerns and questions, as well as the cleanup program background, were incorporated into the **Community Relations Plan**. This is a formal document, meeting Environmental Protection Agency (EPA) and State of California community relations guidelines, which describes community involvement activities at a hazardous waste remediation site. The Community Relations Plan is a public document and is on file at the Information Repositories.

Information Repositories

In order to ensure that relevant cleanup-related reports and findings are available for public access, two information repositories have been established. These locations were selected for public convenience and accessibility, based upon comments received during the community interviews:

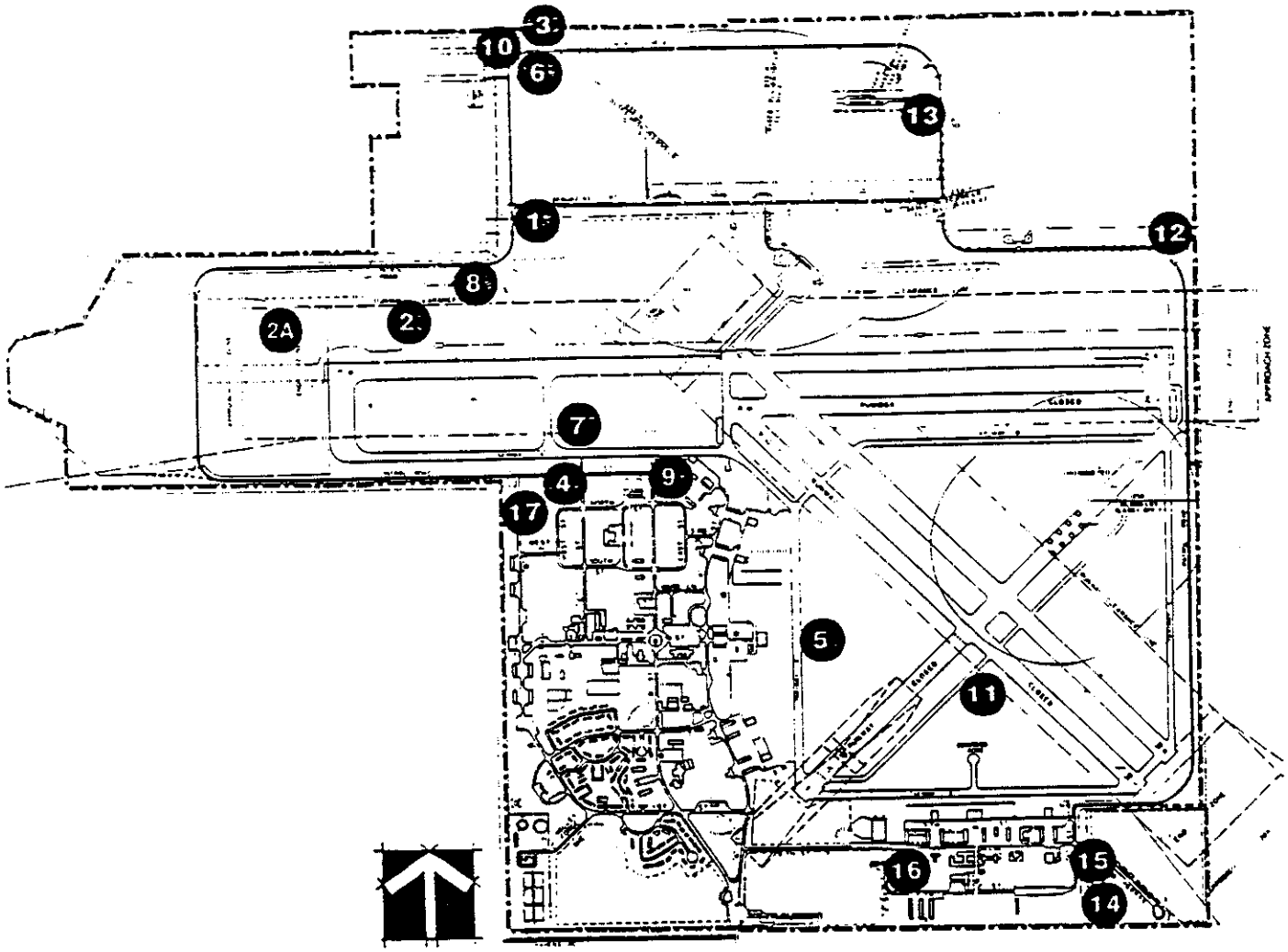
El Centro Public Library	M-Th	10 a.m.-8 p.m.
529 State Street	Fri	10 a.m.-5 p.m.
El Centro, CA 92243	Sat	10 a.m.-1 p.m.
Brawley Public Library	M-Th	12 p.m.-8 p.m.
400 Main Street	Sat	9 a.m.-5 p.m.

FOR MORE INFORMATION, PLEASE CONTACT:

Public Affairs Officer
Naval Air Facility El Centro
El Centro, CA 92243-5001
(619) 339-2519

Mr. John Crow
Naval Air Facility El Centro
El Centro, CA 92243-5001
(619) 339-2264

 (Words shown in bold type are defined in the glossary)



Site	Location	Potential Contaminants
1	Magazine Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
2	Patrol Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
2A	West Patrol Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
3	Sludge Burial Area	Silver, cyanide
4	4th Street Fire Fighting Training Area	Burned leaded fuel, hydraulic fluid, confiscated drugs
5	Fire Fighting Training Area	Burned leaded fuel
6	Northwest Fire Fighting Training Area	Burned leaded fuel
7	Abandoned Fuel Farm	Leaded and diesel fuel
8	Scrapyard	Empty drums, tanks, paint cans, transformers with PCBs
9	Transformer Storage Area	Transformers containing PCBs
10	Sewage Stabilization Ponds	Sewage, leaded fuel, motor fluids, photo solutions
11	Runway Burn Area	Burned fuel
12	Open Burn Pit	Burned confiscated drugs, ceramic, tin cans, wood
13	Old Incinerator	Burned paper
14	Fuel Farm Tank Rinseate Disposal	Leaded and diesel fuel
15	Fuel Farm Filter Cleaning Area	Leaded and diesel fuel
16	Potassium Ferricyanide Spill Area	Potassium ferricyanide
17	Fire Fighting Training Area	Burned leaded and diesel fuel

Installation Restoration Program Site Locations
Naval Air Facility El Centro
El Centro, California

GLOSSARY OF TERMS

CERCLA - The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as "Superfund") which implements EPA emergency and long-term hazardous waste cleanup activities. This Federal legislation covers the identification, investigation and remediation of hazardous waste sites.

Chlorinated pesticides - A class of pesticides which contain chlorinated hydrocarbon compounds. DDT and chlordane are examples of chlorinated pesticides.

Cleanup - Actions taken to deal with a release or threatened release of hazardous substances that could affect public health and/or the environment.

Community Relations Plan (CRP) - Formal plan for EPA community relations activities at a Superfund site. The CRP is designed to ensure citizen opportunities for public involvement at a site, determine activities that will provide for such involvement, and allow citizens the opportunity to learn about the site.

Contaminant - Any physical, chemical, biological, or radiological substance or matter that has an adverse affect on air, water, or soil.

Department of Defense (DOD) - The department of the federal government which oversees national defense, including all branches of the military.

Feasibility Study (FS) - The description and analysis of the potential cleanup alternatives for a hazardous waste site and recommendation of a cost-effective alternative.

Groundwater - Water found beneath the earth's surface that fills pores between materials such as sand, gravel, or soil. In aquifers, groundwater occurs in sufficient quantities that it can be used for drinking water, irrigation, and other purposes.

Hazardous substance - Any material that poses a threat to public health and/or the environment.

Heavy metals - A class of metals categorized by their high molecular weight. A partial list of heavy metals includes: mercury, arsenic, lead, chromium, zinc, cadmium, copper, barium, silver, and nickel.

Installation Restoration Program - A program developed by the DOD and modeled after EPA's "Superfund" (see below) program, to identify and investigate potentially hazardous disposal sites created by former hazardous substance handling, storage, and disposal practices.

Petroleum hydrocarbons - The class of hydrocarbons (organic compounds) derived from petroleum. Typical petroleum hydrocarbons include: gasoline, kerosene, diesel, and oils.

Polychlorinated Biphenyls (PCBs) - A class of chemicals typically used to cool electrical devices such as transformers.

Preliminary Assessment (PA) - The process of collecting and reviewing available information about a known or suspected hazardous waste site or release. EPA or states use this information to determine if a site requires further study.

Remedial Action - The phase of actual implementation or construction that follows remedial investigation, feasibility study, and development of remedial design.

Remedial Investigation (RI) - An in-depth study designed to gather the data necessary to determine the nature and extent of contamination. The data are used to establish criteria for site cleanup and identify preliminary alternatives for remedial action.

SARA - The Superfund Amendments and Reauthorization Act (SARA) is a modification to CERCLA and was enacted on October 17, 1986.

Site Investigation (SI) - The step following Preliminary Assessment (PA). It is designed to collect more extensive information on a hazardous waste site.

Solvent - (Usually liquid) substance capable of dissolving or dispersing other substances.

Superfund - The common name for the federal Comprehensive Environmental Response, Compensation, and Liability Act (see CERCLA, above).

PLEASE KEEP ME INFORMED

YES, I would like to receive information on the progress of environmental cleanup activities at NAF El Centro.

PLEASE RETURN COMPLETED COUPON TO:

Public Affairs Officer
Naval Air Facility El Centro
El Centro, CA 92243-5001

_____
Name

_____
Address

_____
City, State, Zip

_____
(Area Code) Telephone

Southwest Division, Naval Facilities
Environmental Division
1220 Pacific Highway, Building 130
San Diego, CA 92132

FACILIDAD DE MARINA Y AÉREA EL CENTRO
PROGRAMA DE RESTAURACIÓN DE INSTALACIONES

HOJA DE DATOS NO. 1 ABRIL 1994

INTRODUCCIÓN

La Facilidad Marina y Aérea El Centro (NAFEC) está situada aproximadamente nueve millas al oeste de la ciudad de El Centro, California. Al igual que la mayoría de las instalaciones militares, actividades en NAFEC requieren el uso de sustancias definidas como sustancias peligrosas. Como una división del gobierno federal, el Ministerio de Marina de los Estados Unidos está sujeto a las leyes y regulaciones federales, tal como **CERCLA** y **SARA**, abarcando la generación y disposición de **sustancias peligrosas** en las facilidades. Prácticas anteriores de disposición de residuos peligrosos, aunque aceptables en ese tiempo, frecuentemente han resultado en problemas inesperados y de larga duración de parte de la emisión de **contaminantes** dentro de la tierra y el **agua subterránea**.

Esta hoja de datos es la primera en una serie de información sobre actividades para la **limpieza** del medio ambiental en NAFEC. Esta hoja de datos habla sobre actividades pasadas y que se proponen y también identifica fuentes de información adicional.

ANTECEDENTE

NAFEC se estableció en su presente local en 1942, cuando se puso en servicio activo como una Estación Aérea de la Infantería Marina. Aunque el nombre y las actividades han variado desde entonces, el uso de NAFEC ha sido continuo desde la Segunda Guerra Mundial. Hoy en día, NAFEC es la facilidad Marina que da apoyo a escuadrones de flota aéreos, presenta instrucción de táctica aérea, y también es la base invernal de los "Blue Angels". Otras tareas y funciones de NAFEC incluyen operaciones e instrucción, administración, apoyo general para ingeniería, apoyo de personal, apoyo médico y dental, mantenimiento de material, mantenimiento de propiedad y operaciones de utilidades, y operaciones de provisiones.

Programa de Restauración de Instalaciones

El **Departamento de Defensa (DOD)**, de cual la Marina es parte, desarrollo el **Programa de Restauración de Instalaciones (IR)** para identificar e investigar sitios que son potencialmente peligrosos creados por el uso de materiales peligrosos, depósito, y costumbres de disposición--procedimientos una vez aceptados y después establecidos como impropios y peligrosos. El Programa IR fue modelado después de el programa "**Superfund**", que fue establecido por **CERCLA**. Como parte de el Programa IR, investigaciones de la tierra y el agua subterránea esta en vía de realizarse en NAFEC.

El **Programa IR** empleo los siguiente cinco pasos (con el acrónimo que se usan en inglés), que son definidos en el glosario:

- **Valoración Preliminar ("PA")**
- **Investigación de Sitio ("SI")**
- **Investigación Remediadora ("RI")**
- **Estudio de Viabilidad ("FS")**; y
- **Acción Remediadora ("RA")**

(Palabras en negro están definidas en la página tres)

Actividades Pasadas del Sitio

Años de actividad en NAFEC usando sustancias peligrosas y residuos peligrosos han resultado en sitios con potencial para contaminación en la facilidad. En septiembre de 1987, una **Valoración Preliminar** (NEESA 13-106) fue completada en NAFEC que identifico áreas de potencial para contaminación (vea la figura en la próxima página). Al principio dieciséis sitios fueron identificados. Después, dos sitios mas, Sitios 2A y 17, fueron añadidos a el Programa IR para un total de dieciocho sitios.

Como parte de la **Investigación de Sitio** se han conducido estudios y otros están en vía de realizarse para determinar la naturaleza y el alcance de contaminación posible de la tierra, agua superficial, y agua subterránea en NAFEC. De cualquier manera, los primeros resultados indican que la calidad del agua superficial aparentemente no está contaminada en los sitios IR en NAFEC.

Los tipos de sustancias o materiales usados e identificados como parte de los estudios en NAFEC incluyen **petróleos hidrocarburos** (combustibles, fluidos hidráulicos, aceite de motor), **solventes**, pinturas y disolventes, químicas de foto, **metales pesados**, ácido de baterías, **pesticidas clorinadas**, asbesto, **bifenilos policlorinados (PCBs)**, escombro de construcción y demolición, basura de casa, y aguas de albañal.

Un numero de estudios SI, incluyendo exámenes de agua subterránea y de residuos solidos resultando en no menos de 20 reportes, se han conducido para el Programa IR en NAFEC. Investigaciones adicionales en los sitios identificados continúan en la facilidad.

Otras Actividades

El Programa IR enfoca en los problemas del pasado. De acuerdo con las leyes actuales y regulaciones en efecto se asegura que NAFEC trate los residuos peligrosos correctamente y que no se presenten problemas en el futuro. Planes han sido desarrollados e implementados para establecer propia identificación de residuos, manejo y procedimiento de disposición:

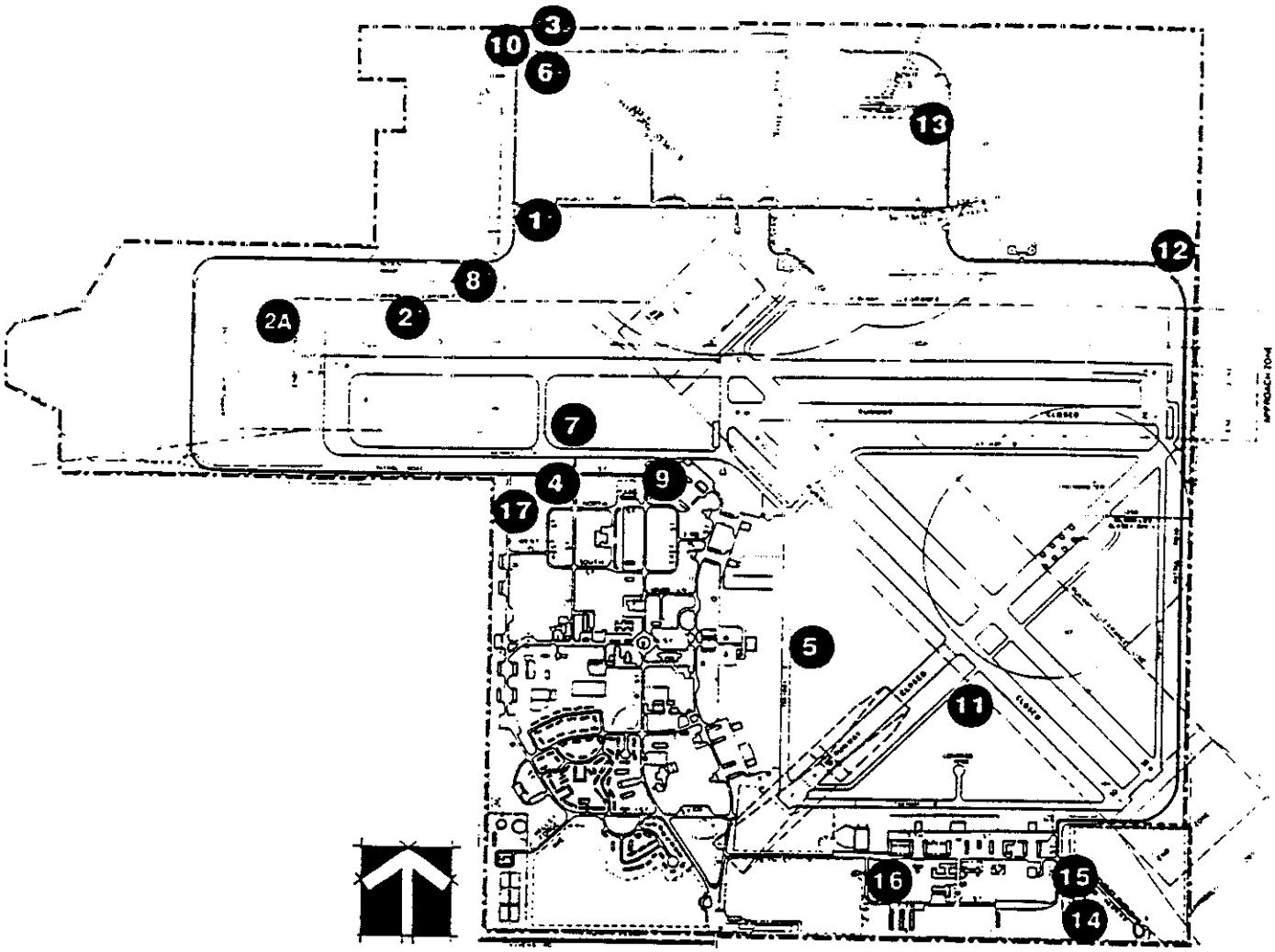
- Plan de Contingencia de Derrame de Aceite y Sustancias Peligrosas
- Plan de Administración de Residuos Peligrosos
- Plan de Prevención, Control y Contramedidas de Derrame de Aceite
- Plan de Administración de Materiales Peligrosos/Sumamente Peligrosos
- Plan AB2588 de Inventario de Emisión de "Lugares Calientes"

Adicionalmente, tanques de almacenaje subterráneos conteniendo combustible y otros productos de petróleo, muchas veces una fuente de contaminación de agua subterránea, se esta reemplazando en NAFEC con tanques de almacenaje por encima de la tierra. Teniendo tanques por encima de la tierra permite mejor supervisión y prevención de derrames potenciales, cuales de otra manera pueden pasar inadvertidos por períodos de mucho tiempo.

Actividades Futuras

La comunidad va a ser informada continuamente e incluida en actividades sobre la limpieza en NAFEC. Hojas de datos futuras, juntas públicas, y oportunidades para repaso y comentario público sobre métodos propuestos para la limpieza de NAFEC son parte de las actividades de relaciones públicas de el Programa IR.

(Pálabras en negro están definidas en la página tres)



Sitio	Ubicación	Contaminantes Potenciales
1	Magazine Road Landfill	Asbesto, combustible, solventes, químicas de foto, acido
2	Patrol Road Landfill	Asbesto, combustible, solventes, químicas de foto, acido
2A	West Patrol Road Landfill	Asbesto, combustible, solventes, químicas de foto, acido
3	Sludge Burial Area	Plata, cianuro
4	4th Street Fire Fighting Training Area	Combustible (con plomo) quemado, fluido hidráulico, drogas
5	Fire Fighting Training Area	Combustible (con plomo) quemado
6	Northwest Fire Fighting Training Area	Combustible (con plomo) quemado
7	Abandoned Fuel Farm	Combustible con plomo y diesel
8	Scrapyard	Tanques, botes de pintura, transformadores con PCBs
9	Transformer Storage Area	Transformadores con PCBs
10	Sewage Stabilization Ponds	Aguas negras, combustible con plomo, aceite, química de foto
11	Runway Burn Area	Combustible quemado
12	Open Burn Pit	Drogas quemadas, cerámica, hojalatas, madera
13	Old Incinerator	Papel quemado
14	Fuel Farm Tank Rinseate Disposal	Combustible con plomo y diesel
15	Fuel Farm Filter Cleaning Area	Combustible con plomo y diesel
16	Potassium Ferricyanide Spill Area	Ferricianuro de potasio
17	Fire Fighting Training Area	Combustibles quemados con plomo y diesel

Ubicaciónes de Sitios de el Programa de Restauración de Instalaciónes
Facilidad Marina y Aérea El Centro
El Centro, California

Una lista de envió se ha desarrollado y será puesta al día continuamente. Para añadir su nombre y dirección, y el de otros que estén interesados en el Programa IR para la limpieza de NAFEC, por favor llene el cupón que está detrás de está hoja de datos.

INFORMACIÓN PARA LA COMUNIDAD

Un número de individuos que están interesados se han comunicado y entrevistados sobre este programa. Personas entrevistadas también tuvieron la oportunidad de hacer preguntas. Sus preocupaciones y preguntas, así como la información básica de el programa de limpieza, fueron incorporados en el **Plan de Relaciones Públicas (PRP)**. Este plan es un documento formal de acuerdo con las pautas del EPA y del Estado de California para las relaciones públicas, cuales describen actividades de participación de las comunidades en un sitio de limpieza. El PRP es un documento público y está archivado en los Depósitos de Información.

Depósitos de Información

Para asegurar que reportes pertinentes a la limpieza y hallazgos estén disponibles para acceso al público, dos depósitos de información se han establecido. Estos locales fueron escogidos para la conveniencia y accesibilidad de el público, basado en comentarios recibidos durante las entrevistas de la comunidad:

- **Biblioteca Pública de El Centro**
  539 State Street
  El Centro, California 92243

  Horas: Lunes-Jueves 10 a.m. a 8 p.m.
  Viernes 10 a.m. a 5 p.m.
  Sábado 10 a.m. a 1 p.m.

- **Biblioteca Pública de Brawley**
  400 Main Street
  Brawley, California 92227

  Horas: Lunes-Jueves 12 p.m. a 8 p.m.
  Sábado 9 a.m. a 5 p.m.

PARA MAS INFORMACIÓN, COMUNÍQUESE CON:

Public Affairs Officer
Facilidad Marina de Aire El Centro
El Centro, California 92243-5001
(619) 339-2519

Sr. John Crow
Facilidad Marina de Aire El Centro
El Centro, California 92243-5001
(619) 339-2264

GLOSARIO

Acción Remediadora - La fase de realización o construcción actual que sigue la investigación remediadora, estudio de viabilidad, y el desarrollo de diseño remediador.

Agua Subterránea - Agua encontrada debajo de la superficie de la tierra que llena los poros en materiales como arena, grava, o tierra. En acúiferos, agua subterránea ocurre en cantidades suficientes que se puede usar como agua potable, para riego, y otros usos.

Bifenilos Policlorinados ("PCBs") - Una clase de químicas típicamente usadas para enfriar aparatos eléctricos como transformadores.

"CERCLA" - El Acta Completa Ambiental de Respuesta, Compensación, y Responsabilidad de 1980 (también conocida por el nombre "Superfund") cual implementa actividades del EPA (Agencia para la Protección del Medio Ambiente) para emergencias y limpieza de largo plazo de residuos peligrosos. Esta legislación federal abarca la identificación, investigación y remediación de sitios con residuos peligrosos.

Contaminante - Cualquier sustancia o materia física, química, biológica, o radiológica cual tiene un efecto adverso en el aire, el agua, o la tierra.

Departamento de Defensa ("DOD") - El departamento de gobierno federal que supervigila la defensa nacional, incluso todas las divisiones militares.

Estudio de Viabilidad ("FS") - La descripción y análisis de las alternativas para la limpieza posible de un sitio de residuos peligrosos y recomendación de alternativas de beneficio.

Investigación de Sitio ("SI") - La fase después de la Valoración Preliminar. Esta fase colecta información extensiva sobre el sitio de residuos peligrosos.

Investigación Remediadora ("RI") - Un estudio profundo para acumular los datos necesarios para determinar la naturaleza y el alcance de contaminación. Los datos son usados para establecer el criterio para la limpieza de los sitios y para identificar alternativas preliminarias para acción remediadora.

Limpieza - Acciones tomadas para contener la liberacion o la amenaza de liberacion de sustancias peligrosas cuales pueden afectar la salud del público y/o el ambiente.

Metales Pesados - Una clase de metales clasificados por sus altos pesos molecular. Una lista parcial de metales pesados incluye: mercurio, arsénico, plomo, cromo, cinc, cadmio, cobre bario, plata y níquel.

Pesticidas Clorinadas - Una clase de pesticidas que contiene hidrocarburos tratados con cloro. "DDT" y "chlordane" son ejemplos de pesticidas clorinadas.

Petróleos Hidrocarburos - La clase de hidrocarburos (compuestos orgánicos) derivada de petróleo. Petróleos hidrocarburos tipicos incluyen: gasolina, keroseno, diesel y aceites.

Plan de Relaciónes Públicas (PRP) - Un plan formal para actividades sobre relaciónes de la comunidad para el EPA en un sitio de "Superfund". El PRP fue concebido para asegurar oportunidades de los ciudadanos para participación pública en un sitio, determinar actividades que van a suministrar para tal participación, y dar a los ciudadanos la oportunidad para averiguar con respecto al sitio.

Programa de Restauración de Instalaciónes (IR) - Un programa desarrollado de parte del "DOD" y servido de modelo después del Programa "Superfund" (vea abajo) de EPA, para identificar e investigar disposición de sitios potencialmente peligrosos creados por anterior manipulación de sustancias peligrosas, almacenaje, y prácticas de disposición.

"SARA" - El Acta de Enmiendas y Reautorización "Superfund" (SARA) es una modificación a "CERCLA" y fue promulgado el 17 de Octubre de 1986.

Solvente - (Normalmente líquido) sustancia capaz de disolver o dispersar otras sustancias.

"Superfund" - El nombre común para el Acta federal de Respuesta Exhaustiva Ambiental, Compensación, y Responsabilidad (vea "CERCLA", arriba).

Sustancias Peligrosas - Cualquier material que representa una amenaza a la salud del público y/o el medio ambiente.

Valoración Preliminar ("PA") - El proceso de colectar y dar repaso a información disponible sobre un conocido o un sitio sospechoso de residuo peligroso o emisión. EPA o estados usan esta información para determinar si un sitio necesita más estudio.

POR FAVOR MANTEGAME INFORMADO

Si, me gustaria recibir información del progreso de las actividades de limpieza ambiental en NAFEC.

Por favor llene el cupón y regreselo a:

Public Affairs Officer
Naval Air Facility El Centro
El Centro, California 92243-5001

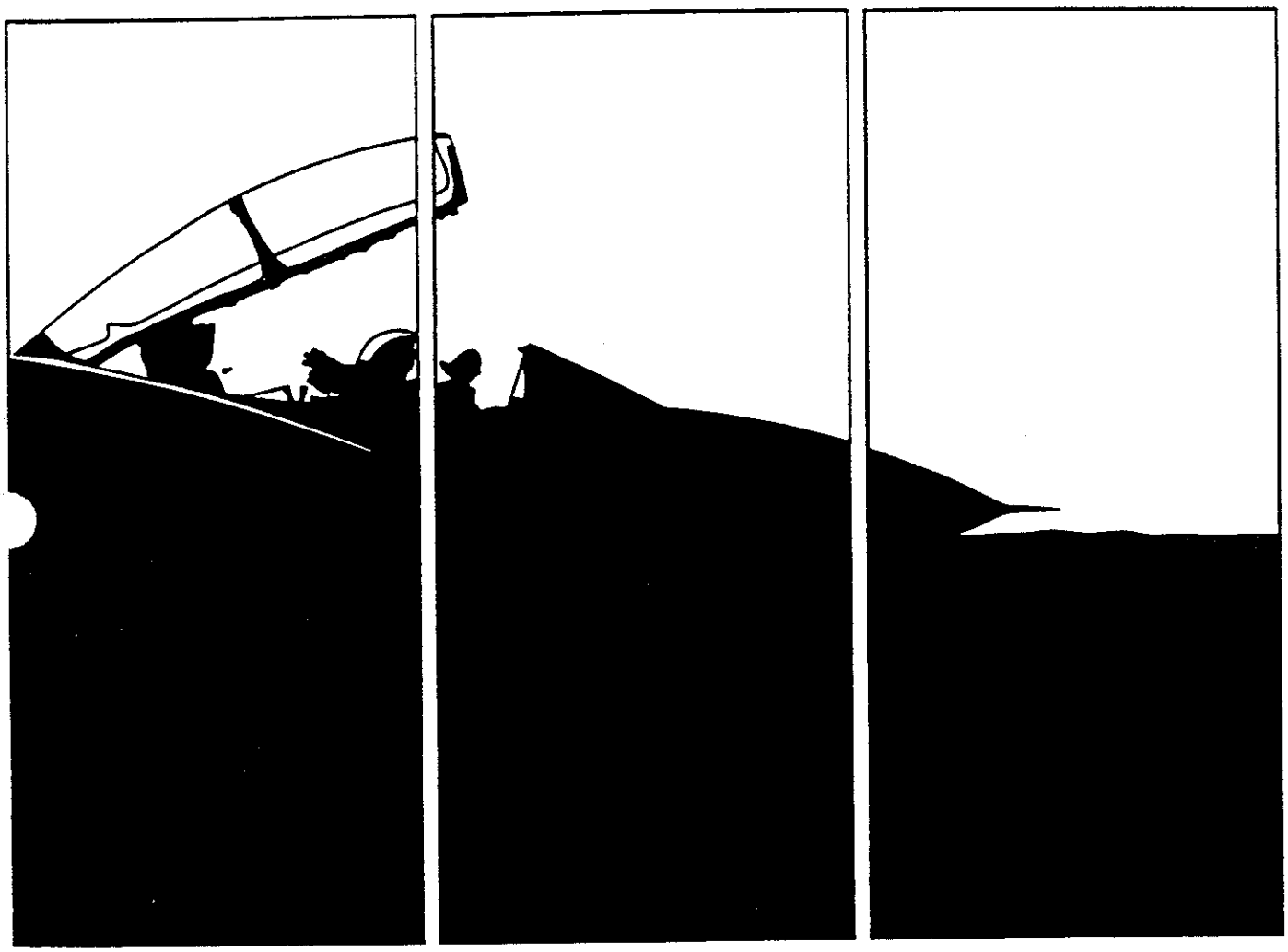
_____
Nombre

_____
Direccion

_____
Ciudad, Estado, Codigo Postal

_____
(Lada) Teletono

Southwest Division, Naval Facilities
Environmental Division
1220 Pacific Highway, Building 130
San Diego, CA 92132

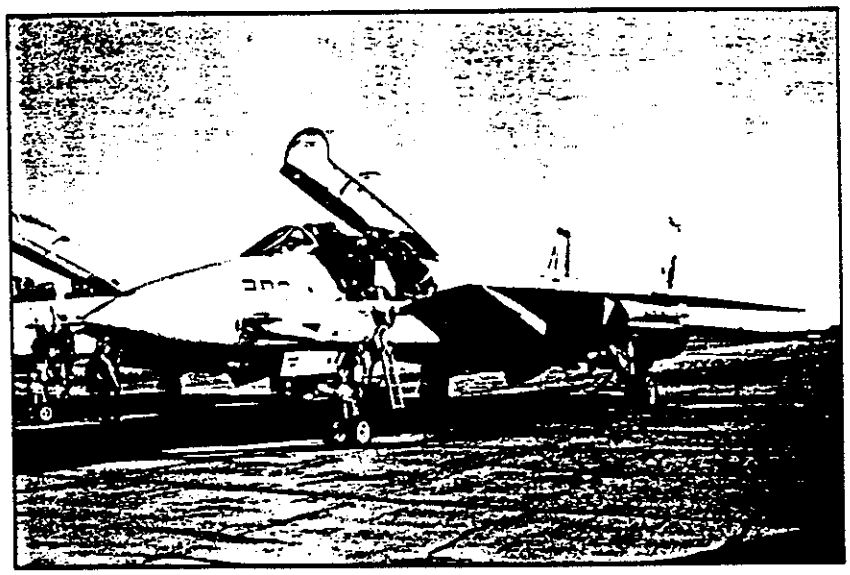


Naval Air Facility, El Centro

Installation Restoration Program

NAF EL CENTRO

NAF El Centro is the Navy's support facility for fleet air squadrons performing tactical air training such as field carrier landing practice, air-to-air and air-to-ground weapons training and fleet fighter air combat maneuvers. Fleet utilization has increased dramatically over the past few years, maximizing the area's excellent training facilities.



The base is the winter home of the Navy's elite Blue Angels precision flying team. NAF El Centro was first used by the Marine Corps during World War II and is now the second largest employer in the Imperial Valley.

PROGRAM OVERVIEW

The Installation Restoration (IR) Program, developed by the Department of Defense (DOD), was modeled after the "Superfund" program established by the Environmental Protection Agency (EPA). The EPA, California Regional Water Quality Control Board and other agencies are involved in reviewing the program as it develops.

The Navy is a leader in hazardous waste management and restoring hazardous waste sites. In the past, accepted and approved procedures, since found to be improper and unsafe, were employed in handling hazardous wastes. This resulted in the improper disposal of hazardous waste across the country.

The Navy has implemented this comprehensive program to identify and investigate potentially hazardous disposal sites created by former hazardous substance handling, storage and disposal practices. Several remedial action alternatives are reviewed, including "no action." Selection of the appropriate remedial action is based on an assessment of the potential health risks, desired level of cleanup, available technology, cost effectiveness and other factors

The IR Program consists of three phases: remedial investigation; feasibility study; and remedial action. A technical review committee, composed of representatives from the Navy, EPA, state and local agencies, environmental groups and the community, will review the program as it applies to specific installations and individual sites.

REMEDIAL INVESTIGATION

The remedial investigation involves a preliminary assessment and site investigation to identify potentially contaminated sites, characterize the nature of the contamination and recommend sites for further study. Once identified, further information is gathered on the extent of contamination and the potential threat to public health and safety and the environment.

A preliminary assessment and site investigation have identified 17 potential hazardous waste sites at NAF El Centro. These sites were evaluated using the EPA hazard ranking system which assesses a site's potential to affect human health, welfare and the environment. High scoring waste sites are placed on the National Priorities List (NPL). NAF El Centro scored well below the threshold and is not listed on the NPL.

The EPA is currently reevaluating previously scored hazardous waste sites under a revised hazard ranking system. It is expected that many sites not now listed on the NPL will be included with the revised scoring.

FEASIBILITY STUDY

Developed concurrently with the remedial investigation is the feasibility study, which proposes and evaluates various cleanup measures based on data gathered in the remedial investigation. The remedial investigation and feasibility study are then summarized in a report. The report, along with a plan for remedial action, is submitted to regulatory agencies for review. After receiving public and agency comments on these documents, a record of decision is developed which establishes cleanup measures to be implemented.

REMEDIAL ACTION

Cleanup planning begins after the record of decision is published. The plan is implemented in the remedial action phase in which contaminants are removed from the sites.

OPERATIONAL CHANGES

To ensure NAF El Centro remains clean of hazardous wastes, three local plans to establish proper procedures for the identification, handling and disposal of hazardous wastes have been developed and implemented. These are the Hazardous Substance Spill Contingency Plan, the Hazardous Materials/Waste Management Plan and the Oil Spill Prevention, Control and Countermeasures Plan.

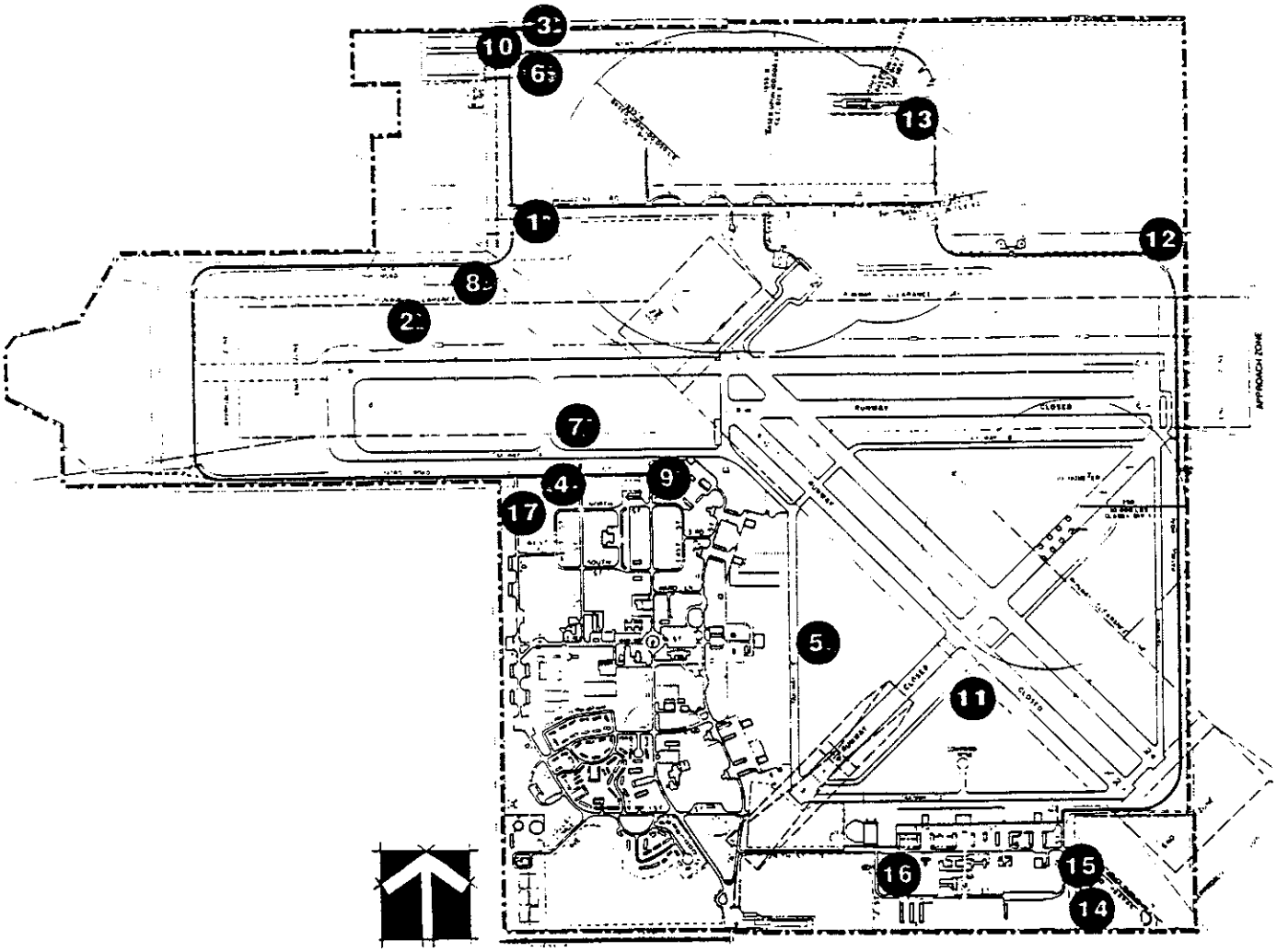
Additionally, the Navy has developed the Underground Storage Tank (UST) program. This continuing program is designed to prevent contamination from the storage of petroleum products underground. NAF El Centro recently completed testing all its underground storage tanks and has drained or adjusted all tanks requiring attention.

COMMUNITY RELATIONS

The Navy, recognizing the importance of community involvement in the IR process to identify and address community concerns, will coordinate with interested community members, provide information to libraries and make community presentations. Exhibits and information bulletins are available by calling:

for general information:
Public Affairs Office,
(619) 339-2519.

for technical information:
Public Works Department,
(619) 339-2201.



Installation Restoration

Site	Location	Potential Contaminants
1	Magazine Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid.
2	Patrol Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid.
3	Sludge Burial Area	Silver, cyanide.
4	4th Street Fire Fighting Training Area	Burned leaded fuel, hydraulic fluid, confiscated drugs.
5	Fire Fighting Training Area Hangar #3	Burned leaded fuel.
6	Northwest Fire Fighting Training Area	Burned leaded fuel.
7	Abandoned Fuel Farm	Leaded and diesel fuel.
8	Scrapyard	Empty drums, tanks, paint cans, transformers w/ PCB.
9	Transformer Storage Area	Transfromers containing PCB.
10	Sewage Stabilization Ponds	Sewage, leaded fuel, motor fluids, photo solutions.
11	Runway Burn Area	Burned fuel.
12	Open Burn Pit	Burned confiscated drugs, ceramic, tin cans, wood.
13	Old Incinerator	Burned paper.
14	Fuel Farm Tank Rinseate Disposal	Leaded and diesel fuel.
15	Fuel Farm Filter Cleaning Area	Leaded and diesel fuel.
16	Potassium Ferricyanide Spill Area	Potassium ferricyanide.
17	Fire Fighting Training Area	Burned leaded and diesel fuel.

NAVAL AIR FACILITY EL CENTRO
INSTALLATION RESTORATION PROGRAM

FACT SHEET NO. 1 **DECEMBER 1994**

INTRODUCTION

The Naval Air Facility El Centro (NAFEC) is located about 9 miles west of the City of El Centro, California. Like most military installations, activities at NAFEC require the use of substances defined as hazardous substances. As a branch of the federal government, the U. S. Navy is subject to the federal laws and regulations, such as **CERCLA** and **SARA**, covering the generation and disposal of **hazardous substances** at its facilities. Past hazardous waste disposal practices, although acceptable at the time, have frequently resulted in unexpected and long-term problems through the release of **contaminants** into soil and **groundwater**.

This fact sheet is the first in a series providing information about the environmental cleanup activities at the NAFEC. This fact sheet discusses past and proposed activities and identifies sources of additional information.

BACKGROUND

NAFEC has been established in its present location since 1942, when it was commissioned as a Marine Corps Air Station. Although its name and activities have varied since then, it has been in continuous use since World War II. Presently, NAFEC is the Navy's support facility for fleet air squadrons performing tactical air training, and is also the winter home of the Navy's elite Blue Angels precision flying team. Other tasks and functions include operations and training, administration, general engineering support, personnel support, medical and dental support, maintenance of material, maintenance of property and utility operations, and supply operations.

Installation Restoration Program

The **Department of Defense (DOD)**, of which the Navy is a part, developed the **Installation Restoration (IR) Program** to identify and investigate potentially hazardous disposal sites created by former hazardous material handling, storage, and disposal practices -- procedures once accepted and approved, but subsequently found to be improper and unsafe. The IR Program was modeled after the "Superfund" program established by **CERCLA**. As part of the IR Program, soil and groundwater investigations are underway at NAFEC.

The IR Program involves these five steps, which are defined in the glossary:

- **Preliminary Assessment (PA)**
- **Site Investigation (SI)**
- **Remedial Investigation (RI)**
- **Feasibility Study (FS)**; and
- **Remedial Action (RA)**

Past Site Activities

Years of activities at NAFEC involving hazardous substances and hazardous wastes have resulted in sites of potential contamination on the facility. In September 1987, a **Preliminary Assessment** (NEESA 13-106) was completed at NAFEC which identified areas of potential contamination (see figure, inside). Sixteen sites were originally identified. Two sites were later added to the IR Program, Sites 2A and 17, for a total of 18 sites.

As part of **Site Investigation**, studies have been conducted and others are underway to determine the nature and extent of possible contamination to soil, surface water, and groundwater at NAFEC. However, early results suggest that surface water quality does not appear to be affected by contamination by NAFEC IR sites.

(Words shown in bold type are defined in the glossary)

The kinds of substances or materials used and identified through studies at NAFEC include **petroleum hydrocarbons** (fuels, hydraulic fluids, motor oils), **solvents**, paints and thinners, photo chemicals, **heavy metals**, battery acids, **chlorinated pesticides**, asbestos, **polychlorinated biphenyls (PCBs)**, construction and demolition debris, household rubbish, and sewage sludge.

A number of SI studies, including groundwater and solid waste testing resulting in at least 20 reports, have been conducted for the IR Program sites at NAFEC. Additional investigative site work is on-going at the facility.

Other Activities

The IR Program focuses on past problems. Compliance with current laws and regulations in effect ensures that NAFEC handles its hazardous wastes properly and that no future problems will arise. Plans have been developed and implemented to establish proper waste identification, handling, and disposal procedures:

- Oil and Hazardous Substance Spill Contingency Plan
- Hazardous Waste Management Plan
- Oil Spill Prevention, Control and Counter-measures Plan
- Hazardous/Extremely Hazardous Materials Management Plan
- AB2588 "Hot Spots" Emission Inventory Plan

In addition, underground storage tanks containing fuel and other petroleum products, often a source of groundwater contamination, are being replaced at NAFEC with above-ground storage tanks. Having tanks above the ground allows better monitoring and prevention of potential leaks, which might otherwise go undetected for long periods of time.

Future Activities

The community will continue to be informed about and involved in cleanup activities at NAFEC. Future fact sheets, public meetings, and opportunities for public review and comment on proposed cleanup methods are a part of the IR Program's community relations activities.

A mailing list has been developed and will be continuously updated. Please add your name and address, and those of others interested in the NAFEC IR Program cleanup, by filling out the mail-in coupon on the back of this fact sheet.

COMMUNITY INFORMATION

A number of potentially interested parties were contacted and interviewed about this program. Interviewees also had the opportunity to ask questions. Their concerns and questions, as well as the cleanup program background, were incorporated into the **Community Relations Plan.** This is a formal document, meeting Environmental Protection Agency (EPA) and State of California community relations guidelines, which describes community involvement activities at a hazardous waste remediation site. The Community Relations Plan is a public document and is on file at the Information Repositories.

Information Repositories

In order to ensure that relevant cleanup-related reports and findings are available for public access, two information repositories have been established. These locations were selected for public convenience and accessibility, based upon comments received during the community interviews:

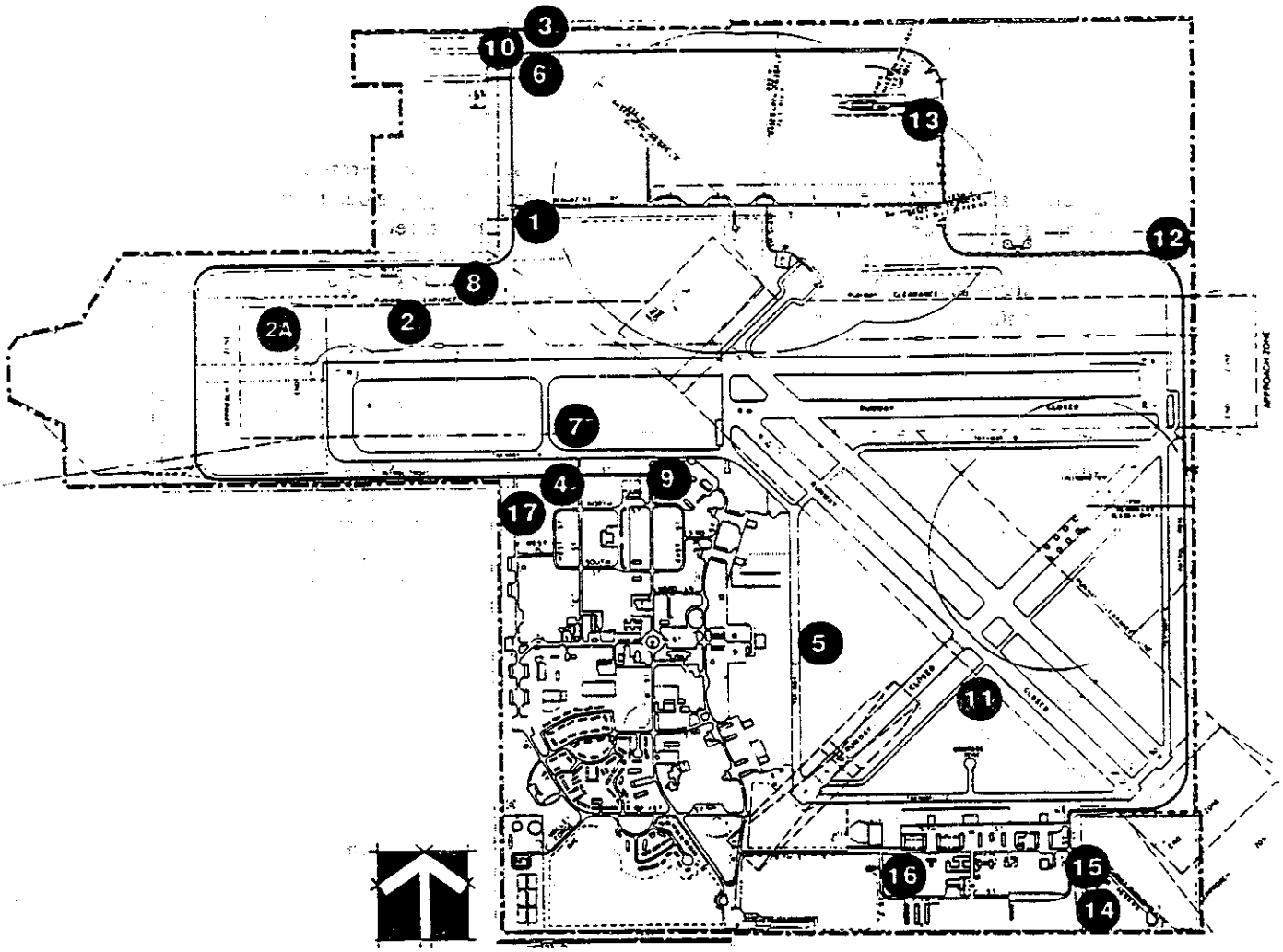
El Centro Public Library	M-Th	10 a.m.-8 p.m.
529 State Street	Fri	10 a.m.-5 p.m.
El Centro, CA 92243	Sat	10 a.m.-1 p.m.
Brawley Public Library	M-Th	12 p.m.-8 p.m.
400 Main Street	Sat	9 a.m.-5 p.m.

FOR MORE INFORMATION, PLEASE CONTACT:

Public Affairs Officer
Naval Air Facility El Centro
El Centro, CA 92243-5001
(619) 339-2519

Mr. John Crow
Naval Air Facility El Centro
El Centro, CA 92243-5001
(619) 339-2264

(Words shown in bold type are defined in the glossary)



Site	Location	Potential Contaminants
1	Magazine Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
2	Patrol Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
2A	West Patrol Road Landfill	Asbestos, fuel, paint, solvents, photo chemicals, acid
3	Sludge Burial Area	Silver, cyanide
4	4th Street Fire Fighting Training Area	Burned leaded fuel, hydraulic fluid, confiscated drugs
5	Fire Fighting Training Area	Burned leaded fuel
6	Northwest Fire Fighting Training Area	Burned leaded fuel
7	Abandoned Fuel Farm	Leaded and diesel fuel
8	Scrapyard	Empty drums, tanks, paint cans, transformers with PCBs
9	Transformer Storage Area	Transformers containing PCBs
10	Sewage Stabilization Ponds	Sewage, leaded fuel, motor fluids, photo solutions
11	Runway Burn Area	Burned fuel
12	Open Burn Pit	Burned confiscated drugs, ceramic, tin cans, wood
13	Old Incinerator	Burned paper
14	Fuel Farm Tank Rinseate Disposal	Leaded and diesel fuel
15	Fuel Farm Filter Cleaning Area	Leaded and diesel fuel
16	Potassium Ferricyanide Spill Area	Potassium ferricyanide
17	Fire Fighting Training Area	Burned leaded and diesel fuel

Installation Restoration Program Site Locations
Naval Air Facility El Centro
El Centro, California

GLOSSARY OF TERMS

CERCLA - The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also known as "Superfund") which implements EPA emergency and long-term hazardous waste cleanup activities. This Federal legislation covers the identification, investigation and remediation of hazardous waste sites.

Chlorinated pesticides - A class of pesticides which contain chlorinated hydrocarbon compounds. DDT and chlordane are examples of chlorinated pesticides.

Cleanup - Actions taken to deal with a release or threatened release of hazardous substances that could affect public health and/or the environment.

Community Relations Plan (CRP) - Formal plan for EPA community relations activities at a Superfund site. The CRP is designed to ensure citizen opportunities for public involvement at a site, determine activities that will provide for such involvement, and allow citizens the opportunity to learn about the site.

Contaminant - Any physical, chemical, biological, or radiological substance or matter that has an adverse affect on air, water, or soil.

Department of Defense (DOD) - The department of the federal government which oversees national defense, including all branches of the military.

Feasibility Study (FS) - The description and analysis of the potential cleanup alternatives for a hazardous waste site and recommendation of a cost-effective alternative.

Groundwater - Water found beneath the earth's surface that fills pores between materials such as sand, gravel, or soil. In aquifers, groundwater occurs in sufficient quantities that it can be used for drinking water, irrigation, and other purposes.

Hazardous substance - Any material that poses a threat to public health and/or the environment.

Heavy metals - A class of metals categorized by their high molecular weight. A partial list of heavy metals includes: mercury, arsenic, lead, chromium, zinc, cadmium, copper, barium, silver, and nickel.

Installation Restoration Program - A program developed by the DOD and modeled after EPA's "Superfund" (see below) program, to identify and investigate potentially hazardous disposal sites created by former hazardous substance handling, storage, and disposal practices.

Petroleum hydrocarbons - The class of hydrocarbons (organic compounds) derived from petroleum. Typical petroleum hydrocarbons include: gasoline, kerosene, diesel, and oils.

Polychlorinated Biphenyls (PCBs) - A class of chemicals typically used to cool electrical devices such as transformers.

Preliminary Assessment (PA) - The process of collecting and reviewing available information about a known or suspected hazardous waste site or release. EPA or states use this information to determine if a site requires further study.

Remedial Action - The phase of actual implementation or construction that follows remedial investigation, feasibility study, and development of remedial design.

Remedial Investigation (RI) - An in-depth study designed to gather the data necessary to determine the nature and extent of contamination. The data are used to establish criteria for site cleanup and identify preliminary alternatives for remedial action.

SARA - The Superfund Amendments and Reauthorization Act (SARA) is a modification to CERCLA and was enacted on October 17, 1986.

Site Investigation (SI) - The step following Preliminary Assessment (PA). It is designed to collect more extensive information on a hazardous waste site.

Solvent - (Usually liquid) substance capable of dissolving or dispersing other substances.

Superfund - The common name for the federal Comprehensive Environmental Response, Compensation, and Liability Act (see CERCLA, above).

PLEASE KEEP ME INFORMED

YES, I would like to receive information on the progress of environmental cleanup activities at NAF El Centro.

PLEASE RETURN COMPLETED COUPON TO:

Public Affairs Officer
Naval Air Facility El Centro
El Centro, CA 92243-5001

Name

Address

City, State, Zip

(Area Code) Telephone

Southwest Division, Naval Facilities
Environmental Division
1220 Pacific Highway, Building 130
San Diego, CA 92132