Engineering Field Activity, West
Contract No. N44255-02-D-2008
Delivery Order No. 0031

Final

Decision Document

Site 22, Northeast Runway Landfill
Naval Air Station Fallon
Fallon, Nevada

September 23, 2004

Prepared for

ENGINEERING FIELD ACTIVITY WEST
Daly City, California

Prepared by

URS Corporation
1501 4th Avenue, Suite 1400
Seattle, Washington 98101
(206) 438-2700

DECLARATION OF THE DECISION

SITE NAME AND LOCATION

Site 22, Northeast Runway Landfill
Naval Air Station Fallon
Fallon, Nevada

CERCLIS Identification Number
NV9170022173

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for Site 22, Northeast Runway Landfill, at Naval Air Station (NAS) Fallon in Fallon, Nevada. This decision is based on information contained in the Administrative Record for the site and is in accordance with the general guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is also in accordance with Nevada Administrative Code (NAC) 445A.226 through 445A.22755 and NAC 444.570 through 444.7499.

The U.S. Navy (Navy) selected the remedy, and the State of Nevada concurs with the remedy selection.

DESCRIPTION OF THE SELECTED REMEDIES

Data collected within, adjacent to, and downgradient of Site 22 indicate no chemical concentrations in excess of state action levels for soil or action levels for groundwater as a result of past activities at the site. Petroleum-related compounds were detected at concentrations above the state action levels in a limited area outside the landfill boundary to the south. However, these chemicals are attributed to a jet fuel release that was cleaned up in 1993 and requires no further action, according to the Nevada Division of Environmental Protection Bureau of Corrective Action (BOCA). Based on these observations and data, *Limited Action* is required at Northeast Runway Landfill (Installation Restoration Site 22), NAS Fallon, Nevada. The *Limited Action* alternative includes limited ground surface regrading to mitigate the potential for surface water ponding, which could infiltrate through the fill material, to improve surface drainage, limited groundwater monitoring to evaluate the off-site impact of fill material, and institutional controls to limit potential future exposure to fill material.

STATUTORY DETERMINATIONS

The selected remedy for Site 22 is protective of human health and the environment and in compliance with federal and state applicable or relevant and appropriate requirements. The analytical results from sampling have shown no exceedances of state action levels in soil or action levels in groundwater as a result of past activities at Site 22.

Captain Scott Ryder
Commanding Officer
Naval Air Station Fallon

10/13/04
Date

Jim Nagima
Chief, Bureau of Corrective Action
Nevada Division of Environmental Protection

11/08/04
Date

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ABBREVIATIONS AND ACRONYMS

bgs	below ground surface
BOCA	Bureau of Corrective Action
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CRP	community relations plan
1,1-DCA	1,1-dichloroethane
EPA	U.S. Environmental Protection Agency
FS	feasibility study
GRA	general response action
HBPHC	high-boiling-point hydrocarbon
IR	Installation Restoration
JP-5	jet petroleum No. 5
LBPHC	low-boiling-point hydrocarbon
LD	lower diagonal
MCL	maximum contaminant level
µg/kg	microgram per kilogram
µg/L	microgram per liter
mg/kg	milligram per kilogram
NAC	Nevada Administrative Code
NAS	Naval Air Station
NAAS	Naval Air Auxiliary Station
NAGPRA	Native American Graves Protection and Repatriation Act
Navy	U.S. Navy
NDEP	Nevada Division of Environmental Protection
NEESA	Naval Energy and Environmental Support Activity
NHPA	National Historic Preservation Act
NPL	National Priorities List
NRS	Nevada Revised Statues
ORNL	Oak Ridge National Laboratory
PA	preliminary assessment
PRG	preliminary remediation goal
RAB	Restoration Advisory Board
RAO	remedial action objective

ABBREVIATIONS AND ACRONYMS (Continued)

RI	remedial investigation
SI	site inspection
TCLP	toxicity characteristics leaching procedure
TCE	trichloroethene
TDS	total dissolved solids
SVOC	semivolatile organic compound
TPH	total petroleum hydrocarbons
TPH-E	total petroleum hydrocarbons—extractable
TPH-JP-5	total petroleum hydrocarbons—jet petroleum No. 5
TPH-P	total petroleum hydrocarbons—purgeable
TRC	Technical Review Committee
VOC	volatile organic compound

1.0 INTRODUCTION

This decision summary describes the site-specific factors and analyses that led to the selection of *Limited Action* as the remedy for Site 22, Northeast Runway Landfill, at Naval Air Station (NAS) Fallon in Fallon, Nevada. The *Limited Action* alternative includes limited ground surface regrading to mitigate the potential for surface water ponding, which could infiltrate through the fill material, to improve surface drainage, limited groundwater monitoring to evaluate the off-site impact of fill material, and institutional controls to limit potential future exposure to fill material. The process used to identify and select *Limited Action* as the preferred remedy for Site 22 is documented in "Remedial Alternatives Evaluation and Cost Analysis, Site 22, Northeast Runway Landfill, Naval Air Station Fallon, Nevada (U.S. Navy 2004). Documents supporting the decision are included in the Administrative Record for the site. Key documents are identified in Section 11.

The format and organization of this decision document are based on U.S. Environmental Protection Agency's (EPA's) *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents,* dated July 1999. This decision document includes the pertinent elements of Nevada Division of Environmental Protection's (NDEP's) *Requirements for (IR) Program Decision Documents*, transmitted in a letter dated December 30, 1998. This decision document is organized as follows:

- **Declaration of the Decision.** Functions as the abstract and formal authorizing signature page for the decision document
- **Section 1—Introduction.** Summarizes the purpose and organization of the decision summary portion of the decision document and identifies the site to which the decision document pertains
- **Section 2—Site Name, Location, Description, and History.** Identifies and describes the site, provides location and property ownership information, and summarizes the history of the site that led to conditions observed at the site as well as previous investigation activities
- **Section 3—Community Participation.** Documents community participation activities throughout the decisionmaking process, references the "responsiveness summary" in Appendix A, and describes the location and availability of the Administrative Record

- **Section 4—Scope and Role of Site.** Discusses Site 22 in relation to other sites at NAS Fallon and identifies when and where monitoring or remedial activities at other sites influence, or are influenced by, monitoring or remedial activities at Site 22

- **Section 5—Site Characteristics.** Summarizes the regional, facility, and site-specific characteristics and conditions, including the concentrations and distribution of contaminants and their fate and transport

- **Section 6—Current and Potential Site and Resource Uses.** Discusses the current and potential future uses of the land

- **Section 7—Summary of Site Risks.** Discusses risks due to contamination present at the site

- **Section 8—Selection of Preferred Alternative.** Provides the rationale for selecting *Limited Action* as the remedial action for Site 22

- **Section 9—Statutory Authority Finding.** States the conclusion that *Limited Action* is selected as remedial actions for Site 22

- **Section 10—Documentation of Significant Changes.** Describes the changes made to this decision document on the basis of comments received during the public comment period

- **Section 11—Bibliography.** Lists the sources of information used in preparing this decision document

- **Appendix A—Responsiveness Summary.** Summarizes responses to public comments

2.0 SITE NAME, LOCATION, DESCRIPTION, AND HISTORY

NAS Fallon is located in west-central Nevada, approximately 6 miles southeast of the city of Fallon and 60 miles east of the city of Reno (Figure 2-1). NAS Fallon was originally established as a military facility in 1942, when the Civil Aviation Administration and Army Air Corps constructed four airfields in Nevada as part of the Western Defense Program. In 1943, the U.S. Navy (Navy) assumed control of the still-uncompleted facility, and on June 10, 1944, Naval Air Auxiliary Station (NAAS) Fallon was commissioned. The newly commissioned facility provided training, servicing, and support to air groups sent to the facility for combat training. From 1946 to 1951, NAAS Fallon experienced varying but reduced operational status and was eventually turned over to Churchill County and the Bureau of Indian Service.

In 1951, Fallon was used as an auxiliary landing field for NAS Alameda, California, and on October 1, 1953, NAAS Fallon was re-established. From 1945 to 1975, the U.S. Air Force also occupied part of the station as part of an early warning radar network. On January 1, 1972, NAAS Fallon was upgraded to its current status of NAS Fallon. NAS Fallon currently serves as the primary aircraft weapons delivery and tactical air combat training facility. With the construction of a new runway and additional aircraft maintenance facilities, NAS Fallon's training mission is expected to continue to expand.

2.1 SITE DESCRIPTION

Site 22, Northeast Runway Landfill, is located in the northeastern corner of NAS Fallon, south of Site 21 (Figure 2-2). A map of Site 22 is provided as Figure 2-3. The site's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Identification Number is listed as NV9170022173. The Navy is the lead agency for site activities, and the NDEP serves as the lead regulatory agency.

The site is currently flat with some surface rubble that causes local minor relief. The surface consists of native vegetation. Groundwater is shallow at the site, ranging from approximately 2 to 11 feet below ground surface (bgs).

Landfilling operations were conducted at the site from 1980 to 1987. The site received an estimated 60,000 tons of solid waste from the station (excluding the housing units) during this time. Solid waste was reported to be trash only. No liquid wastes were permitted, and operations were closely monitored to exclude the disposal of materials that could have posed a threat to human health or the environment. However, due to the potential for liquid wastes to be inadvertently included in some of the accepted wastes, the preliminary assessment/site inspection

(PA/SI) recommended characterization of Site 22 (NEESA 1988). Waste was reportedly disposed of in north-south-oriented trenches constructed with a bulldozer (NEESA 1988). Because of the construction method and shallow groundwater, the excavation and disposal depths are assumed to be limited.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The purpose of the Navy's Installation Restoration (IR) Program is to identify, assess, characterize, and clean up or control contamination from past hazardous material spills and waste disposal activities at Navy and Marine Corps facilities. As part of the IR Program, the Navy conducted the following investigations/assessment activities:

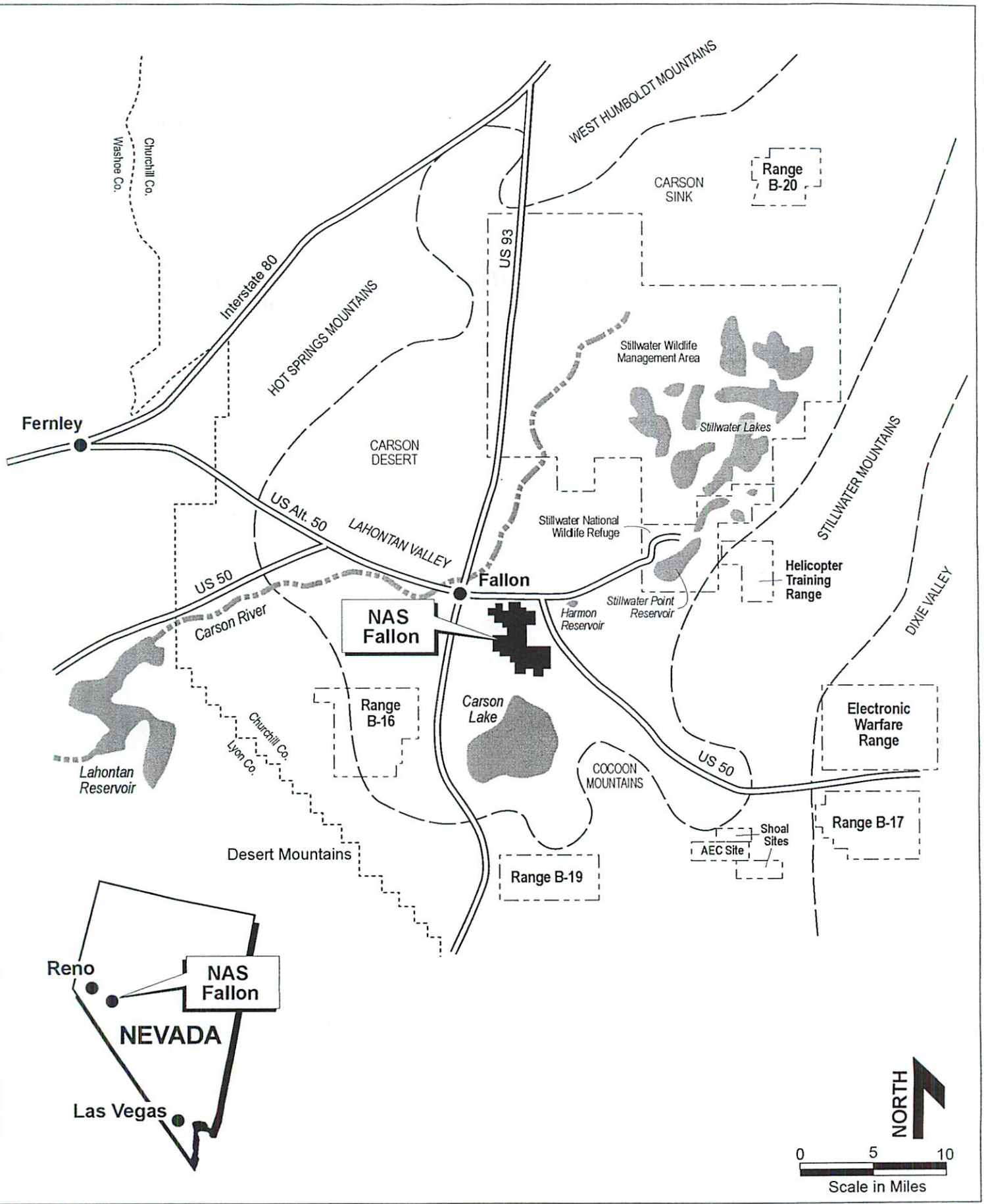
- The Navy performed a PA/SI in 1987, which consisted of a records search, an on-site survey, ranking of the site (based on characteristics of the wastes, the potential migration pathways from the site, and possible receptors), and recommendations for further study or immediate mitigating action (NEESA 1988). Disposal of liquid wastes at the station had been terminated by the time Site 22 became active. However, due to the potential for liquid wastes to be inadvertently included in some of the accepted wastes, the PA/SI recommended characterization of Site 22. The PA/SI recommended installation of two groundwater monitoring wells relative to Site 22, one within the site boundaries and one downgradient of the site to the south.

- In response to recommendations of the PA/SI, the Navy conducted an RI to assess contamination that might be present at the site. During the RI, two wells (PW-03 and MW-57) and several piezometers were installed downgradient of Site 22.

- Additional soil and groundwater sampling was conducted at Site 22 in 1998. Soil and/or groundwater samples were collected from 28 locations along the downgradient border of the site using direct-push methods.

- Additional sampling was performed in 2003 to assess the potential for the landfill to serve as a source of petroleum hydrocarbon, volatile organic compound (VOC), or semivolatile organic compound (SVOC) contamination to groundwater and, if present, to assess the potential for off-site contaminant migration. Additional data were collected from samples at four direct-push soil boring locations within the landfill boundaries. One groundwater monitoring well was installed adjacent to the downgradient boundary of the site.

NAS Fallon is not listed on the National Priorities List, therefore, NDEP provides regulatory oversight. There have been no enforcement activities at the site.



U.S. NAVY	**Figure 2-1** **Location Map, NAS Fallon**	Delivery Order 0031 NAS Fallon DECISION DOCUMENT SITE 22

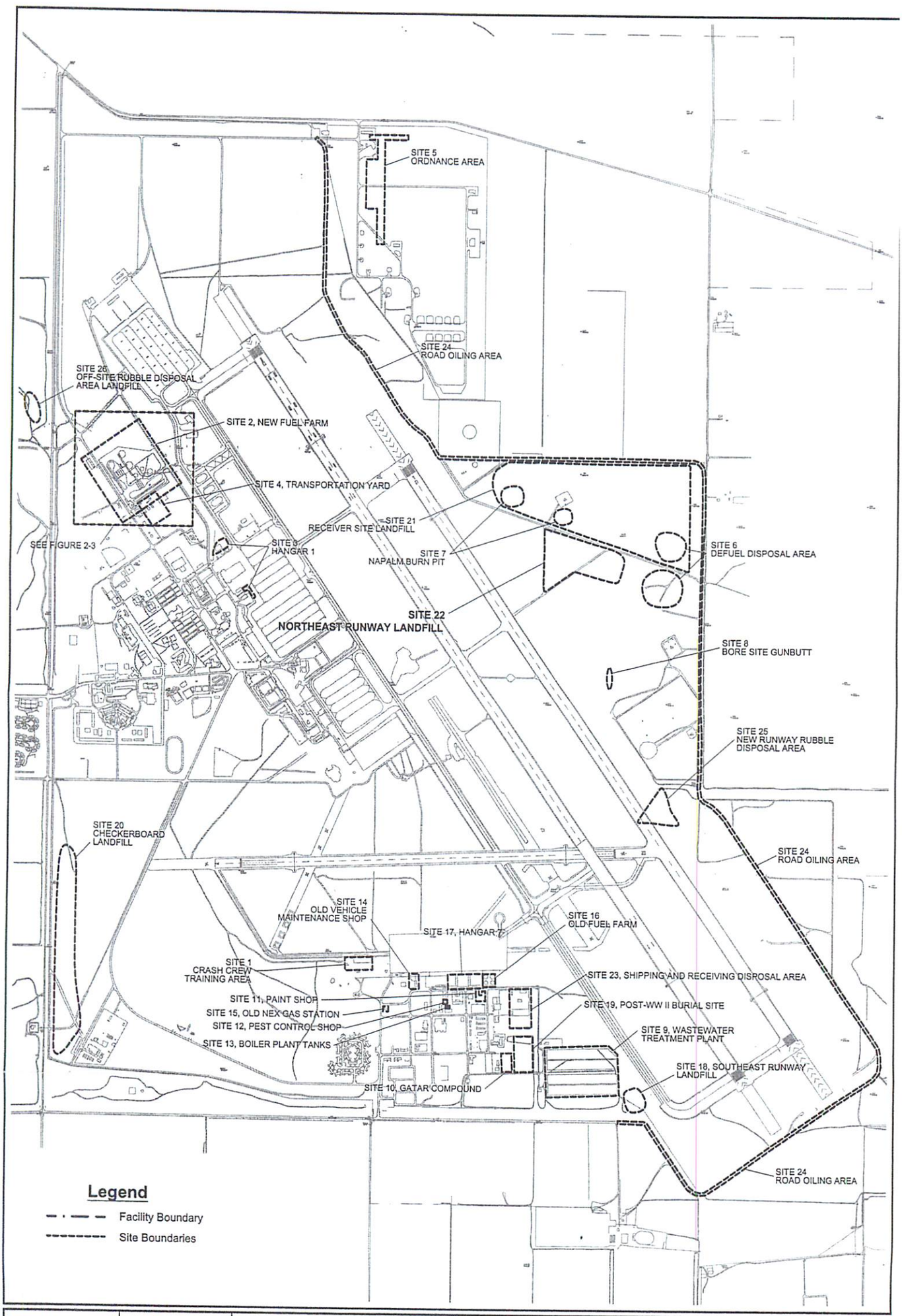


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Figure 2-2
NAS Fallon Facility Map

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DECISION DOCUMENT
SITE 22

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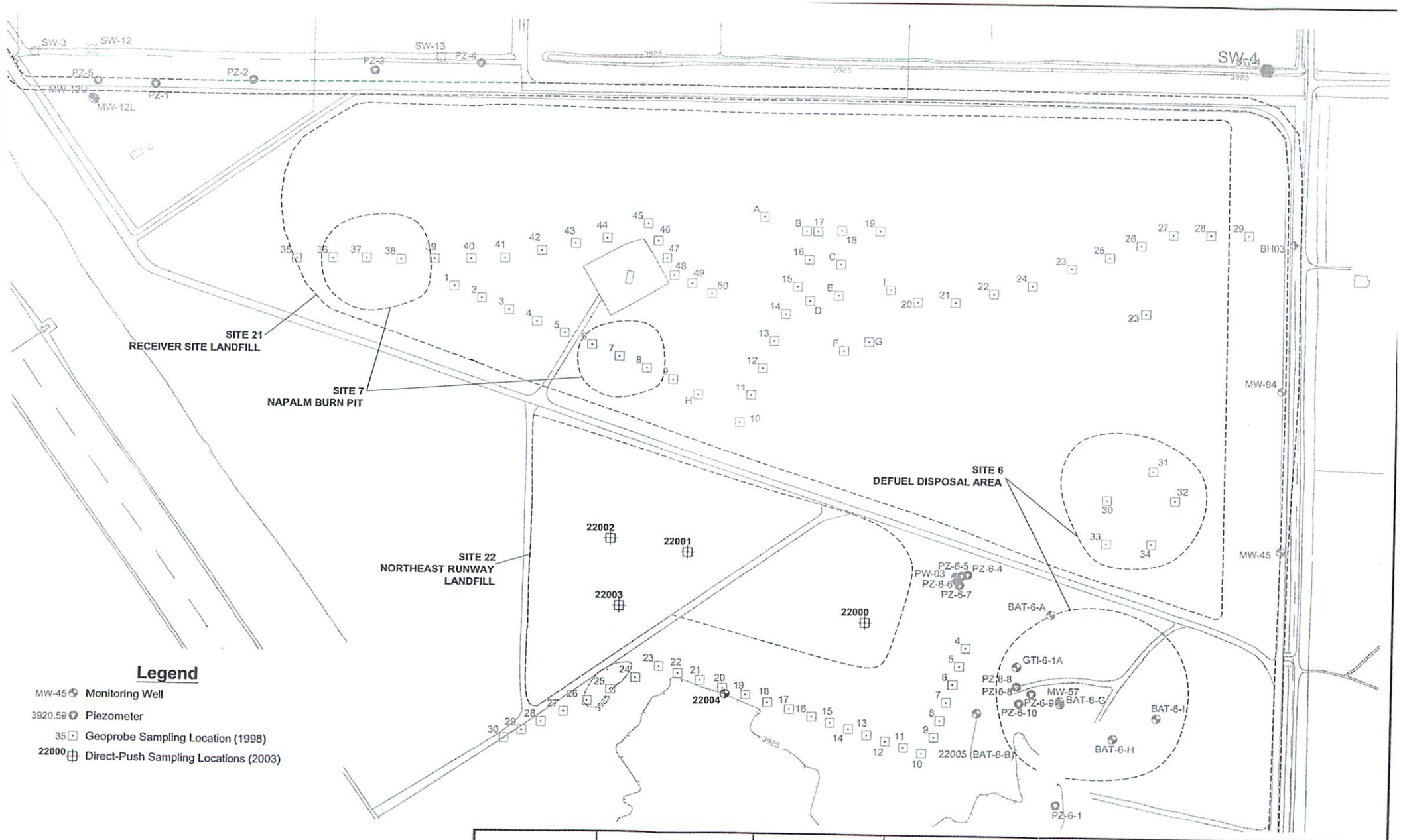
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SW-12
SW-13
PZ-5
PZ-2
PZ-3
PZ-4
PZ-1
MW-12U
MW-12L
SW-4
3925
SITE 21
RECEIVER SITE LANDFILL
SITE 7
NAPALM BURN PIT
BH03
MW-94
MW-45
SITE 6
DEFUEL DISPOSAL AREA
SITE 22
NORTHEAST RUNWAY
LANDFILL
22000
22001
22002
22003
22004
22005 (BAT-6-B)
PW-03
PZ-6-5
PZ-6-4
PZ-6-6
PZ-6-7
BAT-6-A
GTI-6-1A
PZ-6-8
PZI-6-8
MW-57
PZ-6-9
BAT-6-G
PZ-6-10
BAT-6-I
BAT-6-H
PZ-6-1
Legend
MW-45 Monitoring Well
3920.59 Piezometer
35 Geoprobe Sampling Location (1998)
22000 Direct-Push Sampling Locations (2003)
0 75 150 300
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Figure 2-3
Sampling Locations
at Site 22, Northeast Runway Landfill
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3.0 COMMUNITY PARTICIPATION

Community participation is being encouraged under a community relations plan (CRP) drafted pursuant to Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). This plan was updated in 2004.

In 1989, a Technical Review Committee (TRC) was formed in an effort to increase community participation and awareness regarding the IR Program and to provide comments on proposed actions under the NAS Fallon IR Program. The TRC consisted of state and local regulatory representatives and NAS Fallon personnel. The TRC met in June 1989 to discuss potential requirements for future PA/SI or remedial investigation (RI) and feasibility study (FS) activities at NAS Fallon. This meeting provided an opportunity for the regulatory agencies to comment on and provide input to the proposed IR Program at NAS Fallon.

In August 1994, a Restoration Advisory Board (RAB) was established to replace the TRC. The RAB meets once a year and consists of members originally on the TRC and representatives from the local community.

All documents associated with this site, such as the PA/SI report, the RI report, the CRP and the Proposed Plan for Site 22, were made available to the public in the Administrative Record at NAS Fallon (Fallon, Nevada), the Churchill County Public Library (Fallon, Nevada), and at the Engineering Field Activity, West Offices (Daly City, California). The notice of the availability of these documents was published in the *Lahontan Valley News* on August 5, 2004. Notices were also sent to the RAB members. A public comment period extended from August 9, 2004 to September 8, 2004. In addition, a public meeting was held on August 12, 2004, to present the Proposed Plan to the community. At this meeting, representatives from NAS Fallon and the NDEP presented the Proposed Plan. No public comments were received by the Navy during the public comment period.

4.0 SCOPE AND ROLE OF SITE

There are 27 IR sites at NAS Fallon. The locations of all 27 IR sites are shown on Figure 2-2. Site 22 (Northeast Runway Landfill) is located in the northeastern corners of NAS Fallon, south of Site 21. There are two areas identified as Site 6 (Defuel Disposal Area). The northern area identified as Site 6 is located within the boundaries of Site 21. The southern area is located southeast of Site 22. Site 6 is considered an active site and remedial alternatives are being evaluated. Site 21 (Receiver Site Landfill) is located adjacent to the northern border of Site 22.

The sampling locations used to evaluate Site 22 are as follows:

- Twenty-eight direct-push locations (locations 2, 3, and 5 through 30) adjacent to the south and east of Site 22 from which soil and groundwater samples were collected
- Four monitoring wells (PW-03, MW-57, BAT-6-B [also known as location 22005], and 22004) from which soil and groundwater samples were collected
- Four direct-push sampling locations (22000 through 22003) within the landfill boundary from which soil and groundwater samples were collected

The sampling locations used as a basis for the decision for Site 22 are summarized in Table 4-1, together with the gradient relationships to Site 22 and the uses of the data from each location. Laboratory Form 1s for samples collected and analyzed prior to 2000 are not available to confirm reported results. Therefore, results for samples collected prior to 2000 are considered qualitative and were used to guide post-2000 sampling activities. Decisions for the site are based primarily on the post-2000 data. Table 4-2 provides a chronological summary of quantitative sampling activities at each location.

The 28 direct-push borings were completed to qualitatively evaluate potential contamination in soil and groundwater downgradient of Site 22. Soil and groundwater samples from monitoring wells PW-03, MW-57, BAT-6-B (also known as location 22005), and 22004 were used to assess the presence of contaminants in the groundwater and soil downgradient of Site 22. Results from soil and groundwater samples from the four direct-push sampling locations (22000 through 22003) were used to quantitatively evaluate potential contamination within the landfill boundary.

Table 4-1
Summary of Data From Sampling Locations Used as the Basis of Decision for Site 22, Northeast Runway Landfill

Sampling Location	Data Type	Data Uses
Within Site 22		
Direct-push locations 22000 through 22003	Quantitative	Quantitative assessment of presence or absence of potential contaminants in soil and groundwater related to the activities at the landfill
Upgradient of Site 22		
None	NA	NA
Downgradient of Site 22		
Direct-push locations 2, 3, and 5 through 30, and well PW-03	Qualitative	Qualitative assessment of presence or absence of potential contaminants in soil and groundwater related to the activities at the landfill
Well MW-57	Qualitative	Qualitative assessment of presence or absence of potential contaminants in groundwater related to the activities at the landfill for samples collected prior to 2000
Well at 22004	Quantitative	Quantitative assessment of presence or absence of potential contaminants in soil and groundwater related to the activities at the landfill
Well BAT-6-B (also known as location 22005)	Quantitative	Quantitative assessment of presence or absence of potential contaminants in groundwater related to the activities at the landfill

Table 4-2
Chronological Quantitative Sampling Summary

Sampling Location	Matrix	Sampling Date	Range of Analyses
22000 through 22003	Soil	3/03	TPH-E, TPH-P, VOCs, SVOCs, and grain size
22004	Soil	3/03	TPH-E, TPH-P, VOCs, SVOCs
22000 through 22003	Groundwater	3/03	TPH-E, TPH-P, VOCs, SVOCs
Wells at 22004 and 22005	Groundwater	3/03	TPH-E, TPH-P, VOCs, SVOCs, TDS
PW-03	Groundwater	3/03	TPH-E, TPH-P, VOCs, SVOCs

Notes:
SVOCs - semivolatile organic compounds
TDS – total dissolved solids
TPH-E - total petroleum hydrocarbons—extractable
TPH-P - total petroleum hydrocarbons—purgeable
VOCs - volatile organic compounds

5.0 SITE CHARACTERISTICS

This section summarizes the characteristics and conditions of the region, the facility, and the site. It describes the physical and ecological setting, climate, surface water patterns, and geology and hydrogeology, as well as the nature and extent of contamination and the fate and transport of chemicals of concern.

5.1 PHYSICAL SETTING

5.1.1 Physical Setting of Facility

NAS Fallon lies on a broad, flat alluvial plain in the southern Carson Desert referred to as the Lahontan Valley. The Carson Desert is part of the Basin and Range geological province. Carson Lake, a series of ditches and small marshes, is a few miles south of the facility. The Stillwater Lakes, a chain of small lakes, ponds, and marshes, extend for 20 miles south of the Carson Sink in the northern half of the Carson Desert (Figure 2-1). Carson Lake and the Stillwater Lakes are two wetland areas that serve as an important stopover for migratory birds during the spring and fall.

The Carson Desert is a hydrologically closed depression that forms the sink for the Carson River. The entire area is in the rain shadow of the Sierra Nevada Mountains; consequently, precipitation is about 5 inches per year. About 80 percent of the Carson Desert surface consists of the Carson River floodplain, with the rest composed of playas and alluvial fans. The surface soils are enriched with salts and cations such as arsenic, lithium, mercury, and molybdenum that have been transported to the basin by the river and have been concentrated as a result of evaporation of ancient Lake Lahontan.

The Carson River, augmented by the Truckee River via the Truckee canal (part of the Newlands Irrigation Project), provides more than 95 percent of all surface runoff received by the Carson Desert. Much of the area around the facility is irrigated; several irrigation ditches deliver water, and drainage canals remove excess water. The drainage canals generally intersect the shallow water table aquifer and drain excess water from the farmland.

There are two major drainage canals at NAS Fallon:

- The "lower diagonal (LD) drain," the alignment of which is along the southwestern edge of the facility and east along the southern boundary of the facility proper

- The "LD #1 drain," which crosses onto the facility just north of Site 2 (the New Fuel Farm), drains to the east from the west side of the facility, and then drains to the south

The most important distinction between the irrigation ditches and the drainage canals (drains) is that the drains intersect the shallow groundwater as well as surface water and to conduct the water away from the drained areas. Conversely, the irrigation ditches deliver water to the fields. In the process of carrying off excess surface water and shallow groundwater, the drains remove minerals or salts leached from the farmland. The drains carry water southeastward to Carson Lake and northeastward to the Harmon and Stillwater Point Reservoirs.

The LD drain is approximately 500 feet south of the Group IV sites. In addition, an unnamed drain is located just east of Group IV Site 23 and 19. The primary sources of water in this drain are backflow from the LD drain during the irrigation season and the waste water treatment plant. During rare storm events, stormwater in small ditches may enter the unnamed drain.

5.1.2 Site 22 Physical Setting

Site 22, Northeast Runway Landfill, is located in the northeastern corner of NAS Fallon, south of Site 21 (Figure 2-2). Site 22 encompasses approximately 18 acres, extending approximately 1,200 feet from east to west and between 500 to 1,000 feet from north to south. The site is currently flat, and the surface consists of native vegetation. Site 22 is one of the Group II sites that also include the Defuel Disposal Area (Site 6), the Napalm Burn Pit (Site 7), and the Receiver Site Landfill (Site 21). Groundwater is shallow at the site ranging from approximately 2 to 11 feet bgs. Groundwater flow is to the southeast. NAS Fallon does not expect any change in the use of this land or that of the surrounding sites in the foreseeable future. There are no areas of archaeological or historical significance at Site 22.

5.2 ECOLOGY

5.2.1 Vegetation

NAS Fallon was originally a greasewood community typical of alkali valley bottom lands, portions of which have since been irrigated and used as pasture. Typical plants for this area include saltbush, shadscale, quailbush, halogeton, greasewood, milkweed, poverty weed, alkali sacaton, rabbitbrush, saltgrass, and alkali seepweed.

The flat, alkali bottom lands making up the southern portion of the Carson Sink currently receive sufficient irrigation return flow and Carson River water to be recognized as a wetland habitat, especially for waterfowl. Vegetation typical of these areas includes bullbush, cattail, pondweed, widgeon grass, muskgrass, and coontail. Cottonwoods and willows occupy portions of the banks of various ponds, ditches, and drains.

5.2.2 Endangered and Threatened Plant Species

No endangered or threatened plant species designated by the state or federal government are known or likely to occur in the region.

5.2.3 Wildlife

Terrestrial wildlife in the region consists of species adapted to the desert or dependent on wetlands. About 67 species of mammals inhabit the area. Mountain ranges in the region, outside of the area of human impact, support large mammals such as mountain lions and mule deer. Common mammals of the area include bats, coyote, kit fox, jackrabbit, deer mouse, ground squirrel, and kangaroo rat.

More than 252 species of birds have been recorded regionally. Upland game birds of the desert are the ring-necked pheasant, sage grouse, the introduced chukar partridge, quail, and mourning dove. A variety of raptors and songbirds are also present.

The Stillwater National Wildlife Management Area, 7 miles east of NAS Fallon, and Carson Lake, 4 miles south of NAS Fallon, support the two largest concentrations of waterfowl and shorebirds in the state. Important game birds include canvasbacks, whistling swans, and Canada geese. Nongame species include the American avocet, black-necked stilt, white-faced ibis, and dowitchers.

5.2.4 Aquatic Life

The drains at NAS Fallon may be inhabited by mosquito fish, carp, bullhead, catfish, sunfish, muskrats, herons, and eagles.

5.2.5 Endangered Animal Species

Federally listed endangered and threatened animal species that may utilize the NAS Fallon and range areas include bald eagle. These species are most likely to be found hunting the wetland portions of the area but may occasionally be seen elsewhere. The nearest breeding habitat is to the northwest, outside the boundaries of the NAS Fallon facility.

5.3 GEOLOGY AND HYDROGEOLOGY

5.3.1 Regional and Facility Geology

The area within and surrounding NAS Fallon consists of an intermontane valley. The mountains near NAS Fallon are composed primarily of a variety of consolidated igneous, sedimentary, and metamorphic rocks that range in age from Triassic to Quaternary in age.

The Basin and Range faulting that occurred during the Cenozoic Era probably formed the bedrock surface below the valley fill sediments. This formation of the intermontane valley was accompanied by deposition of valley-fill sediments on the floor to depths of several thousand feet. Sediment composing the valley fill was derived from three primary sources:

- Upstream valleys of the Carson River drainage
- Upstream valleys of the Humbolt River basin
- Mechanical weathering of consolidated rocks within the Carson Desert itself

It appears that most of the valley-fill sediments in and around NAS Fallon were transported into the valley by the ancestral Carson River.

The depositional character of the valley-fill sediments at NAS Fallon was greatly influenced by the presence of the ancient Lake Lahontan, a Quaternary-age lake that was subject to numerous cycles of advancement and retreat. Regional climatic changes caused dramatic oscillations of lake stages and shorelines throughout the Pleistocene Epoch. Subsurface stratigraphic evidence also suggests the existence of pre-Quaternary-age lakes in the valley. The pluvial influences on sediment deposition were extensive and probably varied during the greater part of Cenozoic time. The alternating influences of wave action, standing water, flowing water, and wind on the sediment transported into the valley by the Humbolt and Carson Rivers resulted in a complex sequence of interfingered and interbedded deposits of fluvial, deltaic, lacustrine, and eolian deposits.

Previously published descriptions of these deposits were generally confirmed during the installation of monitoring wells across the facility. However, the highly transmissive, coarse-grained deposits were found to be both laterally and vertically discontinuous. Below the upper 20 feet of interbedded coarse-grained and fine-grained deposits, a laterally continuous bed of fine-grained silts and clays forms an aquitard, providing a natural barrier to the downward migration of groundwater and contaminants.

A generalized geologic cross section showing the stratigraphy beneath NAS Fallon is provided in Figure 5-1.

5.3.2 Regional and Facility Hydrogeology

Abundant groundwater is present in the valley-fill sediments and the underlying volcanic strata of the Carson Desert as a result of the closed nature of the hydrologic basin and the remnants of Pleistocene Lake Lahontan that once covered the entire area. Groundwater occurs in three principal aquifer systems: (1) a shallow alluvial aquifer, (2) intermediate and deep alluvial aquifers, and (3) a basalt aquifer.

The shallow water-table aquifer occupies the alluvium from near the ground surface to about 25 feet bgs. The shallow aquifer is composed of many interconnected zones of varying permeability, ranging from highly transmissive channel sands to less-transmissive silty clay floodplain and lake deposits. The water quality is generally poor because the water has a high concentration of dissolved solids; however, freshwater recharge from the surface-water irrigation system helps maintain water quality in some parts of the valley.

Reports of regional water quality in the shallow alluvial aquifer and irrigation return flows contain information on the range of concentrations of various metals and anions. This information is summarized in the *Preliminary Site Characterization Summary (ORNL 1992)*. Although the concentrations of these constituents vary considerably, there is a trend of increasing concentrations toward discharge areas at the Stillwater Lakes and Carson Lake. Concentrations of many trace metals exceed various criteria for the protection of aquatic life and crops, effect levels for fish reproduction, and limits for the propagation of wildlife. For example, background concentrations of boron in surface water often exceed the effect level for fish reproduction of 200 µg/L, and concentrations of arsenic in groundwater and surface water often exceed the Nevada criterion for the protection of aquatic life of 40 µg/L and the drinking water standard of 50 µg/L.

The regional groundwater flow direction is to the east and southeast toward Grimes Point and slightly diagonal to the drainage ditches that cross the facility. Glancy estimated the regional groundwater velocity to be approximately 35 feet per year in 1986. The site-specific groundwater flow velocities from numerous aquifer tests are highly variable.

Intermediate and deep alluvial aquifers are present beneath the shallow alluvial aquifer in the Wyemaha Formation. The boundary between the shallow and the intermediate aquifer is a relatively impermeable clay layer (Sehoo Formation), approximately 20 feet thick. The water in the intermediate and deep aquifers is generally of better quality than the water in the shallow aquifer. The boundary between the intermediate and deep aquifers is defined primarily on the

basis of water quality, rather than the presence of a physical boundary. Water quality in the intermediate and deep alluvial aquifers generally improves with depth.

The deep alluvial aquifer extends to approximately 2,200 feet bgs near the center of the basin. The basalt aquifer lies within the intermediate and deep alluvial aquifers at a depth of approximately 600 feet bgs, within an approximately 4-mile radius around Rattlesnake Hill, a small volcanic cone that outcrops just north of the city of Fallon. The basalt aquifer is the only source of municipal domestic water in the area and is recharged from the intermediate and deep alluvial aquifers. The basalt aquifer is not present beneath NAS Fallon except possibly in the extreme northwest corner of the facility. However, NAS Fallon obtains all of its domestic water from this aquifer using deep wells northwest of the facility.

Three monitoring wells penetrating the intermediate aquifer on the facility indicate a head difference of about 5 to 9 feet between the shallow unconfined aquifer and the intermediate confined aquifer. The head is higher in the intermediate aquifer, indicating artesian conditions that retard or preclude downward migration of groundwater at the facility. Because of this upward hydraulic gradient, investigations at the facility have focused on the shallow water-table aquifer, with three widely spaced wells drilled into the intermediate aquifer.

5.3.3 Site 22 Geology and Hydrogeology

The geologic information for Site 22 was obtained during the installation of direct-push borings 22000 through 22003 and wells BAT-6-B, PW-03, and 22004 (Figure 2-3). Subsurface investigations at the site were limited to the shallow alluvial aquifer, because of the presence of a silty clay aquitard at the base of this aquifer.

Locations 22000 through 22003 are present within the landfill boundaries. PW-03 and BAT-6-B are located approximately 150 and 350 feet, respectively, from the eastern border of the landfill. Well 22004 is located approximately 200 feet from the southern boundary of the landfill.

A generalized fence diagram is provided on Figure 5-2. The shallow saturated formation is dominated by sand with variable amounts of silt from the ground surface to approximately 20 feet bgs. A clay lens is located from approximately 4 to 8 feet bgs at location 22001. A silt lens is also present at location 22001 from approximately 8 to 12 feet bgs. A silt lens is also observed at BAT-6-B from the ground surface to approximately 20 feet bgs. A clay layer is present beneath the site at a depth of approximately 20 feet bgs.

Depth to groundwater was measured in wells 22004, MW-45, MW-94, BAT-6-B, and PW-03. Attempts to locate well MW-12U were unsuccessful. Depth to groundwater in these wells ranged from 3.38 (22004) to 11.44 feet below top of casing (MW-45). Groundwater surface

elevation contours for March 2003 are shown on Figure 5-3. Groundwater flow is estimated to be to the southeast for both November 2002 and March 2003, which is consistent with previous estimates. The average hydraulic gradient across the site was estimated at 0.001 based on the November 2002 and March 2003 measurements.

Slug testing was performed at wells 22004, MW-45, and MW-94 to estimate hydraulic conductivity at these locations. Hydraulic conductivity is estimated to be 94 feet per day at 22004. Hydraulic conductivity is estimated to range from 29.6 to 32.3 feet per day at MW-45. Hydraulic conductivity is estimated to range from approximately 10.9 to 11.5 feet per day at well MW-94. Results of the slug tests appear to compare favorably to the rough estimates from grain-size analysis at select locations.

Assuming an effective porosity of 30 percent and using the slug test data, estimated groundwater velocity across the site ranges from 13 to 39 feet per year. Slug testing results for hydraulic conductivity are considered to be approximations. Pumping tests were conducted in the area of Site 2. Pumping test-derived hydraulic conductivities were estimated at 38.9 to 61.6 feet per day. The slug test estimates are approximately 1.3 to 1.9 times lower than the pumping test based estimates suggesting that groundwater velocity across the site could be as high as 75 feet per year.

These velocity estimates are for groundwater and do not necessarily represent contaminant transport velocities, which are usually slower than groundwater velocity. The degree to which contaminant velocity is "retarded" relative to groundwater depends on the amount of organic carbon in the saturated formation and the contaminant type. Because of retardation, contaminant velocities are typically slower than groundwater velocities.

5.4 NUMERICAL VALUES FOR COMPARISON TO CONTAMINANT CONCENTRATIONS

Comparative numerical values for action decisions are provided in the Nevada Administrative Code (NAC), which states the following:

- The "soil action level" established by NAC 445A.2272 is 100 mg/kg for petroleum substances (typically referred to as total petroleum hydrocarbons [TPH]).
- For contaminants in soil, compare the toxicity characteristics leaching procedure (TCLP) allowable levels listed in 40 CFR Part 261.24 and the state action level

pursuant to NAC 445A.2272 to contaminant concentrations detected during the investigation and/or remedial activities.

- If inhalation, ingestion, or dermal exposure is the primary pathway of concern or an applicable level of concentration is not listed in the Toxicity Characteristics Leaching Rule, the presence of a hazardous substance, hazardous waste, or a regulated substance in the soil at an appropriate level of concentration that is based on the protection of public health and safety and the environment. The appropriate level of concentration must be determined by NDEP using the Integrated Risk Information System, adopted by the EPA, as it existed on October 3, 1996, or an equivalent method chosen by NDEP. (Note: The equivalent method is generally assumed by NDEP to be EPA Region 9 preliminary remediation goals [PRGs]).
- Except as otherwise provided by NAC 445A.2272, if more than one action level for soil may be established using the criteria set forth in subsection 1, the most restrictive action level must be used. In no case may the action level be more restrictive than the background concentration of the hazardous substance, hazardous waste or regulated substance.
- If contaminated soil is to be left in place, provide an A through K analysis pursuant to NAC 445A.227 to determine if corrective action is required.
- The presence of 1/2 inch or more of a petroleum substance that is free-floating on the surface of the water of an aquifer, using a measurement accuracy of 0.01 foot (NAC 445A.22735).
- For contaminants in groundwater, compare the maximum contaminant levels (MCLs) listed in the EPA Drinking Water Regulations and Health Advisories to contaminant concentrations detected during the investigation and/or remedial activities (NAC 445A.22735).
- The action level may be set at a level of concentration equal to the background concentration of a hazardous substance, hazardous waste or a regulated substance, if that level of concentration is greater than the maximum contaminant level for that hazardous substance, hazardous waste, or regulated substance.
- In the absence of an MCL, compare a level of concentration equal to the background concentration of a hazardous substance or an appropriate level of concentration that is based on the protection of public health and safety and the

environment. The appropriate level of concentration must be determined by the division using the Integrated Risk Information System, adopted by reference in NAC 445A.2272, or an equivalent method approved by NDEP. (Note: The equivalent method is assumed by NDEP to be EPA Region 9 PRGs).

The NAC does not provide a state action level for TPH in groundwater. The NDEP provided a guidance concentration of 1,000 µg/L in comments to the PA/SI (NEESA 1998). As a result, 1,000 µg/L has been used consistently as guidance for TPH in groundwater in various reports prepared by the Navy for work conducted at NAS Fallon.

In the absence of an MCL for groundwater, the Navy will use EPA Region 9 PRGs as goals. In the absence of an NAC-specified state action level for soil, the Navy will use EPA Region 9 PRGs as goals.

According to the PA/SI, waste materials that were disposed of in the landfill included trash only. No liquid wastes were permitted. However, the potential for liquid wastes to have been disposed of at the site inadvertently may have resulted in the release of petroleum hydrocarbons, VOCs, and SVOCs.

5.5 NATURE AND EXTENT OF CONTAMINATION

This section first summarizes results of investigations at Site 22, then discussed in detail (in the following subsections) contaminants in soil and groundwater. Investigations at the site include the following:

- Soil sampling to determine the presence of contaminants to the east and south of the landfill
- Soil and groundwater sampling to determine the presence of contaminants within the landfill boundaries
- Groundwater sampling to determine the presence of contaminants hydraulically downgradient to the east and south of the landfill

Results of analyses conducted prior to 2000 are considered to be qualitative and were used to guide the post-2000 sampling events. Decisions at the site are based on the post-2000 results.

The data are summarized below and discussed in detail in the following subsections.

TPH—jet petroleum No. 5 (TPH-JP-5) was detected in 3 of 30 soil samples, and TPH-purgeable was detected in 1 of 35 soil samples at concentrations greater than the state action level (100 mg/kg). VOCs and SVOCs were detected in soil at concentrations less than the state action levels. TPH-JP-5 was detected in 2 of 27 groundwater samples and TPH-purgeable (TPH-P) was detected in 1 of 33 groundwater samples at concentrations greater than the guidance concentration (1,000 µg/L). VOCs and SVOCs were detected at concentrations above the state action level in 2 of 35 samples.

Total metals concentrations observed in soil at Site 22 are consistent with background concentrations and are not considered to be the result of any activities at NAS Fallon.

5.5.1 Soil

Soil samples were collected during three field events to evaluate Site 22: in 1991 during the RI, in 1998 during post-RI sampling, and in 2003. Soil samples were collected at depths between 2 and 12 feet bgs. A summary of the results of detected organics and metals in soil is presented in Tables 5-1 and 5-2, respectively. Sampling locations are shown on Figure 2-3.

Soil samples were collected from 36 locations during three separate sampling events to evaluate Site 22. One soil sample was collected from 5 to 6.5 feet bgs from the well location PW-03 during the RI. This sample was analyzed for high-boiling-point hydrocarbons (HBPHCs) (EPA Method 8015 Modified), low-boiling-point hydrocarbon) (LBPHCs) (EPA Method 8015/8020), VOCs (EPA Method 8240), and SVOCs (EPA Method 3550/8270). In 1998, soil samples were collected from 30 direct-push locations installed south and east of the landfill boundary. These samples were analyzed for TPH-E, TPH-P, VOCs, SVOCs, and metals. The results of both of these sampling efforts are considered to be qualitative and were used to guide the 2003 investigation. In 2003 five soil samples were collected from five locations (22000 through 22004) and analyzed for TPH-E (EPA Method 8015 Modified), TPH-P (EPA Method 8015 Modified), VOCs (EPA Method 8260B), and SVOCs (EPA Method 8270C).

A total of 35 soil samples were collected and analyzed for TPH—extractable (TPH-E) and TPH-P. TPH-JP-5 was tested for in 30 samples. TPH-JP-5, TPH-E, and TPH-P were detected in one or more samples. TPH-JP-5 was detected in three samples above the TPH state action level of 100 mg/kg, and TPH-P was detected once above its state action level of 100 mg/kg. The exceedances were present in samples collected in 1998 at locations 23, 26, 29, and 30, which are south of the landfill towards the runway. Jet fuel was spilled in the general area of the elevated hydrocarbon detections in the 1998 soil and groundwater samples. A fuel tank fell off a jet during takeoff. The spill was reported to the NDEP Bureau of Corrective Action (BOCA) in March 1993. The tank reportedly skidded onto the embankment next to the runway where approximately 290 gallons of JP-5 were released to the ground surface. Approximately 3 cubic

yards of soil were excavated at that time. The action was considered complete according to BOCA (Kelso 2000).

A total of 36 soil samples were collected and analyzed for VOCs. The state action levels were not exceeded for any of the VOCs detected at Site 22. Carbon disulfide, methylene chloride, toluene, total xylenes, 1,2,4-trichlorobenzene, and trichlorofluoromethane were detected in one or more of the samples collected at Site 22. Carbon disulfide was detected in one of 36 samples at a concentration 0.004 mg/kg. Methylene chloride was detected in 1 of 36 samples at a concentration of 0.003 mg/kg. Toluene was detected in 2 of 36 samples with concentrations of 0.043 and 0.073 mg/kg. Total xylenes were detected in 2 of 29 samples with concentrations of 0.066 and 0.137 mg/kg. 1,2,4-trichlorobenzene was detected in three of five samples with concentrations ranging from 0.002 to 0.004 mg/kg. Trichlorofluoromethane was detected in 5 of 36 samples with concentrations ranging from 0.002 to 0.003 mg/kg.

A total of 36 soil samples were collected and analyzed for SVOCs. Bis-(2-ethylhexyl)phthalate, diethylphthalate, and di-n-butylphthalate were detected in one or more of the samples collected at Site 22. The state action levels were not exceeded for any of the SVOCs detected at Site 22. Bis(2-ethylhexyl)phthalate was detected in six samples with concentrations ranging from 0.083 to 3.1 mg/kg. Diethylphthalate was detected in 5 of 36 samples at a concentrations ranging from 0.23 to 0.42 mg/kg. Di-n-butylphthalate was detected in one of the samples collected at a concentration of 0.26 mg/kg.

Thirty soil samples from Site 22 were analyzed for metals. A summary of detected metals is provided in Table 5-2. Arsenic was the only metal detected at concentrations greater than the PRG of 0.39 mg/kg. Arsenic was detected in all 30 soil samples at concentrations ranging from 2 to 5.6 mg/kg. However, these arsenic detections in soil are consistent with naturally occurring background concentrations and are not considered to be a result of Site 22 activities. None of the other detected metals in soil exceeded state action levels.

A summary of 2003 soil sampling results for select analytes is provided in Table 5-3. Soil samples collected at the site in 2003 were analyzed for TPH-E, TPH-P, VOCs, and SVOCs. TPH-E was detected in one sample at a concentration of 61 mg/kg, which is less than the state action level of 100 mg/kg. TPH-E was not detected in the remaining soil samples at concentrations above the reporting limit. TPH-P was not detected in the 2003 soil samples at concentrations above the reporting limit. Carbon disulfide and trichlofluoromethane were the only VOCs detected above the reporting limits. Carbon disulfide was detected in one soil sample at a concentration of 0.004 mg/kg, which is less than the state action level of 360 mg/kg. Trichlofluoromethane was detected in four soil samples at estimated concentrations of 0.002 to 0.003 mg/kg, which are less than the state action level of 390 mg/kg. Bis(2ethylhexyl)phthalate and di-n-butylphthalate were the only SVOCs detected in the 2003 soil samples.

Bis(2ethylhexyl)phthalate was detected in one soil sample at an estimated concentration of 3.1 mg/kg, which is less than the state action level of 35 mg/kg. Di-n-butylphthalate was detected in one soil sample at an estimated concentration of 0.26 mg/kg, which is less than the state action level of 6,100 mg/kg. These compounds are considered to be laboratory contaminants and not a result of Site 22 activities.

5.5.2 Groundwater

Groundwater samples were collected from 32 locations to evaluate Site 22. These include locations 2, 3, and 5 through 30 (excluding 10 and 26), 22000 through 22004, BAT-6-B (22005) and PW-03. Results from piezometers and PW-57 were not included for evaluation because they are impacted by contaminants from Site 6.

All detected organic results for groundwater samples collected at the site to date (including the March 2003 sampling event) are summarized on Table 5-4. TPH-JP-5 was detected in 5 of 27 samples at concentrations ranging from 550 to 11,000 µg/L. Two of the samples contained TPH-JP-5 at concentrations greater than the guidance concentration of 1,000 µg/L. The sample from 1998 location 30 contained TPH-JP-5 at 11,000 µg/L. The sample from 1998 location 28 contained TPH-JP-5 at 2,700 µg/L. TPH-P was detected in one of 33 groundwater samples at a concentration of 1,500 µg/L (location 30), which is greater than the guidance concentration of 1,000 µg/L. TPH-E and TPH-heavy fraction/oil were not detected in the groundwater samples collected at Site 22. The TPH-JP-5 and TPH-P exceedances were attributed to the jet fuel spill reported to NDEP BOCA in March 1993. The remedial action was considered complete according to BOCA (Kelso 2000).

Thirty-five groundwater samples have been collected and analyzed for VOCs at Site 22. Ethylbenzene, xylenes, trichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, dichlorodifluoromethane, and trichlorofluoromethane were detected. None of these analytes were detected at concentrations greater than state action levels (Table 5-4). No other VOC analytes were detected at concentrations greater than their respective reporting limits.

Thirty-five groundwater samples have been collected and analyzed for SVOCs at Site 22. Bis(2-ethylhexyl)phthalate was detected in six samples at concentrations ranging from 3 to 7 µg/L. One groundwater sample contained bis(2-ethylhexyl)phthalate at a concentration of 7 µg/L (22002), which is greater than the state action level of 6 µg/L. Bis(2-ethylhexyl)phthalate was also detected in laboratory method blanks and is considered to be a laboratory contaminant. Naphthalene was detected in 1 of the 36 samples at a concentration of 19 µg/L (location 30), which is greater than the state action level of 6.2 µg/L. Di-n-butylphthalate was detected in 13 of the 35 groundwater samples at concentrations ranging from 63 to 159 µg/L, which are below the state action level of 1,500 µg/L. Di-n-butylphthalate was also detected in laboratory method

blanks and is considered to be a laboratory contaminant. No other SVOC analytes were detected at concentrations above the reporting limits.

Results of all detected metals in groundwater samples collected at the site are summarized on Table 5-5. Arsenic was detected in all 29 samples at concentrations ranging from 4,300 to 7,500, which are all greater than the MCL of 10 µg/L. Arsenic concentrations are consistent with naturally occurring background concentrations and are not considered to be a result of Site 22 activities. Boron was detected in both analyzed groundwater samples, with one sample (from PW-03) having a concentration of 150,000 µg/L, which is greater than the PRG of 7,300 µg/L. Molybdenum was detected in both groundwater samples, with both samples (from PW-03) having concentrations of 1,400 µg/L, which is greater than the PRG of 180 µg/L. Selenium was detected in 28 of the 29 analyzed samples at concentrations ranging from 2 to 130 µg/L. Selenium was detected in 18 groundwater samples at concentrations greater than the MCL of 50 µg/L. Vanadium was detected in all 29 analyzed samples at concentrations ranging from 680 to 3,000 µg/L, all of which are greater than the PRG of 260 µg/L. All of the metals concentrations detected in groundwater samples collected at Site 22 are consistent with naturally occurring background concentrations and are not considered to be a result of Site 22 activities.

Six groundwater samples were collected in March 2003 and analyzed for TPH-E, TPH-P, VOCs, SVOCs, and total dissolved solids (TDS). Select groundwater analytical results for the March 2003 sampling event are summarized by location in Table 5-6. TPH-E and TPH-P were not detected in any of the March 2003 groundwater samples at concentrations greater than the reporting limits. The VOCs trichloroethene (TCE), 1,1-dichloroethane (1,1-DCA), trichlorofluoromethane, and dichlorodifluoromethane were detected in the groundwater sample from location 22001. None of these analytes was detected above its state action level in the sample from 22001 (Table 5-6). TCE, 1,1-DCA, trichlorofluoromethane, and dichlorodifluoromethane were not detected above the reporting limits in the five remaining analyzed samples. Bis(2-ethylhexyl)phthalate was detected in one groundwater sample at a concentration of 7 µg/L (location 22002), which is greater than the state action level of 6 µg/L. Bis(2-ethylhexyl)phthalate was also detected in laboratory method blanks and is considered to be a laboratory contaminant. None of the other VOC or SVOC analytes was detected at a concentration above its reporting limit. TDS was detected in both analyzed groundwater samples at 35,000 mg/L (22004) and 42,000 mg/L (BAT-6-B).

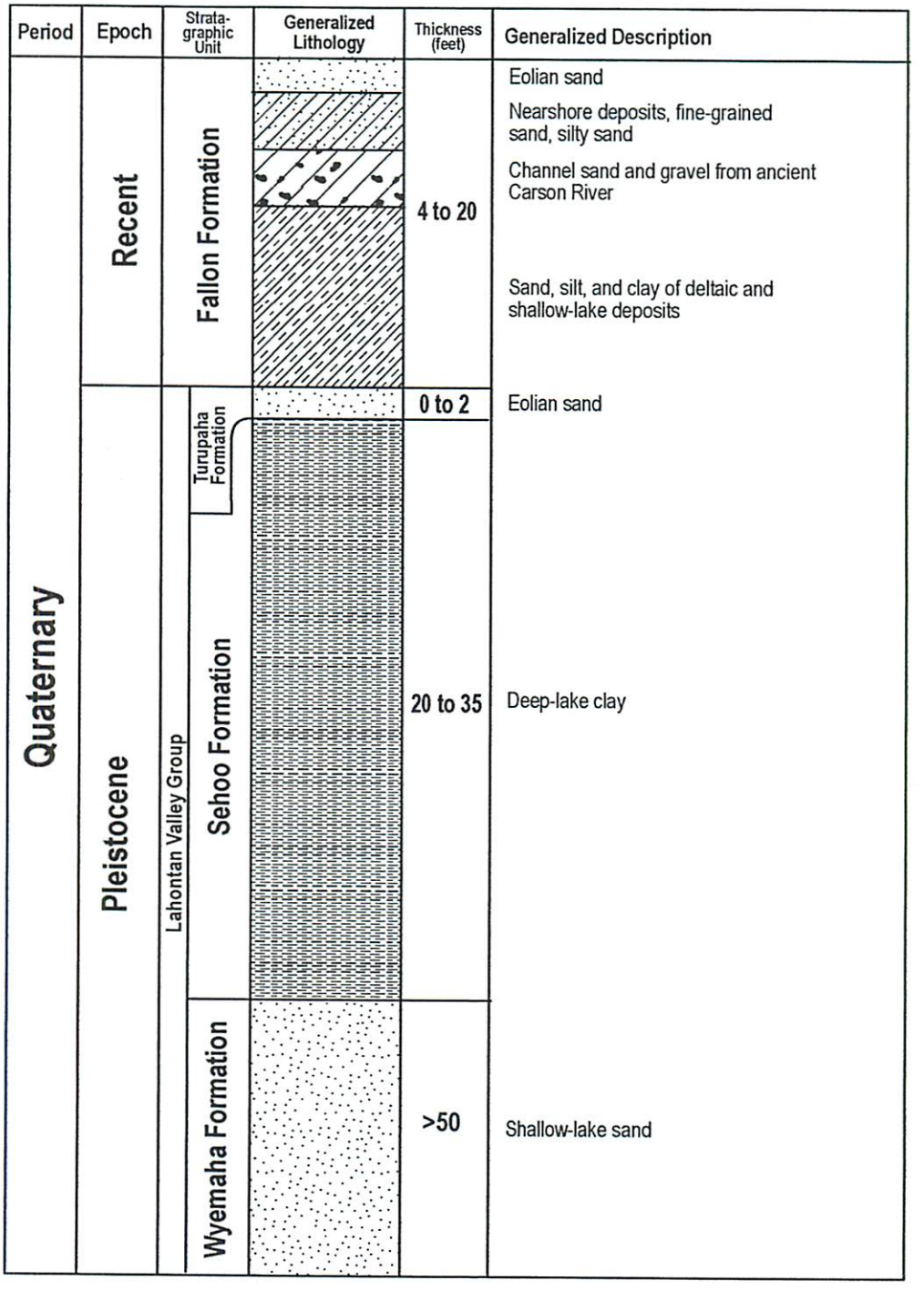
5.6 FATE AND TRANSPORT

Potential contaminants that could have been released as a result of activities at Site 22 include TPH, VOCs, SVOCs, and metals. No chemicals were detected in excess of state action levels for soil or groundwater as a result of activities from Site 22.

The samples containing three exceedances of the TPH-JP-5 state action level and the one exceedance of TPH-P state action level for soil were collected from locations 23, 26, 29, and 30. This area is south of the landfill towards the runway where JP-5 was spilled as a result of the fuel tank from a jet falling off during takeoff. Some of the fuel released at the surface as a result of the accident appears to have migrated to the groundwater in that area. This is suggested by the two exceedances of the TPH-JP-5 action level and the single exceedance of the TPH-P action level in groundwater samples from locations 28 and 30.

No VOCs were detected above state action levels in soil or groundwater samples. No SVOCs were detected above state action levels in soil. Naphthalene was the only SVOC that exceeded its state action level in groundwater. That exceedance was from location 30, which can be attributed to the JP-5 spill discussed in the previous paragraph. The single exceedance of bis(2-ethylhexyl)phthalate can be explained as a laboratory contaminant. The landfill was closed in 1987 according to the standards at that time. Groundwater samples collected from direct-push locations within the landfill boundary and from groundwater monitoring wells downgradient of the landfill have not contained potential chemicals of concern. These observations indicate that potential chemicals of concern have not leached from the landfill and have not migrated downgradient off the site in the almost 20 years since closure.

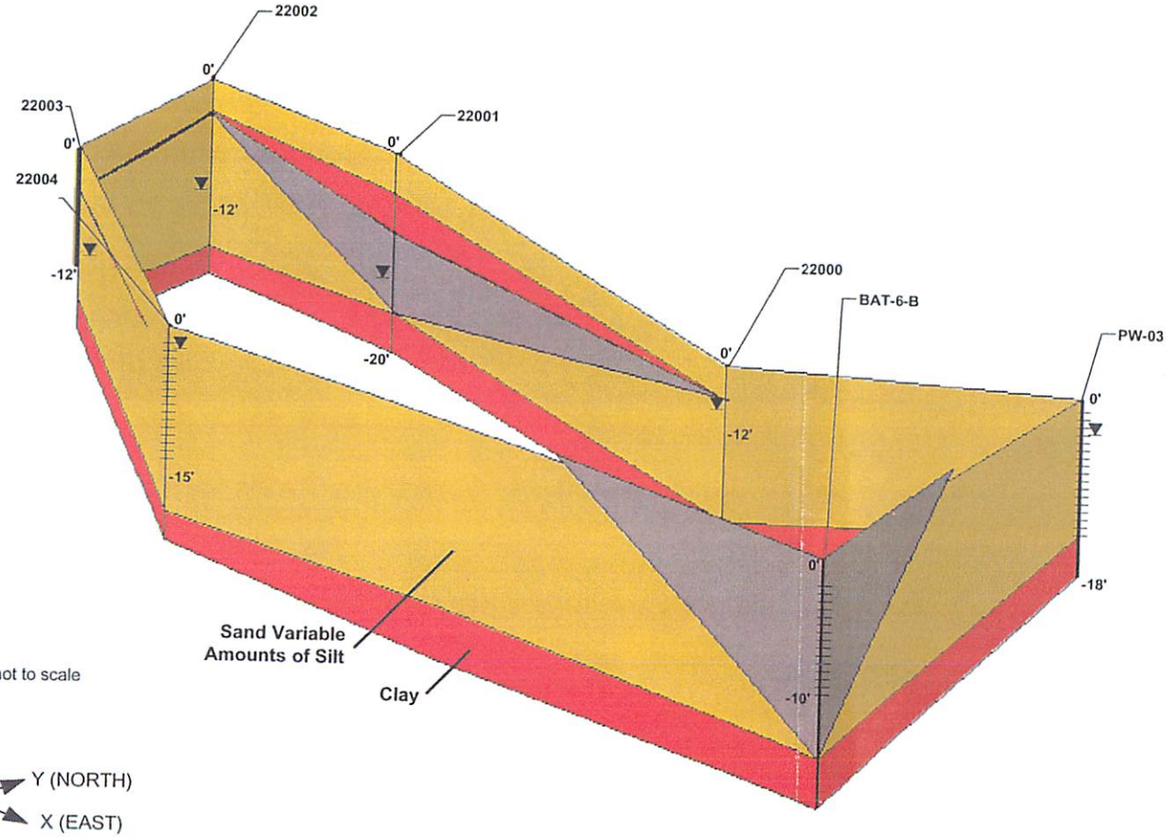
Metals detected in the soil and groundwater are consistent with naturally occurring background concentrations and are not considered to be a result of Site 22 activities.



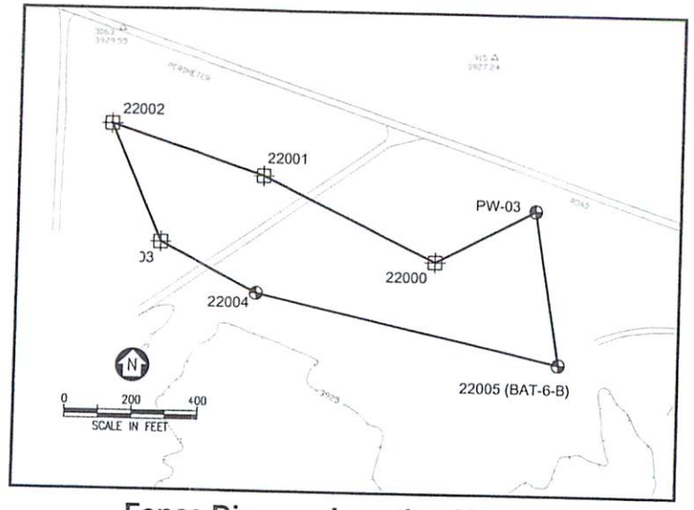
U.S. NAVY

Figure 5-1
Generalized Stratigraphy of NAS Fallon

Delivery Order 0031
NAS Fallon
DECISION DOCUMENT
SITE 22



Note: Fence diagram not to scale



Fence Diagram Location Map View

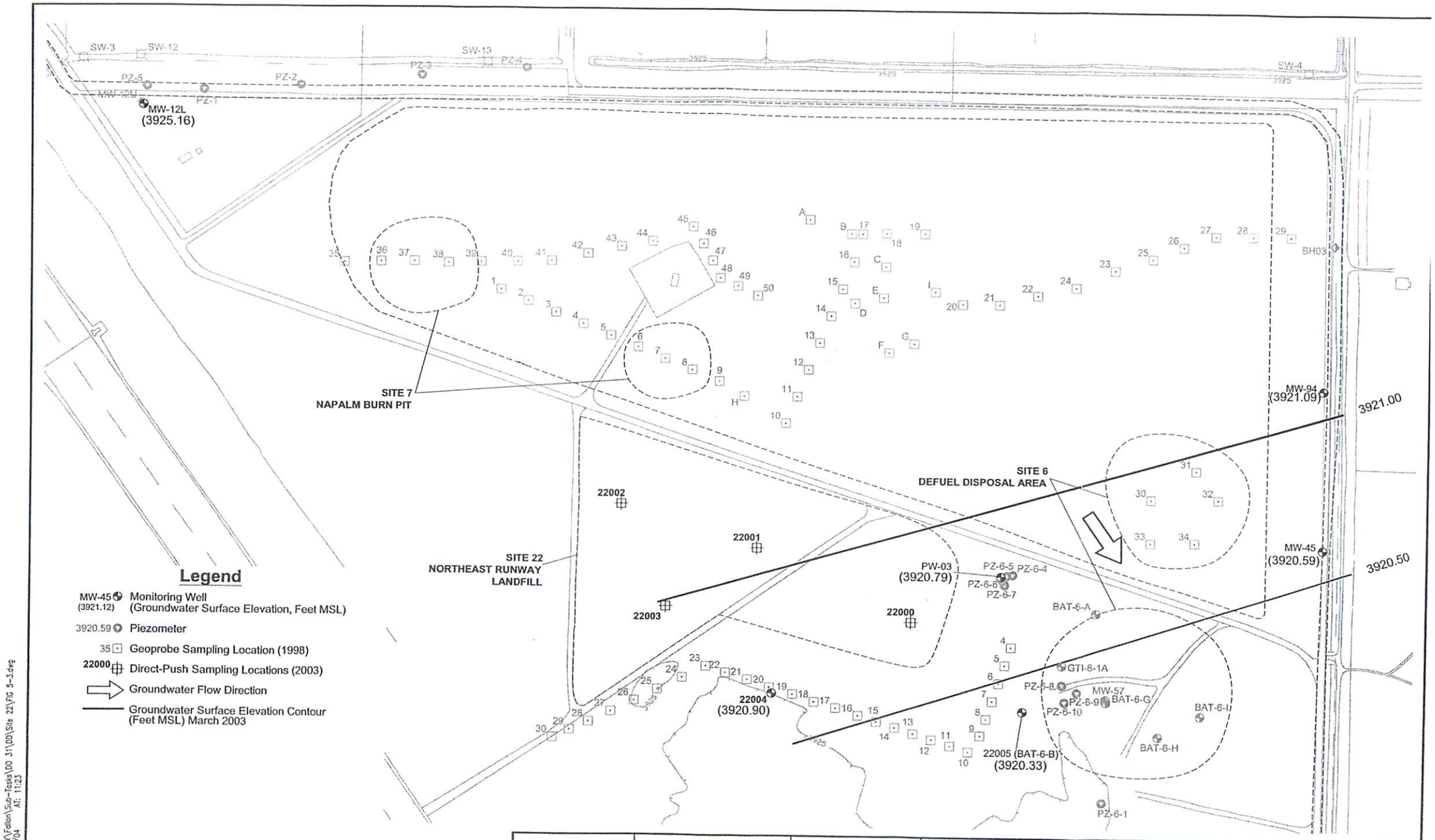
Legend

Screen Interval

Depth to Water in Direct-Push Rods or Monitoring Well

FILENAME: T:\NAVY\Fallon\Sub-Tasks\DO 31\DD\Site 22\FIG 5-2 FENCE.dwg
EDIT DATE: 05/03/04 AT: 13:15

U.S. NAVY	Delivery Order 0031 NAS Fallon DECISION DOCUMENT SITE 22	Scale as Shown	**Figure 5-2** **Generalized Fence Diagram** **Site 22, Northeast Runway Landfill**



FILENAME: T:\NAVY\Fallon\Sub-Tasks\DO 31\DO\Site 22\FIG 5-3.dwg
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U.S. NAVY	Delivery Order 0031 NAS Fallon DECISION DOCUMENT SITE 22	N 0 75 150 300 SCALE IN FEET	**Figure 5-3** **March 2003** **Groundwater Surface Elevation Contours**

Table 5-1
Summary of Detected Organics in Soil Samples From Site 22[a]

Analyte	No. of Tests	No. of Detections	Minimum Detection (mg/kg)	Average Detection (mg/kg)	Maximum Detection (mg/kg)	State Action Level (mg/kg)	No. of Detections Greater Than Action Level	Location IDs Greater Than Action Level
Petroleum Hydrocarbons								
TPH—JP-5	30	5	44	1,420	6,400	100[b]	3	23, 29, 30
TPH—Extractable	35	1	61	61	61	100[b]	0	None
TPH—Purgeable	35	2	25	92.5	160	100[b]	1	26
Volatile Organic Compounds								
Carbon disulfide	5	1	0.004	0.004	0.004	360[c]	0	None
Methylene chloride	36	1	0.003	0.003	0.003	9.1[c]	0	None
Toluene	36	2	0.043	0.058	0.073	520[c]	0	None
Total xylenes	30	2	0.066	0.102	0.137	270[c]	0	None
1,2,4-Trichlorobenzene	5	3	0.002	0.003	0.004	650[c]	0	None
Semivolatile Organic Compounds								
Trichlorofluoromethane	36	5	0.002	0.0022	0.003	390[c]	0	None
Bis(2-ethylhexyl)phthalate	36	6	0.083	0.852	3.1	35[c]	0	None
Diethylphthalate	36	5	0.23	0.31	0.42	49,000[c]	0	None
Di-n-butylphthalate	36	1	0.26	0.26	0.26	6,100[c]	0	None

[a]Includes March 2003 sampling results, qualitative remedial investigation, and qualitative 1998 data
[b]Nevada Administrative Code
[c]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – residential soil

Notes:
JP-5 - jet petroleum No. 5
mg/kg – milligram per kilogram
TPH – total petroleum hydrocarbons

Table 5-2
Summary of Detected Metals in Soil Samples From Site 22[a]

Analyte	No. of Tests	No. of Detections	Minimum Detection (mg/kg)	Average Detection (mg/kg)	Maximum Detection (mg/kg)	PRG (mg/kg)	Naturally Occurring Background	No. of Detections Greater Than PRG	Location IDs Greater Than PRG
Aluminum	30	30	1,800	5,444	12,000	76,000[b]	1,800 to 20,700	0	None
Antimony	30	5	0	2.1	5	31[b]	0.4 to 5	0	None
Arsenic	30	30	2	3.3	5.6	0.39[b]	1.1 to 40	30	All
Beryllium	30	1	0.5	0.5	0.5	150[b]	0.11 to 1.5	0	None
Chromium	30	30	2.2	7.8	64	10,000[b]	0.014 to 64	0	None
Lead	30	30	1	3.6	12	150[b]	0.019 to 55	0	None
Nickel	30	30	2.8	5.7	13	1,600[b]	0.011 to 49	0	None
Vanadium	30	30	11	21.2	42	55[b]	0.054 to 74	0	None

[a]Includes qualitative RI and qualitative 1998 data only
[b]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – residential soil

Notes:
mg/kg – milligram per kilogram
NAS – Naval Air Station
PRG - preliminary remediation goal - residential soil

Table 5-3
Summary of Select Analytes in March 2003 Soil Samples From Site 22

Location ID	Location Cross-Reference	Sample ID	Beginning Depth (ft bgs)	Ending Depth (ft bgs)	TPH-E (mg/kg)	TPH-P (mg/kg)	Carbon Disulfide (mg/kg)	Trichlorofluoro-methane (mg/kg)	Bis(2-ethylhexyl)-phthalate (mg/kg)	Di-n-butyl-phthalate (mg/kg)
22000	GP-22000	230065	6	8	27U	5.3U	0.003U	0.002J	0.35U	0.35U
22001	GP-22001	230053/230054	10	12	34U	6.8U	0.004U	0.003J	0.46U	0.45U
22002	GP-22002	230060	6	8	61	5.7U	0.004	0.002J	3.1J	0.38U
22003	GP-22003	230062	5	7	28U	5.6U	0.003U	0.002J	0.37U	0.26J
22004	MW-22004	230050	3	4.5	30U	6U	0.004U	0.004U	0.4U	0.4U
State Action Level					100[a]	100[a]	360[b]	390[b]	35[b]	6,100[b]

[a]Nevada Administrative Code
[b]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – residential soil

Notes:
ft bgs – foot below ground surface
J – associated numerical value is an estimate
mg/kg – milligram per kilogram
TPH-E – total petroleum hydrocarbons—extractable
TPH-P – total petroleum hydrocarbons—purgeable
U – analyte not detected above the specified reporting limit

Table 5-4
Summary of Detected Organics in Groundwater Samples From Site 22[a]

Analyte	No. of Tests	No. of Detections	Minimum Detection (µg/L)	Average Detection (µg/L)	Maximum Detection (µg/L)	Action Level (µg/L)	No. of Detections Greater Than Action Level	Location IDs Greater Than Action Level
Petroleum Hydrocarbons								
TPH-JP-5	27	5	550	3,092	11,000	1,000[b]	2	28, 30
TPH-extractable	35	0	NA	NA	NA	1,000[b]	0	None
TPH-purgeable	33	1	1,500	1,500	1,500	1,000[b]	1	30
TPH-heavy fraction/oil	33	0	NA	NA	NA	1,000[b]	0	None
Volatile Organics								
Ethylbenzene	35	2	1.5	3.4	5.4	700[c]	0	None
Xylenes	35	5	2	19.2	81	10,000[c]	0	None
Trichloroethene	35	1	0.8	0.8	0.8	5[c]	0	None
1,1-Dichloroethane	35	1	3.9	3.9	3.9	810[d]	0	None
1,1-Dichloroethene	35	1	0.7	0.7	0.7	340[d]	0	None
Dichlorodifluoromethane	7	2	1	2.7	4.3	390[d]	0	None
Trichlorofluoromethane	35	1	2	2	2	1,300[d]	0	None
Semivolatile Organics								
Bis(2-ethylhexyl)phthalate	35	6	3	4.8	7	6[c]	1	22002
Di-n-butylphthalate	35	13	63	94.2	159	1,500[d]	0	None
Naphthalene	35	1	19	19	19	6.2[d]	1	30

[a]Includes March 2003 sampling results, qualitative remedial investigation, and qualitative 1998 data
[b]Neveda Division of Environmental Protection guidance concentration
[c]Maximum contaminant level
[d]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – tap water

Notes:
TPH – total petroleum hydrocarbons
JP-5 - jet petroleum No. 5
µg/L – microgram per liter

Table 5-5
Summary of Detected Metals in Groundwater Samples From Site 22[a]

Analyte	No. of Tests	No. of Detections	Minimum Detection (µg/L)	Average Detection (µg/L)	Maximum Detection (µg/L)	PRG or MCL (µg/L)	Naturally Occurring Background	No. of Detections Greater Than PRG or MCL	Location IDs Greater Than PRG or MCL
Arsenic	29	29	4,300	6,452	7,500	10[b]	6 to 21,000	29	All
Barium	2	2	280	280	280	2,000[b]	6.8 to 660	0	None
Beryllium	29	2	2.4	7.2	12	73[c]	1.2 to 18	0	None
Boron	2	2	17,000	83,500	150,000	7,300[c]	570 to 240,000	1	PW-03
Molybdenum	2	2	1,400	1,400	1,400	180[c]	23 to 5,200	2	PW-03
Potassium	1	1	194,000	194,000	194,000	NE	5,630 to 487,000	NA	NA
Selenium	29	28	2	64.9	130	50[b]	3 to 140	18	Various
Sodium	1	1	12,700,000	12,700,000	12,700,000	NE	128,000 to 22,500,000	NA	NA
Vanadium	29	29	680	1,476	3,000	260[c]	7 to 3,000	29	All

[a]Includes March 2003 sampling results, qualitative remedial investigation, and qualitative 1998 data
[b]Maximum contaminant level
[c]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – tap water

Notes:
µg/L – microgram per liter
MCL - maximum contaminant level
NA – not applicable
NAS – Naval Air Station
PRG - preliminary remediation goal - residential tap water

Table 5-6
Summary of Select Analytes in March 2003 Groundwater Samples From Site 22

Location ID	Location Cross-Reference	Sample ID	TPH-E (µg/L)	TPH-P (µg/L)	TCE (µg/L)	1,1-DCA (µg/L)	1,1-DCE (µg/L)	Trichloro-fluoro-methane (µg/L)	Dichloro-difluoro-methane (µg/L)	bis(2-Ethylhexyl)-phthalate (µg/L)	TDS (mg/L)
22000	GP-22000	230067	250U	50U	1U	1U	1U	1U	1U	5U	NS
22001	GP-22001	230057/230058	250U	50U	0.8J	3.9	0.7J	2	4.3J	3J	NS
22002	GP-22002	230061	250U	50U	1U	1U	1U	1U	1U	7	NS
22003	GP-22003	230064	250U	50U	1U	1U	1U	1U	1U	6	NS
22004	MW-22004	230103	250U	50U	1U	1U	1U	1U	1U	5U	35,000
22005	BAT-6-B	230104	250U	50U	1U	1U	1U	1U	1J	5U	42,000
State Action Level			1,000[a]	1,000[a]	5[b]	810[b]	7[c]	1,300[c]	390[c]	6[c]	

[a]Nevada Division of Environmental Protection guidance concentration
[b]U.S. Environmental Protection Agency Region 9 preliminary remediation goals – tap water
[c]Maximum contaminant level

Notes:
Bolded value indicates result greater than state action level
1,1-DCA – 1,1-dichloroethane
1,1-DCE – 1,1-dichloroethene
J – associated value is an estimate
µg/L – microgram per liter
mg/L – milligram per liter
U – analyte not detected above specified reporting limit
mg/L – milligram per liter
NS – not sampled for specified analyte
TCE – trichloroethene
TDS – total dissolved solids
TPH-E – total petroleum hydrocarbons—extractable
TPH-P – total petroleum hydrocarbons—purgeable

6.0 CURRENT AND POTENTIAL SITE AND RESOURCE USES

NAS Fallon currently serves primarily as an aircraft weapons delivery and tactical air combat training facility. The Navy is expected to maintain NAS Fallon in the future. Disposal operations at the Northeast Runway were terminated during 1965, and Site 22 is currently vacant land. NAS Fallon is not currently using this land for waste disposal operations or any other uses. The Navy does not expect any change in the use of this land or that of the surrounding sites in the foreseeable future.

Excavation restrictions have also been established for former disposal sites at NAS Fallon as part of the facility Overview Plan. The Overview Plan for NAS Fallon includes a discussion of all potentially contaminated areas in the IR Program and their locations. Activities that involve excavation at Site 22 will be prohibited as part of the overview planning process. Any future construction projects conducted at Site 22 will be subjected to an environmental review. The Environmental Department at NAS Fallon oversees the environmental review process. Relevant projects are reviewed by the Occupational Safety and Health Office, Fire Department, Security Department, the Engineering and Planning Divisions of Public Works, and the Environmental Department. This review process is included in all NAS Fallon planning activities. Information provided by the Environmental Department relates to potential contact with contaminated soil and groundwater as a result of these projects.

Groundwater at the site is not currently using as a drinking water or other water source. The Navy does not expect to use groundwater at this site for any purpose in the foreseeable future.

7.0 SUMMARY OF SITE RISKS

A baseline risk assessment was prepared for several sites at NAS Fallon, including Site 22 (ASGI 1994). This risk assessment included an evaluation of human health risk and ecological hazards resulting from residual concentrations of COCs released to the environment at the Northeast Runway Landfill.

Based on a qualitative review of analytical results available for the site at that time, the baseline risk assessment concluded that concentrations of chemicals in soil and groundwater at the site did not warrant quantitative human health or ecological risk assessments (ASGI 1994). Results of sampling conducted after the RI further support the baseline risk assessment conclusion. The analytical results from sampling have shown no exceedances of state action levels in soil or exceedances of state action levels or guidance concentrations in groundwater collected within the landfill boundaries as a result of past activities at Site 22. Exceedances of TPH-JP-5, TPH-P, and naphthalene are documented just southwest of the site boundary; however, the source was an accidental jet-fuel release unrelated to the landfill that was remediated and requires no further action according to BOCA.

Because there are no exceedances of state action levels in soil or action levels in groundwater as a result of past activities at Site 22, there is currently no risk posed by Site 22 to human health and the environment. In addition, potential chemicals of concern have not leached from the landfill and have not migrated downgradient off the site in the almost 20 years since closure. The *Limited Action* proposed herein is intended to prevent future human exposure to landfilled material and to mitigate the potential for future leaching of possible contaminants from the landfilled material to groundwater.

8.0 SELECTION OF PREFERRED ALTERNATIVE

This section provides rationale for the selection of *Limited Action* as the remedial action alternative for the landfill. A summary of the identification and evaluation of remedial action alternatives is provided in Section 8.1, and the basis for the decision is provided in Section 8.2. An expanded discussion of the Alternatives evaluation is provided in "Remedial Alternatives Evaluation and Cost Analysis, Site 22, Northeast Runway Landfill, Naval Air Station, Fallon, Nevada" (U.S. Navy 2004).

8.1 SUMMARY OF THE IDENTIFICATION AND EVALUATION OF REMEDIAL ACTION ALTERNATIVES

Although current site conditions pose no unacceptable risk to human health or the environment, remedial actions were considered for this site to mitigate future potential human and ecological exposure to landfilled material at the site. Therefore, an evaluation of potential remedial alternatives was prepared to identify and select a preferred remedial action alternative for the site. The process used to identify and select an appropriate remedial action generally follows the evaluation process set forth by the CERCLA program. This process includes the following:

- Identification of potentially applicable statutes and regulations
- Development of remedial action objectives (RAOs)
- Identification of general response actions (GRAs), technology types, and process options
- Screening of technology types and process options
- Development of remedial action alternatives
- Analysis of remedial action alternatives
- Selection of the preferred alternative

First, state and federal statutory and regulatory requirements potentially applicable to remedial actions were identified. This evaluation focussed on the statutes and regulations applicable to specific actions to be conducted on the site, since chemical-specific state action levels have been

previously discussed in Section 5.4. The analysis of statues and regulations differed from those typically prepared for CERCLA sites. Since the site is not a CERCLA removal or remedial action site, only the legally applicable (and not the relevant and appropriate) requirements are considered. The statutes and regulations identified for the remedial actions at the site are the following:

- Nevada Administrative Code 444.570 through 444.7499 - Solid Waste Disposal Regulations
- Nevada Revised Statutes (NRS) 445A.465—Stormwater Program, which incorporates the requirements of the federal stormwater program (40 CFR 122.26)
- NAC 445B.22037—Emissions of Particulate Matter: Fugitive Dust
- 40 CFR Part 10—Native American Graves Protection and Repatriation Act (NAGPRA) Regulations
- 36 CFR Parts 60, 63, and 800—National Historic Preservation Act (NHPA) Regulations
- 16 USC 703-712 – Migratory Bird Treaty Act

Nevada solid waste regulations (NAC 444.570 through 444.7499) are potentially applicable to remedial actions at Site 22. The regulations include general provisions addressing cover design and post-closure groundwater monitoring. Assuming that Site 22 is a Class II landfill because municipal-type waste was disposed of there, a deviation from the standard final cover requirements is provided in NAC 444.7175(2). Under this provision, the solid waste management authority may allow the landfill owner to deviate from the provisions concerning the infiltration barrier that are set forth in NAC 444.6891. To allow the deviation from the infiltration provisions, the solid waste management authority must consider the unique characteristics of small communities, climatic and hydrogeologic conditions, and whether allowing the deviation would have an adverse effect on human health or the environment.

The landfill was closed in 1987 according to standards at the time. Groundwater samples collected from direct-push sampling locations within the landfill boundary and from groundwater monitoring wells positioned downgradient of the landfill do not contain potential chemicals of concern at concentrations that pose a risk to human health or the environment. Since potential chemicals of concern have not leached to groundwater or migrated off-site in the almost 20 years since closure, it is anticipated that the potential for future leaching and or migration of potential

chemicals of concern is low. The low annual precipitation (approximately 5-inches per year) at the station is indicative of the low potential for future leaching. In addition, NAS Fallon does not currently use groundwater from the shallow aquifer and will not use this resource in the foreseeable future. As a result, it is assumed that the current cover, with the amendments specified in the selected alternative described below, is sufficient and a deviation from the cover requirements as specified in NAC 444.7175(2) is appropriate.

The RAOs are general cleanup objectives for the remedial alternatives. The RAOs identified for the site are as follows:

- Prevent potential future risks to human health and the environment
- Mitigate the potential for leaching of landfilled material to groundwater

GRAs are broad, generic categories of remedial actions that either alone or in combination are capable of achieving the RAOs. The GRAs provide the basis for developing the remedial action alternatives for the site. No action, institutional controls, containment, monitoring, and removal/disposal are the GRAs identified for the site. Two GRAs, in situ treatment and removal/treatment/disposal, were not considered for the site, because these GRAs are not necessary for meeting the RAOs and are more expensive than other GRAs. In addition, in situ treatment and removal/treatment/disposal would result in an increase in short-term risks during remediation, with no additional benefit to human health or ecological receptors. Four GRAs—no action, institutional controls, containment, and removal/disposal—were considered for soil, and three GRAs—no action, institutional controls, and monitoring—were considered for groundwater.

Technology types and process options applicable to each GRA were then identified. Technology types are general categories of technologies, remediation processes, or other actions within a general response action. Process options are specific processes within a technology type. For example, capping is a technology type under the GRA containment. An example of a process option included under the capping technology type is a vegetative cover. Once the technology types and process options were identified, they were screened to reduce the list of technologies to be considered for incorporation into the remedial alternatives. The technologies and process options were screened based on their technical feasibility, effectiveness (in achieving RAOs), and implementability.

The process options retained after the screening were combined to develop four alternatives for the site. These alternatives are Alternative 1, No Action; Alternative 2, Limited Action; Alternative 3, Limited Source Removal; and Alternative 4, Engineered Cap. A summary of the components of each of the alternatives is presented below.

- Alternative 1, No Action. No active measures would be used to remediate soil and groundwater contaminants, and no institutional controls would be imposed. Evaluation of this alternative is required in all cases to provide a comparative baseline.

- Alternative 2, Limited Action. This alternative includes the following components: institutional controls (land use controls); groundwater monitoring; regrading of the landfill, repairing the existing soil cover by placing native fill in selected areas, revegetating the regarded areas, and maintaining the landfill for a 3-year period.

- Alternative 3, Limited Source Removal. This alternative includes the following components: institutional controls, (land use controls); groundwater monitoring; selectively removing target contaminated surface soil and shallow buried wastes and debris, regrading and native fill activities in the targeted removal areas, revegetating disturbed areas of the landfill, and maintaining the landfill for a 3-year period.

- Alternative 4, Engineered Cap. This alternative includes the following components: institutional controls (land use controls); groundwater monitoring; regrading of the landfill, selective filling and grading landfill surface, installing passive venting structures, constructing an engineered cover system consistent with current solid waste regulations over the entire landfill, and maintaining the landfill for a 3-year period.

These four alternatives were then evaluated against nine criteria: protection of human health and the environment; compliance with applicable statues and regulations; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; long-term effectiveness and permanence; implementability; cost; state acceptance; and community acceptance. State and community comments have not been solicited at this time. Therefore, two of the nine criteria (state and community acceptance) cannot be evaluated until these alternatives have been presented to the public, comments solicited, and the public comment period is closed. Details of the evaluation are presented in the "Remedial Alternatives Evaluation and Cost Analysis, Site 22, Northeast Runway Landfill, Naval Air Station Fallon, Nevada" (U.S. Navy 2004).

The alternative preferred by the Navy and NDEP is Alternative 2, Limited Action. The actions included in the preferred alternative should reduce the potential for human and environmental exposures in the future, reduce the potential for migration of chemicals from the landfill, and control the landfill's uses and future development.

8.2 BASIS FOR DECISION

The Navy has selected *Limited Action* for Site 22 for the following reasons:

- TPH and naphthalene detections that exceed their state guidance and action levels, respectively, are related to the jet-fuel spill addressed under BOCA, as discussed in Section 5.5. The release occurred when a fuel tank fell off an aircraft during take off. The release occurred in the area of these TPH detections. After cleanup action was completed at this location, BOCA of NDEP required no further remediation.

- VOCs were not detected above state action levels for soil or action levels for groundwater at Site 22. SVOCs were not detected above state action levels for soil. Naphthalene and bis(2-ethylhexyl)phthalate were detected once above their action levels in one groundwater sample. The naphthalene exceedance is a result of the fuel release from an aircraft fuel tank. Bis(2-ethylhexyl)phthalate was detected in 1 of the 35 analyzed groundwater samples at a concentration greater than the state action level of 6 µg/L. However, this detection is likely due to laboratory contamination, because it was present in a lab blank. Bis(2-ethylhexyl)phthalate was not detected in any of the 36 soil samples at concentrations greater than the state action level of 35 mg/kg. The results suggest that landfilling operations at Site 22 have not resulted in soil or groundwater impacts.

- The Navy does not expect any change in land use at Site 22 or that of the surrounding sites.

- Shallow groundwater at Site 22 (and NAS Fallon) is not currently used for domestic purposes. The naturally occurring high TDS concentrations will make this shallow groundwater a poor choice for future residential use. Site 22 is also an industrial area and will remain active as an industrial area in the foreseeable future.

In summary, *Limited Action* was selected for Site 22. The limited ground surface regrading component of this alternative will mitigate the potential for surface water ponding, which could infiltrate through the fill material, and improve surface drainage. Because potential chemicals of concern have not leached to groundwater or migrated off-site in the almost 20 years since closure, it is anticipated that the potential for future leaching and or migration of potential chemicals of concern is low. The low annual precipitation (approximately 5-inches per year) at the station is indicative of the low potential for future leaching. This regrading in association with the arid climate at NAS Fallon should further minimize the potential for downward transport of COCs remaining in vadose zone soil within the landfilled portion of the site. The alternative will also provide limited groundwater monitoring to assess the potential for landfilled material to migrate off site. The institutional controls portion of this alternative will limit potential future human exposure to landfilled material. The process used to identify and select *Limited Action* as the preferred remedy for Site 22 is summarized in Remedial Alternatives Evaluation and Cost Analysis, Site 22, Receiver Site Landfill, Naval Air Station Fallon, Nevada (U.S. Navy 2004).

9.0 STATUTORY AUTHORITY FINDING

Site 22 has no identified contaminant sources. Disposal operations at the Northeast Runway Landfill were terminated in 1987. The site is currently vacant land and the Navy does not expect any change in the use of Site 22, or of the surrounding sites, in the foreseeable future.

There were no exceedances of TPH or VOCs in soil or groundwater samples collected from within the site boundaries. The bis(2-ethylhexyl)phthalate exceedance in one groundwater sample is attributed to laboratory contamination. The TPH-JP-5, TPH-P, and naphthalene exceedances in samples collected south of the site boundaries are attributed to an incident unrelated to Site 22, and the remedial actions were deemed concluded by BOCA. These observations suggest that Site 22 does not pose a threat to human health or the environment.

Based on these observations and conditions, current or potential future site conditions pose no unacceptable risk to human health or the environment. Landfilling activities were terminated almost 20 years ago and there is no evidence of contaminant leaching to groundwater or off-site migration. However, to limit human and ecological exposure to buried waste or contaminants remaining in soil at the site, and to evaluate the impact of contaminants left in place that could migrate to off-site receptors, *Limited Action* is selected as the preferred remedial alternative at this site. This action is in accordance with and complies with applicable statues and regulations.

10.0 DOCUMENTATION OF SIGNIFICANT CHANGES

No public comments were received during the public comment period. As a result, there were no significant changes to the Proposed Plan or this decision document.

11.0 BIBLIOGRAPHY

This document was prepared with the use of information contained in the Administrative Record for Site 22, Northeast Runway Landfill, NAS Fallon, Nevada. The Administrative Record is available at the Churchill County Public Library in Fallon, Nevada; at NAS Fallon; and at Engineering Field Activity, West, Offices in Daly City, California. The primary documents used as sources of the information contained in this decision document are listed below.

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Appendix A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Notice of the public comment period was published in the *Lahontan Valley News* on August 5, 2004. The public comment period extended from August 9, 2004 through September 8, 2004. The public meeting presenting the Proposed Plan was held at the Fallon Convention Center in Fallon, Nevada, on August 12, 2004. As of September 13, 2004, the Navy had received no public comments.