

**FINAL  
No Further Response  
Action Planned Decision Document  
Environmental Restoration Program Site 12**

**Former Fire Training Area  
Nevada Air National Guard  
Reno, Nevada**

April 2007



**ANG/CEVR  
Andrews AFB, Maryland**

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No Further Response  
Action Planned Decision Document  
Environmental Restoration Program Site 12**

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Nevada Air National Guard  
Reno, Nevada**

**April 2007**

**Prepared For:**

**Air National Guard  
3500 Fetchet Avenue  
Building R-47  
Andrews AFB, Maryland 20762**

**Prepared By:**



**ERM-West, Inc.  
2525 Natomas Park Drive, Suite 350  
Sacramento, California 95833**

**DECLARATION OF THE DECISION**

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**Site Name and Location**

ERP Site 12, JP-4 Spill Area  
Nevada Air National Guard Base  
Reno, Nevada

**Statement of Basis and Purpose**

The purpose of this No Further Response Action Planned (NFRAP) Decision Document is to document the Air National Guard's decision for no further action at Environmental Restoration Program (ERP) Site 12, a JP-4 spill area, located on the aircraft parking apron at Nevada Air National Guard Base (NVANG). This decision is based on review of the results of the Rapid Response Initiative Spill Investigation and groundwater monitoring conducted at the NVANG. These investigations determined that the site conditions do not pose a threat to human health or the environment.

**Description of the Selected Remedy: No Further Action Planned**

Based on the current conditions at ERP Site 12, it has been determined that no significant risk or threat to human health or the environment exists. Therefore, no further action under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, is recommended.

**Declaration Statement**

This NFRAP Decision Document represents the selected action for this site. The NFRAP was developed in accordance with the general guidelines of CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan that also applies to CERCLA response actions. This decision is also in accordance with Nevada Administrative Code 445A.226 through 445A.22755.

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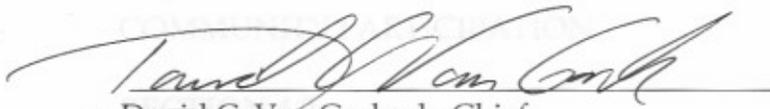
DECLARATION OF THE DECISION

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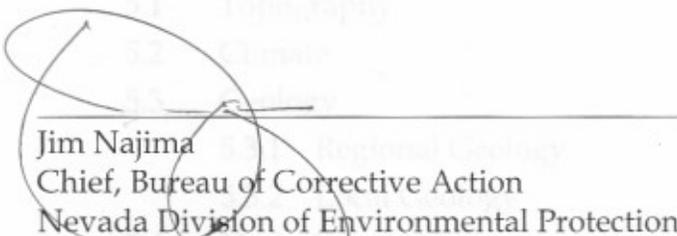
It has been determined that the selected remedy of no further action is protective of human health and the environment. The selected remedy meets Federal and State requirements that are applicable or relevant and appropriate. The statutory preference for further treatment is not satisfied because further treatment was not deemed necessary. Residual contaminant levels at the site have been determined to present no significant threat to human life or the environment.

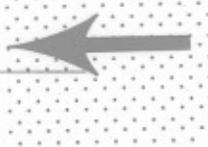
SITE NAME AND LOCATION

ERP Site 12, JP-4 Spill Area  
 Nevada Air National Guard Base  
 Reno, Nevada

  
 David C. Van Gasbeck, Chief  
 Environmental Division  
 Civil Engineer Directorate

19 Sep 06  
 Date

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

Jan 26 2007   
 Date

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## LIST OF ACRONYMS/ABBREVIATIONS

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ANG	Air National Guard
ASG	Automated Sciences Group, Inc.
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
ERM	ERM-West, Inc.
ERP	Environmental Restoration Program
°F	Degrees Fahrenheit
FS	Feasibility Study
ft/d	Feet per day
MCL	Maximum contaminant level
µg/kg	Micrograms per kilogram
µg/L	Microgram per liter
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
NDEP	Nevada Division of Environmental Protection
NVANG	Nevada Air National Guard Base
ORNL/ETS	Oak Ridge National Laboratory/Environmental Technology Section
PA	Preliminary assessment
RI	Remedial investigation
RCRA	Resource Conservation and Recovery Act
SI	Site investigation
SVOC	Semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total petroleum hydrocarbons
VOC	Volatile organic compound
USEPA	United States Environmental Protection Agency

## SECTION 1.0

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**INTRODUCTION**

This decision document describes the site-specific factors and analyses that led to the selection of No Further Action as the remedy for Environmental Restoration Program (ERP) Site 12, a JP-4 spill area, at the Nevada Air National Guard Base (NVANG), Reno, Nevada. Documents supporting the decision are identified in [Section 10](#).

The format and organization of this decision document are based on United States Environmental Protection Agency's (USEPA's) *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, dated July 1989. This decision document includes the pertinent elements of Nevada Division of Environmental Protection's (NDEP's) *Requirements for IRP Decision Documents*, transmitted in a letter dated 30 December 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 1.0 - Introduction.** Summarizes the purpose and organization of the decision summary portion of the decision document, identifies the site to which the decision document pertains, and clarifies the relationship of this decision document to previous versions of the decision document.
- **Section 2.0 - Site Name, Location, Description, and History.** Identifies and describes the site, provides location and property ownership information, and summarizes the site history, conditions, and previous investigation activities.
- **Section 3.0 - Community Participation.** Documents community participation activities throughout the decision-making process, references the Community Relations Plan in [Appendix A](#), and describes the location and availability of the Administrative Record.
- **Section 4.0 - Scope and Role of Site.** Discusses ERP Site 12 in relation to other sites at NVANG and identifies when and where monitoring or

remedial activities at other sites influence, or are influenced by monitoring or remedial activities at Site 12.

- **Section 5.0 - 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 6.0 - Current and Potential Site and Resource Uses.** Discusses the current and potential future uses of the land.
- **Section 7.0 - Summary of Site Risks.** Discusses risks due to contamination present at the site.
- **Section 8.0 - Statutory Authority Finding.** States the conclusion that No Further Action is appropriate for Site 12.
- **Section 9.0 - Documentation of Significant Changes.** Describes the changes made to this decision document on the basis of comments received during the public comment period.
- **Section 10.0 - References.** Lists the sources of information used in preparing this decision document.
- **Appendix A - Responsiveness Summary.** Summarizes responses to public comments.

## SECTION 2.0

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## *SITE NAME, LOCATION, DESCRIPTION, AND HISTORY*

The Reno Tahoe International Airport complex is located approximately 5 miles southeast of downtown Reno, Nevada (Figure 2-1). The NVANG presently occupies approximately 60 acres of land in the southern portion of the northwest quadrant of the airport complex (Automated Sciences Group, Inc. [ASG], 1989).

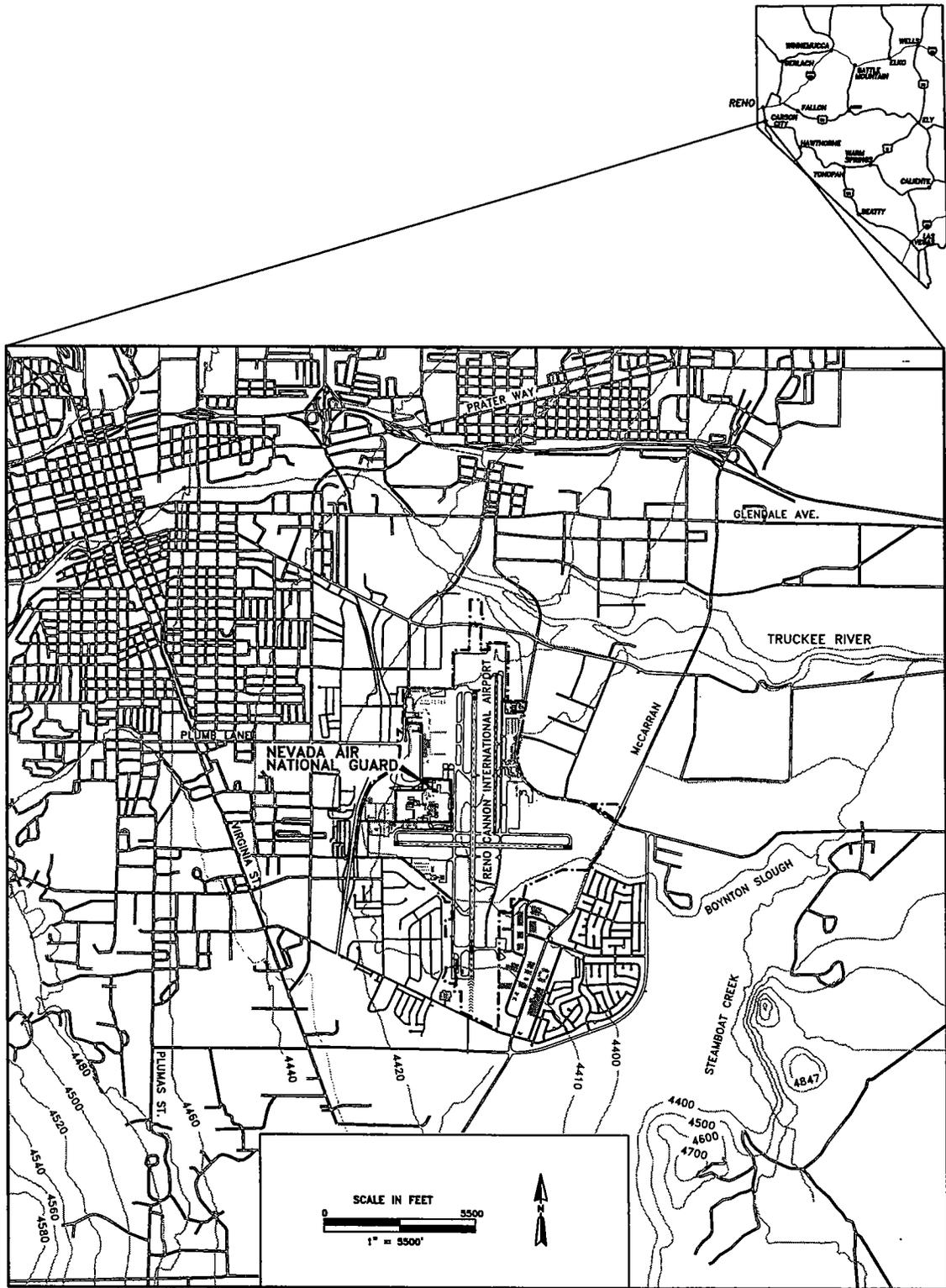
In April 1948, the NVANG was established as the 192nd Fighter Squadron. This designation was changed to the 192nd Fighter Bomber Squadron in April 1951. The unit was redesignated as the 192nd Fighter Interceptor Squadron in June 1955 and retained this designation until April 1958, when the unit was renamed the 152nd Fighter Group. In February 1961, the 152nd Fighter Group acquired the designation of the 152nd Reconnaissance Group (ASG, 1989). In 1996, the mission of the NVANG changed and it currently houses the 152nd Airlift Wing.

Initially, the NVANG was equipped with P-51 aircraft and was located at the Stead Army Air Base in Reno, Nevada. In 1953, the NVANG leased 29 acres of land at Hubbard Field (Reno/Tahoe International Airport) from the City of Reno. NVANG operations were moved from Stead Army Air Base to their present location in 1954. F-86A aircraft were assigned to the NVANG from 1956 until 1961 when the group converted to the RB-57 aircraft. In 1965, the NVANG converted to RF-101 aircraft, which were flown until 1975 when the NVANG converted to RF-4C aircraft (ASG, 1989). Because of its change in mission in 1996, the NVANG now utilizes C-130 aircraft.

### **2.1 Site Description**

ERP Site 12 is a former JP-4 spill area located on the concrete-paved aircraft-parking apron (Figure 2-2). The site is an open area located approximately 360 feet from the northeast corner of Building 9, and approximately 280 feet from the northeast corner of Building 12.

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Drawn By: F. Lee  
Date: 11/08/05  
Project No: 0034388.11

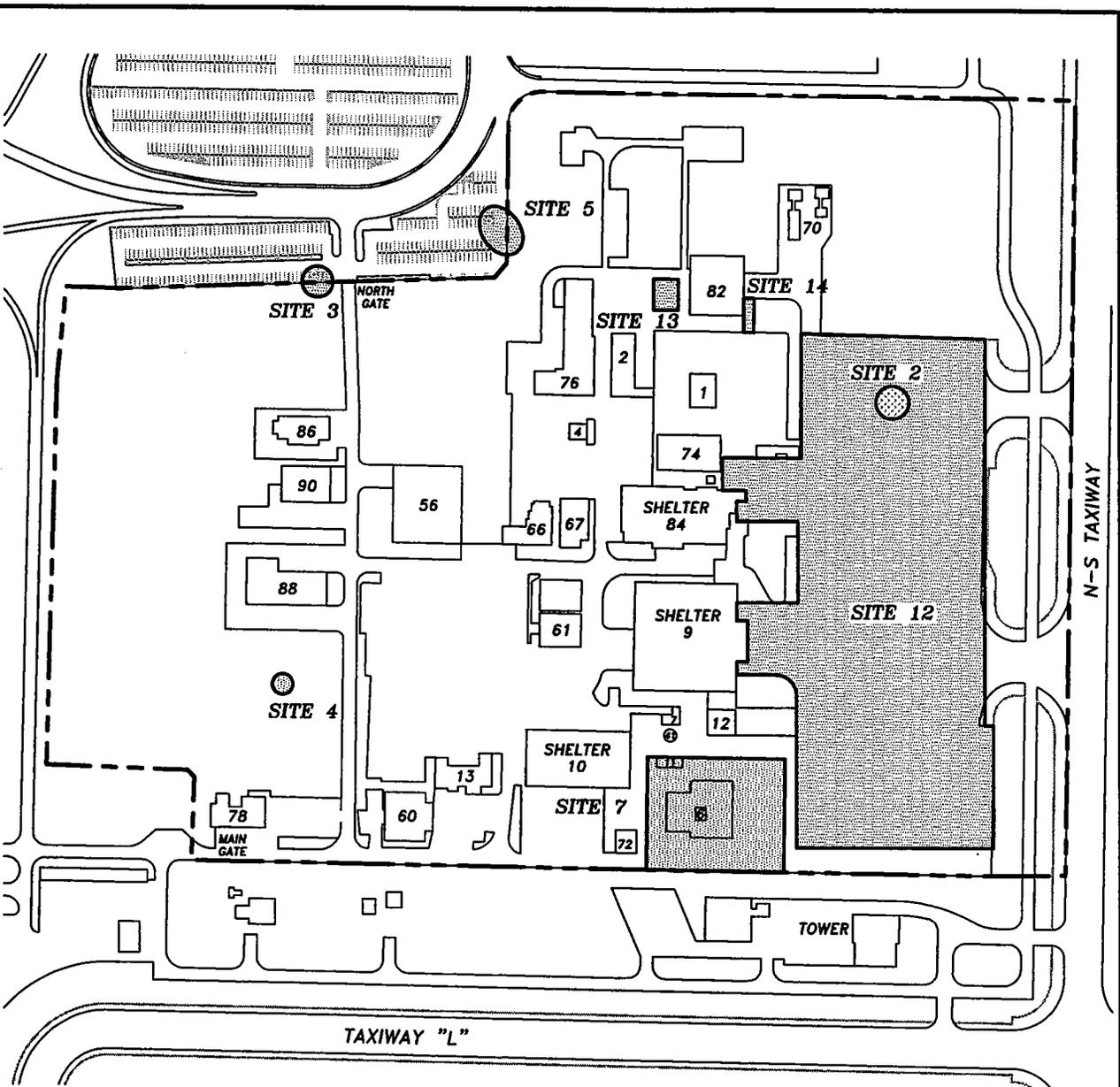


SOURCE: ORNL/ETS, 1994

Figure 2-1  
NVANG Location Map  
152nd Airlift Wing, NVANG  
Reno, Nevada

ERM 11/05

Project No. 0034388.11  
 Date: 11/08/05  
 Drawn By: F. Lee  
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**LEGEND**

-  ERP SITE
-  BASE BOUNDARY
- SITE 2 - FORMER FIRE TRAINING AREA (FTA)
- SITE 4 - FORMER FTA
- SITE 5 - FORMER FTA
- SITE 7 - PETROLEUM, OIL, AND LUBRICANTS (POL) STORAGE AREA
- SITE 12 - AIRCRAFT PARKING AREA

SOURCE: ORNL/ETS, 1994

Figure 2-2  
 ERP Site Location Map  
 152nd Airlift Wing, NVANG  
 Reno, Nevada

ERM 11/05

The spill site consisted of an area of approximately 50 feet by 50 feet, which encompassed two of the 12-foot by 12-foot concrete slabs that make up the concrete-paved aircraft parking apron. According to base personnel, an undocumented JP-4 spill occurred in the area in the 1970s and an estimated 40 gallons were released in 1986. During routine replacement of the concrete slabs, which is required when the slabs become cracked, base personnel discovered fuel odors and potential impact to soil beneath the concrete pavement.

Base personnel stated that four soil samples and one groundwater sample were collected at the location where the slabs were removed. Soil samples contained total petroleum hydrocarbons (TPH) up to 1,700 milligrams per kilogram (mg/kg). The groundwater sample was non-detect for volatile organic compounds (VOCs), but a sheen was observed on the groundwater surface during sample collection.

## **2.2 Site History and Enforcement Activities**

The ERP is an environmental program developed by the Department of Defense to identify, assess, characterize, and clean up or control contamination from past hazardous material spills and waste disposal activities at Department of Defense sites, including Air National Guard (ANG) facilities. As part of the voluntary ERP for NVANG, the following investigations/assessment activities were completed:

- The Preliminary Assessment (PA) was conducted at NVANG in June 1988 (ASG, 1989). This document focused on past and present generation, use, handling, and disposal practices at seven potentially contaminated sites. ERP Site 12 was not evaluated in the PA.
- A Rapid Response Initiative Spill Investigation was completed at ERP Site 12 in 1992 (PEER Consultants, 1992). During the spill investigation, three soil borings were advanced, soil samples were collected, monitoring wells were installed in the borings, and groundwater samples were collected from the monitoring wells. The *Final Site Assessment Report* (PEER Consultants, 1992) recommended destruction of the monitoring wells and no further action at Site 12.
- A Site Investigation (SI) was completed in 1994, which included sediment/surface water sampling, soil borings, groundwater screening, piezometer and monitoring well installation, and aquifer pumping tests (Oak Ridge National Laboratory/Environmental

Technology Section [ORNL/ETS], 1994). Site 12 was not evaluated in the SI.

- A Remedial Investigation (RI) was completed in 1996, which included installation of soil borings and monitoring wells (ERM, 1996). Site 12 was not evaluated in the RI.
- Groundwater monitoring was conducted at NVANG between 1992 and 2004. Monitoring and sampling of MW-27, downgradient of ERP Site 12, was conducted during fourth quarter 2002 and second and fourth quarters 2003.

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

## SECTION 3.0

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**COMMUNITY PARTICIPATION**

Community participation has been encouraged under a community relations plan drafted pursuant to Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The site-specific community relations plan prepared in October 1995 has been available for public review (along with all site reports) at the Washoe County Library in Reno, Nevada, and at the NVANG during normal business hours.

To meet the informational desires of the community and to allow the Reno, Nevada, area residents to participate in the decision-making process, the Air National Guard (ANG) held two Restoration Advisory Board meetings in the early stages of the ERP process at the NVANG. Although results from these meetings were positive, the number of interested parties was low and the ERP program at the NVANG was viewed by the community with little concern; therefore, no further meetings were scheduled.

To further inform the community about the Environmental Restoration Program and sites selected for closure, an open-house meeting was held at the NVANG on 25 July 2006. To announce the planned meeting, an advertisement was published in the *Reno Gazette Journal* on 21 and 22 July 2006 (Figures 3-1 and 3-2).

Information provided during the 25 July 2006 meeting included a visual presentation (which gave an historic overview of investigative work performed at Site 12) and printed handouts with similar information. In addition, draft copies of this decision document were available for review during the meeting. This meeting also marked the start of a 30-day public comment period to give interested parties an opportunity to review the documents supporting closure of Site 12.

There was no community attendance at the open-house meeting. Additionally, no community feedback was received during the 30-day comment period.

**Public Notice**  
**Nevada Air National Guard Base**  
**Request for No Further Action**  
**Open-House/Community Participation Meeting**

The Nevada Air National Guard is announcing that a No Further Action status has been requested for seven environmental program sites located at the Nevada Air National Guard Base in Reno, NV. These seven sites are part of the Air National Guard's Installation Restoration Program, a nationwide effort to help seek and identify any possible environmental effects that could have resulted from past practices, accidents, or incidents on Air National Guard installations. The environmental assessment for the Air National Guard Base, Reno, NV was completed in 1989. The ground sites to be closed include several areas previously used for fire training, (training practices changed in the late 1970's) a soil area by the oil water separator (from 1975, new procedures are now in place) and areas outside the Petroleum, Oil and Lubricants Storage Facility (from the 1980's).

To promote community participation in the Installation Restoration Program, the Air National Guard has scheduled an open house/community meeting for the following location/date:

Tuesday, July 25, 2006 @ 6:00 PM - 8:00 PM  
Nevada Air National Guard Base  
1776 National Guard Way  
Reno, Nevada

This meeting has been designed to provide information to the community about the Environmental Restoration Program and sites selected for closure. Documents supporting the No Further Action request for the seven sites are available for public view in Building 56, Office #10 at the base. These documents will also be available for public review during the community meeting. Public comments on the No Further Action requests will be accepted for thirty days after the date of the community meeting.

Please contact Lt. Col. John Peck at (775) 788-4503 for further information.

Figure 3-1  
Public Meeting Notice  
152<sup>nd</sup> Airlift Wing, NVANG  
Reno, Nevada

RENO NEWSPAPERS INC  
Publishers of  
RENO GAZETTE-JOURNAL  
955 Kuenzli St. P.O.Box 22000 RENO, NV 89520 PHONE: (775) 788-6200  
Legal Advertising Office (775) 788-6394

Customer Account # 313208  
PO# /ID# 0000159257  
Ad Cost \$2,425.50

- ERM
- 2525 Natomas Park Dr #350
- Sacramento, CA 95833
- David - Bettes

STATE OF NEVADA  
COUNTY OF WASHOE

ss: Julia Ketcham

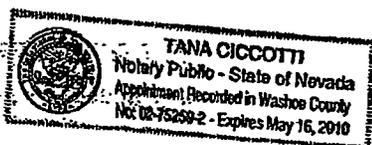
Being first duly sworn, deposes and says:  
That as the legal clerk of the RENO  
GAZETTE-JOURNAL, a daily newspaper  
published in Reno, Washoe County,  
State of Nevada, that the notice:  
request for no further action

has published in each regular and entire  
issue of said newspaper on the following  
dates to wit:  
July 21, 22, 2006

Signed: *Julia Ketcham*

7-22-06

*Tana Luotti*  
Notary Public



PROOF OF PUBLICATION

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**Nevada Air National Guard Base**  
**Request for No Further Action**  
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Please contact Lt. Col. John Peck at (775) 788-4503 for further information.

Figure 3-2  
Proof of Publication  
152<sup>nd</sup> Airlift Wing, NVANG  
Reno, Nevada

## SECTION 4.0

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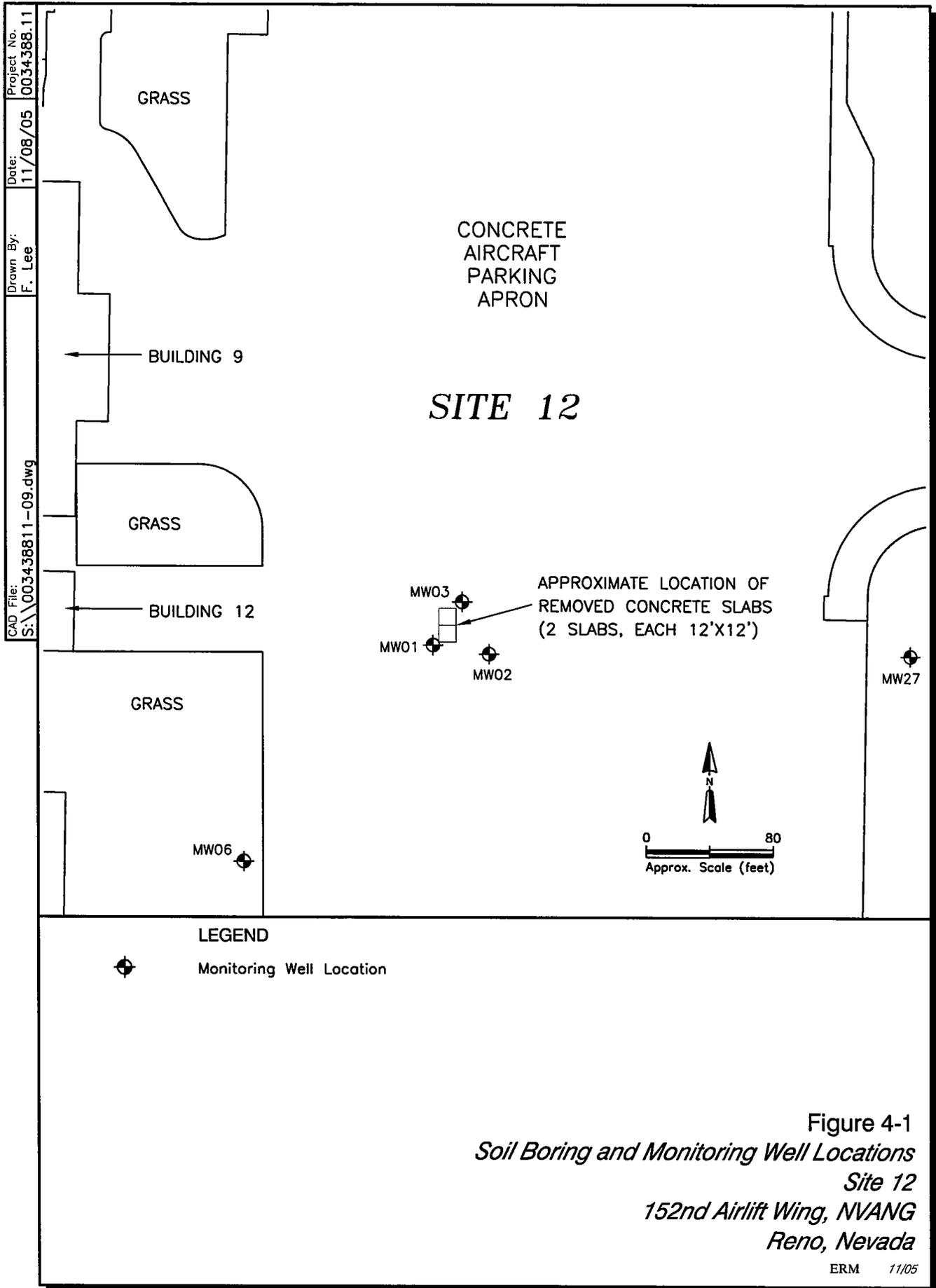
**SCOPE AND ROLE OF SITE**

Based on the results of the PA and interviews with NVANG personnel, 14 sites were identified where past waste management and facility operations may have impacted shallow soil and groundwater. The PA recommended further investigation of ERP Sites 2 through 7. Site 12 was investigated during the Rapid Response Site Assessment (PEER Consultants, 1992). Sites 2, 3, 4, 5, 7, 13, and 14 were investigated during the SI (ORNL/ETS, 1994); and Sites 4, 5, 7, and 14 were further investigated during the RI (ERM, 1996). [Figure 2-2](#) shows the location of Site 12 in relation to other ERP sites. Per agreement between the ANG and NDEP, no further action is appropriate for Sites 2, 3, 4, 5, 12, 13, and 14. Closure requests for each of these sites will be submitted under separate documents. A remedial action (that includes source removal) is ongoing at Site 7.

As shown in [Figure 2-2](#), Site 12 is located in the east central portion of the NVANG and is generally cross gradient of Site 7, which is approximately 300 feet southwest of the suspected spill area at Site 12. The nearest monitoring well associated with Site 7 is MW-06, which is approximately 300 feet south-southwest (cross gradient) of the suspected spill area at Site 12. Site 7, which is the most heavily impacted portion of NVANG, is consistently cross gradient of Site 12, and consequently is not expected to impact groundwater beneath Site 12. Site 4 is approximately 1,100 feet west of Site 12. Sites 2, 3, 5, 13, and 14 are approximately 450 to 1,200 feet north or northwest and are generally upgradient or cross gradient of Site 12.

The sampling locations used to evaluate Site 12 are as follows:

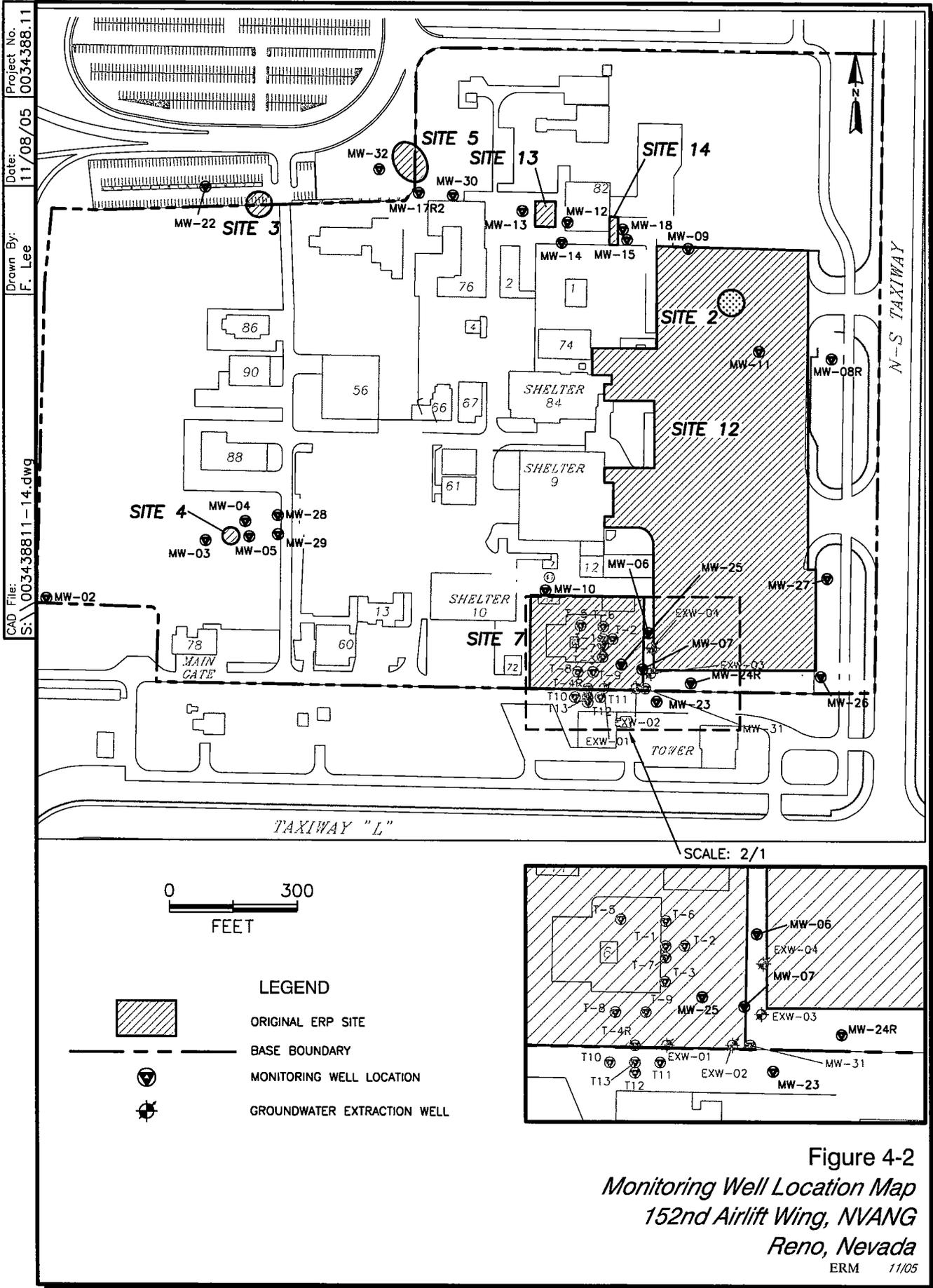
- Three hollow-stem auger soil borings advanced to approximately 15 feet below ground surface (bgs). Soil samples were collected using a split-barrel sampler from depths ranging from 1 to 11 feet bgs. Soil boring locations are shown in [Figure 4-1](#).



- Three monitoring wells (MW-01, MW-02, and MW-03) were installed for groundwater monitoring and sampling at the suspected spill area. One permanent monitoring well (MW-27) was installed to monitor groundwater conditions downgradient of Site 12. Monitoring well locations are shown in [Figures 4-1](#) and [4-2](#).

Sampling locations used as a basis for the decision for Site 12 are summarized on [Table 4-1](#), along with the gradient relationships to Site 12 and the uses of the data from each location. [Table 4-2](#) provides a chronological summary of quantitative sampling activities at each location.

Soil sampling was conducted to confirm the distribution of residual chemicals in soil and quantitatively identify the compounds present. Monitoring wells were installed to determine direction and gradient of groundwater flow and quantitatively identify the compounds dissolved in groundwater.



**Table 4-1**

**Summary of Data From Sampling Locations Used as  
Basis of Decision for ERP Site 12  
152nd Airlift Wing  
Nevada Air National Guard  
Reno, Nevada**

Sampling Location	Data Type	Data Uses
<b>Within or cross-gradient of Site 12</b>		
MW01 and MW03	Qualitative	Quantitative assessment of lateral extent of suspected area of chemicals in soil. Determination of direction and magnitude of groundwater flow. Quantitative assessment of dissolved chemical concentrations upgradient of suspected source area.
<b>Downgradient of Site 12</b>		
MW02 and MW27	Quantitative	Quantitative assessment of lateral extent of suspected area of chemicals in soil. Determination of direction and magnitude of groundwater flow. Quantitative assessment of dissolved chemical concentrations downgradient of suspected source area.

**Key:**  
MW - Monitoring well

**Table 4-2**

**Chronological Quantitative Sampling Summary for ERP Site 12  
152nd Airlift Wing  
Nevada Air National Guard  
Reno, Nevada**

Sampling Location	Matrix	Sampling Date(s)	Range of Analyses
MW01 through MW03	Soil	10/91	TPH, BTEX
MW01 through MW03	Groundwater	10/91	TPH, BTEX
MW27	Groundwater	10/02, 04/03, and 10/93	VOCs

**Key:**

BTEX - Benzene, toluene, ethylbenzene, and xylenes

MW - Monitoring well

TPH - Total petroleum hydrocarbons

VOC - Volatile organic compound

## SECTION 5.0

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**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 Topography**

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The average elevation of Truckee Meadows, where the NVANG is located, is 4,400 feet above mean sea level. The area around Truckee Meadows is generally flat with a gentle slope to the west, although topographic relief is substantial in the surrounding mountain ranges (ASG, 1989).

**5.2 Climate**

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The annual mean temperature for Reno, Nevada, is 49.9 degrees Fahrenheit (°F) with a maximum monthly average of 91.3°F occurring in July and a minimum monthly average of 18.9°F occurring in December. The average daily temperature change is 35°F with a maximum daily temperature change of 43.5°F occurring in July and August (ASG, 1989).

National Oceanic and Atmospheric Administration Station No. 26-6779, located at Reno Tahoe International Airport, records an average annual precipitation of 7.49 inches for the Reno, Nevada, area. According to the Water Atlas of the United States, Plate 12, the average annual evaporation from open water surfaces is 43 inches (ASG, 1989). Using the method outlined in the Federal Register (47 Federal Regulation 31224, July 1982), the annual net precipitation for the NVANG is -35.51 inches (ASG, 1989). Rainfall intensity based on the 1-year, maximum 24-hour rainfall is calculated to be 1.5 inches (ASG, 1989).

## 5.3 Geology

### 5.3.1 Regional Geology

The majority of the information presented in the following subsections was obtained from Cohen and Loeltz (1964), Bingler (1975), and the PA (ASG, 1989), which contains information derived from the Nevada Bureau of Mines and Geology Report #25 (Bateman and Scheibach, 1975).

Geologic maps of the Reno and Mt. Rose quadrangles show that the northern portion of the NVANG lies on a Quaternary deposit termed “floodplain and lacustrine deposits” consisting of interbedded gray to pale grayish-yellow silt and fine-grained sand with thin lenses of peat. These are fluvial and lacustrine deposits up to 23 feet thick with little or no soil development (Bonham and Rogers, 1983). The southern portion of the airfield is underlain by deposits known as “alluvial bajada deposits” consisting of thin, sheet-like aprons of fine- to medium-grained sand with intercalated muddy, medium-pebble gravel. These deposits result from low gradient streams that have reworked older gravelly outwash and alluvial fan deposits. They are weakly weathered and largely undissected, with little or no soil development (Bonham and Rogers, 1983).

The general geology of the Reno area consists of a north-trending basin known as the Truckee Meadows. This basin is located at the western margin of the Basin and Range physiographic province just east of the Sierra Nevada. Bingler (1975) describes the Truckee Meadows as a structural depression bounded by the Carson Range on the west, the Virginia Range on the east, Steamboat Hills to the south, and the eastern part of the Peavine Mountain block to the north. These marginal blocks consist of Mesozoic metavolcanic and plutonic rocks overlain by a thick sequence of Tertiary volcanic and epiclastic rocks. The Tertiary rocks are predominantly andesite and andesite porphyry flow rock, hypabyssal intrusives, and minor siliceous welded tuff, which are commonly represented by the Kate Peak and Alta Formations.

The foothill and mountain drainages that rim the basin contain large exposures of altered volcanic rock. Along the western margin of the basin and to the north and west along the Truckee River drainage basin, tilted beds of Miocene to upper Pliocene Hunter Creek Sandstone (composed of conglomerate, sandstone, and diatomite) are exposed, marking the start of early basin-sediment accumulation. The continuation of long-established patterns of basin-sediment accumulation is represented by the extensive Quaternary deposits exposed in the Truckee Meadows.

Bingler (1975) divided the Quaternary deposits into three major categories:

- Main stream gravel deposits of the Truckee River represented by bouldery outwash from glacial activity;
- A long and complex history of alluvial fan deposition along the margins of the Truckee Meadows that extends in time from the Pleistocene into the Holocene; and
- Reworking of older deposits and deposition of fine-grained clastic debris throughout the central part of the Truckee Meadows by low gradient streams during the Holocene and continuing to the present.

Geothermal activity in Truckee Meadows is found in two major areas known as Steamboat Springs and Moana. These activities are likely due to the cooling of an intrusive body at a depth that may be connected to groundwater resources through fault systems near these areas. Geothermal activity has a profound effect on groundwater chemistry by means of hydrothermal alteration of volcanic rocks underlying Truckee Meadows.

### **5.3.2 Local Geology**

The soil descriptions below are based on the PA (ASG, 1989) and were derived from the *Soil Survey of Washoe County, Nevada, South Part* (Baumer, 1983).

The Truckee sandy loam, gravelly substratum covers the northern half of the airport and all of the NVANG property (Baumer 1983, Map Index No. 805). This very deep, somewhat poorly drained soil is on flood plains and is formed in alluvium derived from mixed rock sources. Typically, the surface layer is gray sandy loam about 12 inches thick. The upper 18 inches of the underlying material is gray, stratified sandy loam through silty clay loam. The lower part, to a depth of 60 inches, is a pale-brown, stratified, gravelly sand and very gravelly sandy loam. Depth to the gravelly material ranges from 30 to 40 inches.

The Vamp silt loam, which is strongly saline-alkali, covers the southern half of the airport and adjacent areas (Baumer, 1983, Map Index No. 911). This is a moderately deep, somewhat poorly drained soil found on flood plains and terraces. The soil is formed in alluvium and is derived from mixed rock sources. Typically, the surface layer is grayish-brown silty loam about 3 inches thick. Below this is a layer of light grayish-brown and

pale-brown, stratified, fine sandy loam and loam about 33 inches thick. The next layer is white, strongly cemented hardpan about 6 inches thick, which is underlain to a depth of 60 inches by yellowish-brown and light olive-gray, stratified loam, sandy loam, and loamy sand. Depth to the hardpan ranges from 20 to 40 inches. Permeability of the Vamp soil is moderate. A seasonal high water table is at a depth of 30 to 40 inches in spring and early summer.

Channeling and deposition are common along stream banks in both soil units. The risk of corrosion is high for uncoated steel and concrete structures because both soil units are strongly saline and alkaline-affected. Both soil units are subject to seasonal flooding that has been controlled around the NVANG by deepened drainage ditches.

## **5.4 Hydrology**

The following subsections describe the surface water hydrology and the hydrogeology of the NVANG.

### **5.4.1 Surface Water Hydrology**

Surface water in the vicinity of the NVANG occurs in both open and covered drainage ditches. Irrigation ditches fed by diversion dams on the Truckee River pass by the NVANG just east of the airfield. There are drainage ditches along the north and south sides of the NVANG that conduct water to the east, across the airfield, and into Boynton Slough, which drains into Steamboat Creek (ASG, 1989).

The Truckee Meadows is drained by the Truckee River, which flows from west to east through the Meadows. The NVANG lies 1.5 miles south of the river channel at its closest point. Steamboat Creek, the major tributary to the Truckee River within the Meadows, enters through Pleasant Valley to the south and flows north to the Truckee River. Other streams in this area flow mainly during spring runoff (ASG, 1989).

### **5.4.2 Hydrogeology**

The potentiometric surface at the NVANG can be as shallow as 3 feet below the land surface. The fine-grained nature of the upper sediments compared with the more permeable lower sediments may result in confined conditions across the NVANG. The proximity of the

groundwater surface to the land surface is due to the area's function as a groundwater discharge point for the Truckee Meadows. Much of the NVANG and airport lie on former swampland that was filled in and drained with ditches that receive the current groundwater discharge. Cohen and Loeltz (1964) estimated the total groundwater discharge into the drainage ditches, drains, and sloughs east of the airport to be 6,500 acre-feet per year (acre-feet/year) with an additional 2,200 acre-feet/year discharged to drains immediately north of the airfield. Today, the only remaining swampland, located east of the NVANG, is found south of the confluence of Boynton Slough and Steamboat Creek.

Groundwater in the Truckee Meadows occurs under both artesian and water table conditions in the unconsolidated and partially consolidated younger and older alluvium of the valley fill. Artesian heads in the Meadows area are commonly less than 20 feet above the land surface (Cohen and Loeltz, 1964). Depths to groundwater vary considerably due to the interfingering nature of the valley-fill deposits. Several public water supply wells located in the Meadows are screened at depths ranging from 274 feet to more than 800 feet. Commonly, wells located several yards apart will tap water-bearing deposits at different depths. This trend becomes more pronounced in the area of the Truckee River, where channel shifts have left discontinuous and sinuous gravels (ASG, 1989).

Review of Nevada Department of Water Resources drilling records, stored by the United States Geological Survey Water Resources Division in Carson City, Nevada, indicates that there are 90 monitoring wells within a 1-mile radius of the NVANG. None of these wells are considered private supply wells, as they are less than 30 feet deep and constructed as monitoring wells related to environmental site assessments in the airport area. Because shallow groundwater in this area contains high concentrations of naturally occurring inorganic compounds, there are no known private drinking water wells near the NVANG.

Cohen and Loeltz (1964) suggest that 70 percent of the recharge to the groundwater in the Truckee Meadows is from infiltration by crop irrigation practices and 30 percent can be attributed to the infiltration of streamflow and underflow from tributary valleys. Increasing urbanization in the Meadows, however, has decreased the use of crop irrigation, thus decreasing the rate of recharge and consequently lowering water levels. The State engineer's office in Carson City estimates the present annual groundwater recharge to the Truckee Meadows at 20,000 to 25,000 acre-feet.

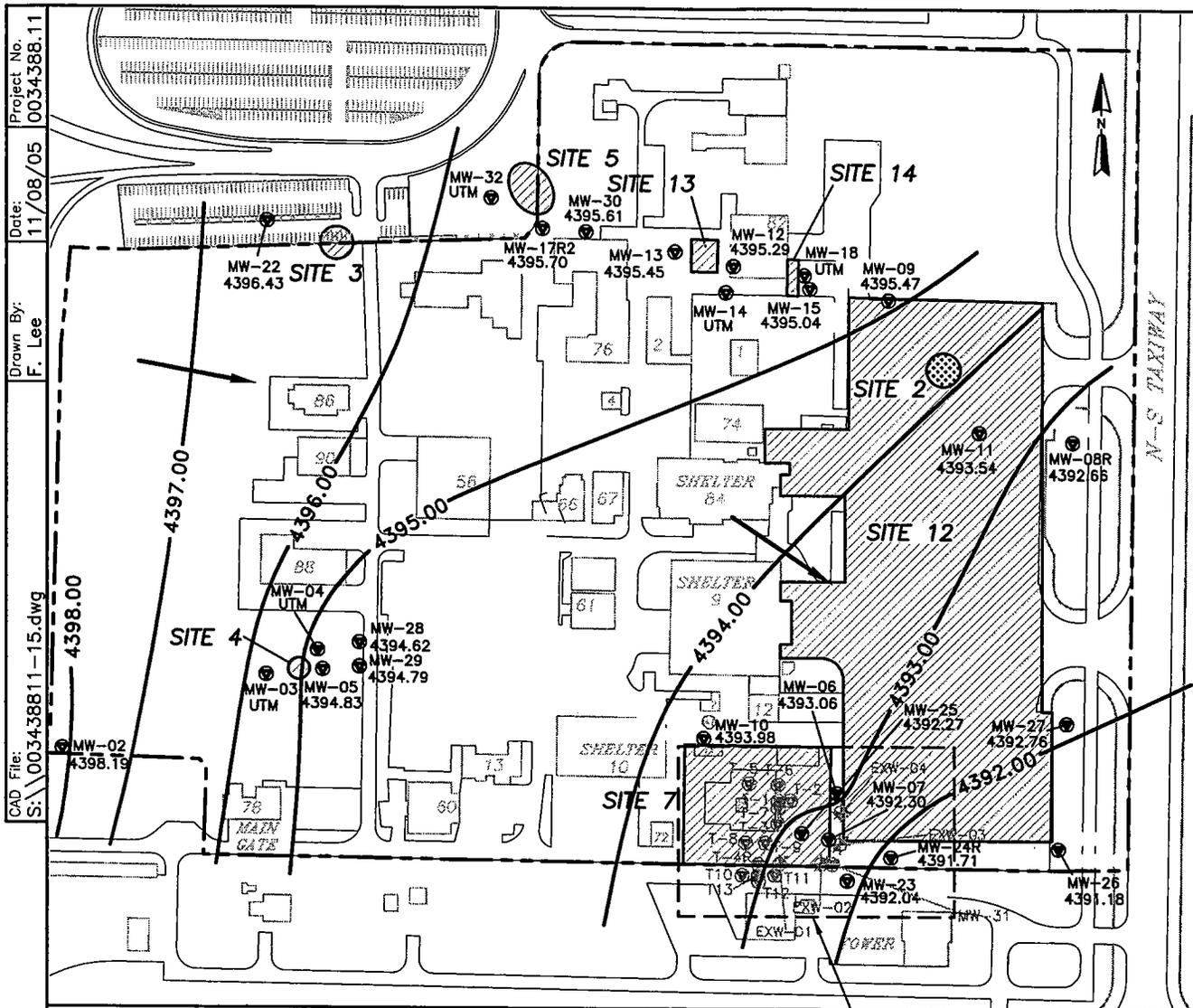
During the SI, single well pumping tests were performed on six monitoring wells, and recovery tests were performed on two wells. Transmissivity values calculated from the pump test data ranged from 39 to 3,110 square feet per day (ft/d). Hydraulic conductivities, defined as the product of the screened aquifer thickness and transmissivity, ranged from 4 to 479 ft/d. The range of values indicates the lithology of the unconfined saturated zone is very heterogeneous. This conclusion is consistent with data from borehole logs. Using an average hydraulic conductivity value of 500 ft/d, a gradient of 0.001, and effective porosity of 0.2 (fine to coarse sand), the SI Report calculated an average linear groundwater velocity of 2.5 ft/d (ORNL/ETS, 1994).

Figure 5-1 shows the potentiometric surface map developed based on the last semiannual monitoring event (third quarter 2003). As indicated, groundwater flow is east-southeast or southeast. Gradients range from 0.01 to 0.0033 feet per foot in the vicinity of Site 12. These results are consistent with groundwater gradient and flow directions observed during previous events (ERM, 2003a).

## 5.5 Cleanup Levels for Soil and Groundwater

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Cleanup levels for impacted soil and groundwater at NVANG (created for the RI/Feasibility Study) were calculated for protection of both human health (assuming direct contact with soil) and groundwater. Direct contact standards were calculated following the methodology established in Subpart S of the Resource Conservation and Recovery Act Corrective Action Rule (USEPA, July 1990). Cleanup levels for protection of groundwater were calculated based on (1) Toxicity Characteristic Leaching Procedure (TCLP) standards; (2) Federal Maximum Contaminant Levels (MCLs); or (3) a drinking water equivalency level using Subpart S methodology. Where available, the numeric TCLP standard (in milligrams per liter [mg/L]) was selected as the groundwater protective cleanup level (in mg/kg) without any unit conversion. For compounds with no established TCLP standard, the cleanup levels were calculated by multiplying the MCL (in mg/L) by 100. For compounds with no established TCLP standard or MCL, a drinking water equivalency standard (in mg/L), calculated using Subpart S methodology, was multiplied by 100 to derive the soil cleanup level (in mg/kg). Table 5-1 summarizes groundwater protective cleanup levels for Site 12 soils. Groundwater protective cleanup levels are presented because they are more conservative than the human health cleanup levels for the chemicals of concern.



SCALE: 2/1

- LEGEND**
- ORIGINAL ERP SITE
  - BASE BOUNDARY
  - MONITORING WELL LOCATION
  - GROUNDWATER EXTRACTION WELL
  - ELEVATION OF POTENTIOMETRIC SURFACE (FEET ABOVE MEAN SEA LEVEL)
  - UTM UNABLE TO MEASURE
  - NM NOT MEASURED
  - GROUNDWATER FLOW DIRECTION

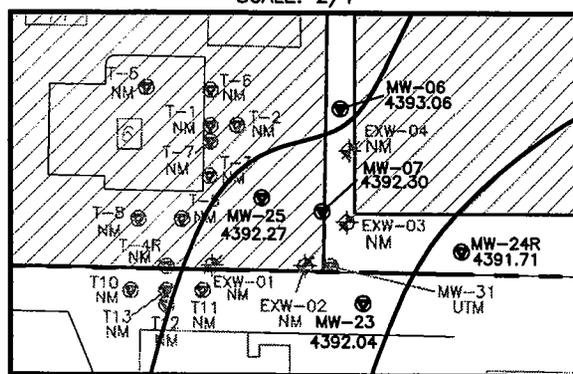


Figure 5-1  
 Potentiometric Surface Map  
 October 2003  
 152nd Airlift Wing, NVANG  
 Reno, Nevada

**Table 5-1**  
**Summary of Soil Cleanup Levels**  
**ERP Site 12**  
**152nd Airlift Wing, Nevada Air National Guard**  
**Reno, Nevada**

Compound	Human Health Cleanup Level (Based on Subpart S)	Groundwater Protection Cleanup Level	Groundwater Protection Cleanup Level Method
<i>Volatile Organic Compounds (micrograms per kilogram)</i>			
Benzene	24,000	500	TCLP
Ethylbenzene	8,000,000	70,000	MCL x 100
Toluene	16,000,000	100,000	MCL x 100
Xylenes	160,000,000	1,000,000	MCL x 100
TPH (milligrams per kilogram)	4,800	210	Subpart S x 100

**Key:**

MCL = Maximum contaminant level

TCLP = Toxicity characteristic leaching procedure

TPH - Total petroleum hydrocarbons

Consistent with NDEP guidance, potential cleanup levels identified in the SI and RI for groundwater were based primarily on Federal MCLs. For several compounds with no established MCLs, the RI derived drinking water equivalency levels using the methodology set forth in Subpart S of the proposed RCRA Corrective Action Rule (EPA, 1990). [Table 5-2](#) summarizes cleanup levels for Site 12 groundwater. The RI Report (ERM, 1996) contains further details on calculation of soil and groundwater cleanup levels.

## **5.6 Nature and Extent of Contamination**

This section summarizes results of investigations at Site 12 and discusses, in detail, contaminants in soil and groundwater. Investigations at the site are summarized in [Section 2](#).

Soil samples collected during the Rapid Response Initiative Spill Investigation were analyzed for benzene, toluene, ethylbenzene and total xylenes (BTEX) via USEPA Method 8240; and for TPH as JP-4 via USEPA Method 8015 Modified. The samples contained detectable TPH, benzene, ethylbenzene, and xylenes, with the highest concentrations detected in boring MW-01, located at the southwest corner of the two concrete slabs that were removed. After monitoring wells MW-01, MW-02, and MW-03 were installed and developed, groundwater samples were collected and analyzed for BTEX via USEPA Method 624 and TPH as JP-4 via USEPA Method 8015 Modified. Samples from MW-01 and MW-02 contained trace concentrations ethylbenzene and xylenes.

Samples collected from MW-27 (downgradient of Site 12) during 2002 and 2003 were non-detect for all analytes, including all halogenated VOCs and fuel related compounds.

### **5.6.1 Quantitative Soil Data**

Quantitative soil analytical data were collected during the Rapid Response Initiative Spill Investigation to define the nature and extent of chemical impacts in the unsaturated zone. Three soil borings were advanced around the perimeter of the two concrete slabs that had been removed. Soil samples were collected at depths ranging from 1 to 11 feet bgs and were analyzed for TPH as JP-4 and BTEX. [Table 5-3](#) summarizes analytical results for soil samples. As indicated, TPH, benzene, ethylbenzene, and xylenes were detected in borings MW-01 and MW-02.

**Table 5-2**  
**Summary of Groundwater Cleanup Levels**  
**ERP Site 12**  
**152nd Airlift Wing, Nevada Air National Guard**  
**Reno, Nevada**

Compound	Groundwater Cleanup Level ( $\mu\text{g/L}$ )	Source
<i>Volatile Organic Compounds</i>		
Ethylbenzene	700	USEPA Region 9 Primary MCL
Xylenes	10,000	USEPA Region 9 Primary MCL

**Key:** $\mu\text{g/L}$  = Micrograms per liter

MCL = Maximum contaminant level

USEPA = United States Environmental Protection Agency

**Table 5-3**  
**Hydrocarbon Compounds Detected in Soil**  
**Site 12**  
**152nd Airlift Wing, Nevada Air National Guard**  
**Reno, Nevada**

Location	Depth (feet)	Date Sampled	TPH	Benzene	Ethyl-benzene	Toluene	Total Xylenes
MW-01	1-2	10/03/91	<b>2,800</b>	<b>0.62</b>	6.7	ND	11.0
	2-3.5	10/03/91	<b>410</b>	ND	ND	ND	ND
	5-6.5	10/03/91	ND	ND	ND	ND	ND
	6.5-8	10/03/91	ND	ND	ND	ND	ND
	9.5-10.5	10/04/91	ND	ND	ND	ND	ND
MW-02	1-2	10/04/91	<b>1,000</b>	ND	1.3	ND	2.8
	2-3.5	10/04/91	<b>900</b>	ND	0.7	ND	1.6
	3.5-5.5	10/04/91	210	ND	ND	ND	ND
	5.5-6.5	10/04/91	76	ND	0.020	ND	0.057
	6.5-8	10/04/91	ND	ND	ND	ND	ND
MW-03	8-9.5	10/04/91	ND	ND	ND	ND	ND
	1-2	10/04/91	ND	ND	ND	ND	ND
	6.5-8	10/04/91	ND	ND	ND	ND	ND
	9.5-11	10/04/91	ND	ND	ND	ND	ND

**Notes:**

Bold = Result exceeds cleanup level.

All concentrations reporting in milligrams per kilogram.

**Abbreviations:**

ND = Not detected

TPH = Total petroleum hydrocarbons

The highest concentrations of TPH (2,800 mg/kg), benzene (620 micrograms per kilogram [ $\mu\text{g}/\text{kg}$ ]), ethylbenzene (6,700  $\mu\text{g}/\text{kg}$ ), and xylenes (11,000  $\mu\text{g}/\text{kg}$ ) were reported in MW-01 at 1 to 2 feet bgs. MW-02 also contained elevated concentrations of TPH (up to 1,000 mg/kg), ethylbenzene (up to 1,300  $\mu\text{g}/\text{kg}$ ), and xylenes (up to 2,800  $\mu\text{g}/\text{kg}$ ); but was non-detect for benzene. In general, the highest concentrations occurred just beneath surface pavement, with concentrations decreasing to nondetect levels below 3.5 feet in MW-01 and below 6.5 feet in MW-02. All samples from MW-03 were non-detect for all analytes.

Reported concentrations of TPH exceeded the cleanup level (210 mg/kg) in four samples (all from 1 to 3.5 feet bgs), and the cleanup level for benzene (0.5 mg/kg) was exceeded in one sample (1 to 2 feet bgs).

### **5.6.2 Groundwater Monitoring**

Groundwater samples were collected from MW-01 through MW-03 during the Rapid Response Initiative Spill Investigation and were analyzed for TPH as JP-4 via USEPA Method 8015 Modified and for BTEX via USEPA Method 624. [Table 5-4](#) summarizes groundwater-sampling results. As indicated, samples from MW-01 and MW-02 contained trace concentrations of TPH (up to 2 mg/L), ethylbenzene (up to 2 micrograms per liter [ $\mu\text{g}/\text{L}$ ]), and xylenes (up to 4  $\mu\text{g}/\text{L}$ ). Benzene was non-detect in all samples. Groundwater samples collected from downgradient well MW-27 during 2002 and 2003 were analyzed for halogenated and fuel-related VOCs via USEPA Method 8260B, but were non-detect for all analytes. All groundwater sample results were less than groundwater cleanup levels ([Table 5-2](#)).

## **5.7 Contaminant Fate and Transport**

The RI Report (ERM, 1996) evaluated the fate and transport of JP-4 constituents and trichloroethene present in soil and groundwater beneath the NVANG. The evaluation assessed potential routes of migration, contaminant persistence, and migration of these compounds.

JP-4 constituents, including TPH and BTEX, have been detected in vadose zone soils and groundwater at Site 12. Potential routes of migration for JP-4 constituents include the following:

- Lateral flow of floating nonaqueous-phase liquid on the water table;

**Table 5-4**

**Hydrocarbon Compounds Detected in Groundwater**  
**Site 12**  
**152nd Airlift Wing, Nevada Air National Guard**  
**Reno, Nevada**

Location	Date Sampled	TPH (mg/L)	Benzene	Ethylbenzene	Toluene	Total Xylenes
MW-01	10/91	ND	ND	1.0	ND	2.0
MW-02	10/91	ND	ND	2.0	ND	4.0
MW-02 (D)	10/91	ND	ND	ND	ND	2.0
MW-03	10/91	ND	ND	ND	ND	ND
MW-27	10/02	NA	ND	ND	ND	ND
MW-27	04/03	NA	<0.5	<0.5	<0.5	<0.5
MW-27	10/03	NA	<1.0	<1.0	<1.0	<1.0

**Notes:**

All concentrations are in micrograms per liter, unless noted.

\* = No established value

(1) = EPA Region 9 Maximum Contaminant Level

< = Not detected at concentration greater than specified detection limit

**Abbreviations:**

mg/L = milligrams per liter

NA = Not analyzed

ND = Not detected

TPH = Total petroleum hydrocarbons

(D) = duplicate sample

- Volatilization of free-phase or adsorbed chemicals into soil gas;
- Transport of dissolved and adsorbed chemicals in surface water runoff;
- Leaching of adsorbed or free-phase chemicals in soil to groundwater;
- Volatilization of dissolved chemicals from groundwater to soil gas;
- Release of chemicals in soil gas to ambient air; and
- Transport of dissolved chemicals via groundwater flow.

For JP-4 constituents, both transport and transformation processes are important in determining fate of chemicals in soil and groundwater. Biodegradation of fuel constituents in soil or groundwater is considered the most important transformation process. Volatilization of VOCs in soil or groundwater to soil gas, migration of VOCs in soil gas to ambient air, leaching of VOCs and other fuel constituents from soil to groundwater, and movement of dissolved chemicals with groundwater flow are considered the most important transport processes.

Reported organic compound concentrations from Site 12-related monitoring wells indicate there is no significant impact to groundwater beneath or downgradient of the site.

Soil analytical data collected in 1991 indicated residual petroleum hydrocarbons and BTEX were present in soil in the vicinity of the suspected source area. However, based on the absence of impact to the underlying unconfined aquifer, continued leaching of residual chemicals to groundwater does not appear significant. In addition, the site has remained covered with the concrete pavement of the aircraft-parking apron since before the suspected releases occurred.

## **5.8 Basis for Decision**

The ANG has selected No Further Action as the preferred alternative for Site 12 for the following reasons:

- Several organic chemicals (TPH and benzene) were detected at concentrations exceeding groundwater protection cleanup levels reported in the RI Report (ERM, 1996). However, benzene only slightly exceeded the cleanup level in one sample. TPH exceeded the cleanup level in four samples, but the reported concentrations in all

samples were well below cleanup levels for protection of human health.

- Based on available groundwater data, there were no significant impacts to the shallow unconfined aquifer due to potential releases at Site 12. All detections of organic compounds were trace concentrations and were well below cleanup levels for groundwater.
- Based on the absence of impacts to shallow groundwater and the fact that the site has remained covered with concrete pavement since the suspected releases occurred, leaching of residual chemicals to groundwater does not appear significant. The arid climate at NVANG also minimizes the potential for these contaminants to migrate downward toward groundwater in the future.
- The ANG does not expect any change in the use of Site 12, or of the surrounding area, in the foreseeable future.

In summary, No Further Action is recommended for this site because there appears to be no significant ongoing source of contamination and the site does not present a risk to human health or the environment. Additionally concentrations of organic chemicals dissolved in groundwater are now below applicable cleanup levels.

## SECTION 6.0

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***CURRENT AND POTENTIAL SITE AND  
RESOURCE USES***

NVANG currently serves as the home of the Air National Guard's 152nd Airlift Wing, which services and operates C-130E and C-130H aircraft. The NVANG occupies approximately 60 acres of land in the northwest quadrant of the Reno Tahoe International Airport Complex. The land to the south and west of the NVANG is primarily industrial and residential. The land east and north of the NVANG is occupied by the Reno Tahoe International Airport. Currently, Site 12 is part of the aircraft parking apron and is entirely paved over. Groundwater at the site is not currently used as a drinking water resource. Use of Site 12 is not expected to change and the ANG does not expect to use groundwater at this site for any purpose in the foreseeable future.

## SECTION 7.0

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***SUMMARY OF SITE RISKS***

Analytical results obtained during the Rapid Response Initiative indicated that TPH and benzene in soil exceeded cleanup levels for protection of groundwater. However, all concentrations were less than cleanup levels for protection of human health, which are summarized in Section 8 of the RI Report (ERM, 1996). In addition, the site has remained covered with the concrete pavement of the aircraft parking apron since the suspected releases occurred, further minimizing potential for exposure to affected soil and any downward migration to groundwater.

Based on groundwater analytical data obtained during the Rapid Response Initiative, impacts to the unconfined aquifer beneath and downgradient of the site were negligible. All detections were trace concentrations and all were well below cleanup levels for groundwater.

In summary, there is no unacceptable risk to human health and the environment associated with any of the chemicals potentially attributable to releases at Site 12. Therefore, the preferred alternative for Site 12 is No Further Action.

## SECTION 8.0

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***STATUTORY AUTHORITY FINDING***

Analytical results from soil samples collected at Site 12 were below soil cleanup levels for protection of human health. Detected concentrations of TPH in four samples and benzene in one sample exceeded cleanup levels for protection of groundwater. However, based on negligible impacts to groundwater beneath Site 12 and the fact that the site has remained covered with concrete pavement, continued migration of chemicals in soil to groundwater does not appear likely. Dissolved concentrations in samples collected from site related wells were all less than groundwater cleanup levels.

Based on these observations and conditions, Site 12 does not pose an unacceptable risk to human health or the environment. Accordingly, no further action is recommended at this site. This action is in accordance with and complies with applicable statutes and regulations.

**SECTION 9.0**

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***DOCUMENTATION OF  
SIGNIFICANT CHANGES***

No changes were made to this document following the open house community meeting and subsequent 30-day comment period.

## SECTION 10.0

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**REFERENCES**

This document was prepared with the use of information contained in the Administrative Record for Site 12, which is available for review at NVANG, Reno, Nevada. 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 open house meeting and public comment period was published in the *Reno Gazette Journal* on 21 and 22 July 2006. The public comment period extended from 25 July through 24 August 2006. The public meeting presenting the proposed site closure was held at the Nevada Air National Guard Base in Reno, Nevada, on 25 July 2006. As of 25 August 2006, the ANG had received no public comments on the proposed closure of Site 12.

Based on the low community response to the Restoration Advisory Board meetings, no attendance at the 25 July 2006 open house meeting, and the lack of community feedback during the 30-day comment period, there appears to be little to no community concern regarding the closure of Site 12.