CAFB 04-002

DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

08 NOV 2004

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Cannon AFB NM 88103-5003

Mr. James Bearzi
Chief Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Building 1
Santa Fe NM 87505-6303

RECEIVED
NOV 2004
NMED Hazardous
Waste Bureau

Dear Mr. Bearzi

Cannon Air Force Base hereby submits the attached Petition for No Further Action (NFA) Review for 34 Solid Waste Management Units (SWMU) and Areas of Concern (AOC).

The 34 SWMU and AOC included in this petition were originally submitted to your bureau as part of a Class 3 Modification Request in September 2000. Mr. Glenn von Gonten of your staff reviewed that original request and recommended in a letter dated January 12, 2004 that Cannon resubmit the subject sites under a separate Petition for NFA Review document.

If this Petition meets your approval, we formally request that the subject sites be placed on Table 2 (List of SWMU and AOC Not Currently Requiring Corrective Action) of the Cannon AFB Hazardous Waste Facility Permit No. NM7572124454.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or person who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely

ROBERT S. PYEATT, GS-13

Attachment:
Petition for No Further Action Review

cc:
NMED HWB Bureau (G. von Gonten) w/o Atch
EPA Region VI (B. Sturdivant) w/o Atch

CAFB 04-002

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HAZARDOUS AND SOLID WASTE AMENDMENTS / CORRECTIVE ACTION-RELATED PERMIT MODIFICATION REQUEST

NO FURTHER ACTION PROPOSALS

CANNON AFB, NEW MEXICO
PERMIT NO. NM7572124454

Prepared for
New Mexico Environment Department
Hazardous and Radioactive Materials Bureau

October 2004

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List of Acronyms

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
ACM	Asbestos-containing material
AFB	Air Force Base
AOC	Area of Concern
AST	Aboveground Storage Tank
BRA	Baseline Risk Assessment
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CRQL	Contract Required Quantitation Limit
DPDO	Defense Property Disposal Office
DRO	Diesel-Range Organics
EP	Extraction Procedure
GC	Gas Chromatograph
GIS	Geographical Information System
GRO	Gasoline-Range Organics
HELP	Hydrologic Evaluation of Landfill Performance (Model)
HI	Hazard Index
IRP	Installation Restoration Program
JP-4	Jet Propellant
MCL	Maximum Contaminant Level
MCPP	2-(2-methyl-4-chlorophenoxy) propionic acid
mgd	million gallons per day
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MOGAS	Motor Gasoline
MSSL	Media-Specific Screening Level
MULTIMED	Multimedia Exposure Assessment Model
NFA	No Further Action
NMED	New Mexico Environment Department
OVA	Organic Vapor Analyzer
OWS	Oil/Water Separator
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl

PID	Photoionization Detector
PLM	Polarized light microscopy
POL	Petroleum, Oil, and Lubricants
ppb	parts per billion
ppm	parts per million
ppm/v	parts per million on a volume to volume basis
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RL	Reporting Limit
RME	Reasonable Maximum Exposure
SI	Site Inspection
SSTL	Site-Specific Target Level
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TCO	Total Chromatographable Organics
TIC	Tentatively Identified Compound
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
TRPH	Total Recoverable Petroleum Hydrocarbons
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
UTL	Upper Tolerance Limit
VOC	Volatile Organic Compound
W-C	Woodward-Clyde
WWTP	Wastewater Treatment Plant

This document is intended to serve as a formal request for Class 3 modifications to the Cannon Air Force Base (AFB) Resource Conservation and Recovery Act (RCRA) Part B Permit pursuant to 40 CFR 270.42(c) of the Hazardous and Solid Waste Amendments of 1984 for closure of sixty-one Solid Waste Management Units (SWMUs) and seven Areas of Concern (AOCs). The SWMUs included in this document were listed in two of the Appendices (I, and II) to the Cannon AFB RCRA Permit.

All of the SWMUs and AOCs addressed by this document, and the applicable New Mexico Environment Department (NMED) No Further Action (NFA) Proposal Criteria for their closure, are listed in the table below. (Please note that, based on investigative histories, SWMUs 61, 62, and 63, have been grouped together as Section 17.)

TABLE ES-1

Section	SWMU/AOC	Description	NMED Criterion
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Section 4	SWMU 5	Oil/Water Separator No. 121	5
Section 5	SWMU 7	Oil/Water Separator No. 129	5
Section 6	SWMU 8	Oil/Water Separator No. 165	5
Section 7	SWMU 9	Aircraft Washrack Drain System	5
Section 8	SWMU 11	Oil/Water Separator No. 170	5
Section 9	SWMU 16	Oil/Water Separator No. 680	5
Section 10	SWMU 32A	Oil/Water Separator No. 186 (#1 - East)	5
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Section 13	SWMU 39	Oil/Water Separator No. 195	5
Section 14	SWMU 46	Oil/Water Separator No. 196	5
Section 15	SWMU 47	Oil/Water Separator No. 494	5
Section 16	SWMU 48B	Aboveground Overflow Capacity Tank	5
Section 17	SWMU 51	Oil/Water Separator No. 375	5
Section 18	SWMU 55	Lead Acid Battery Accumulation Point	5
Section 19	SWMU 57	Oil/Water Separator No. 379	5
Section 20	SWMUs 61, 62 and 63	Sand Traps Nos. 5077A and 5077B and Oil/Water Separator No. 5077C	5
Section 21	SWMU 74	Landfill No. 1	5
Section 22	SWMU 76	Sludge Weathering Pit (WP-14)	5
Section 23	SWMU 83	Sump	5
Section 24	SWMU 92	Oil/Water Separator No. 5120	5
Section 25	SWMU 93	Oil/Water Separator No. No. 5121	5
Section 26	SWMU 94	Oil/Water Separator No. 5144	5

Sec 27 SWMU 113 LFS

TABLE ES-1

Section	SWMU/AOC	Description	NMED Criterion
Section 28	SWMU 113	Landfill No. 5, Cell 3	4
Section 29	AOC D	Asbestos Burial Pit	4
Section 30	AOC E	Runway Rubble Pile	5
Section 31	AOC F	Calibration Target Berm	5
Section 32	AOC G	Disturbed Area - North Housing Site	5
Section 33	AOC H	Disturbed Area - South Housing Site	5
Section 34	DP-33	Drum Disposal Pit	4

Each of the individual sections listed above are divided into the following subsections:

- Summary – lists the past investigations and assessments completed at a given SWMU or AOC; summarizes the conclusions of these investigations and assessments; and states the rationale for a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) for closure of the SWMU or AOC.
- Description and Operational History – briefly describes the site and its operational history.
- Land Use – states current and future or proposed uses for the site.
- Investigatory Activities – briefly summarizes the past investigations and their conclusions; discusses any non-sampling data collected during the first investigation, discusses any sampling data collected during the first investigation, discusses any gaps in the data collected during the first investigation, and discusses the results and conclusions of the first investigation; and repeats these discussions for all subsequent investigations.
- Site Conceptual Model – describes the nature and extent and ultimate environmental fate of any contamination identified during the site investigations.
- Site Assessments – summarizes any assessments performed using the data collected during the site investigations; discusses any screening assessments that may have been performed to determine potential impacts on human health or the ecology; discusses any risk assessments that may have been performed to determine potential impacts on human health or the ecology; discusses any other applicable assessments that may have been performed at the site (e.g., on surface water, ground water, underground storage tanks, or other issues relevant to the site).
- No Further Action Proposal – summarizes the rationale for a Class 3 modification to the Cannon AFB RCRA Part B Permit, and concludes by stating the applicable NMED criterion used.

The locations of each of the SWMUs and AOCs addressed herein are illustrated in Figure 1-2, Appendix A. Appendix B contains tables associated with each SWMU section. Appendix C contains a list of references.

1.1 SETTING - PHYSICAL GEOGRAPHY

Cannon AFB is situated in the Southern High Plains Physiographic Province in the Llano Estacado subprovince. The Llano Estacado is a nearly flat plain sloping gently (10 to 15 feet per mile) to the east and southeast. Elevations in the eastern New Mexico portion of the Llano Estacado exceed 4,000 feet above mean sea level (msl). In the vicinity of Cannon AFB, elevations range from 4,250 feet to 4,350 feet above msl.

The most prominent geomorphic features in the vicinity of Cannon AFB are blowouts and broad, widely spaced valleys. Less common landforms are relict sand dunes located along the northern side of the Portales Valley south of the Base. Relict dunes are not found on or near Cannon AFB.

Blowouts are broad shallow depressions which form as the result of soil erosion by wind. Blowouts commonly collect surface runoff from small to moderate sized drainage areas. During periods of rainfall, runoff collects in blowouts to form ephemeral playa lakes. Playas have no external surface drainage. Water is lost by infiltration to the soil and evaporation; without recharge, playa lakes persist for only a few days or weeks. Three playas are located within the Base, and several more are found to the north and east of the Base.

Stream valleys tend to be fairly broad and widely spaced. Streams are ephemeral and drainages are poorly developed. No streams exist on or near Cannon AFB. Running Water Draw and Frio Draw, located about 10 and 20 miles, respectively, north of Cannon AFB, are the nearest streams. These are second-order streams. Both streams are very straight, flow southeast, and have rectilinear drainage patterns with short laterals (W-C 1991).

1.2 DEMOGRAPHICS AND LAND USE AT AND NEAR CANNON AFB

Cannon AFB is located just south of U.S. Highway 60-84 in a farming and ranching area (Figure 1-1, Appendix A). The majority of the SWMUs and AOCs addressed herein are located in an industrial/aircraft maintenance area of the Base (Figure 1-2, Appendix A). One SWMU 74, and three AOCs, D, G, and H, are the exceptions; at least a portion of these four sites are located in either a residential or a recreational (golf course) area.

The majority of the land surrounding Cannon AFB is productive, irrigated farmland or grassland. The major crops are wheat, sorghum, sugar beets, corn, cotton, alfalfa, barley, and peanuts. The land is also used for cattle grazing, both beef and dairy, and Clovis is considered the "Cattle Capital of the Southwest." There were 32,767 people living in Clovis in 1990, while the Cannon AFB population was estimated to be 4,650 in 1990 (W-C 1991).

1.3 CLIMATOLOGY

The climate of east-central New Mexico is classified as tropical semiarid, with summer temperature and precipitation maxima. Average monthly temperatures range from a January low of 12°C (39°F) to a July high of 26°C (78°F). Extreme daily temperatures range from -24°C

(-11°F) to 41°C (106°F) (Lee Wan and Associates 1990). Average monthly precipitation ranges from 1 cm (0.4 inches) in winter to 6.9 cm (2.7 inches) in July. The maximum recorded 24-hour rainfall is 12.2 cm (4.8 inches), which occurred in August. Rainfall occurs on eight or more days per month during the summer precipitation maximum. Mean annual precipitation is approximately 41 cm (16 inches). The mean annual evapotranspiration rate is 181.4 cm/yr (71.4 inches/yr) (Lee Wan and Associates 1990). Prevailing winds are from the west at an average of 5 km/hr (3.1 mph) during fall, winter, and spring. During the summer, winds are from the south at an average of 3.7 km/hr (2.3 mph).

The atmosphere around the area of Cannon AFB is generally well mixed. The seasonal and annual average mixing heights can vary from 400 meters in the morning to 4,000 meters in the afternoon. The afternoon mixing heights are typically greater during the spring and fall seasons. The morning mixing heights are usually low, due to nighttime heat loss from the ground, producing surface-based temperature inversions. After sunrise, these inversions break up, and solar heating of the earth's surface causes vertical mixing in the atmosphere.

Dust is frequently entrained into the atmosphere in this region of the country because of gusty winds and the semiarid climate. The Texas Panhandle-eastern New Mexico area is considered the worst area in the United States for windblown dust. Occasionally, this windblown dust is of sufficient quantity to restrict visibility. Most of the seasonal dust storms occur in March and April, when the wind speeds are typically high (average 5 km/hr) (W-C 1991).

1.4 GEOLOGY

The near-surface stratigraphic units of interest at Cannon AFB are the Late Miocene-Late Pliocene-age Ogallala Formation and the Early Triassic Dockum Group as shown in Figure 1-3, Appendix A.

The Dockum Group consists of three formations. The stratigraphically lowest unit is the Santa Rosa Sandstone. Overlying the Santa Rosa Sandstone are the Chinle and Redonda Formations. The Chinle and Redonda Formations are composed mainly of red shales with lesser interbedded sands, and are known locally as "redbeds." The top of the Dockum Group is marked by an erosional unconformity having relief of up to several hundred feet (Lee Wan and Associates 1990).

Overlying the Dockum Group redbeds is the Ogallala Formation. The Ogallala Formation extends from eastern New Mexico and Colorado into Texas, Oklahoma, Kansas, Nebraska, and South Dakota. Drillers' logs from Cannon AFB indicate that the Ogallala Formation varies from 360 feet to 415 feet in thickness. The incised upper surface of Triassic redbeds strongly influences Ogallala thickness. Paleo valleys in the post-Triassic unconformity are deep and trend dominantly east-west. Ogallala thickness may thus vary significantly over short north-south distances.

The Ogallala is erosionally truncated to the south along the abandoned Portales Valley, to the west along the Pecos River Valley, and to the north in a series of ephemeral stream valleys. The Ogallala Formation extends more than 125 miles to the east before terminating as an escarpment

in Briscoe County, Texas. Springs and seeps are common along the erosional margins of the Ogallala.

The Ogallala dips gently and monoclinally to the southeast in the vicinity of Cannon AFB. As reported in Lee Wan and Associates (1990), data suggest that some Quaternary warping may have occurred; however, most of the structures are well to the northwest and southwest of Cannon AFB. No faults or buried structural lineaments are known in the vicinity of Cannon AFB.

The Ogallala Formation is composed of unconsolidated poorly sorted gravel, sand, silts, and clays. The base of the Ogallala is generally marked by a gravel, cobble, and boulder deposit. This basal member contains sediments derived from igneous and sedimentary rocks transported from the mountains to the west. The Ogallala Formation was laid down as stream and overbank deposits formed within coalescing alluvial fans. These fans form a broad pediment along the eastern flank of the Rocky Mountains. As is typical of alluvial deposits, Ogallala internal stratigraphy varies vertically and horizontally over short distances.

Except where strongly cemented by calcium carbonate (caliche), the sediments of the Ogallala are loose and friable. Authigenic and allogenic clays are found as a trace to abundant matrix mineral (Lee Wan and Associates 1990). As reported by Lee Wan and Associates (1990), five zones have been distinguished within the Ogallala of east central New Mexico on the basis of clay minerals. Smectites (montmorillonites) and attapulgite (with sepeotite) are the dominant clays throughout the Ogallala. Illite is a lesser, but persistent clay, as is kaolinite. Smectite is a swelling clay, causing deep cracks to form in dry surface soils. Smectite in particular and, to a lesser extent, attapulgite and illite, are clays with moderate to high cation exchange capacities (CEC). The formation as a whole should therefore have a relatively high CEC, which should inhibit the migration of charged contaminants, and especially ionic forms of metals.

Caliche is a major feature of the Ogallala Formation, occurring as nearly continuous to discontinuous layers throughout. A generalized geologic section at Cannon AFB is shown in Figure 1-3, Appendix A. Caliche is hard, white to pale tan on fresh surfaces, weathering to gray, and has a chalky appearance. Caliche forms as calcium carbonate, leached from overlying sediments, and precipitates in the pore space of the host sediments. Precipitation is caused by the evaporation of downward percolating water. The caliche may thus mark the position of ancient vadose zones. As reported in Lee Wan and Associates (1990) radiocarbon dates for the upper "climax" caliche range from 27,000 yr. Before Present (B.P.) to 42,000 yr. B.P.

Caliche is relatively soluble in acidic water (pH < 7) or in waters containing dissolved CO_2. The top surface of the upper "climax" caliche in fresh outcrop shows solution etching.

The Ogallala has numerous continuous to discontinuous caliche layers throughout its thickness. The uppermost caliche, termed the "climax" caliche, is pisolitic (consisting of spherical concentrically laminated aggregates 1 to 10 mm in diameter (Lee Wan and Associates 1990). The pisolites are thought to have formed as the caliche was repeatedly chemically weathered and brecciated during Pleistocene pluvials (wet climate episodes) and later recemented during drier intervals. This upper caliche crops out around playas and the bounding escarpments of the

Ogallala, and is locally termed "caprock." The "climax" caliche is typically 3 to 5 feet thick. Caliches which occur lower in the Ogallala are platy and harder. Caliche may be thin or absent below playas (W-C 1991).

1.5 HYDROGEOLOGY

The lower portion of the Ogallala Formation is the primary regional aquifer for both potable and irrigation water. No deeper aquifers are utilized in the vicinity of Cannon AFB. The Ogallala aquifer is part of the High Plains Aquifer which extends continuously from Wyoming and South Dakota into New Mexico and Texas. In east central New Mexico, the Ogallala aquifer rests on Dockum Group redbeds, which serve as the basal confining layer. The Ogallala is a water table, or unconfined, aquifer (Lee Wan and Associates 1990). The Ogallala aquifer has a southeasterly regional gradient of about 13 feet/mile. Well yields vary from less than one gallon per minute (gpm) in thin silts and sands, and up to 1,600 gpm in thick sands and gravels (Lee Wan and Associates 1990). Water quality is generally good, with hardness and fluorides being somewhat high (Lee Wan and Associates 1990).

At Cannon AFB, the depth to groundwater is greater than 200 feet, and the Ogallala aquifer has an average saturated thickness of 120 feet based on mid-1960s data. Saturated thickness ranges from 93 to 143 feet, and is influenced by the configuration of the erosional nonconformity surface marking the top of the Dockum Group. The local groundwater gradient is southeasterly at 7.5 feet/mile (Lee Wan and Associates 1990). Figure 1-4, Appendix A, shows water table elevation contours for 1984. Flow within the saturated zone may be influenced by the configuration of the top of the Dockum Group. Yields in tests of Cannon AFB water wells have ranged from 776 L/min (205 gpm) to 4,353 L/min (1150 gpm). Specific capacities range from 0.14 m^3/m (11.4 gal/ft) to 0.35 m^3/m (27.9 gal/ft) (Lee Wan and Associates 1990).

Very rough estimates of hydraulic conductivity were made from well pump tests in water wells 5 and 9 (Figure 1-5, Appendix A) using the Theis equation. An estimate of hydraulic conductivity for water well 8 was based on water level recovery data using the Bouwer and Rice approach (Lee Wan and Associates 1990). The data used in these calculations were obtained to evaluate pump rates, efficiency, and well yield, and were not intended for use in calculating aquifer properties. The results of these calculations should therefore be considered as first approximations.

Hydraulic conductivity values for water wells 5 and 9 were found to be approximately 2.0×10^{-3} cm/sec. Calculations for water well 8 resulted in a hydraulic conductivity of 2.0×10^{-2} cm/sec. In addition, slug testing of two monitoring wells (MW-O and MW-N) was done by Woodward-Clyde in February 1995 (W-C 1995a). The estimated hydraulic conductivities from these slug tests were both 3×10^{-3} cm/sec. These estimates appear to be low when compared to published hydraulic conductivity data for sands and gravels. As reported in Lee Wan and Associates (1990) a groundwater flow velocity of about 45 m/yr (150 ft/yr) has been estimated. This calculates out to a hydraulic conductivity of approximately 1.0×10^{-1} cm/sec. Again, this appears to be low when compared with published data (Freeze and Cherry 1979).

The presence of interstitial clays may account for both the variability and low values of hydraulic conductivities. Boring logs from Cannon AFB IRP projects and published reports (Lee Wan and Associates 1990) indicated that interstitial and interstratified clays are abundant in the Ogallala Formation.

Recharge to the Ogallala is primarily through precipitation. As reported in Lee Wan and Associates (1990), a recharge rate of 0.5 inches/year was calculated using the Theis equation. Lee Wan and Associates (1990) reported that the recharge rate may be as much as 1.0 inches/yr. Due to the high evapotranspiration rate and low precipitation, recharge probably occurs only during heavy rainfall events in which the infiltration capacity of the soil is exceeded and runoff occurs, or during cool months when precipitation exceeds evapotranspiration. Excess runoff flows to playas, and the presence of water in playas may allow deep percolation to the aquifer. The occurrence of this process is evidenced by the presence of clay deposits in, and thin or nonexistent caliche layers directly below, playas. Caliche is soluble in acidic rain waters, and is leached over time to form percolation pathways.

Discharge from the Ogallala occurs through well pumping and springs along the eroded margins of the formation. Spring discharge does not occur on or near Cannon AFB. Domestic and irrigation water wells are common on and around the Base, however. The rate of discharge exceeds the rate of recharge. Water levels in the Ogallala have declined steadily from the 1930s to the present. A decline of 50 to 100 feet has been observed in the area around Clovis, New Mexico for the period from the 1930s to 1980. Lee Wan and Associates (1990), states "the largest area of water level decline exceeding 100 feet occurs south of the Canadian River extending from Curry Co., New Mexico to Crosby Co., Texas."

The dominant uses of groundwater in the Cannon AFB area are for potable and irrigation water. Numerous wells are found in the Cannon AFB area, most of which provide only irrigation water (Figure 1-5, Appendix A).

The Ogallala will continue to be used as the primary source of potable and irrigation water for eastern New Mexico. The New Mexico State Engineer designated Curry County as a Water Basin in 1989. This designation allows for regulation of water rights, usage, and well drilling (W-C 1991).

1.6 SOILS

Soils in the vicinity of Cannon AFB are classified as SM to SC under the Unified Classification Systems, and as aridisols (calciorthids) under the Soil Conservation Service Comprehensive Soil Classification System. The following summary is based on the Soil Conservation Service Curry County Soil Survey as reported in Lee Wan and Associates (1990).

The most common soil type on the Base is the Amarillo fine sandy loam, 0- to 2-percent slope phase (map symbol Ab Figure 1-6, Appendix A). This soil consists of a thin sandy A horizon, well-defined clayey B_{1-3} horizons, with a calcic B_3 horizon at depths below 40 inches. The calcic B_3 horizon lies on a calcic C horizon, or on caliche. The Amarillo fine sandy loam is present on

all relatively flat surfaces at the Base, but is also found on slopes associated with playas (map symbol Ac).

Clovis fine sandy loams, 0- to 2-percent slope phase (map symbol Cb) and 2- to 5-percent slope phase (map symbol Cc), are very similar to Amarillo fine sandy loams. In the Clovis soils, the depth to the calcic C horizon ranges from 28 to 56 inches. The depth to caliche exceeds 56 inches. Clovis and Amarillo fine sandy loams occur in close association.

In a few limited areas, particularly along the steeper slopes around playas, Mausker fine sandy loam, 0- to 2-percent slope phase (map symbol Ma), and 2- to 5-percent phase (map symbol Mb) are found. Mausker fine sandy loams have no B horizons and are very calcareous. The calcic C horizon is within 2 feet of the surface.

The A and B horizons of Amarillo and Clovis fine sandy loams are rapidly to moderately permeable. Mausker fine sandy loam A and Ac horizons are rapidly permeable. Permeabilities in calcic B and C horizons are moderate (Lee Wan and Associates 1990).

1.7 BACKGROUND METALS CONCENTRATIONS IN SOIL AND WATER QUALITY

The natural soils in the vicinity of Cannon AFB are alkaline and rich in metals in general. Typically high concentrations of aluminum, iron, magnesium, manganese, and potassium combine with elevated levels of many other metals in the natural soils. Calcium is naturally present in the soils at levels up to nearly 200,000 mg/kg. Tightly cemented layers of "caliche" are present in several horizons in the natural soils and the Ogallala aquifer below.

The background levels of inorganic compounds in surface and subsurface soil at Cannon AFB are presented in Table 1-1, Appendix B, in the form of a mean value and statistical information on the ranges encountered for each element. Table 1-1 has been adapted from a final report by Woodward-Clyde dated September 1997 entitled "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico." This report summarizes background data for soil from numerous past investigations in the vicinity.

The mean values and upper tolerance limits (UTLs) presented in Table 1-1, Appendix B, are the background levels used in the screening of soil chemical results for this RFI. In addition to comparison to the UTL of the Base-wide background data (which is necessarily from a limited data set), other sources of naturally occurring metals concentrations, such as USGS (1984), were considered when determining whether metals concentrations are within background levels.

1.8 BIOLOGICAL RESOURCES

Land adjacent to Cannon AFB is primarily used for agriculture, and there is little natural vegetation remaining in the area. The wildlife species that are common to agricultural areas throughout the region include bobwhite quail and pheasant. There are a few playa lakes in the

area; these are used by upland game for cover, by waterfowl for resting and feeding, and by wildlife in general for drinking. Nearby riverbeds also provide water sources during rainy seasons. During periods of low rainfall, the riverbeds are dry (W-C 1991).

1.8.1 Plant Resources

The climate of the Base area is considered to be semiarid. The thin layer of topsoil in the vicinity of Cannon AFB is sandy loam, which is highly susceptible to wind erosion. The undisturbed natural vegetation is mostly shortgrass prairie, including blue grama grassland and mixed grama grassland vegetation types, which have moderately fast recovery rates (W-C 1991).

Much of the study area has been previously cleared for agricultural crops. The predominant land use of the region is rangeland, primarily for cattle grazing. In general, moderately grazed rangeland areas of the types occurring in the project area are highly productive in terms of both forage quality and quantity. The rangeland in the vicinity may support up to 15 to 20 head of cattle per section, depending on the rainfall. Large trees do not uniformly exist in the vicinity of the range except where planted around buildings and other structures on the Base. Woodlands composed of large shrubs and small trees are confined to riparian areas and playa lakes in the vicinity (W-C 1991).

The following plants are candidate species for the Federal List of Endangered and Threatened Wildlife and Plants (CFR 1990) and are found within a 50-mile radius of Cannon AFB: chatterbox orchid (*Epipactus gigantea*), spiny aster (*Aster harridus*), Whittmans milkvetch (*Astragalus witmanii*), dune unicorn plant (*Proboscidea sabulosa*), and the tall plains spruce (*Eupjorbia strictior*). The dune unicorn plant is also on the state endangered plant species list. No federally protected endangered plants are known to be present on the Base (Lee Wan and Associates 1990).

1.8.2 Wildlife Resources

The eastern New Mexico area contains many nongame wildlife species that are typical of the High Plains. Most of these species are distributed widely throughout the western United States. Species diversity is low in most habitats because of the low vegetation diversity. Most amphibian species are associated with riparian habitats and playa lakes. Reptiles are found in all terrestrial habitat types, but are most abundant in scrub/grasslands. Nocturnal rodents are the most abundant members of the small mammal community.

Grasslands on the High Plains support a variety of seed-eating sparrows and other ground-dwelling birds, both as residents and migrants. Raptors (hawks and owls) are relatively abundant in all habitats in the region. Insectivorous and tree-nesting species are most abundant in riparian areas. Shorebirds and waterbirds and migratory waterfowl in general utilize the rivers, playa lakes, and reservoirs of the region.

Two National Wildlife Refuges (NWRs) are in the region surrounding Cannon AFB. The Grulla and Muleshoe NWRs are within 30 miles of Cannon AFB. These areas provide high-quality habitat for migratory and breeding waterfowl.

Big-game species in the area include mule deer, white-tailed deer, pronghorn, and barbary sheep. Pronghorn are the most abundant game animal in the area. Several species of upland game, such as quail, ring-necked pheasant, and turkey are common in the area. Reservoirs (Ute Lake, Conchas Lake, and Clayton Lake) and playa lakes are important waterfowl habitats in the region. Numerous species of native and introduced fish inhabit the rivers and perennial streams, and the reservoirs support recreational fishing of warm-water species such as walleye, crappie, channel catfish, largemouth bass, and bluegill.

As determined by the regional office of the U.S. Fish and Wildlife Service, two federally listed endangered animal species, the bald eagle and peregrine falcon, are known to inhabit the area within a 50-mile radius of Cannon AFB. The New Mexico Department of Game and Fish also indicated that the state endangered Mississippi Kite, Baird's Sparrow, and the Black-Footed Ferret may also occur in the vicinity of the Base. The federal- and state-protected species are listed in Table 1-2, Appendix B.

Within Curry County, the only state-protected bird that is expected to occur is the Mississippi Kite. In New Mexico, since the early 1960s, this kite summers regularly and breeds in the Clovis region. The birds frequent the golf course at Cannon AFB. Two other state-protected birds that may occur within Curry County are the McCown's Longspur and Baird's Sparrow. These two species have not been sighted regularly in recent years. No information is available on the McCown's Longspur in New Mexico; however, Baird's Sparrow occurs mainly in autumn during migration in the eastern plains and southern lowlands. Migrants appear as early as the first week of August and move further south by November. The species seems to have declined in abundance throughout its range in the Southwest due to the loss of shrubby shortgrass habitats.

State-protected birds known to occur infrequently are the bald eagle and the peregrine falcon. The bald eagle migrates and winters from the northern border of New Mexico to the Gila, lower Rio Grande, middle Pecos, and Canadian valleys. It is seen occasionally in summer and as a breeding bird, with nests reported in the extreme northern and western parts of the state. Winter and migrant populations appear to have increased with reservoir construction. The peregrine falcon is widely distributed but population numbers are low. The American subspecies breeds statewide in New Mexico, but mainly west of the eastern plains (Source: Draft Environmental Impact Statement - Cannon AFB 1990).

2.1 SUMMARY

SWMU 1, OWS No. 119, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected two organic compounds (acetone and toluene) and three metals (chromium, mercury, and nickel) at concentrations of potential concern in the area of SWMU 1. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 1, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 1, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 1.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

2.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

2.2.1 Site Description

SWMU 1, OWS No. 119, was located at the southwest corner of Building 119 (Figure 2-1 in Appendix A). The OWS was an underground concrete unit, which consisted of two compartments, a 700-gallon main compartment and a 260-gallon oil storage compartment. The OWS measured approximately 12 feet by 6 feet in plan and extended approximately 10 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water generated from aircraft maintenance operations in Building 119, an aircraft maintenance hangar. Recovered oils were stored in the 260-gallon oil storage compartment and wastewaters were discharged to storm water drainage.

2.2.2 Operational History

OWS No. 119 was active from approximately 1963 until the unit was partially removed in 1996 (USACE 1999). The OWS at SWMU 1 has been partially removed and no longer receives wash water. All wash water now enters the sanitary sewer system and is treated at the Cannon AFB wastewater treatment plant (WWTP).

2.3 LAND USE

2.3.1 Current

The current land use of the SWMU location is industrial.

2.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. The site of the OWS has been surveyed and identified by a brass survey marker. The creation of a Geographical Information System (GIS) database identifying the location is being developed. Use classification will continue to remain industrial in nature.

2.4 INVESTIGATIVE ACTIVITIES

2.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected two organic compounds and three metals at concentrations of potential concern in the area of SWMU 1. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 1, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 1, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 1.

2.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

2.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

2.4.2.2 Sampling Data Collection

Three borings, drilled to a depth of 10 feet in the area of the OWS, were sampled during the RFI (boring locations are shown in Figure 2-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed evidence of slight contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

2.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 1. In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

2.4.2.4 Results and Conclusions

One organic (toluene) and one metal (chromium) were detected at low concentrations in the surface soil samples collected from all three borings. However, these compounds were not detected in any of the subsurface samples analyzed. One organic (acetone) and two metals (mercury and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 2-1a and 2-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4.0×10^{-5} at SWMU 1, a level that fell within the U.S. Environmental Protection Agency (USEPA) target risk range of 1.0×10^{-4} to 1.0×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 1, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 1, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

2.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

2.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

2.4.3.2 Sampling Data Collection

After the OWS had been partially removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

2.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

2.4.3.4 Results and Conclusions

The OWS at SWMU 1 was pumped dry and cleaned. Then the determination was made that the unit would only be partially removed, due to the presence of an old high-pressure water line adjacent to the unit. The top 2 feet of the OWS were removed, and the unit's inlet and discharge pipes were disconnected and capped. The partial removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot. The analytical results for this investigation are shown in Tables 2-2a and 2-2b in Appendix B.

After partial removal of the OWS, one soil sample was collected approximately 2 feet beneath both the inlet and discharge pipes, one soil sample was collected from both the east and the west walls of the excavation, and two soil samples were collected from holes drilled through the bottom of the unit each at an approximate depth of 11 feet. A seventh, confirmatory sample was collected from the bottom of the excavation, at approximately 11 feet, and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH–DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the pipe and one of the wall samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 1. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels (W-C 1997a) for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

2.5 SITE CONCEPTUAL MODEL

2.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 1 included the drilling and sampling of a total of three borings to a depth of 10 feet. Two organic compounds and three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the partial removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels (W-C 1997a) for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 1 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

2.5.2 Environmental Fate

Contaminants encountered at OWS No. 119 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 1, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

2.6 SITE ASSESSMENTS

2.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 1. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 1.

2.6.2 Screening Assessments

2.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs (Table 2-2b in Appendix B) for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels (W-C 1997a) for arsenic at Cannon AFB. Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 1.

2.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

2.6.3 Risk Assessments

2.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4.0×10^{-5} at SWMU 1, a level that fell within the USEPA's target risk range of 1.0×10^{-4} to 1.0×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 1, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

2.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

2.6.4 Other Applicable Assessments

2.6.4.1 Surface Water

SWMU 1 contained no surface water.

2.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

2.6.4.3 Underground Storage Tanks (USTs)

OWS No. 119 included a 260-gallon underground oil storage compartment. This compartment was partially removed along with the unit's other compartments in 1996. There have been no other storage tanks associated with the area of SWMU 1.

2.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this

study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

2.7 NO FURTHER ACTION PROPOSAL

2.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 1.

2.7.2 Criterion

SWMU 1 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

3.1 SUMMARY

SWMU 3, OWS No. 108, has been listed as an Appendix II site. A Phase I RFI of the Appendix II sites (LRL 1993) detected two organic compounds (acetone and toluene) and four metals (barium, chromium, mercury, and nickel) at concentrations of potential concern in the area of SWMU 3. Based on the results of a limited risk assessment performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 3.

A Phase II RFI of the Appendix II sites (W-C 1997c) detected one organic compound and no metals at concentrations of potential concern at SWMU 3. However, the risk evaluation portion of the Phase II RFI report concluded that the maximum detected concentration of this chemical was within the acceptable excess carcinogenic risk range. Based on this, the Phase II RFI recommended NFA for SWMU 3.

The conclusions reached in the Phase I and Phase II RFIs were consistent in recommending NFA at this site based on the results of a Risk Assessment and a risk evaluation, respectively. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

3.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

3.2.1 Site Description

SWMU 3, OWS No. 108, was located to the west of former Hangar 125 (Figure 3-1 in Appendix A). The precise location of the unit is unknown, but it is believed to have been located approximately 8 feet west and 96 feet south of the northwest corner of what is now Building 108. The size and construction of the OWS is unknown. In fact, it is unknown whether this unit was an OWS or a grease trap. However, because the unit was referred to as an OWS in previous reports, it will also be referred to as an OWS herein. The unit reportedly received wastewater from Building 102 and waste wash water generated from aircraft maintenance operations in Hangar 121. Wastewaters from the unit were discharged to a sanitary sewer line.

3.2.2 Operational History

OWS No. 108 was active until approximately 1990 when the unit was removed during the demolition of Hangar 125 (W-C 1997c). The OWS at SWMU 3 has been removed and no longer receives wastewaters.

3.3 LAND USE

3.3.1 Current

The current land use of the SWMU location is industrial. The suspected former location of this OWS is currently covered with asphalt.

3.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 108 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

3.4 INVESTIGATIVE ACTIVITIES

3.4.1 Summary

The Phase I RFI of the Appendix II sites (LRL 1993) detected two organic compounds and four metals at concentrations of potential concern in the area of SWMU 3. However, the Risk Assessment portion of the Phase I RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 3, the Phase I RFI recommended NFA for this SWMU.

A Phase II RFI of the Appendix II sites (W-C 1997c) detected one organic compound and no metals at concentrations of potential concern at SWMU 3. However, the risk evaluation portion of the Phase II RFI report concluded that the maximum detected concentration of this chemical was within the acceptable excess carcinogenic risk range. Based on this, the Phase II RFI recommended NFA for SWMU 3.

3.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI) – Phase I

3.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

3.4.2.2 Sampling Data Collection

Three borings, drilled to a depth of 10 feet in the area of the former OWS unit, were sampled during the Phase I RFI (boring locations are shown in Figure 3-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5, and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed potential evidence of slight contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

3.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 3.

In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

3.4.2.4 Results and Conclusions

One organic (toluene) and two metals (chromium and nickel) were detected at low concentrations in the surface soil samples collected from one or more borings. One organic (acetone) and three metals (barium, mercury, and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 3-1a and 3-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 3, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 3, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the Phase I RFI for all 15 SWMUs covered by the Phase I RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 3, the Phase I RFI recommended NFA at this SWMU.

3.4.3 Investigation #2 Appendix II RFI – Phase II

3.4.3.1 Non-Sampling Data Collection

The purpose of the Phase II RFI was to evaluate whether a release of SWMU-related chemicals had occurred from SWMU 3 that could pose a significant risk to human health or the environment. In addition, the Phase II included a risk screening to verify whether the recommendation for NFA based on the Phase I RFI was appropriate for SWMU 3, and to characterize the vertical extent of contamination in this area.

3.4.3.2 Sampling Data Collection

Three soil borings were drilled to a depth of approximately 20 feet in the area of the former OWS (boring locations are shown in Figure 3-1 in Appendix A), and 15 soil samples were collected and analyzed from these borings. The borings were drilled in a triangular pattern with each boring located approximately 15 feet from the presumed location of the former OWS. The boring locations were chosen to further assess the lateral presence and extent of site-related soil contaminants.

Surface soil samples were collected from the from the 0- to 2.0-foot depth interval in all three borings. Subsurface soil samples were also collected from each boring at the 3- to 5-foot, the 8- to 10-foot, the 13- to 15-foot, and the 18- to 20-foot depth intervals. Target analytes included VOCs, SVOCs, TAL metals, and TRPH.

3.4.3.3 Data Gaps

Sufficient data was collected during the Phase II RFI to further characterize the nature and extent of contamination and conduct a risk screening at this SWMU. There were no sampling issues associated with the Phase II RFI that adversely affected data usability. In addition, the analytical data was judged acceptable for determining the nature and extent of contamination in the area of SWMU 3, and for completing the human health risk screening. Therefore, no data gaps existed.

3.4.3.4 Results and Conclusions

The analytical results of the Phase II RFI are presented in Table 3-2 in Appendix B. The maximum detected concentration of one organic compounds (benzo(a)pyrene) exceeded the corresponding USEPA Region III RBC for residential soil (USEPA 1994). However, the estimated risk from this compound fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic compounds. In addition, the maximum detected concentration did not exceed the RBC for industrial soil.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

Because there were no unacceptable health risks associated with SWMU 3, the Phase II RFI recommended that no further investigation was necessary for this SWMU.

3.5 SITE CONCEPTUAL MODEL

3.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 3 included the drilling and sampling of three borings to a depth of 10 feet. Two organic compounds and four metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the Phase I RFI report concluded

that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

A Phase II RFI of the Appendix II sites (W-C 1997c) detected one organic compound and no metals at concentrations of potential concern at SWMU 3. However, the risk evaluation portion of the Phase II RFI report concluded that the maximum detected concentration of this chemical was within the acceptable excess carcinogenic risk range. Based on this, the Phase II RFI recommended NFA for SWMU 3.

Groundwater at SWMU 3 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

3.5.2 Environmental Fate

Contaminants encountered at OWS No. 108 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air - volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 3, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

3.6 SITE ASSESSMENTS

3.6.1 Summary

The Phase I RFI included a risk assessment portion and the Phase II RFI included a risk evaluation for SWMU 3. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 3.

3.6.2 Screening Assessments

3.6.2.1 Human Health

The risk assessment portion of the Phase I RFI was actually a screening assessment, and included a comparison of data that exceeded the established background levels (W-C 1997a) to accepted risk-based remediation objectives.

The Phase II RFI's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The comparison is shown in Table 3-2b in Appendix B. The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with Phase II RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding RBCs at SWMU 3.

3.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or Phase II RFI, but a human health risk screening/evaluation was included in the Phase II RFI. Detected chemical concentrations attributable to SWMU contamination did not significantly exceed the screening criteria. The Region III RBCs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

3.6.3 Risk Assessments

3.6.3.1 Human Health

Based on the results of the risk assessment portion of the Phase I RFI and the risk evaluation portion of the Phase II RFI (both of which were actually risk screenings), a full-scale human health risk assessment was not warranted for SWMU 3.

3.6.3.2 Ecological

Based on the results of the risk assessment portion of the Phase I RFI and the risk evaluation portion of the Phase II RFI (both of which were actually risk screenings), a full-scale ecological risk assessment was not warranted for SWMU 3.

3.6.4 Other Applicable Assessments

3.6.4.1 Surface Water

SWMU 3 contained no surface water.

3.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

3.6.4.3 Underground Storage Tanks (USTs)

OWS No. 108 may have included an oil UST as one of the unit's compartments. However, the entire unit and all of its compartments were removed in 1990.

3.6.4.4 Other

In 1987-1988, the Tulsa District of the Army Corps of Engineers collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

3.7 NO FURTHER ACTION PROPOSAL

3.7.1 Rationale

Based on the conclusions reached in the Phase II RFI, NFA has been recommended for SWMU 3.

3.7.2 Criterion

SWMU 3 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

4.1 SUMMARY

SWMU 5, OWS No. 121, has been listed as an Appendix II site. A Phase I RFI of the Appendix II sites (LRL 1993) detected one organic compound (acetone) and three metals (barium, mercury and nickel) at concentrations of potential concern in the area of SWMU 5. Based on the results of a limited risk assessment performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 5.

A Phase II RFI of the Appendix II sites (W-C 1997c) did not detect any chemicals at concentrations of potential concern at SWMU 5. Based on this, the Phase II RFI recommended NFA for SWMU 5.

The conclusions reached in the Phase I and Phase II RFIs were consistent in recommending NFA at this site based on the results of a Risk Assessment and a risk evaluation, respectively. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

4.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

4.2.1 Site Description

SWMU 5, OWS No. 121, was located to the west of former Hangar 121 (Figure 4-1 in Appendix A). The precise location of the unit is unknown, but it is believed to have been located approximately 140 feet southwest of Building 123 and approximately 135 feet southeast of Building 112. The size and construction of the OWS is unknown. In fact, it is unknown whether this unit was an OWS or a grease trap. However, because the unit was referred to as an OWS in previous reports, it will also be referred to as an OWS herein. The unit reportedly received wastewater from Buildings 102 and 125 and waste wash water generated from aircraft maintenance operations in Hangar 121. Wastewaters from the unit were discharged to a sanitary sewer line.

4.2.2 Operational History

OWS No. 121 was active until approximately 1990 when the unit was removed during the demolition of Hangar 121 (W-C 1997c). The OWS at SWMU 5 has been removed and no longer receives wastewaters.

4.3 LAND USE

4.3.1 Current

The current land use of the SWMU location is industrial. The suspected former location of this OWS is currently covered with asphalt.

4.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 121 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

4.4 INVESTIGATIVE ACTIVITIES

4.4.1 Summary

The Phase I RFI of the Appendix II sites (LRL 1993) detected one organic compound and three metals at concentrations of potential concern in the area of SWMU 5. However, the Risk Assessment portion of the Phase I RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 5, the Phase I RFI recommended NFA for this SWMU.

A Phase II RFI of the Appendix II sites (W-C 1997c) did not detect any chemicals at concentrations of potential concern at SWMU 5. Based on this, the Phase II RFI recommended NFA for SWMU 5.

4.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI) – Phase I

4.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

4.4.2.2 Sampling Data Collection

Three borings, each drilled to a depth of 10 feet in the area of the former OWS unit, were sampled during the Phase I RFI (boring locations are shown in Figure 4-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5, and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed potential evidence of slight contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

4.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 5. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

4.4.2.4 Results and Conclusions

No organics or metals were detected in the surface soil samples collected from the three borings. One organic (acetone) and three metals (barium, mercury and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 4-1a and 4-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

Based on the results of a limited risk assessment performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 5.

4.4.3 Investigation #2 Appendix II RFI – Phase II

4.4.3.1 Non-Sampling Data Collection

The purpose of the Phase II RFI was to evaluate whether a release of SWMU-related chemicals had occurred from SWMU 5 that could pose a significant risk to human health or the environment. In addition, the Phase II included a risk screening to verify whether the recommendation for NFA based on the Phase I RFI was appropriate for SWMU 5, and to characterize the vertical extent of contamination in this area.

4.4.3.2 Sampling Data Collection

Three soil borings were drilled to a depth of approximately 20 feet and a fourth boring was drilled to a depth of approximately 34.5 feet in the area of the former OWS (boring locations are shown in Figure 4-1 in Appendix A), and 17 soil samples were collected and analyzed from these borings. The boring locations were chosen to further assess the lateral presence and extent of site-related soil contaminants.

Surface soil samples were collected from the from the 0- to 2.0-foot depth interval in the three 20-foot borings. Subsurface soil samples were also collected from each of the three 20-foot borings at the 3- to 5-foot, the 8- to 10-foot, the 13- to 15-foot, and the 18- to 20-foot depth intervals. Subsurface soil samples were collected from the 34.5-foot boring at the 28- to 29-foot and the 33- to 34.5-foot depth intervals. Target analytes included VOCs, SVOCs, TAL metals, and TRPH.

4.4.3.3 Data Gaps

Sufficient data was collected during the Phase II RFI to further characterize the nature and extent of contamination and conduct a risk screening at this SWMU. There were no sampling issues associated with the Phase II RFI that adversely affected data usability. In addition, the analytical data was judged acceptable for determining the nature and extent of contamination in the area of SWMU 5, and for completing the human health risk screening. Therefore, no data gaps existed.

4.4.3.4 Results and Conclusions

The analytical results of the Phase II RFI are presented in Table 4-2a in Appendix B. The maximum concentrations of all detected chemicals did not exceed the corresponding USEPA Region III RBC for residential soil (USEPA 1994) (see Table 4-2b in Appendix B).

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

Because there were no unacceptable health risks associated with SWMU 5, the Phase II RFI recommended that no further investigation was necessary for this SWMU.

4.5 SITE CONCEPTUAL MODEL

4.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 5 included the drilling and sampling of three borings to depths of 10 feet. One organic compound and three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the Phase I RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

A Phase II RFI of the Appendix II sites (W-C 1997c) did not detect any chemicals at concentrations of potential concern at SWMU 5. Based on this, the Phase II RFI recommended NFA for SWMU 5.

Groundwater at SWMU 5 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

4.5.2 Environmental Fate

Contaminants encountered at OWS No. 121 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 5, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

4.6 SITE ASSESSMENTS

4.6.1 Summary

The Phase I RFI included a risk assessment portion and the Phase II RFI included a risk evaluation for SWMU 5. Based on the results of the risk assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 5.

4.6.2 Screening Assessments

4.6.2.1 Human Health

The risk assessment portion of the Phase I RFI was actually a screening assessment, and included a comparison of data that exceeded the established background levels (W-C 1997a) to accepted risk-based remediation objectives.

The Phase II RFI's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The comparison is shown in Table 4-2b in Appendix B. The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with Phase II RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding RBCs at SWMU 5.

4.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or Phase II RFI, but a human health risk screening/evaluation was included in the Phase II RFI. Detected chemical concentrations attributable to SWMU contamination did not significantly exceed the screening criteria. The Region III RBCs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

4.6.3 Risk Assessments

4.6.3.1 Human Health

Based on the results of the risk assessment portion of the Phase I RFI and the risk evaluation portion of the Phase II RFI (both of which were actually risk screenings), a full-scale human health risk assessment was not warranted for SWMU 5.

4.6.3.2 Ecological

Based on the results of the risk assessment portion of the Phase I RFI and the risk evaluation portion of the Phase II RFI (both of which were actually risk screenings), a full-scale ecological risk assessment was not warranted for SWMU 5.

4.6.4 Other Applicable Assessments

4.6.4.1 Surface Water

SWMU 5 contained no surface water.

4.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

4.6.4.3 Underground Storage Tanks (USTs)

OWS No. 121 may have included an oil UST as one of the unit's compartments. However, the entire unit and all of its compartments were removed in 1990.

4.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

4.7 NO FURTHER ACTION PROPOSAL

4.7.1 Rationale

Based on the conclusions reached in the Phase II RFI, NFA has been recommended for SWMU 5.

4.7.2 Criterion

SWMU 5 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

5.1 SUMMARY

SWMU 7, Oil/Water Separator (OWS) No. 129, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected three organic compounds (acetone, toluene, and xylenes) and four metals (arsenic, chromium, mercury, and nickel) at concentrations of potential concern in the area of SWMU 7. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 7, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 7, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 7.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

5.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

5.2.1 Site Description

SWMU 7, OWS No. 129, a grease or sand trap that had been misidentified as an OWS, was located adjacent to the northwest side of Building 129 (Figure 5-1 in Appendix A), and just south of Building 116. For the purposes of this report, this unit will be referenced herein as an OWS. The OWS was an underground concrete unit that consisted of one compartment of unknown capacity. The OWS measured approximately 5 feet by 7 feet in plan and extended approximately 5.5 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water generated from aircraft maintenance operations in Building 119, an aircraft maintenance hangar. Wastewaters from the unit were discharged to a storm sewer line.

5.2.2 Operational History

OWS No. 129 was active from approximately 1943 until the unit was removed in 1996 (USACE 1999). The OWS at SWMU 7 has been removed and no longer receives waste wash water.

5.3 LAND USE

5.3.1 Current

The current land use of the SWMU location is industrial.

5.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 129 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

5.4 INVESTIGATIVE ACTIVITIES

5.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected three organic compounds and four metals at concentrations of potential concern in the area of SWMU 7. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 7, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 7, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 7.

5.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

5.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

5.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 6-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5, and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed no evidence of contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, twelve soil samples were sent for chemical analyses.

5.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 7. In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

5.4.2.4 Results and Conclusions

Three organics (acetone, toluene and xylenes) and two metals (arsenic and chromium) were detected at low concentrations in the surface soil samples collected from at least one of the three borings. One organic (acetone) and two metals (mercury and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 5-1a and 5-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 7, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 7, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 7, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

5.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

5.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

5.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

5.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

5.4.3.4 Results and Conclusions

The OWS at SWMU 7 was pumped dry and cleaned. Then the unit was excavated by hand, due to the proximity of Building 116, a high-voltage electrical facility. No stained soil or fuel odors were observed during the excavation activities. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 8 feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom, at approximately 8 feet of depth, and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH – diesel-range organics (DRO), total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are shown in Tables 5-2a and 5-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 7. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

5.5 SITE CONCEPTUAL MODEL

5.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 7 included the drilling and sampling of a total of three borings to depths of 10 feet. Three organic compounds and four metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 7 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

5.5.2 Environmental Fate

Contaminants encountered at OWS No. 129 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 7, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

5.6 SITE ASSESSMENTS

5.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 7. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 7.

5.6.2 Screening Assessments

5.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB. Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 7.

5.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

5.6.3 Risk Assessments

5.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 7, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 7, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

5.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels. All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

5.6.4 Other Applicable Assessments

5.6.4.1 Surface Water

SWMU 7 contained no surface water.

5.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

5.6.4.3 Underground Storage Tanks (USTs)

OWS No. 129 was actually a single-compartment grease or sand trap constructed of concrete. This unit was removed in 1996.

5.6.4.4 Other

In 1987-1988, the Tulsa District of the Army Corps of Engineers collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

5.7 NO FURTHER ACTION PROPOSAL

5.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 7.

5.7.2 Criterion

SWMU 7 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

6.1 SUMMARY

SWMU 8, OWS No. 165, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected one organic compound (xylenes) and three metals (barium, chromium, and nickel) at concentrations of potential concern in the area of SWMU 8. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 8, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 8, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 8.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

6.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

6.2.1 Site Description

SWMU 8, OWS No. 165, was located at the east end of the aircraft washrack Facility 165 (Figure 6-1 in Appendix A). The OWS was an underground concrete unit that consisted of three compartments with a 4,500-gallon main compartment and a 710-gallon oil storage compartment. The OWS measured approximately 21 feet by 12 feet in plan and extended approximately 10 feet below the surface. The top of the unit sat approximately 1 foot above the surrounding ground surface. The unit reportedly received waste wash water generated from the aircraft washrack. Recovered oils were stored in the 710-gallon oil storage compartment and wastewaters were discharged to a sanitary sewer line.

6.2.2 Operational History

OWS No. 165 was active from approximately 1963 until the unit was partially removed in 1996 (USACE 1999). The OWS at SWMU 8 has been partially removed and no longer receives waste wash water

6.3 LAND USE

6.3.1 Current

The current land use of the SWMU location is industrial.

6.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 165 has been partially removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

6.4 INVESTIGATIVE ACTIVITIES

6.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected one organic compound and three metals at concentrations of potential concern in the area of SWMU 8. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 8, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 8, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 8.

6.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

6.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

6.4.2.2 Sampling Data Collection

Three borings, drilled to a depth of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 6-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed evidence of slight contamination in one of the borings during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

6.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 8.

In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

6.4.2.4 Results and Conclusions

No organics or metals were detected in the surface soil samples collected from the three borings. One organic compound (xylenes) and three metals (barium, chromium, and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 6-1a and 6-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 8, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 8, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 8, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

6.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

6.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

6.4.3.2 Sampling Data Collection

After the OWS had been partially removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

6.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

6.4.3.4 Results and Conclusions

The OWS at SWMU 8 was pumped dry and cleaned. Then the determination was made that the unit would only be partially removed, due to its proximity to the concrete washrack slab. All of the OWS, except the bottom, was removed, and the inlet and discharge pipes leading to and from the unit were disconnected and capped. The partial removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from beneath both the inlet and discharge pipes, one soil sample was also collected from both the east and the west walls of the excavation, and two soil samples were collected from holes drilled through the bottom of the unit each at an approximate depth of 12 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at approximately 12 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH –DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the pipe and one of the wall samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 6-2a and 6-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 8. Arsenic was the only compound detected in a concentration that exceeded the corresponding MSSL. However, the maximum concentration of arsenic detected fell within the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

6.5 SITE CONCEPTUAL MODEL

6.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 8 included the drilling and sampling of a total of three borings to a depth of 10 feet. One organic compound and three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the partial removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound detected that exceeded the corresponding MSSL. However, the maximum concentration of arsenic detected fell within the established background levels for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 8 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

6.5.2 Environmental Fate

Contaminants encountered at OWS No. 165 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 8, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

6.6 SITE ASSESSMENTS

6.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 8. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 8.

6.6.2 Screening Assessments

6.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

The maximum arsenic concentration detected during the Corrective Measure Completion exceeded the Region VI MSSLs for both carcinogenic arsenic and noncarcinogenic arsenic. However, the maximum concentration of arsenic detected falls within the established background levels for arsenic at Cannon AFB. Therefore, it has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 8.

6.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

6.6.3 Risk Assessments

6.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 8, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 8, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

6.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels. All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

6.6.4 Other Applicable Assessments

6.6.4.1 Surface Water

SWMU 8 contained no surface water.

6.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet, as such this SWMU contained no means for groundwater discharges to occur.

6.6.4.3 Underground Storage Tanks (USTs)

OWS No. 165 included a 710-gallon underground oil storage compartment. This compartment was partially removed along with the unit's other compartments in 1996. There have been no other storage tanks associated with the area of SWMU 1.

6.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

6.7 NO FURTHER ACTION PROPOSAL

6.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 8.

6.7.2 Criterion

SWMU 8 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

7.1 SUMMARY

SWMU 9, Aircraft Washrack Drain System, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected four organic compounds (acetone, tetrachloroethene, toluene and xylenes) and three metals (barium, chromium, and nickel) at concentrations of potential concern in the area of SWMU 9. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 9, the RFI recommended NFA for SWMU 9.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the Aircraft Washrack Drain System at SWMU 9, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 9.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

7.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

7.2.1 Site Description

SWMU 9, Aircraft Washrack Drain System, was a drain/sandtrap located in the center of a concrete washrack pad used to clean aircraft (Figure 7-1 in Appendix A). The washrack pad sloped to the Aircraft Washrack Drain System, which discharged to OWS No. 165 (SWMU 8). The Aircraft Washrack Drain System measured approximately 5 feet by 4 feet in plan and extended approximately 5 feet below the paved surface. The unit reportedly received waste wash water generated from aircraft cleaning operations at the washrack. Wastewaters from the unit were discharged to a sanitary sewer line.

7.2.2 Operational History

The Aircraft Washrack Drain System was active from approximately 1966 until the unit was removed in 1996 (USACE 1999). The Aircraft Washrack Drain System at SWMU 9 has been removed and no longer receives waste wash water.

7.3 LAND USE

7.3.1 Current

The current land use of the SWMU location is industrial.

7.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the Aircraft Washrack Drain System has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

7.4 INVESTIGATIVE ACTIVITIES

7.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected four organic compounds and three metals at concentrations of potential concern in the area of SWMU 9. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 9, the RFI recommended NFA for SWMU 9.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the Aircraft Washrack Drain System at SWMU 9, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 9.

7.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

7.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

7.4.2.2 Sampling Data Collection

Four borings, drilled to depths of 20 feet in the area of the Aircraft Washrack Drain System unit, were sampled during the RFI (boring locations are shown in Figure 7-1 in Appendix A). Soil samples were collected at the surface and from depths of, 5, 10, 15 and 20 feet to characterize the distribution of potential contaminants. Field screening with a PID detected readings as high as 480 parts per million during this investigation, indicating the potential presence of contamination in all four borings.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 20 soil samples were sent for chemical analyses.

7.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 9.

In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

7.4.2.4 Results and Conclusions

Four organics (acetone, tetrachloroethene, toluene, and xylenes) and three metals (barium, chromium and nickel) were detected at low concentrations in the surface soil samples collected from at least one of the three borings. One organic (acetone) and two metals (barium and chromium) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 7-1a and 7-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 9, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 9, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 9, the RFI recommended NFA for this SWMU.

7.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

7.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

7.4.3.2 Sampling Data Collection

After the Aircraft Washrack Drain System had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

7.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

7.4.3.4 Results and Conclusions

The Aircraft Washrack Drain System at SWMU 9 was pumped dry and cleaned. Two feet of soil surrounding the unit was excavated, and the drain system was removed from the excavation in pieces. Stained soil and fuel odors were observed during the excavation activities in the area of the 8-inch pipe that connected SWMU 9 to SWMU 8.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 8 feet. Two additional samples were collected from the sand trap outlet areas, each at an approximate depth of 4 feet. A ninth, confirmatory sample was collected from the center of the excavation's bottom at approximately 8 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the outlet samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 7-2a and 7-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 9. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

7.5 SITE CONCEPTUAL MODEL

7.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 9 included the drilling and sampling of a total of four borings to depths of 20 feet. Four organic compounds and three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the partial removal of the Aircraft Washrack Drain System from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a, so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 9 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

7.5.2 Environmental Fate

Contaminants encountered at Aircraft Washrack Drain System could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 9, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

7.6 SITE ASSESSMENTS

7.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 9. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 9.

7.6.2 Screening Assessments

7.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 9.

7.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

7.6.3 Risk Assessments

7.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 9, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 9, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

7.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

7.6.4 Other Applicable Assessments

7.6.4.1 Surface Water

SWMU 9 contained no surface water.

7.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

7.6.4.3 Underground Storage Tanks (USTs)

The Aircraft Washrack Drain System was actually a single-compartment drain or sand trap constructed of concrete. This unit was removed in 1996.

7.6.4.4 Other

In 1987-1988, the Tulsa District of the Army Corps of Engineers collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

7.7 NO FURTHER ACTION PROPOSAL

7.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 9.

7.7.2 Criterion

SWMU 9 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

8.1 SUMMARY

SWMU 11, OWS No. 170, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected one organic compound (methylene chloride) and two metals (mercury and nickel) at concentrations of potential concern in the area of SWMU 11. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 11, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 11, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 11.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

8.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

8.2.1 Site Description

SWMU 11, OWS No. 170, was located on the west side of Building 170 (Figure 8-1 in Appendix A). The OWS was an underground concrete unit consisting of three compartments. The OWS measured approximately 5 feet by 7 feet in plan and extended approximately 5.5 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received effluent from the drains in Building 170, an aircraft maintenance hangar. Wastewaters from the unit discharged to a sanitary sewer line.

8.2.2 Operational History

OWS No. 170 was active from approximately 1963 until approximately 1989. The unit was removed in 1996 (USACE 1999). The OWS at SWMU 11 has been removed and no longer receives waste wash water.

8.3 LAND USE

8.3.1 Current

The current land use of the SWMU location is industrial.

8.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 170 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

8.4 INVESTIGATIVE ACTIVITIES

8.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected one organic compound (methylene chloride) and two metals (mercury and nickel) of potential concern in the area of SWMU 11. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 11, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 11, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 11.

8.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

8.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

8.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 8-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID detected low-level readings up to 6.0 mg/kg during this investigation, indicating the potential presence of contamination in all three borings.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

8.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 11.

In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

8.4.2.4 Results and Conclusions

Low levels of VOCs were detected at insignificant concentrations in the surface soil samples collected at this SWMU. One organic (methylene chloride) and two metals (mercury and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 8-1a and 8-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 11, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 11, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 11, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

8.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

8.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

8.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

8.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

8.4.3.4 Results and Conclusions

The OWS at SWMU 11 was pumped dry and cleaned. The unit was then excavated routinely and without incident. No staining was observed on the exterior walls of the unit during the excavation activities. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of eight to nine feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom at approximately 9 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH–DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 8-2a and 8-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for background soil concentrations to determine if a significant release had occurred in the area of SWMU 11. Barium was the only compound detected at a concentration that exceeded the corresponding MSSL. However, the maximum concentration of barium detected (456 mg/kg) fell below both the established background level for barium at Cannon AFB (805 mg/kg) (W-C 1997a) and the MSSL for residential soil (5,300 mg/kg), so the elevated concentration of barium was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases, posing an unacceptable human health risk for any potential exposure pathway, had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

8.5 SITE CONCEPTUAL MODEL

8.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 11 included the drilling and sampling of a total of three borings to depths of 10 feet. One organic compound and two metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the partial removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Barium was the only compound detected that exceeded the corresponding MSSL for background soil. However, the maximum concentration of barium detected fell below the established background levels for metals at Cannon AFB (W-C 1997a) and the MSSL for residential soil, so the elevated concentration of barium was dismissed as naturally occurring.

Groundwater at SWMU 11 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

8.5.2 Environmental Fate

Contaminants encountered at OWS No. 170 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 11, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

8.6 SITE ASSESSMENTS

8.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 11. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 11.

8.6.2 Screening Assessments

8.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for background soil concentrations to determine if a significant release had occurred in the area of SWMU 11. Barium was the only compound detected at a concentration that exceeded the corresponding MSSL. However, the maximum concentration of barium detected (456 mg/kg) fell below both the established background level for barium at Cannon AFB (805 mg/kg) (W-C 1997a) and the MSSL for residential soil (5,300 mg/kg), so the elevated concentration of barium was dismissed as naturally occurring.

8.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

8.6.3 Risk Assessments

8.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 11, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 11, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

8.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

8.6.4 Other Applicable Assessments

8.6.4.1 Surface Water

SWMU 11 contained no surface water.

8.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

8.6.4.3 Underground Storage Tanks (USTs)

OWS No. 170 consisted of three compartments, one of which was an oil storage tank of unknown size. The unit was removed in 1996.

8.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

8.7 NO FURTHER ACTION PROPOSAL

8.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 11.

8.7.2 Criterion

SWMU 11 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

9.1 SUMMARY

SWMU 16, OWS No. 680, has been listed as an Appendix II site. A Phase I RFI of the Appendix II sites (LRL 1993) detected three metals (lead, mercury and nickel) at concentrations of potential concern in the area of SWMU 16. Based on the results of a limited risk assessment performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 16.

A Phase II RFI of the Appendix II sites (W-C 1997c) was planned for SWMU 16, but was not conducted because of the presence of a garage and numerous subsurface utilities in the area of the former location of this SWMU.

The conclusions reached in the Phase I RFI recommended NFA at this site based on the results of a Risk Assessment. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

9.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

9.2.1 Site Description

SWMU 16, OWS No. 680, was formerly located near the southwest of Building 680 (Figure 9-1 in Appendix A). The concrete OWS was a three-compartment unit with a 584-gallon main compartment and a 140-gallon oil storage compartment. The unit reportedly received wastewater generated from aircraft washing and maintenance operations.

9.2.2 Operational History

OWS No. 680 was active from approximately 1965 until approximately 1991 when the unit was removed during building renovations (W-C 1997c). The separator unit was replaced with a new OWS located approximately 15 feet east of this SWMU. The OWS at SWMU 16 has been removed and no longer receives wastewaters.

9.3 LAND USE

9.3.1 Current

The current land use of the SWMU location is industrial. The site of the former separator unit is presently located inside a garage and is covered with concrete pavement.

9.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 680 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

9.4 INVESTIGATIVE ACTIVITIES

9.4.1 Summary

The Phase I RFI of the Appendix II sites (LRL 1993) detected three metals at concentrations of potential concern in the area of SWMU 16. However, the Risk Assessment portion of the Phase I RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 16, the Phase I RFI recommended NFA for this SWMU.

A Phase II RFI of the Appendix II sites (W-C 1997c) did not detect any chemicals at concentrations of potential concern at SWMU 16. Based on this, the Phase II RFI recommended NFA for SWMU 16.

9.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI) – Phase I

9.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

9.4.2.2 Sampling Data Collection

Three borings, each drilled to a depth of 10 feet in the area of the former OWS unit, were sampled during the Phase I RFI (boring locations are shown in Figure 9-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5, and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed potential evidence of slight contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

9.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 16. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

9.4.2.4 Results and Conclusions

No organics or metals were detected in the surface soil samples collected from the three borings. One organic (acetone) and three metals (barium, mercury, and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Table 9-1 in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 16, a level that fell within USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 16, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the Phase I RFI for all 15 SWMUs covered by the Phase I RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 16, the Phase I RFI recommended NFA at this SWMU.

9.5 SITE CONCEPTUAL MODEL

9.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 16 included the drilling and sampling of three borings to depths of 10 feet. Three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the Phase I RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable risk ranges.

Groundwater at SWMU 16 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

9.5.2 Environmental Fate

Contaminants encountered at OWS No. 680 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement

within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at SWMU 16, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

9.6 SITE ASSESSMENTS

9.6.1 Summary

The Phase I RFI included a risk assessment portion for SWMU 16. Based on the results of the risk assessment, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, no further response action was recommended for SWMU 16.

9.6.2 Screening Assessments

9.6.2.1 Human Health

The risk assessment portion of the Phase I RFI was actually a screening assessment, and included a comparison of data that exceeded the established background levels (W-C 1997a) to accepted risk-based remediation objectives.

No COPCs were detected at concentrations exceeding the corresponding RBCs at SWMU 16.

9.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI, but the screening criteria are highly conservative, and as such are protective of ecological and human health.

9.6.3 Risk Assessments

9.6.3.1 Human Health

Based on the results of the risk assessment portion of the Phase I (actually a risk screening), a full-scale human health risk assessment was not warranted for SWMU 16.

9.6.3.2 Ecological

Based on the results of the risk assessment portion of the Phase I (actually a risk screening), a full-scale ecological risk assessment was not warranted for SWMU 16.

9.6.4 Other Applicable Assessments

9.6.4.1 Surface Water

SWMU 16 contained no surface water.

9.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

9.6.4.3 Underground Storage Tanks (USTs)

OWS No. 680 included an oil UST. However, the entire unit and all of its compartments were removed in 1990.

9.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

9.7 NO FURTHER ACTION PROPOSAL

9.7.1 Rationale

Based on the conclusions reached in the Phase I RFI, NFA has been recommended for SWMU 16.

9.7.2 Criterion

SWMU 16 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

10.1 SUMMARY

SWMU 32A, OWS No. 186 (#1 - East), has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected one organic compound, xylenes, and three metals, barium, mercury and nickel, at concentrations of potential concern in the area of SWMU 32A. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 32A, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 32A, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 32A.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

10.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

10.2.1 Site Description

SWMU 32A, OWS No. 186 (#1 - East), was located on the east side of Building 186 (Figure 10-1 in Appendix A), on the flightline side and adjacent to a washrack. The OWS was an underground concrete unit consisting of two compartments, each of which had a 300-gallon capacity. The OWS measured approximately 6 feet by 6 feet in plan and extended approximately 7.5 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water generated from the aircraft washrack. Wastewaters from the unit were discharged to a sanitary sewer line.

10.2.2 Operational History

OWS No. 186 (#1 - East) was active from approximately 1971 until the unit was removed in 1997 (USACE 1999). The OWS at SWMU 32A has been removed and no longer receives waste wash water.

10.3 LAND USE

10.3.1 Current

The current land use of the SWMU location is industrial.

10.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 186 (#1 - East) has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

10.4 INVESTIGATIVE ACTIVITIES

10.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected one organic compound and three metals at concentrations of potential concern in the area of SWMU 32A. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 32A, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 32A, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 32A.

10.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

10.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

10.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 10-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed a maximum reading of 1.8 parts per million, indicating a low potential for contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

10.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of

SWMU 32A. In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

10.4.2.4 Results and Conclusions

One organic (xylenes) and no metals were detected at low concentrations in the surface soil samples collected from at least one of the three borings. No organics and three metals (barium, mercury and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 10-1a and 10-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 32A, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 32A, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 32A, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

10.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

10.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

10.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

10.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

10.4.3.4 Results and Conclusions

The OWS at SWMU 32A was pumped dry and cleaned. The unit was then excavated routinely and without incident. No stained soil or fuel odors were observed during the excavation activities. A new OWS was installed to replace the old unit. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 9 to 9.5 feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom at approximately 8 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH–DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 10-2a and 10-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 32A. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

10.5 SITE CONCEPTUAL MODEL

10.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 32A included the drilling and sampling of a total of three borings to depths of 10 feet. One organic compound and three metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 32A was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

10.5.2 Environmental Fate

Contaminants encountered at OWS No. 186 (#1 - East) could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 32A, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

10.6 SITE ASSESSMENTS

10.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 32A. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 32A.

10.6.2 Screening Assessments

10.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 32A.

10.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

10.6.3 Risk Assessments

10.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 32A, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 32A, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

10.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals, except mercury, were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

10.6.4 Other Applicable Assessments

10.6.4.1 Surface Water

SWMU 32A contained no surface water.

10.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

10.6.4.3 Underground Storage Tanks (USTs)

OWS No. 186 (#1 - East) was composed of two compartments, one of which was a 300-gallon oil storage tank constructed of concrete. The entire unit was removed in 1997.

10.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

10.7 NO FURTHER ACTION PROPOSAL

10.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 32A.

10.7.2 Criterion

SWMU 32A is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

11.1 SUMMARY

SWMU 33B, OWS No. 186 (#2 - West), has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected two organic compounds (acetone and toluene) and four metals (arsenic, barium, chromium, and nickel) at concentrations of potential concern in the area of SWMU 33B. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 33B, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 33B, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 33B.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

11.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

11.2.1 Site Description

SWMU 33B, OWS No. 186 (#2 - West), was located adjacent to the west side of Building 186 (Figure 11-1 in Appendix A), near the northwest corner. The OWS was an underground concrete unit consisting of two compartments, including an oil storage tank with a capacity of 140 gallons. The OWS measured approximately six feet by six feet in plan and extended approximately 7.5 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water from the drains in Building 186, an aircraft hangar. Wastewaters from the unit were discharged to a sanitary sewer line.

11.2.2 Operational History

OWS No. 186 (#2 - West) was active from approximately 1971 until the unit was removed in 1996 (USACE 1999). The OWS at SWMU 33B has been removed and no longer receives waste wash water.

11.3 LAND USE

11.3.1 Current

The current land use of the SWMU location is industrial.

11.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 186 (#2 - West) has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

11.4 INVESTIGATIVE ACTIVITIES

11.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected two organic compounds and four metals at concentrations of potential concern in the area of SWMU 33B. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 33B, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 33B, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 33B.

11.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

11.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

11.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 11-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed a maximum reading of 7.2 ppm, indicating a low potential for contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

11.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of

SWMU 33B. In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

11.4.2.4 Results and Conclusions

One organic, acetone, and two metals, chromium and nickel, were detected at low concentrations in the surface soil samples collected from at least one of the three borings. One organic, toluene, and two metals, arsenic and barium, were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 11-1a, 11-1b, and 11-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 33B, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 33B, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 33B, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

11.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

11.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

11.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

11.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

11.4.3.4 Results and Conclusions

The OWS at SWMU 33B was pumped dry and cleaned. The unit was then excavated routinely and without incident. Some stained soil was observed during the excavation activities, indicating that the unit had leaked. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 8 to 9 feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom at approximately 9 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 11-2a and 11-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 33B. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

11.5 SITE CONCEPTUAL MODEL

11.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 33B included the drilling and sampling of a total of three borings to depths of 10 feet. Two organic compounds and four metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 33B was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

11.5.2 Environmental Fate

Contaminants encountered at OWS No. 186 (#2 - West) could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 33B, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

11.6 SITE ASSESSMENTS

11.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 33B. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 33B.

11.6.2 Screening Assessments

11.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 33B.

11.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

11.6.3 Risk Assessments

11.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 33B, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 33B, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

11.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

11.6.4 Other Applicable Assessments

11.6.4.1 Surface Water

SWMU 33B contained no surface water.

11.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

11.6.4.3 Underground Storage Tanks (USTs)

OWS No. 186 (#2 - West) was composed of two compartments, one of which was a 140-gallon oil storage tank constructed of concrete. The entire unit was removed in 1996.

11.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

11.7 NO FURTHER ACTION PROPOSAL

11.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 33B.

11.7.2 Criterion

SWMU 33B is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

12.1 SUMMARY

SWMU 38, OWS No. 194, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected three organic compounds (acetone, 1,1,1-trichloroethane, and toluene) and two metals (nickel and chromium) at concentrations of potential concern in the area of SWMU 38. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 38, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 38, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 38.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

12.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

12.2.1 Site Description

SWMU 38, OWS No. 194, was located adjacent to the southeast corner of Building 194 (Figure 12-1 in Appendix A). The OWS was an underground concrete unit consisting of three compartments, including an oil storage tank with a capacity of 140 gallons. The OWS measured approximately 9 feet by 7 feet in plan and approximately 12 feet in depth. The top of the unit sat approximately 1 foot above ground surface. The unit reportedly received waste wash water from the drains in Building 194, an aircraft hangar. Wastewaters from the unit were discharged to a sanitary sewer line.

12.2.2 Operational History

OWS No. 194 was active from approximately 1971 until the unit was removed in 1996 (USACE 1999). The OWS at SWMU 38 has been removed and no longer receives waste wash water.

12.3 LAND USE

12.3.1 Current

The current land use of the SWMU location is industrial.

12.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 194 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

12.4 INVESTIGATIVE ACTIVITIES

12.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected two organic compounds and four metals at concentrations of potential concern in the area of SWMU 38. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 38, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 38, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 38.

12.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

12.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

12.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 12-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed a maximum reading of 1.0 parts per million, indicating a low potential for contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

12.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 38.

In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after the completion of the RFI.

12.4.2.4 Results and Conclusions

Three organics, acetone, 1,1,1-trichloroethane and toluene, and no metals were detected at low concentrations in the surface soil samples collected from at least one of the three borings. Three organics (acetone, 1,1,1-trichloroethane and toluene) and two metals (chromium and nickel) were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 12-1a and 12-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 38, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 38, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 38, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

12.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

12.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

12.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

12.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

12.4.3.4 Results and Conclusions

The OWS at SWMU 38 was pumped dry and cleaned. The unit was then excavated without incident. No stained soil or odors were observed during the excavation activities. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 12 to 14 feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom at approximately 14 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 12-2a and 12-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 38. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

12.5 SITE CONCEPTUAL MODEL

12.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 38 included the drilling and sampling of a total of three borings to depths of 10 feet. Three organics and two metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 38 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

12.5.2 Environmental Fate

Contaminants encountered at OWS No. 194 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 38, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

12.6 SITE ASSESSMENTS

12.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 38. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 38.

12.6.2 Screening Assessments

12.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 38.

12.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

12.6.3 Risk Assessments

12.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 38, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 38, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

12.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

12.6.4 Other Applicable Assessments

12.6.4.1 Surface Water

SWMU 38 contained no surface water.

12.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

12.6.4.3 Underground Storage Tanks (USTs)

OWS No. 194 was composed of two compartments, one of which was a 140-gallon oil storage tank constructed of concrete. The entire unit was removed in 1996.

12.6.4.4 Other

In 1987-1988, the Tulsa District of the USACE collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

12.7 NO FURTHER ACTION PROPOSAL

12.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 38.

12.7.2 Criterion

SWMU 38 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

13.1 SUMMARY

SWMU 39, OWS No. 195, has been listed as an Appendix II site. An RFI of the Appendix II sites (LRL 1993) detected two organic compounds, acetone and toluene, and four metals, barium, chromium, lead, and nickel, at concentrations of potential concern in the area of SWMU 39. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 39, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 39, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 39.

The conclusions reached in the Corrective Measure Completion Report recommended NFA at this site based on the results of a risk evaluation. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

13.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

13.2.1 Site Description

SWMU 39, OWS No. 195, was located adjacent to the northeast corner of Building 195 (Figure 13-1 in Appendix A). The OWS was an underground concrete unit consisting of two compartments, including an oil storage tank with a capacity of 140 gallons. The OWS measured approximately 9 feet by 7 feet in plan and approximately 8.5 feet in depth. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water from the drains in Building 194, an aircraft hangar. Wastewaters from the unit were discharged to a sanitary sewer line.

13.2.2 Operational History

OWS No. 195 was active from approximately 1971 until the unit was removed in 1996 (USACE 1999). The OWS at SWMU 39 has been removed and no longer receives waste wash water.

13.3 LAND USE

13.3.1 Current

The current land use of the SWMU location is industrial.

13.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 195 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

13.4 INVESTIGATIVE ACTIVITIES

13.4.1 Summary

An RFI of the Appendix II sites (LRL 1993) detected two organic compounds and four metals at concentrations of potential concern in the area of SWMU 39. However, the Risk Assessment portion of the RFI report concluded that the detected concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges. Based on the conclusions reached in the Risk Assessment for SWMU 39, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 39, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 39.

13.4.2 Investigation #1: Appendix II RCRA Facility Investigation (RFI)

13.4.2.1 Non-Sampling Data Collection

The RFI included a Risk Assessment. The results of the Risk Assessment are discussed below.

13.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the OWS unit, were sampled during the RFI (boring locations are shown in Figure 13-1 in Appendix A). Soil samples were collected at the surface and from depths of 2.5, 5 and 10 feet to characterize the distribution of potential contaminants. Field screening with a PID revealed a maximum reading of 21.0 ppm, indicating a potential for contamination during this investigation.

Target analytes for all borings included TCL VOCs, BTEX, and priority pollutant metals. In total, 12 soil samples were sent for chemical analyses.

13.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a Risk Assessment and to determine that a significant release had not occurred in the area of SWMU 39.

In addition, the data quality was deemed to be sufficient to meet the objectives of the RFI. Therefore, no data gaps existed after completion of the RFI.

13.4.2.4 Results and Conclusions

Two organics, acetone and toluene, and no metals were detected at low concentrations in the surface soil samples collected from at least one of the three borings. Two organics, acetone and toluene, and four metals, barium, chromium, lead, and nickel, were detected in at least one of the subsurface samples at low concentrations. The analytical results from this investigation are shown in Tables 13-1a and 13-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 39, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 39, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

Based on the conclusions reached in the Risk Assessment for SWMU 39, the RFI recommended that an integrity test be performed on the OWS at this SWMU. As long as the unit passed the integrity test, NFA was recommended.

13.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

13.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

13.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

13.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

13.4.3.4 Results and Conclusions

The OWS at SWMU 39 was pumped dry and cleaned. The unit was then excavated without incident. No stained soil or odors were observed during the excavation activities. The removal of the OWS effectively rendered the RFI's recommendation for an integrity test moot.

One soil sample was then collected from each of the excavation's four walls, and two soil samples were collected from the bottom of the excavation, each at an approximate depth of 8.5 to 9 feet. A seventh, confirmatory sample was collected from the center of the excavation's bottom at approximately 9 feet of depth and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 13-2a and 13-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 39.

Because none of the detected chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, no further response action was recommended at this SWMU.

13.5 SITE CONCEPTUAL MODEL

13.5.1 Nature and Extent of Contamination

The RFI conducted at SWMU 39 included the drilling and sampling of a total of three borings to depths of 10 feet. Two organics and four metals were detected at concentrations of potential concern. However, the Risk Assessment portion of the RFI report concluded that the detected

concentrations of these chemicals were all within or below the acceptable excess carcinogenic and noncarcinogenic risk ranges.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. No detected chemicals exceeded the corresponding MSSL.

Groundwater at SWMU 39 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

13.5.2 Environmental Fate

Contaminants encountered at OWS No. 195 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and, groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 39, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; but they do persist for long periods of time.

13.6 SITE ASSESSMENTS

13.6.1 Summary

The RFI included a Risk Assessment portion and the Corrective Measure Completion Report included a risk evaluation for SWMU 39. Based on the results of the Risk Assessment and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 39.

13.6.2 Screening Assessments

13.6.2.1 Human Health

The Risk Assessment portion of the RFI did not include a human health risk screening. The results of the RFI's Human Health Risk Assessment are discussed below.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for

residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 39.

13.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

13.6.3 Risk Assessments

13.6.3.1 Human Health

The results of the Human Health Risk Assessment found a maximum excess carcinogenic risk of 4×10^{-5} at SWMU 39, a level that fell within the USEPA's target risk range of 1×10^{-4} to 1×10^{-6} for carcinogenic effects (USEPA 1989). This indicated that no unacceptable risk of carcinogenic effects was expected at this SWMU.

The results of the Human Health Risk Assessment found a maximum excess noncarcinogenic risk of 0.61 at SWMU 39, a level that fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk of noncarcinogenic effects was expected at this SWMU.

13.6.3.2 Ecological

A single Ecological Risk Assessment was included in the RFI for all 15 SWMUs covered by the RFI. The Ecological Risk Assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). All detected chemicals were considered COCs and discussed in the Ecological Risk Assessment. Potential risk from COCs in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, it was determined that none of the COC VOCs or metals poses a risk to small mammalian populations.

13.6.4 Other Applicable Assessments

13.6.4.1 Surface Water

SWMU 39 contained no surface water.

13.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

13.6.4.3 Underground Storage Tanks (USTs)

OWS No. 195 was composed of two compartments, one of which was a 140-gallon oil storage tank constructed of concrete. The entire unit was removed in 1996.

13.6.4.4 Other

In 1987-1988, the Tulsa District of the Army Corps of Engineers collected samples of the influent and effluent from a number of OWSs at Cannon AFB and had them analyzed. However, the results of this study pertain more to water treatment issues than hazardous or solid waste issues (USACE 1988).

13.7 NO FURTHER ACTION PROPOSAL

13.7.1 Rationale

Based on the conclusions reached in the Corrective Measure Completion Report, NFA has been recommended for SWMU 39.

13.7.2 Criterion

SWMU 39 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

14.1 SUMMARY

SWMU 46, OWS No. 196, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) found two metals (barium and antimony) at concentrations exceeding the corresponding RBCs in the area of SWMU 46. However, the report concluded that these detected metals were naturally occurring and were not SWMU-related. Because there was no evidence of a significant release in the area of SWMU 46, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 46, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 46.

The conclusions reached in the Phase I RFI and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

14.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

14.2.1 Site Description

SWMU 46, OWS No. 196, was located at the southwest corner of Building 196 (Figure 14-1 in Appendix A). The OWS was an underground concrete unit consisting of two compartments, a 560-gallon main compartment and a 135-gallon oil storage compartment. The OWS measured approximately 7 feet by 9 feet in plan and extended 8.5 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water generated from aircraft maintenance operations in Building 196, an aircraft maintenance hangar. Recovered oils were stored in the 135-gallon oil storage compartment and wastewaters were discharged to a sanitary sewer line.

14.2.2 Operational History

OWS No. 196 was active from approximately 1969 until the unit was partially removed in 1996 (USACE 1999). The OWS at SWMU 46 has been partially removed and no longer receives waste wash water.

14.3 LAND USE

14.3.1 Current

The current land use of the SWMU location is industrial.

14.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 196 has been partially removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

14.4 INVESTIGATIVE ACTIVITIES

14.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found two metals (barium and antimony) at concentrations exceeding the corresponding RBCs in the area of SWMU 46. However, the report concluded that these detected metals were naturally occurring and were not SWMU-related. Because there was no evidence of a significant release in the area of SWMU 46, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the partial removal of the OWS at SWMU 46, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 46.

14.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

14.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

14.4.2.2 Sampling Data Collection

Three borings drilled to depths of 10 feet in the area of the separator unit were sampled during the Phase I RFI (boring locations are shown in Figure 14-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot, 2- to 4-foot, 4- to 6-foot, and 8- to 10-foot depth intervals to characterize the distribution of potential contaminants. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Near surface samples were collected at the 0.5- to 2-foot depth interval from directly beneath the asphalt pavement. In total, 12 soil samples were sent for chemical analyses.

14.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk screening and to determine that a significant release had not occurred in the area of SWMU 46.

In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

14.4.2.4 Results and Conclusions

Two metals, barium and antimony, were found at levels exceeding the corresponding RBCs. However, the detection of these metals was not attributable to contamination and reported concentrations were dismissed as naturally occurring. The analytical results from this investigation are shown in Tables 14-1a, 14-1b and 14-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the risk screening found that only the detected concentrations of barium and antimony exceeded the corresponding screening-level RBCs (by an approximate factor of 2). However, the detection of these metals was not attributable to contamination and reported concentrations were dismissed as naturally occurring. Based on this, the Phase I RFI recommended NFA for SWMU 46.

14.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

14.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

14.4.3.2 Sampling Data Collection

After the OWS had been partially removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

14.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

14.4.3.4 Results and Conclusions

The OWS at SWMU 46 was pumped dry and cleaned. Then the determination was made that the unit would only be partially removed, due to the presence of a 12-foot-diameter light pole foundation located adjacent to and within 15 inches of the unit. Two feet of soil were excavated from outside the walls of the unit, and the top 3 feet of the OWS were removed.

One soil sample was then collected from each of the four walls of the excavation at an approximate depth of 4 feet, and two soil samples were collected from holes drilled through the bottom of the unit at an approximate depth of 10 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at approximately 10 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 14-2a and 14-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 46.

Because none of the detected chemicals exceeding the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, no further response action was recommended at this SWMU.

14.5 SITE CONCEPTUAL MODEL

14.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 46 included the drilling and sampling of a total of three borings to depths of 10 feet. Two metals (barium and antimony) were detected at concentrations of potential concern. However, the detection of these metals was not attributable to contamination and reported concentrations were dismissed as naturally occurring.

The Corrective Measure Completion Report documented the partial removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. No COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 46.

Groundwater at SWMU 46 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

14.5.2 Environmental Fate

Contaminants encountered at OWS No. 196 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at SWMU 46, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; but they do persist for long periods of time.

14.6 SITE ASSESSMENTS

14.6.1 Summary

The Phase I RFI included a risk screening and the Corrective Measure Completion Report included a risk evaluation for SWMU 46. Based on the results of the risk screening and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, no further response action was recommended for SWMU 46.

14.6.2 Screening Assessments

14.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although two metals, barium and antimony, were detected at concentrations exceeding the corresponding RBCs, the detection of these metals was not attributable to contamination and reported concentrations were dismissed as naturally occurring.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 46.

14.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in these investigations. In each investigation, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. Both the Region III RBCs and the Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

14.6.3 Risk Assessments

14.6.3.1 Human Health

Because neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria, a full-scale human health risk assessment was not warranted for SWMU 46.

14.6.3.2 Ecological

Neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria. In addition, both the Region III RBCs and the Region VI MSSLs, used as screening criteria in the human health risk screening and risk evaluation, respectively, are highly conservative, and as such are protective of ecological health in addition to human health. Therefore, an ecological risk assessment was not warranted for SWMU 46.

14.6.4 Other Applicable Assessments

14.6.4.1 Surface Water

SWMU 46 contained no surface water.

14.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

14.6.4.3 Underground Storage Tanks (USTs)

OWS No. 196 included a 135-gallon underground oil storage compartment. This compartment was partially removed along with the unit's other compartments in 1996.

14.6.4.4 Other

No other assessments have been conducted in the area of SWMU 46.

14.7 NO FURTHER ACTION PROPOSAL

14.7.1 Rationale

Based on the conclusions reached in the Phase I RFI or the Corrective Measure Completion Report, NFA has been recommended for SWMU 46.

14.7.2 Criterion

SWMU 46 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

15.1 SUMMARY

SWMU 47, OWS No. 494, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) found insignificant concentrations of organic compounds and metals in the area of SWMU 47. None of the organics and none of the metals were detected at concentrations exceeding the corresponding RBCs. Because there was no evidence of a significant release in the area of SWMU 47, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 47, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 47.

The conclusions reached in the Phase I RFI and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

15.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

15.2.1 Site Description

SWMU 47, OWS No. 494, consisted of an OWS unit located beneath an asphalt drive adjacent to the northeast wall of Building 494, the Auto Hobby Shop at Cannon AFB, and a large sand trap located at the east corner of the building (Figure 15-1 in Appendix A). The OWS was an underground concrete unit consisting of two compartments, a 50-gallon main compartment and a 50-gallon oil storage compartment. The OWS measured approximately 1 foot by 2.5 feet, and was estimated to extend less than 10 feet below the surface. The 200-gallon sand trap measured approximately 4 feet by 5 feet in plan, and extended approximately 4 feet below the surface. The units reportedly received waste wash water generated from personal vehicle maintenance operations by off-duty Air Force personnel in the Auto Hobby Shop. Recovered oils were stored in the 50-gallon oil storage compartment of the OWS and wastewaters were discharged to a sanitary sewer line.

15.2.2 Operational History

OWS No. 494 was active from approximately 1982 until its removal in 1996 (USACE 1999). The OWS at SWMU 47 has been removed and no longer receives waste wash water.

15.3 LAND USE

15.3.1 Current

The current land use of the SWMU location is industrial.

15.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 494 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

15.4 INVESTIGATIVE ACTIVITIES

15.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found insignificant concentrations of organic compounds and metals in the area of SWMU 47. None of the organics and none of the metals were detected at concentrations exceeding the corresponding RBCs. Because there was no evidence of a significant release in the area of SWMU 47, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 47, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 47.

15.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

15.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

15.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the separator unit, were sampled during the Phase I RFI (boring locations are shown in Figure 15-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot (0- to 0.5-foot in one boring), 2- to 4-foot, 4- to 6-foot, and 8- to 10-foot depth intervals to characterize the distribution of potential contaminants. Two borings, drilled to depths of 10 feet in the area of the sand trap unit, were also sampled during the Phase I RFI (boring locations are shown in Figure 15-1 in Appendix A). Soil samples were collected from the 0- to 0.5-foot, 1.5- to 3.5-foot, 4- to 6-foot, and 8- to 10-foot depth intervals to characterize the distribution of potential contaminants. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Near surface samples were collected at the 0.2- to 0.5-foot depth interval in vegetated areas or from directly beneath the asphalt pavement for risk assessment purposes. In total, 20 soil samples were sent for chemical analyses.

15.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk screening and to determine that a significant release had not occurred in the area of SWMU 47. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

15.4.2.4 Results and Conclusions

The analyses detected insignificant concentrations of organic compounds and metals in the area of SWMU 47. None of the organics and none of the metals were detected at concentrations exceeding the corresponding RBCs. The analytical results from this investigation are shown in Tables 15-1a, 15-1b and 15-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the risk screening found that none of the detected concentrations of organics and none of the concentrations of metals exceeded the corresponding screening-level RBCs. Based on this, the Phase I RFI recommended NFA for SWMU 47.

15.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

15.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

15.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

15.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

15.4.3.4 Results and Conclusions

The OWS and the sand trap at SWMU 47 were pumped dry and cleaned. Two feet of soil were excavated from outside the walls of the units and then the units were removed without incident.

No staining or odors were observed during the removal activities. After the old units had been removed, they were replaced with a new OWS.

One soil sample was then collected from each of the four walls of the sand trap excavation at approximate depths of 7.5 feet, and two soil samples were collected from the bottom of the excavation at approximate depths of 7.5 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at approximately 7.5 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Table 15-2a in Appendix B.

One soil sample was then collected from each of the four walls of the OWS excavation at approximate depths of 6 feet, and two soil samples were collected from the bottom of the excavation at approximate depths of 6 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at approximately 6 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 100 ppm and that the BTEX content of each sample was less than 50 ppm. This sample was analyzed for VOCs, SVOCs, TPH –DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 15-2a and 15-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 47. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

15.5 SITE CONCEPTUAL MODEL

15.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 47 included the drilling and sampling of a total of five borings to a depth of 10 feet. The analyses detected insignificant concentrations of organic

compounds and metals in the area of SWMU 47. None of the organics and none of the metals were detected at concentrations exceeding the corresponding RBCs.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 47 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

15.5.2 Environmental Fate

Contaminants encountered at OWS No. 494 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 47, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; but they do persist for long periods of time.

15.6 SITE ASSESSMENTS

15.6.1 Summary

The Phase I RFI included a risk screening and the Corrective Measure Completion Report included a risk evaluation for SWMU 47. Based on the results of the risk screening and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 47.

15.6.2 Screening Assessments

15.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations of

potential contaminants detected during the RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Insignificant concentrations of organic compounds and metals were detected in the area of SWMU 47. None of the organics and none of the metals were detected at concentrations exceeding the corresponding RBCs.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 1.

15.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in these investigations. In each investigation, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. Both the Region III RBCs and the Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological health in addition to human health.

15.6.3 Risk Assessments

15.6.3.1 Human Health

Because neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria, a full-scale human health risk assessment was not warranted for SWMU 47.

15.6.3.2 Ecological

Neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria. In addition, both the Region III RBCs and the Region VI MSSLs, used as screening criteria in the human health risk

screening and risk evaluation, respectively, are highly conservative, and as such are protective of ecological health in addition to human health. Therefore, an ecological risk assessment was not warranted for SWMU 47.

15.6.4 Other Applicable Assessments

15.6.4.1 Surface Water

SWMU 47 contained no surface water.

15.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

15.6.4.3 Underground Storage Tanks (USTs)

OWS No. 494 included a 50-gallon underground oil storage compartment. This compartment was removed along with the units' other compartments in 1996.

15.6.4.4 Other

No other assessments have been conducted in the area of SWMU 47.

15.7 NO FURTHER ACTION PROPOSAL

15.7.1 Rationale

Based on the conclusions reached in the Phase I RFI or the Corrective Measure Completion Report, NFA has been recommended for SWMU 47.

15.7.2 Criterion

SWMU 47 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

16.1 SUMMARY

SWMU 48B, Aboveground Overflow Capacity Tank, has been listed as an Appendix II site. A Phase I RFI of the Appendix II sites (LRL 1993) found elevated levels of organic compounds and metals in the area of SWMU 48B. The results of a limited risk assessment, performed as part of this investigation, indicated minimal or no risk to human health or the environment from SWMU 48B.

A Phase II RFI of the Appendix II sites (W-C 1997c) also found elevated levels of six organic compounds and five metals in the area of this SWMU. However, the report documenting this investigation noted that none of the concentrations of the chemicals detected at SWMU 48B pose an unacceptable human health risk. The Phase II RFI report recommended no further investigation at this site.

The conclusions reached in the Phase I and Phase II RFIs were consistent in recommending no further work at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

16.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

16.2.1 Site Description

SWMU 48B, Aboveground Overflow Capacity Tank, was a 2,000-gallon aboveground storage tank (AST) located approximately 125 feet east of the intersection of Argentina Avenue and Torch Boulevard (Figure 16-1 in Appendix A). This SWMU and SWMU 48A were located adjacent to each other within a fenced area measuring approximately 20 feet by 40 feet in plan. Prior to its removal in 1992, the AST served as an overflow tank for the UST (SWMU 48A), which had been used to store waste products. The area currently is paved and used as a parking lot (W-C 1999).

16.2.2 Operational History

The former AST at SWMU 48B was active from 1941 to 1985. Historically, the site was used as a gas station from 1941 to 1965. From 1965 to 1985 the AST served as an overflow tank for the UST (SWMU 48A), which had been used to store waste products including: waste oils, spent solvents, paint thinners, and recovered fuels. These products were removed from the tanks periodically. The quantities of each product stored in the tanks during it use is unknown. The AST and its associated piping were removed in 1992.

16.3 LAND USE

16.3.1 Current

The area of SWMU 48B has been covered with asphalt pavement and is being used as a parking lot. The AST and its associated piping were removed in 1992.

16.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the AST and its associated piping were removed in 1992. Use classification will continue to remain industrial in nature.

16.4 INVESTIGATIVE ACTIVITIES

16.4.1 Summary

A Phase I RFI of the Appendix II sites (LRL 1993) found elevated levels of organic compounds and metals in the area of SWMU 48B. A Phase II RFI of the Appendix II sites (W-C 1997) also found elevated levels of found elevated levels of six organic compounds and five metals in the area of this SWMU.

16.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix II SWMUs – Phase I

16.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a limited risk assessment performed using the results of the investigation. The limited risk assessment indicated minimal or no risk to human health or the environment from SWMU 48B (LRL 1993).

16.4.2.2 Sampling Data Collection

A Phase I RFI was performed at SWMU 48B to determine whether a release of SWMU-related chemicals had occurred from the AST. Two borings were advanced to a depth of 30 feet below the surface to determine the vertical extent of any potential contamination. Target analytes for samples from the three borings included TCL VOCs, BTEX, cyanide, and TAL metals.

16.4.2.3 Data Gaps

The data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

16.4.2.4 Results and Conclusions

Acetone, xylenes and methylene chloride were detected at low concentrations in one Phase I boring at the surface and at the 5-foot interval. Metals were detected above background levels (W-C 1997a) in surface and subsurface samples to a maximum depth of 20 feet in both borings. The results of this investigation are presented in Tables 16-1a, 16-1b, and 16-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater was greater than 250 feet at Cannon AFB, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of a limited risk assessment, performed as part of this investigation, indicated minimal or no risk to human health or the environment from SWMU 48B.

16.4.3 Investigation #2: RFI, Appendix II SWMUs – Phase II

16.4.3.1 Non-Sampling Data Collection

The purpose of the Phase II RFI was to evaluate whether a release of SWMU-related chemicals had occurred as a result of spillage or leakage from the AST that could pose a significant risk to human health or the environment. In addition, the Phase II included a risk screening to verify whether the recommendation of NFA based on the Phase I RFI was appropriate for SWMU 48B, and to characterize the vertical extent of contamination in this area.

16.4.3.2 Sampling Data Collection

Two soil borings were drilled to a depth of approximately 40 feet in the area of the former AST (boring locations are shown in Figure 16-1 in Appendix A), and 18 soil samples were collected from these borings during the Phase II RFI. Two of the borings were drilled at each end of the presumed location of the former tank. The boring locations were chosen to further assess the lateral presence and extent of site-related soil contaminants.

Surface soil samples were collected from the 0- to 0.5-foot depth interval in one boring and from the 0.5- to 2.5-foot depth interval in the other boring. Subsurface soil samples were also collected from each boring at the 3- to 5-foot, the 8- to 10-foot, the 13- to 15-foot, the 18- to 20-foot, the 23- to 25-foot, the 28- to 30-foot, the 33- to 35-foot, and the 38- to 40-foot depth intervals. Target analytes included VOCs, SVOCs, TAL metals, and TRPH.

16.4.3.3 Data Gaps

Sufficient data was collected during the Phase II RFI to further characterize the nature and extent of contamination and to conduct a risk screening of this SWMU. There were no sampling issues associated with the Phase II RFI that adversely affected data usability. In addition, the analytical data was judged acceptable for determining the nature and extent of contamination in the area of

SWMU 48B, and for completing the human health risk screening. Therefore, no data gaps existed.

16.4.3.4 Results and Conclusions

Six organic compounds and five metals were detected during the Phase II RFI. However, none of the concentrations of organics exceeded the associated RBCs , and none of the concentrations of metals exceeded the associated background levels (W-C 1997a) or the RBCs. Compounds detected were either detected at very low levels, or the concentrations decreased with depth. Based on the results of the Phase II RFI, the vertical extent of contamination has been adequately assessed, and potential impacts to groundwater were considered low. The results of this investigation are presented in Table 16-2a in Appendix B.

Because there were no unacceptable health risks associated with SWMU 48B, the Phase II RFI recommended that no further investigation was necessary for this SWMU.

16.5 SITE CONCEPTUAL MODEL

16.5.1 Nature and Extent of Contamination

A total of four borings, two to a depth of 30 feet and two to a depth of 40 feet, were installed during the two phases of the RFIs to effectively delineate the extent of contamination at SWMU 48B. Chemical analyses detected elevated concentrations of metals and organic compounds, including TRPH, in samples collected during the Phase I and Phase II RFIs.

Groundwater at SWMU 48B was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

16.5.2 Environmental Fate

Because there were no chemicals detected in soil at levels above the associated RBCs or background levels (W-C 1997a) in the area of SWMU 48B, the fate and transport of contaminants in the vadose zone was not modeled as part of the CMS.

16.6 SITE ASSESSMENTS

16.6.1 Summary

Limited risk assessments were conducted as part of the Phase I and II RFIs. The results of the limited risk assessments are discussed below.

16.6.2 Screening Assessments

16.6.2.1 Human Health

The results of a limited risk assessment, performed as part of the Phase I RFI, indicated minimal or no risk to human health from SWMU 48B. The results of the Phase II RFI at SWMU 48B showed no evidence that a significant chemical release, posing an unacceptable human health risk for any potential exposure pathway, had occurred at this SWMU. Risk comparisons from the Phase II RFI are presented in Table 16-2b in Appendix B.

16.6.2.2 Ecological

The area of SWMU 48B has been covered with asphalt pavement and is being used as a parking lot. Based on this, SWMU 48B did not contain any significant ecological component such that a formal ecological risk assessment was warranted. However, the results of a limited risk assessment, performed as part of Phase I RFI, indicated minimal or no risk to the environment from SWMU 48B.

16.6.3 Risk Assessments

16.6.3.1 Human Health

None of the maximum detected concentrations for each of the contaminants found at SWMU 48B exceeded the associated RBCs or the associated background levels (W-C 1997a); as such, a formal risk assessment was not warranted for this SWMU.

16.6.3.2 Ecological

Based on the conclusions of the ecological risk screening, SWMU 48B did not contain any significant ecological component such that a formal ecological risk assessment was warranted.

16.6.4 Other Applicable Assessments

16.6.4.1 Surface Water

SWMU 48B contained no surface water.

16.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

16.6.4.3 Underground Storage Tanks (USTs)

The former UST at SWMU 48A was active from 1941 to 1985. Historically, the site was used as a gas station from 1941 to 1965. The AST at SWMU 48B served as an overflow tank for this

UST. From 1965 to 1985, the UST was used to store waste products including: waste oils, spent solvents, paint thinners, and recovered fuels. These products were removed from the tank periodically. The quantities of each product stored in the tank during it use is unknown. The UST and its associated piping were removed in 1988. This former UST was addressed by the Phase I and II RFIs and the CMS performed for SWMU 48A, and is discussed in Section 30 of this document.

16.6.4.4 Other

No other assessments have been conducted in the area of SWMU 48B.

16.7 NO FURTHER ACTION PROPOSAL

16.7.1 Rationale

Based on the conclusions reached in the Phase I RFI, the Phase II RFI and the CMS, NFA has been recommended for SWMU 48B.

16.7.2 Criterion

SWMU 48B is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

17.1 SUMMARY

SWMU 51, OWS No. 375, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) detected concentrations of four organic compounds, plus TPH, and one metal at concentrations of potential concern in the area of SWMU 51. All four organics, plus TPH, and the one metal were detected at concentrations exceeding the corresponding RBCs. Because there was evidence of a potentially significant release in the area of SWMU 51, the Phase I RFI recommended that a BRA be completed for this SWMU.

The BRA for Appendix III SWMUs – Phase I (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases from this SWMU were expected, and recommended NFA for SWMU 51.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 51, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 51.

The conclusions reached in the BRA and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

17.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

17.2.1 Site Description

SWMU 51, OWS No. 375, consisted of an OWS unit and an oil containment vault. The OWS was located beneath 0.5 feet of asphalt pavement adjacent to the northwest side of Building 375, a vehicle maintenance facility within the motorpool compound (Figure 17-1 in Appendix A). The OWS measured approximately 5 feet square, and extended approximately 5.5 feet below the surface. The oil containment vault was located beneath and integral to the floor and the northwest foundation wall of Building 375. The oil containment vault measured approximately 2 feet by 10 feet, and extended approximately 7 feet below the surface. The units reportedly received waste wash water generated from vehicle maintenance operations. Recovered oils were stored in the oil containment vault and wastewaters were discharged to a sanitary sewer line.

17.2.2 Operational History

OWS No. 375 was active from approximately 1968 until the separator unit was removed and the oil containment vault was abandoned in place in 1997 (USACE 1999).

17.3 LAND USE

17.3.1 Current

The OWS at SWMU 51 has been removed and at the oil containment vault has been abandoned in place. Neither unit receives waste wash water.

17.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the OWS at SWMU 51 has been removed and at the oil containment vault has been abandoned in place. Neither unit receives waste wash water. Use classification will continue to remain industrial in nature.

17.4 INVESTIGATIVE ACTIVITIES

17.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found potentially significant concentrations of four organic compounds, plus TPH, and one metal in the area of SWMU 51. The organics and the metal were detected at concentrations exceeding the corresponding risk screening criteria.

A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases are expected at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 51, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 51.

17.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

17.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

17.4.2.2 Sampling Data Collection

Three borings, drilled to depths of 10 feet in the area of the separator unit, were sampled during the Phase I RFI (boring locations are shown in Figure 17-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot, 2- to 4-foot, 4- to 6-foot, and 8- to 10-foot depth intervals to characterize the distribution of potential contaminants. The area of the oil containment vault was

investigated during the Phase I RFI. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Near surface samples were collected from directly beneath the asphalt pavement for risk assessment purposes. In total, 12 soil samples were sent for chemical analyses.

17.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after completion of the Phase I RFI.

17.4.2.4 Results and Conclusions

Four organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene), plus TPH, and one metal (barium) were found at levels exceeding the corresponding RBCs and/or other screening criteria. The highest concentrations of contaminants were detected in near-surface samples. The vertical extent of contamination was characterized by the soil borings. The analytical results from this investigation are shown in Tables 17-1a, 17-1b and 17-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The Phase I RFI recommended completing a BRA for SWMU 51.

17.4.3 Investigation #2: Baseline Risk Assessment (BRA) for Appendix III SWMUs – Phase I

17.4.3.1 Non-Sampling Data Collection

No additional data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors, and all appropriate exposure pathways, was performed on the data collected during the Phase I RFI.

17.4.3.2 Sampling Data Collection

No additional data was collected during the BRA.

17.4.3.3 Data Gaps

It was concluded that the data collected during the Phase I RFI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI and the BRA. Therefore, no data gaps existed.

17.4.3.4 Results and Conclusions

Potential receptors at SWMU 51 for human health risks included occupational workers, hypothetical future construction workers, and hypothetical future trespassers. The receptors were assumed to be exposed to soil via ingestion, dermal contact, and inhalation pathways. The maximum potential excess human risk at SWMU 51 was 1×10^{-8} for occupational workers. This level fell below the USEPA's target risk range of 1×10^{-6} to 1×10^{-4} for risk from releases at hazardous waste sites, thus indicating that no unacceptable risk was expected. The primary contributor to the risk was ingestion of polynuclear aromatic hydrocarbons (PAHs) in surface soils. A summary of human health risks at SWMU 51 are shown in Table 17-2 in Appendix B.

Potential human health risks from groundwater were evaluated using fate and transport modeling. The modeling indicated that contaminants would not reach groundwater at concentrations of potential concern. Therefore, this pathway was considered insignificant.

Results of the ecological risk assessment showed that no unacceptable ecological risks due to chemical releases are expected at SWMU 51.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, no further response action was recommended at this SWMU.

17.4.4 Investigation #3: Corrective Measure Completion Report, Appendices II and III SWMUs

17.4.4.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

17.4.4.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

17.4.4.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

17.4.4.4 Results and Conclusions

The OWS at SWMU 51 was pumped dry and cleaned. More than 2 feet of soil were excavated from outside the walls of the separator to accommodate the new unit, then the old unit was then removed. Significant staining and odors were observed during the removal activities near the

OWS's outlet pipe that led to the oil containment vault. After the old separator unit had been removed, it was replaced with a new OWS.

Holes were drilled in the bottom and side walls of the oil containment vault for sampling purposes. After the samples had been collected, the vault was filled with clean sand and capped with concrete. The vault was abandoned in place, not removed, in order to protect the integrity of Building 375.

Soil samples were then collected from the bases of southeast and southwest walls of the OWS excavation at approximate depths of 9 feet. Two soil samples were collected from the bottom of the excavation, at locations northeast and northwest of the separator unit, at an approximate depth of 10 feet. One sample was collected from the base of the excavation in the area of stained soil at an approximate depth of 10 feet. A sixth sample was collected from the bottom of the excavation, beneath the footprint of the unit, at an approximate depth of 10 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at approximately 10 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, four duplicate samples were collected from the same locations as the southeast wall sample, the northeast bottom sample, the stained sample, and the footprint sample, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX.

Five soil samples were then collected from three of the four walls and the base of the oil containment vault at approximate depths of 8 feet. (The fourth wall of the vault was the foundation wall of Building 375, and the sampling activities associated with the OWS unit had adequately investigated the other side of this wall.) A sixth, confirmatory sample was collected from the bottom of the excavation at approximately 8 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH–DRO, total metals, and TCLP metals. In addition, one duplicate sample was collected from the same location as one of the wall samples and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 51. Although barium and selenium were both detected at maximum concentrations that exceeded the established background levels for Cannon AFB (W-C 1997a), arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring. The analytical results of this investigation are presented in Table 17-3a and 17-3b in Appendix B.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

17.5 SITE CONCEPTUAL MODEL

17.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 51 included the drilling and sampling of three borings to a depth of 10 feet. The analyses detected potentially significant concentrations of organic compounds and barium in the area of SWMU 51 at concentrations exceeding the corresponding RBCs.

The Corrective Measure Completion Report documented the removal of the OWS and the abandonment of the tank vault at this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Although barium and selenium were both detected at maximum concentrations that exceeded the established background levels for Cannon AFB (W-C 1997a), arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 51 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

17.5.2 Environmental Fate

Contaminants encountered at OWS No. 375 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 51, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; but they do persist for long periods of time.

17.6 SITE ASSESSMENTS

17.6.1 Summary

The Phase I RFI included a risk screening and the Corrective Measure Completion Report included a risk evaluation for SWMU 51. Based on the results of the risk screening and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 51.

17.6.2 Screening Assessments

17.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Because organic compounds and barium were detected at concentrations slightly exceeding the corresponding RBCs, it was determined that a BRA was warranted for SWMU 51.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. Barium and selenium were both detected at concentrations that exceeded the established background levels for Cannon AFB; however, the maximum detected concentrations of these two metals both fell below the corresponding MSSLs. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 51.

17.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI, BRA, or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report investigation. In this investigation, the screening criteria

were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

In addition, an ecological risk screening was not included as part of the BRA. However, an ecological risk assessment was included and is discussed below in Section 17.6.3.2.

17.6.3 Risk Assessments

17.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included occupational workers, hypothetical workers performing intrusive actions, and hypothetical trespassers. Based on site conditions at SWMU 51, the most significant exposure pathways included inhalation of fugitive VOCs or dust, and direct contact with soil resulting in incidental ingestion or dermal absorption of chemicals from soil.

The BRA found that all hazard indices for subchronic and chronic exposures to site COCs fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. In addition, the total carcinogenic risk for exposures at SWMU 51 fell below the USEPA's target risk range (1×10^{-4} to 1×10^{-6}). This indicated that no unacceptable risk of noncarcinogenic or carcinogenic effects was expected at SWMU 51.

Because no COPCs were detected at concentrations exceeding the corresponding screening criteria during the Corrective Measure Completion Report investigation at SWMU 51, a full-scale human health risk assessment was not warranted for this investigation.

17.6.3.2 Ecological

SWMU 51 is located in a small area of very poor wildlife habitat quality within the developed portion of Cannon AFB, where existing ground cover consists mainly of asphalt paving and buildings. Because of the lack of habitat at SWMU 51, no key receptor species were identified. Therefore, the ecological risk assessment was not conducted.

17.6.4 Other Applicable Assessments

17.6.4.1 Surface Water

SWMU 51 contained no surface water.

17.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

17.6.4.3 Underground Storage Tanks (USTs)

OWS No. 375 included a 50-gallon underground oil storage tank. This tank was removed along with the unit's other compartments in 1996.

17.6.4.4 Other

No other assessments have been conducted in the area of SWMU 51.

17.7 NO FURTHER ACTION PROPOSAL

17.7.1 Rationale

Based on the conclusions reached in the Phase I RFI and the Corrective Measure Completion Report, NFA has been recommended for SWMU 51.

17.7.2 Criterion

SWMU 51 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

18.1 SUMMARY

SWMU 55, Lead Acid Battery Accumulation Point, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) detected lead at concentrations of potential concern in the area of SWMU 55. Because there was no evidence of a significant release in the area of SWMU 55, the Phase I RFI recommended NFA at this SWMU.

A Phase II RFI (W-C 1997d) detected three metals and five organic compounds at concentrations of potential concern in the area of SWMU 55. Because there was no evidence of a significant release in the area of SWMU 55, the Phase II RFI recommended NFA at this SWMU.

The conclusions reached in the Phase I and Phase II RFIs were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

18.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

18.2.1 Site Description

SWMU 55, the Lead Acid Battery Accumulation Point, consisted of a square of asphalt pavement measuring approximately 8 feet by 8 feet. The SWMU was located approximately 100 feet north of the Vehicle Maintenance Shop, Building 379 (Figure 18-1 in Appendix A). The pavement was contiguous with an asphalt parking lot and sloped slightly toward the northwest. Used lead acid batteries were stored "wet" on pallets at the SWMU until enough had been accumulated to sell to a battery recycling company.

18.2.2 Operational History

The Lead Acid Battery Accumulation Point was active from approximately 1965 until sometime between the field investigation associated with the Phase I RFI (1993) and the field investigation associated with the Phase II RFI (1997).

18.3 LAND USE

18.3.1 Current

The Lead Acid Battery Accumulation Point at SWMU 55 is no longer used for battery storage.

18.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the Lead Acid Battery Accumulation Point is no longer used for battery storage. Use classification will continue to remain industrial in nature.

18.4 INVESTIGATIVE ACTIVITIES

18.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) detected lead at concentrations of potential concern in the area of SWMU 55. Because there was no evidence of a significant release in the area of SWMU 55, the Phase I RFI recommended NFA at this SWMU.

A Phase II RFI (W-C 1997c) detected three metals and five organic compounds at concentrations of potential concern in the area of SWMU 55. Because there was no evidence of a significant release in the area of SWMU 55, the Phase II RFI recommended NFA at this SWMU.

18.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

18.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

18.4.2.2 Sampling Data Collection

Three borings, drilled to maximum depths of 20 feet in the area of the asphalt pad, were sampled during the Phase I RFI (boring locations are shown in Figure 18-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot, 3- to 5-foot, 8- to 10-foot, 13- to 15-foot, and 18- to 20-foot depth intervals to characterize the distribution of potential contaminants. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included lead and pH. In total, 15 soil samples were sent for chemical analyses.

18.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk screening and to determine that a significant release had not occurred in the area of SWMU 55. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

18.4.2.4 Results and Conclusions

Lead was detected at concentrations exceeding the established background levels at SWMU 55 (W-C 1997a). However, the detected concentrations of lead did not exceed the corresponding RBCs or other risk screening criteria. The analytical results from this investigation are shown in Tables 18-1a and 18-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than

250 feet, and the soil sampling results demonstrated that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the risk screening found that no detected concentrations of any chemicals exceeded the corresponding RBCs or other risk screening criteria. Based on this, the Phase I RFI recommended NFA for SWMU 55.

18.4.3 Investigation #2: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase II

18.4.3.1 Non-Sampling Data Collection

The Phase II RFI included a risk screening. The results of the risk screening are discussed below.

18.4.3.2 Sampling Data Collection

Three borings drilled to depths of 20 feet in the area of the asphalt pad were sampled during the Phase II RFI (boring locations are shown in Figure 18-1 in Appendix A). Soil samples were collected from the 0- to 2-foot, 3- to 5-foot, 8- to 10-foot, 13- to 15-foot, and 18- to 20-foot depth intervals to characterize the distribution of potential contaminants. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, TAL metals, TRPH, and pH. In total, 15 soil samples were sent for chemical analyses.

18.4.3.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete and risk screening and to determine that a significant release had not occurred in the area of SWMU 55. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase II RFI. Therefore, no data gaps existed after the completion of the Phase II RFI.

18.4.3.4 Results and Conclusions

Three metals (aluminum, barium and zinc) were detected at concentrations slightly exceeding the established background levels for Cannon AFB (W-C 1997a). However, none of these metals exceeded the corresponding RBCs. Five organic compounds, all PAHs, were detected at concentrations exceeding the corresponding RBCs or other risk screening criteria. The analytical results from this investigation are presented in Table 18-2a in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrated that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the risk screening found that the maximum detected concentrations of organics that exceeded the corresponding RBCs were all within the EPA target risk range of 1×10^{-6} to 1×10^{-4}. Based on this, the Phase II RFI recommended NFA for SWMU 55.

18.5 SITE CONCEPTUAL MODEL

18.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 55 included the drilling and sampling of three borings to a depth of 20 feet. Lead was detected at concentrations of potential concern. However, there was no evidence of a significant release in the area of SWMU 55, and the Phase I RFI recommended NFA at this SWMU.

The Phase II RFI conducted at SWMU 55 also included the drilling and sampling of three borings to a depth of 20 feet. Three metals and five organic compounds were detected at concentrations of potential concern in the area of SWMU 55. However, there was no evidence of a significant release in the area of SWMU 55, and the Phase II RFI recommended NFA at this SWMU.

Groundwater at SWMU 55 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrated that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

18.5.2 Environmental Fate

Contaminants encountered at the Lead Acid Battery Accumulation Point could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 55, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

18.6 SITE ASSESSMENTS

18.6.1 Summary

The Phase I and Phase II RFIs each included a risk screening for SWMU 55. Based on the results of the risk screening, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 55.

18.6.2 Screening Assessments

18.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected concentrations of lead to the established background level for lead at Cannon AFB (W-C 1997a). Because none of the detected concentrations of lead exceeded the established background level, a comparison to the highly conservative RBCs for residential soil was not warranted. No COPCs were detected at concentrations exceeding the corresponding RBCs during the Phase I RFI. Therefore, NFA was recommended for SWMU 55. The results of the risk screening are presented in Tables 18-2b and 18-2c in Appendix B.

No chemicals of potential concern were detected at concentrations exceeding the corresponding RBCs during the Phase II RFI. Therefore, NFA was recommended for SWMU 55.

18.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or the Phase II RFI, but a human health risk screening was included in these investigations. In each investigation, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region III RBCs, used as screening criteria, are highly conservative, and as such are protective of human health and the environment.

18.6.3 Risk Assessments

18.6.3.1 Human Health

Because the risk screening did not detect chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria, a full-scale human health risk assessment was not warranted for SWMU 55.

18.6.3.2 Ecological

The risk screening did not detect chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria. In addition, the Region III RBCs, used as screening criteria in the human health risk screening, are highly conservative, and as such are

protective of human health and the environment. Therefore, an ecological risk assessment was not warranted for SWMU 55.

18.6.4 Other Applicable Assessments

18.6.4.1 Surface Water

SWMU 55 contained no surface water.

18.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

18.6.4.3 Underground Storage Tanks (USTs)

No USTs are associated with the Lead Acid Battery Accumulation Point.

18.6.4.4 Other

No other assessments have been conducted in the area of SWMU 55.

18.7 NO FURTHER ACTION PROPOSAL

18.7.1 Rationale

Based on the conclusions reached in the Phase I and Phase II RFIs, NFA has been recommended for SWMU 55.

18.7.2 Criterion

SWMU 55 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

19.1 SUMMARY

SWMU 57, OWS No. 379, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) detected no metals and no organic compounds at concentrations exceeding the corresponding RBCs in the area of SWMU 57. Because there was no evidence of a significant release in the area of SWMU 57, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 57, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 57.

The conclusions reached in the Phase I RFI and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

19.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

19.2.1 Site Description

SWMU 57, OWS No. 379, was located beneath the pavement adjacent to the southwest side of Building 379 (Figure 19-1 in Appendix A). The OWS was an underground concrete unit consisting of three compartments. The OWS measured approximately 6.5 feet by 5 feet in plan and extended approximately 6 feet below the paved surface. The immediate area above the unit was paved with a layer of asphalt approximately 0.5 feet thick. The unit reportedly received waste wash water generated from heavy vehicle maintenance operations in Building 379. Recovered oils were stored in the oil storage compartment and wastewaters were discharged to a sanitary sewer line.

19.2.2 Operational History

OWS No. 379 was active from approximately 1965 until the unit was removed in 1996 (USACE 1999). After OWS No. 379 had been completely removed, it was replaced with a new OWS unit. OWS No. 379 at SWMU 57 has been removed and no longer receives waste wash water.

19.3 LAND USE

19.3.1 Current

The current land use of the SWMU location is industrial.

19.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 379 has been removed and no longer receives waste wash water. Use classification will continue to remain industrial in nature.

19.4 INVESTIGATIVE ACTIVITIES

19.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found no metals and no organics at concentrations exceeding the corresponding RBCs in the area of SWMU 57. Because there was no evidence of a significant release in the area of SWMU 57, the Phase I RFI recommended NFA at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 57, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 57.

19.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

19.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

19.4.2.2 Sampling Data Collection

Three borings drilled to depths of 10 feet in the area of the separator unit were sampled during the Phase I RFI (boring locations are shown in Figure 19-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot, 2- to 4-foot, 4- to 6-foot, and 8- to 10-foot depth intervals to characterize the distribution of potential contaminants. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Near-surface samples were collected at the 0.5- to 2-foot depth interval from directly beneath the asphalt pavement. In total, 12 soil samples were sent for chemical analyses.

19.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete risk screening and to determine that a significant release had not occurred in the area of SWMU 57. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

19.4.2.4 Results and Conclusions

No metals and no organic compounds were detected at concentrations exceeding the corresponding RBCs or other risk screening criteria. The analytical results from this investigation are shown in Tables 19-1a, 19-1b, and 19-1c in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of the risk screening found that no detected concentrations of any chemicals exceeded the corresponding RBCs or other risk screening criteria. Based on this, the Phase I RFI recommended NFA for SWMU 57.

19.4.3 Investigation #2: Corrective Measure Completion Report, Appendices II and III SWMUs

19.4.3.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

19.4.3.2 Sampling Data Collection

After the OWS had been removed, soil samples were collected from the walls and bottom of the resultant excavation and sent for chemical analyses.

19.4.3.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

19.4.3.4 Results and Conclusions

The OWS at SWMU 57 was pumped dry and cleaned. Two feet of soil were excavated from outside the walls of the unit, then the unit was removed without incident. After OWS No. 379 had been completely removed, it was replaced with a new OWS unit.

One soil sample was then collected from each of the four walls of the excavation at an approximate depth of 8 feet, and two soil samples were collected from the bottom of the excavation at an approximate depth of 8 feet. A seventh, confirmatory sample was collected from the bottom of the excavation at an approximate depth of 8 feet and sent for laboratory analysis after field analysis of these samples using immunoassay method 4030 indicated that the TPH content of each sample was less than 20 ppm and that the BTEX content of each sample

was less than 10 ppm. This sample was analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, two duplicate samples were collected from the same locations as one of the wall and one of the bottom samples, and sent for laboratory analysis, which confirmed the field analysis results for TPH and BTEX. The analytical results for this investigation are presented in Tables 19-2a and 19-2b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 57.

Because none of the detected chemicals exceeding the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

19.5 SITE CONCEPTUAL MODEL

19.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 57 included the drilling and sampling of three borings to depths of 10 feet. No COPCs were detected during the Phase I RFI. Therefore, NFA was recommended for SWMU 57.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. No COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 57.

Groundwater at SWMU 57 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

19.5.2 Environmental Fate

Contaminants encountered at OWS No. 379 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

However, because no chemicals were detected at concentrations of potential concern during either of the two investigations, the fate and transport of contaminants is irrelevant at SWMU 57.

19.6 SITE ASSESSMENTS

19.6.1 Summary

The Phase I RFI included a risk screening and the Corrective Measure Completion Report included a risk evaluation for SWMU 57. Based on the results of the risk screening and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 57.

19.6.2 Screening Assessments

19.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding RBCs during the Phase I RFI. Therefore, NFA was recommended for SWMU 57.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

No COPCs were detected at concentrations exceeding the corresponding MSSLs during the Corrective Measure Completion Report investigation. Therefore, NFA was recommended for SWMU 57.

19.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in these investigations. In each investigation, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. Both the Region III RBCs and the Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

19.6.3 Risk Assessments

19.6.3.1 Human Health

Because neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria, a full-scale human health risk assessment was not warranted for SWMU 57.

19.6.3.2 Ecological

Neither the risk screening nor the risk evaluation detected chemical concentrations attributable to SWMU contamination at concentrations exceeding the screening criteria. In addition, both the Region III RBCs and the Region VI MSSLs, used as screening criteria in the human health risk screening and risk evaluation, respectively, are highly conservative, and as such are protective of ecological and human health. Therefore, an ecological risk assessment was not warranted for SWMU 57.

19.6.4 Other Applicable Assessments

19.6.4.1 Surface Water

SWMU 57 contained no surface water.

19.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

19.6.4.3 Underground Storage Tanks (USTs)

OWS No. 379 included an underground oil storage tank. This tank was removed along with the unit's other compartments in 1996.

19.6.4.4 Other

No other assessments have been conducted in the area of SWMU 57.

19.7 NO FURTHER ACTION PROPOSAL

19.7.1 Rationale

Based on the conclusions reached in the Phase I RFI and the Corrective Measure Completion Report, NFA has been recommended for SWMU 57.

19.7.2 Criterion

SWMU 57 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

20.1 SUMMARY

SWMUs 61, 62, and 63, Sand Trap Nos. 5077A and 5077B, and OWS No. 5077C have been listed as Appendix III sites. Because of their close proximity, the three SWMUs were investigated together during a Phase I RFI of the Appendix III sites (W-C 1994a).

The Phase I RFI found no contaminants at concentrations that exceeded the corresponding RBCs and/or the corresponding background levels (W-C 1997a) in the area of SWMU 61. Therefore, NFA was recommended for this SWMU.

The Phase I RFI also found no contaminants at concentrations that exceeded the corresponding RBCs and/or the corresponding background levels (W-C 1997a) in the area of SWMU 62. Therefore, NFA was also recommended for this SWMU.

One metal and four organic compounds were detected at concentrations exceeding the screening criteria, including RBCs and background levels (W-C 1997a), at SWMU 63. Therefore, the Phase I RFI report recommended conducting a BRA at this site using the data collected during the Phase I RFI.

A BRA of the Appendix III SWMUs (W-C 1994b) later found that no unacceptable human health or ecological risks due to chemical releases were expected at SWMU 63. Based on this, the BRA recommended NFA for this SWMU.

The conclusions reached in the BRA recommended no further work at SWMU 63. Therefore, based on the recommendations of the Phase I RFI and the BRA, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

20.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

20.2.1 Site Description

Facility 5077 is a vehicle wash rack located in the Civil Engineering Squadron Compound at Cannon AFB(Figure 20-1 in Appendix A). The facility includes two 380-gallon sand traps (SWMUs 61 and 62) within the limits of the wash rack, and a 1,675-gallon OWS (SWMU 63) located to the southeast of the wash rack. Both sand traps and the wash rack are constructed of concrete. As-built plans show that each sand trap measures approximately 3 feet square, and the OWS measures approximately 5 feet by 10 feet. The exact depths of the three units are not known, but none are expected to be greater than 10 feet.

The sand traps and the OWS reportedly received wash water generated by motor vehicle cleaning activities. SWMU 63 has been described as an OWS, but field observations noted that it was a single-compartment unit with no baffles. Despite the fact that this unit appears to be a third sand trap, it will be referenced herein as an OWS.

20.2.2 Operational History

At the time of the field investigation, the wash rack area was roped off and out of use. According to the Base Civil Engineering Office, the facility was seldom used and has been taken out of service.

20.3 LAND USE

20.3.1 Current

Although the wash rack and its associated sand traps and OWS are still in place and functional, the facility was seldom used and has been taken out of service.

20.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, Sand Trap Nos. 5077A and 5077B and OWS No. 5077C were seldom used and have been taken out of service. Use classification will continue to remain industrial in nature.

20.4 INVESTIGATIVE ACTIVITIES

20.4.1 Summary

The Phase I RFI found no contaminants at concentrations that exceeded the corresponding RBCs and/or the corresponding background levels (W-C 1997a) in the areas of SWMU 61 or SWMU 62. Therefore, NFA was recommended for these SWMUs.

One metal and four organic compounds were detected at concentrations that exceeded the screening criteria, including RBCs and background levels (W-C 1997a), at SWMU 63. Therefore, the Phase I RFI report recommended conducting a BRA at this site using the data collected during the Phase I RFI.

A BRA of the Appendix III SWMUs (W-C 1994b) later found that no unacceptable human health or ecological risks due to chemical releases were expected at SWMU 63. Based on this, the BRA recommended NFA for this SWMU.

20.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

20.4.2.1 Non-Sampling Data Collection

The Phase I RFI was purely a field investigation and data collection effort. However, a BRA was performed using the results of the Phase I RFI for SWMU 63. The BRA is discussed as Investigation #2 below.

20.4.2.2 Sampling Data Collection

Six borings, two in the area of each of the three SWMUs, were drilled to a depth of 10 feet and sampled during the Phase I RFI (boring locations are shown in Figure 20-1 in Appendix A). Soil samples were collected from the 0.5- to 2-foot, the 2- to 4-foot, the 4- to 6-foot, and the 8- to 10-foot depth intervals at SWMUs 61 and 62, and from the 0.2- to 0.5-foot, the 1.5- to 3-foot, the 4- to 6-foot, and the 8- to 10-foot depth intervals at SWMU 63 to characterize the presence of potential contaminants.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Surficial samples were collected from the 0.2- to 0.5-foot depth interval at SWMU 63 to provide surface soil data for risk assessment purposes. Samples from the 0.5- to 2-foot interval were collected immediately beneath the pavement at SWMUs 61 and 62. In total, 12 soil samples were sent for chemical analyses.

20.4.2.3 Data Gaps

The data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. In addition, it was concluded that the data available from this investigation was sufficient to complete a BRA. Therefore, no data gaps existed after the completion of the Phase I RFI.

20.4.2.4 Results and Conclusions

Low levels of organic compounds and metals were detected in the soil samples collected from the borings drilled at both SWMU 61 and SWMU 62. However, none of these chemicals were detected at concentrations that exceeded the corresponding RBCs and/or other screening criteria, including established background levels for metals (W-C 1997a). In addition, the highest concentrations of detected chemicals occurred in the near-surface soil samples. Therefore, the vertical extent of contamination has been characterized by the borings at SWMU 61 and at SWMU 62, and the potential impacts to groundwater have been characterized as low.

Four organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) and one metal (barium) were found at levels exceeding the corresponding RBCs at SWMU 63. However, the highest detected concentration of barium fell within the range of background concentrations for the site and was dismissed as naturally occurring. The highest concentrations of all the contaminants were detected in near-surface samples. Therefore, the vertical extent of contamination has been characterized by the borings at SWMU 63, and the potential impacts to groundwater have been characterized as low. The analytical results from this investigation are shown in Tables 20-1a, 20-1b, 20-1c, 20-1d, and 20-1e in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The Phase I RFI recommended completing a BRA for SWMU 63, and NFA for SWMUs 61 and 62.

20.4.3 Investigation #2: Baseline Risk Assessment (BRA) for Appendix III SWMUs – Phase I

20.4.3.1 Non-Sampling Data Collection

No additional data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors and all appropriate exposure pathways was performed on the data collected during the Phase I RFI.

20.4.3.2 Sampling Data Collection

No additional data was collected during the BRA.

20.4.3.3 Data Gaps

It was concluded that the data collected during the Phase I RFI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI and the BRA. Therefore, no data gaps existed.

20.4.3.4 Results and Conclusions

Potential receptors at SWMU 63 for human health risks included occupational workers, hypothetical future construction workers, and hypothetical future trespassers. The receptors were assumed to be exposed to soil via ingestion, dermal contact, and inhalation pathways. The primary contributor to the risk was ingestion of PAHs in surface soils. The maximum potential excess human risk at SWMU 63 was 2×10^{-6} for occupational workers. This level fell within the USEPA's target risk range of 1×10^{-6} to 1×10^{-4} for risk from releases at hazardous waste sites, thus indicating that no unacceptable risk was expected. The concentrations of COCs identified during the BRA are shown in Table 20-2a and 20-2b in Appendix B. A summary of human health risks at SWMU 63 is shown in Table 20-2c in Appendix B.

Results of the ecological risk assessment showed that SWMU 63 COCs were unlikely to present an unacceptable risk to the raptor indicator species (i.e., robins). Therefore, no unacceptable ecological risks were expected at SWMU 63.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from SWMU 63. Therefore, NFA was recommended at this SWMU.

20.5 SITE CONCEPTUAL MODEL

20.5.1 Nature and Extent of Contamination

Low levels of organic compounds and metals were detected in the soil samples collected from the borings drilled at both SWMU 61 and SWMU 62. However, none of these chemicals were detected at concentrations that exceeded the corresponding RBCs and/or other screening criteria, including established background levels for metals (W-C 1997a). In addition, the highest concentrations of detected chemicals occurred in the near-surface soil samples. Therefore, the vertical extent of contamination has been characterized by the borings at SWMU 61 and at SWMU 62, and the potential impacts to groundwater have been characterized as low.

Four organic compounds and one metal were found at levels exceeding the corresponding RBCs at SWMU 63. The highest concentrations of all the contaminants were detected in near-surface samples. Therefore, the vertical extent of contamination has been characterized by the borings at SWMU 63, and the potential impacts to groundwater have been characterized as low.

Groundwater at SWMUs 61, 62, and 63 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

20.5.2 Environmental Fate

Contaminants encountered at Sand Trap Nos. 5077A and 5077B and OWS No. 5077C could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at SWMUs 61, 62, and 63, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; however, they do persist for long periods of time. The potential for metals to precipitate in the subsurface, thus limiting downward migration in the vadose zone, is evidenced by the caliche layers encountered in the borings drilled during the Phase I RFI.

Organic compounds are likely to be relatively to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

20.6 SITE ASSESSMENTS

20.6.1 Summary

As part of the Phase I RFI, detected chemicals were compared to the corresponding RBCs.

A BRA was also conducted based on the results of the Phase I RFI for SWMU 63. Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 63.

20.6.2 Screening Assessments

20.6.2.1 Human Health

The risk screening at SWMUs 61, 62, and 63 consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations detected during the RFI posed a significant human health risk, and whether a risk assessment was warranted. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies. Based on this comparison, NFA was recommended for SWMUs 61 and 62. Because organic compounds and barium were detected at concentrations exceeding the corresponding RBCs, it was determined that a BRA was warranted for SWMU 63.

20.6.2.2 Ecological

An ecological risk screening was not included as part of the BRA for SWMU 63. However, an ecological risk assessment was included and is discussed below in Section 20.6.3.2.

20.6.3 Risk Assessments

20.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included occupational workers, hypothetical workers performing intrusive actions, and hypothetical trespassers. Based on site conditions at SWMU 63, the most significant exposure pathways included inhalation of fugitive VOCs or dust, and direct contact with soil, resulting in incidental ingestion or dermal absorption of chemicals from soil.

All hazard indices for subchronic and chronic exposures to site COCs fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. In addition, the total carcinogenic risk for exposures at SWMU 63 fell below or within the USEPA's target risk range (1×10^{-4} to 1×10^{-6}). This indicated that no unacceptable risk of noncarcinogenic or carcinogenic effects was expected at SWMU 63.

20.6.3.2 Ecological

The ecological risk assessment portion of the BRA focused on the potential for adverse effects to occur to selected indicator species (chemical receptors) from environmental stressors (COCs). Potential risk from contaminants in soil to biota was considered greatest through indirect exposure of raptor species (i.e., robins) to SWMU-related chemicals bioaccumulated in the birds'

prey (earthworms) that inhabit SWMU 63, and the incidental soil consumption associated with the consumption of prey.

The ecological risk assessment found that no unacceptable ecological risks due to chemical releases were expected from SWMU 63. Therefore, NFA was recommended at this SWMU.

20.6.4 Other Applicable Assessments

20.6.4.1 Surface Water

SWMUs 61, 62, and 63 contained no surface water.

20.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, these SWMUs contained no means for groundwater discharges to occur.

20.6.4.3 Underground Storage Tanks (USTs)

Although SWMU 63 has been described as an OWS, it was observed to be a single-compartment unit with no baffles. Therefore, no storage tanks, aboveground or underground, are known to have existed in the areas of SWMUs 61, 62, and 63.

20.6.4.4 Other

No other assessments have been conducted in the area of SWMUs 61, 62, and 63.

20.7 NO FURTHER ACTION PROPOSAL

20.7.1 Rationale

Based on the conclusions reached in the Phase I RFI and the BRA, NFA has been recommended for SWMUs 61, 62, and 63.

20.7.2 Criterion

SWMUs 61, 62, and 63 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

21.1 SUMMARY

Solid Waste Management Unit (SWMU) 74, Landfill No. 1, has been listed as an Appendix I site. A Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) of Landfill No. 1 (W-C 1997b) found elevated levels of one metal and five organic compounds (including one pesticide and one herbicide) in the area of SWMU 74. Based on the results of a limited risk assessment performed as part of this investigation, the recommendation in the Phase I RFI Report of a Class 3 modification to the Cannon Air Force Base (AFB) RCRA Part B Permit pursuant to 40 Code of Federal Regulations (CFR) 270.42(c) is warranted for closure of this SWMU.

21.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

21.2.1 Site Description

Landfill No. 1 (SWMU 74) was an inactive landfill located in the northwest area of Cannon AFB (Figure 21-1 in Appendix A) beneath a portion of the 14th fairway at the Whispering Winds Golf Course. The landfill was reportedly unlined, and it occupied approximately 8 acres of land. Overall, the landfill site is relatively flat and is covered by the grass of the 14th fairway. The general surface water runoff is toward the east, into a pond located east of the golf course's 15th fairway (W-C 1997b).

21.2.2 Operational History

Landfill No. 1 was the original landfill at Cannon AFB. It accepted wastes from 1943 to 1946. The landfill's operation apparently consisted of placing waste in trenches and burning it before burying it. Waste materials received at the site reportedly included domestic solid wastes and shop wastes, which included waste oils and solvents, paint strippers and thinners, outdated paint, pesticide containers, and various empty cans and drums (Radian 1986).

Radian Corporation previously investigated an area reported to be Landfill No. 1 in 1984 and 1985 under the Installation Restoration Program (IRP) (Radian 1986). This investigation focused on an area approximately 1,000 feet north of Cannon AFB hospital (Lee Wan and Associates 1990). However, landfill material was not encountered in any of the five soil borings drilled during this investigation.

Based on the uncertainty concerning the location of Landfill No. 1, Lee Wan and Associates, Inc. performed a review of aerial photographs from 1945 and 1946 (Lee Wan and Associates 1990). The exact location of the landfill could not be determined, but Lee Wan and Associates estimated the location to be northeast of the Base hospital. A subsequent review of aerial photographs from 1939 and 1951 through 1979, conducted by Woodward-Clyde (W-C) in conjunction with the U.S. Army Corps of Engineers (USACE) and Cannon AFB personnel in March 1992, found evidence of possible surface activity and or disturbance in the same area that had been identified by Lee Wan and Associates.

Based on the available information, W-C delineated the approximate area of the suspected landfill at a location approximately 400 feet northeast of the base hospital. In April and March 1992, W-C conducted a field investigation which included conducting a geophysical survey along 15 traverses, drilling 32 geotechnical soil borings, and collecting 25 lithographic soil samples for archival purposes. An electromagnetic geophysical survey was completed using a Geonics EM-31. The results of the geophysical survey indicated the presence of anomalies in the area suspected to be the location of Landfill No. 1. However, these anomalies had most likely been influenced by underground utilities, the golf course sprinkler system, and the moist soils found near the course's playa lakes and greens, rather than buried landfill materials. In addition, no landfill materials were encountered during the drilling of the soil borings. Based on the results of this investigation, it did not appear that Landfill No. 1 was present in the suspected location.

In the summer of 1993, Cannon AFB began to modify and expand the Whispering Winds Golf Course. In the process of installing the sprinkler system, evidence of burn and bury trenches, potentially associated with landfill activities, was encountered. These trenches were encountered approximately 1,000 feet north-northwest of the Base hospital, in the proximity of the area Radian had investigated in 1984 and 1985.

21.3 LAND USE

21.3.1 Current

Cannon AFB personnel use the Whispering Winds Golf Course frequently on a year-round basis. Approximately 23,000 rounds of golf (i.e., 23,000 person visits, with each visit lasting approximately 1 to 3 hours) are played on the course each year. The average daily usage consists of approximately 40 rounds played each weekday, and approximately 80 rounds played each weekend day. In addition, golf course maintenance personnel work in the area approximately 8 hours per day, 5 days per week.

21.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, it is possible that a change in the flying mission of Cannon AFB could result in the closure of the Whispering Winds Golf Course in the area of SWMU 74. Use classification will continue to remain industrial in nature.

21.4 INVESTIGATIVE ACTIVITIES

21.4.1 Summary

A Phase I RFI of Landfill No. 1 (W-C 1997b) found elevated levels of one metal and five organic compounds (including one pesticide and one herbicide) in the area of SWMU 74. The results of the human health risk evaluation conducted during the Phase I RFI at SWMU 74 indicated that this SWMU poses no unacceptable risk to human health.

21.4.2 Investigation #1: Phase I RCRA Facility Investigation Report for Landfill No. 1 (SWMU 74)

21.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a limited risk assessment performed using the results of this investigation. The limited risk assessment indicated that there is no unacceptable risk to human health from this SWMU (W-C 1997b).

21.4.2.2 Sampling Data Collection

A Phase I RFI was performed at SWMU 74 to determine whether a release of landfill-related chemicals had occurred. Two electromagnetic geophysical surveys were completed, one using a Geonics EM-31 and the other using a Geonics EM-61. The results of both surveys were interpreted, and the anomalies encountered were determined to be indicative of the presence of landfill materials. Based on these results, a subsurface soil investigation was designed. A total of 23 borings were drilled and subsurface soil samples were collected and submitted for chemical analyses from 15 of the borings (boring locations are shown in Figure 21-1 in Appendix A). The borings were advanced to depths ranging from 10 to 50 feet below the surface to determine the vertical extent of any potential contamination. Target analytes for the 43 samples collected from the 23 borings included Target Compound List (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), cyanide, pesticides, polychlorinated biphenyls (PCBs), herbicides, total recoverable petroleum hydrocarbons (TRPH), Target Analyte List (TAL) metals, and total organic carbon (TOC). In addition, the analytical laboratory reported three volatile and five semivolatile organic tentatively identified compounds (TICs).

21.4.2.3 Data Gaps

The data quality was deemed to be sufficient to meet the quality assurance objectives of the Phase I RFI Quality Assurance Project Plan (QAPP). Therefore, no data gaps existed after the completion of the Phase I RFI.

21.4.2.4 Results and Conclusions

One VOC (toluene), two SVOCs (pyrene and pentachlorophenol), one herbicide, (2-[2-methyl-4-chlorophenoxy] propionic acid [MCPP]), one pesticide (4,4'-DDT), and one metal (barium) were detected at concentrations of potential concern during the Phase I RFI at Landfill No. 1. All other compounds detected were excluded from concern because they were detected below the associated background levels (W-C 1997a) in the case of metals, because they were considered to be a laboratory contaminant in the case of organic compounds, or because did not have risk screening criteria. The analytical results for this investigation are presented in Tables 21-1a and 21-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater was greater than

250 feet at Cannon AFB, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The landfill material encountered during the Phase I RFI included construction debris and domestic waste. No liquid wastes or soils saturated with liquid wastes were encountered during the field activities.

Based on the results of a limited risk assessment performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 74.

21.5 SITE CONCEPTUAL MODEL

21.5.1 Nature and Extent of Contamination

A total of 23 borings, to depths ranging from 10 to 50 feet, were installed during the Phase I RFI at Landfill No. 1 to effectively delineate the extent of contamination at SWMU 74. Chemical analyses detected elevated concentrations of metals and organic compounds in subsurface soil samples collected during the Phase I RFI at SWMU 74.

Metals that exceeded the associated background levels (W-C 1997a), and organics that were not dismissed as laboratory contaminants, were compared to the United States Environmental Protection Agency (USEPA) Region III Risk-Based Concentrations (RBCs). Additional chemicals were excluded as chemicals of interest if they did not have Region III RBCs (i.e., chemicals without a Region III RBC do not have USEPA-established toxicity values, and therefore cannot be quantitatively evaluated by a risk assessment).

Groundwater at SWMU 74 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

21.5.2 Environmental Fate

Contaminants encountered at Landfill No. 1 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Toluene is likely to be medium to highly mobile in subsurface soil and is not likely to persist for long periods of time due to high vapor pressure, high volatilization potential, and a high biodegradation rate.

MCPP is not likely to persist in the environment over time due to a very high water solubility, a tendency not to adsorb to clays, and a high biodegradation rate.

Pyrene, phenanthrene, and pentachlorophenol are likely to be relatively immobile due to low vapor pressure, low water solubility, and a tendency to adsorb to clays. In addition, these three compounds have moderate to low biodegradation rates.

4,4'-DDT is likely to persist in the environment due to its extremely low vapor pressure, low water solubility, and tendency to readily adsorb to soil. This compound also has a low biodegradation rate.

Based on the general subsurface characteristics at SWMU 74, including moderate to high clay content and an alkaline soil pH, metals (i.e., barium) are not likely to be very mobile in the subsurface; however, they do persist for long periods of time. The potential precipitation of metals in the subsurface, thus limiting downward migration in the vadose zone, is evidenced by the caliche layers encountered in the borings drilled during the Phase I RFI.

21.6 SITE ASSESSMENTS

21.6.1 Summary

A limited risk assessment was conducted based on the results of the Phase I RFI. The results of the limited risk assessment are discussed below.

21.6.2 Screening Assessments

21.6.2.1 Human Health

A human health risk screening was performed for Landfill No. 1 to determine whether chemicals detected in soils at the site may pose an unacceptable risk to human health. Maximum concentrations of the chemicals were compared to USEPA Region III RBCs for residential soil ingestion to estimate potential noncarcinogenic hazard and carcinogenic risk. Conservative assumptions were used throughout the screening process; therefore, the results overestimate the actual hazard/risk and the site.

None of the chemicals detected above background levels (W-C 1997a) that were not dismissed as laboratory contaminants exceeded the established RBCs. The cumulative Hazard Index (HI) for noncarcinogenic effects was 0.4, less than USEPA's level of concern (1.0), indicating that the maximum concentrations of noncarcinogenic chemicals at the site do not pose an unacceptable risk to human health. The cumulative cancer risk from exposure to the maximum concentrations of 4,4'-DDT and pentachlorophenol was 1×10^{-8}, less than USEPA's "point of departure" of 1×10^{-6} for evaluating cancer risk at hazardous waste sites.

Concentrations without toxicity values (RBCs) and tentatively identified compounds were evaluated qualitatively and were found not to pose a threat to human health based on low toxicity, low potential for human exposure (due to infrequent detections), and low detected concentrations.

Based on the results of the human health risk screening, chemicals detected in soils at Landfill No. 1 do not pose an unacceptable risk to human health.

21.6.2.2 Ecological

No formal ecological risk screening has been performed at SWMU 74.

21.6.3 Risk Assessments

21.6.3.1 Human Health

Based on the conclusions of the human health risk screening, SWMU 74 did not contain any significant hazards/risks such that a formal ecological risk assessment was warranted.

21.6.3.2 Ecological

No formal ecological risk assessment has been performed at SWMU 74.

21.6.4 Other Applicable Assessments

21.6.4.1 Surface Water

SWMU 74 contained no surface water.

21.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

21.6.4.3 Underground Storage Tanks (USTs)

There is no record of any storage tanks, either underground or aboveground, in the area of SWMU 74.

21.6.4.4 Other

No other assessments have been conducted in the area of SWMU 74.

21.7 NO FURTHER ACTION PROPOSAL

21.7.1 Rationale

Based on the conclusions reached in the Phase I RFI, no further action (NFA) has been recommended for SWMU 74.

21.7.2 Criterion

SWMU 74 is proposed for NFA based on New Mexico Environment Department (NMED) NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

22.1 SUMMARY

SWMU 76, the Sludge Weathering Pit, was located near Building 326, adjacent to the installation's northern boundary fence. The pit, last used in 1980, was used to weather sludge from leaded gasoline storage tanks in the 1960s and 1970s. The sludge was landfilled after it was judged to have been sufficiently weathered.

An RI of 18 IRP/SWMU sites was completed in 1991 (W-C 1992). Based on the analytical results from this investigation, the RI report recommended that NFA was required at SWMU 76.

A BRA, performed using the results of the RI, was included in the RI report. The BRA assessed potential adverse human health and ecological effects by comparing soil data to risk-based RFI criteria listed in the RFI Guidance, Volume I (USEPA 1989a), or if these levels were exceeded, by calculating site-specific health risks. The BRA concluded that potential impacts to human health and the environment were insignificant at SWMU 76.

The conclusions reached in the RI report and the BRA were consistent in recommending no further work at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

22.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

22.2.1 Site Description

SWMU 76, the Sludge Weathering Pit, covered approximately 200 square feet (HARZA 1997). This relatively flat SWMU was located near Building 326 and adjacent to the northern boundary of Cannon AFB (Figure 22-1 in Appendix A). SWMU 76 was used throughout the 1960s and 1970s to weather sludge from leaded gasoline storage tanks. The sludge was landfilled after it was judged to have been sufficiently weathered.

22.2.2 Operational History

The Sludge Weathering Pit, last used in 1980, was used to weather sludge from leaded gasoline storage tanks during the 1960s and 1970s. According to a Phase I Records Search performed in 1983 (CH2M Hill 1983), a soil sample collected in 1981 to evaluate a past material disposal site was analyzed for total lead, oil and grease. The lead analysis was nondetect, and 0.012 mg/kg of oil and grease were detected. An RI of 18 IRP/SWMU sites investigated this site in 1991. The RI report included a BRA and recommended that NFA was required.

22.3 LAND USE

22.3.1 Current

The Sludge Weathering Pit, last used in 1980, was used to weather sludge from leaded gasoline storage tanks. Since 1980, SWMU 76 has been covered with fill material and closed.

22.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the facility will remain active for the foreseeable future. However, SWMU 76 has been covered with fill material and has been inactive since 1980. Use classification will continue to remain industrial in nature.

22.4 INVESTIGATIVE ACTIVITIES

22.4.1 Summary

According to a Phase I Records Search (CH2M Hill 1983), a soil sample collected in 1981 to evaluate a past material disposal site was analyzed for total lead, oil and grease. The lead analysis was nondetect, and 0.012 mg/kg of oil and grease were detected. No additional information was reviewed regarding this sampling event.

SWMU 76 was the subject of a RI in 1991 (W-C 1992). A BRA, conducted using the results of the RI, was included in the RI report. Based on the results of the RI and the BRA, it was determined that the NFA alternative was most appropriate for SWMU 76.

22.4.2 Investigation #1: Remedial Investigation (RI) of 18 IRP/SWMU Sites

22.4.2.1 Non-Sampling Data Collection

In addition to the field investigation and data collection effort, the RI also included the performance of a BRA on the analytical data from SWMU 76. The BRA is addressed as Investigation #2 in Section 22.4.3 below.

22.4.2.2 Sampling Data Collection

Four soil borings were drilled and samples were collected for chemical and geotechnical analyses during the RI. Two surface samples were collected from three of the borings at depth intervals of 0 to 0.5 feet. Additionally, nine subsurface soil samples were collected from the four borings at depth intervals ranging from 4 to 31 feet. The boring locations and total depths were chosen to evaluate the nature and extent of potential hazardous contaminants in the area of SWMU 76. Samples were selected for analyses from varying depth intervals to provide a cross-section profile of the Sludge Weathering Pit. The sampling locations are shown in Figure 22-1 in Appendix A.

All soil samples collected were analyzed for TCL VOCs and SVOCs, and for TAL metals and organic lead.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater at Cannon AFB is greater than 250 feet, and the soil sampling results demonstrate that contaminants were not being transported significantly in a vertical direction beneath the SWMU.

22.4.2.3 Data Gaps

It was concluded that the data collected during the RI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the RI and the BRA. Therefore, no data gaps existed.

22.4.2.4 Results and Conclusions

The maximum concentrations of ethylbenzene and xylenes were detected in the same sample collected from a depth interval of 8 to 10 feet at estimated concentrations of 4,000 µg/kg and 7,900 µg/kg, respectively. Ethylbenzene and xylenes may have been present in a second sample collected from another boring drilled during the RI at the same depth and at similar concentrations. In addition, these compounds may have also been present in a third sample collected from a third boring at a depth interval of 4 to 6 feet at concentrations as high as 29,000 µg/kg. However, in both cases the presence of ethylbenzene and xylenes was potentially masked by the high detection limits necessitated by laboratory dilution of the samples due to the presence of non-target compounds. Lower levels of organics were also detected in the samples analyzed at intervals up to 18 feet in depth.

Mercury was the only metal detected at levels of potential concern. The maximum detected concentration of mercury was 0.85 mg/kg from a 25-foot depth interval. Organic lead was only detected at very low levels. However, inorganic lead was found at concentrations exceeding the background levels established for Cannon AFB (W-C 1997a), but these concentrations were well below regional background levels for lead. Both the maximum concentration of lead detected at SWMU 76 (12.6 mg/kg) and the background levels for lead were below the applicable USEPA Generic Soil Screening Level of 400 mg/kg. Tables 22-1a, and 22-1b in Appendix B present the analytical results for SWMU 76.

The analytical data from SWMU 76 suggest the possible presence of residual petroleum sludge from storage tank bottoms. Petroleum chemicals were also detected to depths of 18 feet in underlying native soils.

22.4.3 Investigation #2: Baseline Risk Assessment (BRA) of 18 IRP/SWMU Sites

22.4.3.1 Non-Sampling Data Collection

No additional sampling data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors and all appropriate exposure pathways was performed on the data collected during the RI.

22.4.3.2 Sampling Data Collection

No data was collected during the BRA. However, the BRA was included in the RI report. The RI was addressed as Investigation #1 in Section 22.4.2 above.

22.4.3.3 Data Gaps

It was concluded that the data collected during the RI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the RI and the BRA. Therefore, no data gaps existed.

22.4.3.4 Results and Conclusions

The BRA used validated soil data collected as part of the RI to identify and select COCs for the quantitative characterization of risk at SWMU 76. Potential receptors at this SWMU for human health risks included current and future maintenance workers at the SWMU. Potential construction workers and residents were eliminated as receptors because this SWMU is less than 0.5 acres in size (the minimum plot size judged to be reasonable for future construction) and covered with clean fill material and grass. In addition, trespassers and off-site residents/workers were also eliminated because of the low frequency and duration of exposure associated with these potential receptors.

Based on site conditions at SWMU 76, all exposure pathways were determined to be either incomplete, insignificant, or not applicable with the exception of the VOC inhalation pathway. Human receptors for this pathway were identified as adult, general-duty or ground maintenance workers. Potential exposures via this pathway were expected to be low because of the anticipated low ambient VOC concentrations and the short duration of relatively infrequent exposures (grass mowing for approximately 5 to 10 minutes once per month).

The COCs for SWMU 76 were identified as lead (despite being detected at concentrations below regional background levels), ethylbenzene, and xylenes. However, since a USEPA-verified toxicity value for lead had not been established, the quantitative evaluation of human health impacts at this site were limited to ethylbenzene and xylenes. None of these COCs are classified as carcinogenic chemicals. All hazard indices and hazard quotients for subchronic and chronic exposures to site COCs fell well below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk was expected.

A single ecological risk assessment was included in the BRA for all 18 IRP/SWMU sites covered by the RI report. The ecological risk assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). However, lead was the only COC discussed in the ecological risk assessment that was also detected at SWMU 76. Potential risk from metals in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, none of the COC metals (including lead) were considered to pose a risk to small mammal populations. Tables 22-2a, 22-2b, and 22-2c in Appendix B present the selection of the COCs and the calculation of the risk characterizations for SWMU 76.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for this SWMU.

22.5 SITE CONCEPTUAL MODEL

22.5.1 Nature and Extent of Contamination

The analytical data from SWMU 76 suggested the possible presence of residual petroleum sludge from storage tank bottoms. The detection limits were elevated in two samples from the 4- to 6-foot depth interval because of dilution necessitated by the presence of nontarget compounds. Petroleum chemicals were also detected to depths of 18 feet in underlying native soils.

Ethylbenzene and xylenes were detected in a single boring at a depth interval of 8 to 10 feet at estimated concentrations of 4,000 µg/kg and 7,900 µg/kg, respectively. These compounds may have also been present in a second boring at the same depth, and also in a third boring at a depth of 4 to 6 feet, but their presence was potentially masked by the elevated detection limits discussed above.

Mercury, with a maximum detected concentration of 0.85 mg/kg at a 25-foot depth interval, was the only metal detected at levels of potential concern.

22.5.2 Environmental Fate

Based on site conditions at SWMU 76, all exposure pathways were determined to be either incomplete, insignificant, or not applicable, with the exception of the air pathway. Within the air pathway, the fate and transport of the metals detected in the soils of this area showed no evidence of health risks. Based on air quality modeling of soil gas releases, VOCs detected at SWMU 76 do not present a health risk. Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

22.6 SITE ASSESSMENTS

22.6.1 Summary

A BRA was conducted based on the results of the RI for SWMU 76. Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 76.

22.6.2 Screening Assessments

22.6.2.1 Human Health

The COPCs at SWMU 76, including ethylbenzene, xylenes, mercury, and lead, were initially screened by comparing detected concentration of these chemicals to RFI criteria. This screening process eliminated mercury; the remaining chemicals were considered COCs for this site.

Although the maximum concentration of lead detected at SWMU 76 (12.6 mg/kg) was below the applicable USEPA Generic Soil Screening Level of 400 mg/kg and regional background levels

for lead (W-C 1997a), lead was considered a COC because the maximum concentration detected exceeded the background levels established for Cannon AFB.

Ethylbenzene and xylenes were also considered COCs. All COCs were subjected to a quantitative characterization of risk.

22.6.2.2 Ecological

A single ecological risk assessment was included in the BRA for all 18 IRP/SWMU sites covered by the RI report. The ecological risk assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels (W-C 1997a). However, lead was the only COC discussed in the ecological risk assessment that was also detected at SWMU 76. Potential risk from metals in soil to biota was considered greatest through direct exposure of small mammals and other ground-dwelling organisms. Based on the calculated toxicity values for incidental soil ingestion, none of the COC metals (including lead) were considered to pose a risk to small mammal populations.

22.6.3 Risk Assessments

22.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included current and future maintenance workers at the SWMU. Based on site conditions at SWMU 76, all exposure pathways were determined to be either incomplete, insignificant, or not applicable, with the exception of the VOC inhalation pathway. Human receptors for this pathway were identified as adult, general-duty or ground maintenance workers. Potential exposures via this pathway were expected to be low because of the anticipated low ambient VOC concentrations and the short duration of relatively infrequent exposures.

The COCs for SWMU 76 were identified as lead, ethylbenzene, and xylenes. However, since a USEPA-verified toxicity value for lead had not been established, the quantitative evaluation of human health impacts at this site were limited to ethylbenzene and xylenes. None of these COCs are classified as carcinogenic chemicals. All hazard indices and hazard quotients for subchronic and chronic exposures to site COCs fell well below the USEPA's level of concern (1.0) for noncarcinogenic effects. This indicated that no unacceptable risk was expected.

22.6.3.2 Ecological

Based on the results of the BRA, NFA was recommended for SWMU 76. Therefore, a full-scale ecological risk assessment was not conducted for SWMU 76.

22.6.4 Other Applicable Assessments

22.6.4.1 Surface Water

SWMU 76 contained no surface water.

22.6.4.2 Groundwater

Groundwater at SWMU 76 has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

22.6.4.3 Underground Storage Tanks (USTs)

There have never been any USTs located at SWMU 76.

22.6.4.4 Other

According to a Phase I Records Search (CH_2M Hill 1983), a soil sample collected in 1981 to evaluate a past material disposal site was analyzed for total lead, oil and grease. The lead analysis was nondetect, and 0.012 mg/kg of oil and grease were detected. No additional information was reviewed regarding this sampling event.

No other assessments have been conducted in the area of SWMU 76.

22.7 CONFIRMATION SAMPLING

During June 2004, the U.S. Geological Survey collected one subsurface confirmation sample from a depth of 5.5 to 6 feet below ground surface in connection with the Fuel Replacement System at Cannon AFB (Figure 22-2). The sampling results are presented in Table 22-3. The compounds ethylbenzene, methyl tert-butyl ether, and total xylenes were detected, and all detected concentrations were well below U.S. EPA Region 9 residential preliminary remediation goals (PRGs) of 8.9 mg/kg, 62 mg/kg, and 270 mg/kg, respectively.

22.8 NO FURTHER ACTION PROPOSAL

22.8.1 Rationale

Based on the conclusions reached in the RI and the BRA, NFA has been recommended for SWMU 76.

22.8.2 Criterion

SWMU 76 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

23.1 SUMMARY

SWMU 83, Sump, has been listed as an Appendix II site. A Phase I RFI of the Appendix II sites (LRL 1993) detected elevated levels of TRPH in the area of SWMU 83. The results of a limited risk assessment, performed as part of this investigation, indicated minimal or no risk to human health or the environment from SWMU 83.

A Phase II RFI of the Appendix II sites (W-C 1997c) also found elevated levels of 14 organic compounds, nine of which were PAHs, and one metal in the area of this SWMU. However, the report documenting this investigation noted that none of the concentrations of the chemicals detected at SWMU 83 posed an unacceptable human health risk. The Phase II RFI report recommended no further investigation at this site.

The conclusions reached in the Phase I and Phase II RFIs were consistent in recommending no further work at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

23.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

23.2.1 Site Description

SWMU 83, Sump, was located approximately 90 feet northwest of Building 120 (Figure 23-1 in Appendix A). The depth to the former sump, which had been constructed in a 12- by 14-foot concrete pad, is unknown (W-C 1997c). A portion of the sump's former location has been paved. Historically, the sump received rainwater, wash water, and dilute waste oil runoff from flight line operations.

23.2.2 Operational History

The installation date and initial use date of SWMU 83 are unknown. The sump was removed in 1993. Historically, the sump received rainwater, wash water, and dilute waste oil runoff from flight line operations. A portion of the sump's former location is currently paved.

23.3 LAND USE

23.3.1 Current

The sump has been removed, and a portion of the sump's former location is currently paved.

23.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the sump was removed in 1993. Use classification will continue to remain industrial in nature.

23.4 INVESTIGATIVE ACTIVITIES

23.4.1 Summary

A Phase I RFI of the Appendix II sites (LRL 1993) found elevated levels of TRPH in the area of SWMU 83. A Phase II RFI of the Appendix II sites (W-C 1997c) also detected elevated levels of 14 organic compounds and one metal in the area of this SWMU.

23.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix II SWMUs – Phase I

23.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a limited risk assessment performed using the results of this investigation. The limited risk assessment indicated minimal or no risk to human health or the environment from this SWMU (LRL 1993).

23.4.2.2 Sampling Data Collection

During the Phase I RFI, three soil borings were drilled and sampled to a depth of 10 feet at SWMU 83 to determine whether a release of SWMU-related chemicals had occurred from the sump (Figure 23-1 in Appendix A). Soil samples collected were analyzed for TCL VOCs, cyanide, TAL metals, and TRPH. TRPH was detected at the surface in all three borings, and at the 2.5-foot and 5-foot depth intervals in two of the three borings. A maximum concentration of 5,000 ppm was detected at a depth of 2.5 feet. Aluminum, iron, nickel, potassium, zinc, copper and manganese were all detected in low concentrations in surface and subsurface samples from each of the three soil borings.

23.4.2.3 Data Gaps

Sufficient data was collected during the Phase I RFI to complete a limited risk assessment for SWMU 83, and to reach the conclusion that this SWMU posed minimal or no risk to human health or the environment. Therefore, no data gaps existed after the completion of the Phase I RFI.

23.4.2.4 Results and Conclusions

TRPH was detected at elevated concentrations in samples collected from the surface and subsurface of all three Phase I borings drilled in the area of SWMU 83. Metals were detected at low concentrations in all three borings.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater was greater than 250 feet at Cannon AFB, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The results of a limited risk assessment, performed as part of this investigation, indicated minimal or no risk to human health or the environment from SWMU 83. The results of this investigation are presented in Tables 23-1a and 23-1b in Appendix B.

23.4.3 Investigation #2: RFI, Appendix II SWMUs – Phase II

23.4.3.1 Non-Sampling Data Collection

The purpose of the Phase II RFI was to evaluate whether a release of SWMU-related chemicals had occurred as a result of spillage or leakage from the sump that could pose a significant risk to human health or the environment. In addition, the Phase II RFI included a risk screening to verify whether the recommendation of NFA based on the Phase I RFI was appropriate for SWMU 83, and characterized the vertical extent of contamination in this area.

23.4.3.2 Sampling Data Collection

A Phase II RFI was performed at SWMU 83 to determine whether a release of SWMU-related chemicals had occurred from the sump. Two borings were advanced to depths of 25 feet below the surface and samples were collected and analyzed to determine the vertical extent of any potential contamination. Target analytes for samples from the three borings included VOCs, SVOCs, TAL metals, and TRPH.

23.4.3.3 Data Gaps

During the Phase II RFI, two borings were drilled instead of three, the number listed in the Final Work Plan Addendum (W-C 1994). The third boring could not be drilled due to the presence of overhead hazards. The data quality was deemed to be sufficient to meet the objectives of the Phase II RFI. Therefore, no data gaps existed after the completion of the Phase II RFI.

23.4.3.4 Results and Conclusions

Fourteen organic compounds were detected during the Phase II RFI. In addition, one metal, cadmium, was detected at a maximum concentration that exceeded the background level for soils (W-C 1997a) in the area of SWMU 83. However, the maximum concentration of only one compound, benzo(a)pyrene, slightly exceeded the associated RBC. Based on the results of the Phase II RFI at SWMU 83, the vertical extent of contamination has been adequately assessed and potential impacts to groundwater were considered low. The results of this investigation are presented in Tables 23-2a and 23-2b in Appendix B.

Because there were no unacceptable health risks associated with SWMU 83, the Phase II RFI recommended that no further investigation was necessary for this SWMU.

23.5 SITE CONCEPTUAL MODEL

23.5.1 Nature and Extent of Contamination

Five borings, three to a depth of 10 feet and two to a depth of 25 feet, were installed during the two phases of the RFI to effectively delineate the extent of contamination at SWMU 83. Chemical analyses detected concentrations of metals and organic compounds, including TRPH, at concentrations of potential concern in samples collected during the Phase I and Phase II RFIs conducted at SWMU 83.

Groundwater at SWMU 83 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

23.5.2 Environmental Fate

Because there were no unacceptable health risks associated with SWMU 83, the fate and transport of contaminants in the vadose zone was not modeled as part of the Phase II RFI.

23.6 SITE ASSESSMENTS

23.6.1 Summary

A limited risk assessment and a risk screening were conducted as part of the Phase I and II RFIs, respectively. The results of the limited risk assessment and risk screening are discussed below.

23.6.2 Screening Assessments

23.6.2.1 Human Health

The results of a limited risk assessment, performed as part of the Phase I RFI, indicated minimal or no risk to human health from SWMU 83. The results of the Phase II RFI at SWMU 83 showed no evidence that a significant chemical release, posing an unacceptable human health risk for any potential exposure pathway, had occurred at this SWMU.

23.6.2.2 Ecological

The former sump located at SWMU 83 has been removed and the area has been partially paved. Based on this, SWMU 83 did not contain any significant ecological component such that a formal ecological risk assessment was warranted. However, the results of a limited risk assessment, performed as part of Phase I RFI, indicated minimal or no risk to the environment from SWMU 83.

23.6.3 Risk Assessments

23.6.3.1 Human Health

The results of a limited risk assessment, performed as part of the Phase I RFI, indicated minimal or no risk to human health from SWMU 83. The results of the Phase II RFI at SWMU 83 showed no evidence that a significant chemical release, posing an unacceptable human health risk for any potential exposure pathway, had occurred at this SWMU. As such, a formal risk assessment was not warranted for SWMU 83.

23.6.3.2 Ecological

Based on the conclusions of the ecological risk screening, SWMU 83 did not contain any significant ecological component such that a formal ecological risk assessment was warranted.

23.6.4 Other Applicable Assessments

23.6.4.1 Surface Water

SWMU 83 contained no surface water.

23.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet, as such this SWMU contained no means for groundwater discharges to occur.

23.6.4.3 Underground Storage Tanks (USTs)

There is no record, other than the RFA, of any storage tanks, either underground or aboveground, associated with SWMU 83.

23.6.4.4 Other

No other assessments have been conducted in the area of SWMU 83.

23.7 NO FURTHER ACTION PROPOSAL

23.7.1 Rationale

Based on the conclusions reached in the Phase I and Phase II RFIs, NFA has been recommended for SWMU 83.

23.7.2 Criterion

SWMU 83 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the

available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

24.1 SUMMARY

SWMU 92, OWS No. 5120, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) found slightly elevated levels of organic compounds, including PAHs, and one metal in the area of SWMU 92. The Phase I RFI report recommended conducting a BRA at this site using available data.

A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases were expected at this SWMU. Based on this, the BRA recommended NFA for SWMU 92.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 92, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 92.

The conclusions reached in the BRA and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

24.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

24.2.1 Site Description

This SWMU was formerly located east of Power Check Pad No. 5120. The OWS, which consisted of a two-compartment underground unit with a detached 100-gallon oil storage tank, reportedly received waste wash water generated from aircraft maintenance operations in Building 5120 (Figure 24-1 in Appendix A). Recovered oils were stored in the 100-gallon tank and the wastewaters were discharged to a leach well located approximately 40 feet east of the OWS.

24.2.2 Operational History

OWS No. 5120 was active from approximately 1957 to 1988. In 1988, the unit and the associated leach well were taken out of use after the demolition of Building 5120. The OWS and the associated leach well were physically removed in 1996.

24.3 LAND USE

24.3.1 Current

The OWS and the associated leach well no longer exist. Power Check Pad No. 5120 continues to be used for surface storage of aircraft maintenance vehicles and equipment.

24.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 5120 and the associated leach well no longer exist. Use classification will continue to remain industrial in nature.

24.4 INVESTIGATIVE ACTIVITIES

24.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found slightly elevated levels of organic compounds, including PAHs, and one metal in the area of SWMU 92.

A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases are expected at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 92, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 92.

24.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

24.4.2.1 Non-Sampling Data Collection

The Phase I RFI was purely a field investigation and data collection effort. However, a BRA, performed using the results of the Phase I RFI, is discussed as Investigation #2 in Section 18.4.3 below.

24.4.2.2 Sampling Data Collection

Five borings, two to depths of 10 feet in the area of the separator unit and three to depths of 60 feet in the area of the leach well, were drilled and sampled during the Phase I RFI (boring locations are shown in Figure 24-1 in Appendix A). Soil samples were collected from the 1.5- to 3.5-foot, 4- to 6-foot, and 8- to 10-foot depth intervals in all five borings. Additional samples were collected from the 18- to 20-foot, 28- to 30-foot, 38- to 40-foot, 48- to 50-foot, and 58- to 60-foot depth intervals in the three 60-foot borings to characterize the vertical distribution of potential contaminants.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Surficial samples were collected the 0.2- to 0.5-foot depth interval to provide surface soil data for risk assessment purposes. In total, 35 soil samples were sent for chemical analyses.

24.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

24.4.2.4 Results and Conclusions

Four organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) and one metal (lead) were found at levels exceeding the corresponding RBCs. The highest concentrations of contaminants were detected in near-surface samples. The vertical extent of contamination was characterized by the soil borings. The analytical results from this investigation are shown in Tables 24-1a and 24-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The Phase I RFI recommended completing a BRA for SWMU 92.

24.4.3 Investigation #2: Baseline Risk Assessment (BRA) for Appendix III SWMUs – Phase I

24.4.3.1 Non-Sampling Data Collection

No additional data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors and all appropriate exposure pathways was performed on the data collected during the Phase I RFI.

24.4.3.2 Sampling Data Collection

No additional data was collected during the BRA.

24.4.3.3 Data Gaps

It was concluded that the data collected during the Phase I RFI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI and the BRA. Therefore, no data gaps existed.

24.4.3.4 Results and Conclusions

Potential receptors at SWMU 92 for human health risks included occupational workers, hypothetical future construction workers, and hypothetical future trespassers. The receptors were assumed to be exposed to soil via ingestion, dermal contact, and inhalation pathways. The primary contributor to the risk was ingestion of PAHs in surface soils. The maximum potential excess human risk at SWMU 92 was 2×10^{-6} for occupational workers. This level fell within the

USEPA's target risk range of 1×10^{-6} to 1×10^{-4} for risk from releases at hazardous waste sites, thus indicating that no unacceptable risk was expected. The concentrations of COCs identified during the BRA are shown in Table 24-2a and 24-2b in Appendix B. A summary of human health risks at SWMU 92 are shown in Table 24-2c in Appendix B.

Results of the ecological risk assessment showed there is a low potential for risk to predatory birds (i.e., the Northern Harrier) from SWMU-related chemicals. However, this risk is most likely insignificant because the SWMU 92 area represents only a very small percentage of the birds' hunting range.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, no further response action was recommended at this SWMU.

24.4.4 Investigation #3: Corrective Measure Completion Report, Appendices II and III SWMUs

24.4.4.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

24.4.4.2 Sampling Data Collection

After the OWS and the associated leach well had been removed, soil samples were collected from the walls and bottom of the resultant excavations and sent for chemical analyses (Figure 24-3 in Appendix A).

24.4.4.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

24.4.4.4 Results and Conclusions

The OWS at SWMU 92 was pumped dry and cleaned, then the leach well box and the top 2 feet of cobblestone were removed from the associated leach well. No significant staining or odors were observed during the removal. The separator unit and the leach well were both removed routinely and without incident.

Soil samples were collected from the walls of the OWS excavation at approximate depths of 9 feet. Two soil samples were collected from the bottom of the excavation at an approximate depth of 10 feet. These samples were field analyzed using immunoassay method 4030. Next, a confirmatory sample was collected from the bottom of the excavation and analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, a duplicate of one of the

samples collected from the bottom of the excavation was sent for laboratory analysis. No significant concentrations of TPH or BTEX compounds were detected in the duplicate sample. Finally, a composite soil sample collected from the excavation was field screened using immunoassay method 4030 and analyzed for TCLP metals.

Soil samples were collected from the walls of the leach well excavation at an approximate depth of 11 feet. One soil sample was also collected from the bottom of the excavation at an approximate depth of 12 feet. These samples were field analyzed using immunoassay method 4030. Next, a confirmatory sample was collected from the bottom of the excavation and analyzed for VOCs, SVOCs, TPH –DRO, total metals, and TCLP metals. In addition, a duplicate of one of the samples collected from the bottom of the excavation was sent for laboratory analysis. No significant concentrations of TPH or BTEX compounds were detected in the duplicate sample. Finally, a composite soil sample collected from the excavation was field screened using immunoassay method 4030 and analyzed for TCLP metals. The results of this investigation are shown in Tables 24-3a and 24-3b in Appendix B.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 92. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels (W-C 1997a) for metals at Cannon AFB, so the elevated concentration of arsenic was dismissed as naturally occurring.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

24.5 SITE CONCEPTUAL MODEL

24.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 92 found organic compounds and metals at levels of potential concern. Five borings (two to a depth of 10 feet and three to a depth of 60 feet) were installed during the field investigation to effectively delineate and characterize the horizontal and vertical extents of contamination. The highest concentrations of organics and metals were detected in near-surface samples.

The Corrective Measure Completion Report documented the partial removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound that potentially exceeded the corresponding MSSL. However, the maximum possible concentration of arsenic fell below the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 92 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

24.5.2 Environmental Fate

Contaminants encountered at OWS No. 5120 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at SWMU 92, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; however, they would persist for long periods of time. The potential for metals to precipitate in the subsurface, thus limiting downward migration in the vadose zone, is evidenced by the caliche layers encountered in the borings drilled during the IRP Phase II, the RFI, and the Phase II RFI.

VOCs are likely to be relatively to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

24.6 SITE ASSESSMENTS

24.6.1 Summary

A BRA was conducted based on the results of the Phase I RFI for SWMU 92. Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 92.

24.6.2 Screening Assessments

24.6.2.1 Human Health

The risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations detected during the RFI posed a significant human health risk, and whether a risk assessment was warranted. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Because organic compounds and lead were detected at concentrations slightly exceeding the corresponding RBCs, it was determined that a BRA was warranted for SWMU 92.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Although no arsenic concentrations were detected in any of the soil samples analyzed during the Corrective Measure Completion Report, the laboratory detection limit of 3.0 mg/kg exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the laboratory detection limit of 3.0 mg/kg lies within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, any potential arsenic present in any of the samples above the MSSL, but below the detection limit, has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 92.

24.6.2.2 Ecological

An ecological risk screening was not included as part of the RFI, the BRA, or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report. The results of the RFI's Ecological Risk Assessment are discussed below. In the Corrective Measure Completion Report, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

An ecological risk screening was not included as part of the BRA. However, an ecological risk assessment was included and is discussed in Section 24.6.3.2 below.

24.6.3 Risk Assessments

24.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included occupational workers, hypothetical workers performing intrusive actions, and hypothetical trespassers. Based on site conditions at SWMU 92, the most significant exposure pathways included inhalation of fugitive VOCs or dust, and direct contact with soil resulting in incidental ingestion or dermal absorption of chemicals from soil.

All hazard indices for subchronic and chronic exposures to site COCs fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. In addition, the total carcinogenic risk for exposures at SWMU 92 fell below or within the USEPA's target risk range (1.0×10^{-4} to 1.0×10^{-6}). This indicated that no unacceptable risk of noncarcinogenic or carcinogenic effects was expected at SWMU 92.

Because no COPCs were detected at concentrations exceeding the corresponding screening criteria during the Corrective Measure Completion Report investigation at SWMU 92, a full-scale human health risk assessment was not warranted for this investigation.

24.6.3.2 Ecological

The ecological risk assessment portion of the BRA focused on the potential for adverse effects to occur to selected indicator species (chemical receptors) from environmental stressors (COCs). Potential risk from contaminants in soil to biota was considered greatest through indirect exposure of predatory birds (i.e., the robin) to SWMU-related chemicals bioaccumulated in the birds' prey (earthworms, etc.) that inhabits SWMU 92. However, this risk is most likely insignificant because the SWMU 92 area represents only a very small percentage of the predatory birds' hunting range.

24.6.4 Other Applicable Assessments

24.6.4.1 Surface Water

SWMU 92 contained no surface water.

24.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

24.6.4.3 Underground Storage Tanks (USTs)

OWS No. 5120 included a detached 100-gallon underground oil storage tank. This tank was removed along with the unit and associated leach well in 1996.

24.6.4.4 Other

No other assessments have been conducted in the area of SWMU 92.

24.7 NO FURTHER ACTION PROPOSAL

24.7.1 Rationale

Based on the conclusions reached in the BRA and the Phase II RFI, NFA has been recommended for SWMU 92.

24.7.2 Criterion

SWMU 92 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

25.1 SUMMARY

SWMU 93, OWS No. 5121, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) found elevated levels of four organic compounds and one metal in the area of SWMU 93. The Phase I RFI report recommended conducting a BRA at this site using available data.

A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases were expected at this SWMU. Based on this, the BRA recommended NFA for SWMU 93.

A Phase II RFI of the Appendix III sites (W-C 1997d) also found elevated levels of organic compounds and metals in the area of this SWMU. However, the report documenting this investigation noted that none of the concentrations of metals or organics exceeded the USEPA Region III RBCs for residential soil (USEPA 1994). The Phase II RFI report recommended no further investigation at this site.

The conclusions reached in the BRA and the Phase II RFI are consistent in recommending no further work at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

25.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

25.2.1 Site Description

This SWMU was formerly located beneath the hush house portion of Building 5123, a jet engine test facility. The OWS, which consisted of a two-compartment underground unit with a detached 100-gallon oil storage tank, had been located on the east side of former Power Check Pad No. 5121 (Figure 25-1 in Appendix A). The unit received waste wash water from aircraft engine testing and maintenance operations. Recovered oils were stored in the 100-gallon tank and the wastewaters were discharged to a leach field located approximately 40 feet to the east of the OWS.

25.2.2 Operational History

OWS No. 5121 was active from approximately 1957 to 1988. In 1988, the unit and the associated leach field were removed during the demolition of Building 5121. This building was then replaced with Building 5123, which was constructed atop the former location of OWS No. 5121.

25.3 LAND USE

25.3.1 Current

The OWS and the associated leach field no longer exist. Building 5123, which sits atop the former location of SWMU 93, is currently used for the testing of jet engines from fighter aircraft.

25.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, OWS No. 5121 and the associated leach field no longer exist. Use classification will continue to remain industrial in nature.

25.4 INVESTIGATIVE ACTIVITIES

25.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found elevated levels of four organic compounds and one metal in the area of SWMU 93. A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases are expected at this SWMU. A Phase II RFI of the Appendix III sites (W-C 1997d) also found elevated levels of organic compounds and metals in the area of this SWMU, but none of the detected concentrations exceeded the corresponding RBCs.

25.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

25.4.2.1 Non-Sampling Data Collection

The Phase I RFI was purely a field investigation and data collection effort. However, a BRA, performed using the results of the Phase I RFI, is discussed as Investigation #2 in Section 47.4.3 below.

25.4.2.2 Sampling Data Collection

Three 60-foot borings were installed at locations as close as possible to the OWS and the leach field during the Phase I RFI (boring locations are shown in Figure 25-1 in Appendix A). Soil samples were collected from the 1.5- to 3.5-foot, 4- to 6-foot, 8- to 10-foot, 18- to 20-foot, 28- to 30-foot, 38- to 40-foot, 48- to 50-foot, and 58- to 60-foot depth intervals to characterize the vertical distribution of potential contaminants.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Surficial samples were collected from the 0.2- to 0.5-foot depth interval to provide surface soil data for risk assessment purposes. Twenty-seven soil samples were sent for chemical analyses.

25.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

25.4.2.4 Results and Conclusions

Four organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) and one metal (barium) were found at levels exceeding the corresponding RBCs. The highest concentrations of organics were detected in near-surface samples. The highest concentration of barium was detected at 28 feet. The vertical extent of contamination was characterized by the soil borings. The analytical results from this investigation are shown in Tables 25-1a and 25-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The Phase I RFI recommended completing a BRA for SWMU 93.

25.4.3 Investigation #2: Baseline Risk Assessment (BRA) for Appendix III SWMUs – Phase I

25.4.3.1 Non-Sampling Data Collection

No additional data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors, and all appropriate exposure pathways, was performed on the data collected during the Phase I RFI.

25.4.3.2 Sampling Data Collection

No data was collected during the BRA.

25.4.3.3 Data Gaps

It was concluded that the data collected during the Phase I RFI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI and the BRA. Therefore, no data gaps existed.

25.4.3.4 Results and Conclusions

Potential receptors at SWMU 93 for human health risks included occupational workers, hypothetical future construction workers, and hypothetical future trespassers. The receptors were assumed to be exposed to soil via ingestion, dermal contact, and inhalation pathways. The maximum potential excess human risk at SWMU 93 was 2×10^{-7} for occupational workers. The primary contributor to the risk was ingestion of PAHs in surface soils. This level fell below the USEPA's target risk range of 1×10^{-6} to 1×10^{-4} for risk from releases at hazardous waste sites, thus indicating that no unacceptable risk was expected. The concentrations of COCs identified during the BRA are shown in Table 25-2a and 25-2b in Appendix B. A summary of human health risks at SWMU 93 are shown in Table 25-2c in Appendix B.

Results of the ecological risk assessment showed that there is a low potential for risk to predatory birds (i.e., the Northern Harrier) from SWMU-related chemicals. However, this risk is most likely insignificant because the SWMU 93 area represents only a very small percentage of the birds' hunting range.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended at this SWMU.

25.4.4 Investigation #3: RFI, Appendix III SWMUs – Phase II

25.4.4.1 Non-Sampling Data Collection

The purpose of the Phase II RFI was to further characterize the nature and extent of contamination in the area of SWMU 93. In addition, the Phase II included a risk screening to verify whether the recommendation for NFA based on the BRA was appropriate for SWMU 93.

25.4.4.2 Sampling Data Collection

Three soil borings were installed during the Phase II RFI (boring locations are shown in Figure 25-1 in Appendix A). One boring was drilled near the northwest corner of Building 5123, the second boring was drilled near the southeast corner of Building 5123, and the third boring was drilled immediately south of Building 5123. Each boring was drilled and sampled to a maximum depth of 10 feet. The boring locations were chosen to further assess the lateral presence and extent of site-related soil contaminants.

Surface soil samples from all borings were collected from 0 to 2 feet. All three borings were also sampled at intervals of 3 to 5 and 8 to 10 feet. Nine soil samples were analyzed for the following target analytes: VOCs, SVOCs, total TAL metals, and TRPH.

25.4.4.3 Data Gaps

Sufficient data was collected during the Phase II RFI to further characterize the nature and extent of contamination and conduct a risk screening at this SWMU. There were no sampling issues associated with the Phase II RFI that adversely affected data usability. In addition, the analytical data was judged acceptable for determining the nature and extent of contamination in the area of SWMU 93, and for completing the human health risk screening. Therefore, no data gaps existed.

25.4.4.4 Results and Conclusions

Three organic compounds and two metals detected during the Phase II RFI exceeded the levels detected during the Phase I RFI. However, none of the organics or metals exceeded the corresponding RBCs. The analytical results from this investigation are shown in Tables 25-3a and 25-3b in Appendix B.

The Phase II sampling results confirmed that contamination at SWMU 93 was mainly confined to surface and near surface soils. In addition, the vertical distribution of site contaminants appears to be well defined, and potential impacts to site groundwater are considered low.

Because there were no unacceptable health risks associated with SWMU 93, the Phase II RFI recommended that no further investigation was necessary for this SWMU.

25.5 SITE CONCEPTUAL MODEL

25.5.1 Nature and Extent of Contamination

The Phase I and Phase II RFIs conducted at SWMU 93 found organic compounds and metals at levels of potential concern. Six borings (three to a depth of 10 feet and three to a depth of 60 feet) were installed during the two phases of investigation to effectively delineate and characterize the horizontal vertical extents of contamination. The highest concentrations of organics were detected in near-surface samples. The highest concentration of barium was detected at the 28-foot depth interval.

Groundwater at SWMU 93 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

25.5.2 Environmental Fate

Contaminants encountered at OWS No. 5121 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at SWMU 93, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time. The potential for metals to precipitate in the subsurface, thus limiting downward migration in the vadose zone, is evidenced by the caliche layers encountered in the borings drilled during the IRP Phase II, the RFI, and the Phase II RFI.

VOCs are likely to be relatively to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

25.6 SITE ASSESSMENTS

25.6.1 Summary

A BRA was conducted based on the results of the Phase I RFI for SWMU 93. Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 93.

The Phase II RFI also included a risk screening that was completed to verify that the analytical results of this investigation corresponded to the results of the Phase I RFI, and to verify that the NFA recommendation is appropriate for SWMU 93.

25.6.2 Screening Assessments

25.6.2.1 Human Health

The first step in the risk screening was to compare the maximum detected Phase II concentrations to the maximum detected Phase I concentrations. The comparison evaluated whether the extent of contamination and potential risk had been adequately defined by the Phase I RFI, and assessed whether the NFA recommendation was appropriate.

The maximum detected Phase II concentrations that exceeded the maximum detected Phase I concentrations were compared to highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations detected during the Phase II posed a significant human health risk (i.e., whether the potential risk at SWMU 93 is higher than predicted by the Phase I BRA). Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

None of the maximum detected Phase II concentrations found to exceed the maximum detected Phase I concentrations also exceeded the corresponding RBCs. Therefore no unacceptable human health risks are expected from SWMU 93.

25.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase II RFI. However, the analytical results and the human health risk screening results from the Phase II generally corresponded to the analytical results of the Phase I and the human health risk assessment results of the BRA, respectively. Based on this, results of an ecological risk screening using the results of the Phase II investigation, had such a screening been conducted, were expected to correspond to the ecological risk assessment results of the BRA.

25.6.3 Risk Assessments

25.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included occupational workers, hypothetical workers performing intrusive actions, and hypothetical trespassers. Based on site conditions at SWMU 93, the most significant exposure pathways included inhalation of fugitive VOCs or dust, and direct contact with soil resulting in incidental ingestion or dermal absorption of chemicals from soil.

All hazard indices for subchronic and chronic exposures to site COCs fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. In addition, the total carcinogenic risk for exposures at SWMU 93 fell below the USEPA's target risk range (1.0×10^{-4} to 1.0×10^{-6}). This indicated that no unacceptable risk of noncarcinogenic or carcinogenic effects was expected at SWMU 93.

25.6.3.2 Ecological

The ecological risk assessment portion of the BRA focused on the potential for adverse effects to occur to selected indicator species (chemical receptors) from environmental stressors (COCs). Potential risk from contaminants in soil to biota was considered greatest through indirect exposure of predatory birds (i.e., the robin) to SWMU-related chemicals bioaccumulated in the birds' prey (earthworms, etc.) that inhabits SWMU 93.

The ecological risk assessment found a low potential for risk to predatory birds from SWMU-related chemicals (i.e., selenium). However, this risk is most likely insignificant because the SWMU 93 area represents only a very small percentage of the predatory birds' hunting range.

25.6.4 Other Applicable Assessments

25.6.4.1 Surface Water

SWMU 93 contained no surface water.

25.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

25.6.4.3 Underground Storage Tanks (USTs)

OWS No. 5121 included a detached 100-gallon oil UST. This tank was removed along with the unit and associated leach field in 1988 during the demolition of Building 5121.

25.6.4.4 Other

No other assessments have been conducted in the area of SWMU 93.

25.7 NO FURTHER ACTION PROPOSAL

25.7.1 Rationale

Based on the conclusions reached in the BRA and the Phase II RFI, NFA has been recommended for SWMU 93.

25.7.2 Criterion

SWMU 93 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

26.1 SUMMARY

SWMU 94, OWS No. 5144, has been listed as an Appendix III site. A Phase I RFI of the Appendix III sites (W-C 1994a) detected concentrations of five organic compounds and three metals at concentrations of potential concern in the area of SWMU 94. All four organics, plus TPH, and the three metals were detected at concentrations exceeding the corresponding RBCs. Because there was evidence of a potentially significant release in the area of SWMU 94, the Phase I RFI recommended that a BRA be completed for this SWMU.

The BRA for Appendix III SWMUs – Phase I (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases from this SWMU were expected, and recommended NFA for SWMU 94.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 94, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases were expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 94.

The conclusions reached in the BRA and the Corrective Measure Completion Report were consistent in recommending NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this SWMU.

26.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

26.2.1 Site Description

SWMU 94, OWS No. 5144, was comprised of an OWS and two sand traps that served a two-bay vehicle washrack adjacent to the Army, Air Force Exchange Service (AAFES) service station, located east of the intersection of D.L. Ingram Street and Argentia Avenue (Figure 26-1 in Appendix A). The 1,700-gallon OWS, which was located approximately 30 feet northeast of the two sand traps, was an underground concrete unit that reportedly received effluent from the neighboring sand traps. The OWS measured approximately 5 feet by 10 feet in plan, and extended approximately 9 feet below the surface. Recovered oils were stored in the unit and wastewaters were discharged to a sanitary sewer line. The OWS unit was a single-compartment unit with no baffles, and as such appeared to be a sand trap. However, because the unit was referred to as an OWS in earlier reports (including the Corrective Measure Completion Report, which documented the unit's removal), it is also referred to as an OWS herein.

The two sand traps were each located in the approximate center of each of the two vehicle washracks. The sand traps measured approximately 3.5 feet by 8 feet in plan, and extended approximately 6.5 feet below the surface. The sand traps reportedly received wash-down water from personal vehicle maintenance operations, and discharged effluent to the OWS.

26.2.2 Operational History

OWS No. 5144 was active from approximately 1960 until approximately 1988. The three units were removed in 1996 (USACE 1999). The OWS and the two sand traps at SWMU 94 have been removed. The units no longer receive waste wash water.

26.3 LAND USE

26.3.1 Current

The current land use of the SWMU location is industrial.

26.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the OWS and the two sand traps at SWMU 94 have been removed and no longer receive waste wash water. Use classification will continue to remain industrial in nature.

26.4 INVESTIGATIVE ACTIVITIES

26.4.1 Summary

A Phase I RFI of the Appendix III sites (W-C 1994a) found potentially significant concentrations of four organics, plus TPH, and the three metals in the area of SWMU 94. The organics and the metals were all detected at concentrations exceeding the corresponding risk screening criteria.

A BRA of the Appendix III SWMUs (W-C 1994b) found that no unacceptable human health or ecological risks due to chemical releases are expected at this SWMU.

A Corrective Measure Completion Report (USACE 1999) documented the removal of the OWS at SWMU 94, discussed the analytical results of soil samples collected from the resultant excavation, and found that no unacceptable human health risks due to chemical releases are expected at this SWMU. Based on this, the Corrective Measure Completion Report recommended NFA for SWMU 94.

26.4.2 Investigation #1: RCRA Facility Investigation (RFI), Appendix III SWMUs – Phase I

26.4.2.1 Non-Sampling Data Collection

The Phase I RFI included a risk screening. The results of the risk screening are discussed below.

26.4.2.2 Sampling Data Collection

Six borings, two in the vicinity of each unit, were drilled to depths of 10 feet and sampled during the Phase I RFI (boring locations are shown in Figure 26-1 in Appendix A). Soil samples were collected from the 0- to 0.5-foot, 1.5- to 3.5-foot, 4- to 6-foot, and 8- to 10-foot depth intervals from the borings drilled near the OWS, and samples were collected from the 0.5- to 2-foot, 2- to 4-foot, 4- to 6-foot, and 8- to 10-foot depth intervals from the borings drilled near the sand traps, to characterize the distribution of potential contaminants. Minor soil staining was observed in two of the borings drilled near the sand traps during this investigation.

Target analytes for all borings included VOCs, SVOCs, metals, and TRPH. Near-surface samples were collected for risk assessment purposes. In total, 24 soil samples were sent for chemical analyses.

26.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI. Therefore, no data gaps existed after the completion of the Phase I RFI.

26.4.2.4 Results and Conclusions

Four organic compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene) plus TPH, and three metals (antimony, barium, and beryllium) were found at levels exceeding the corresponding RBCs and/or other screening criteria. The highest concentrations of organics were detected in near-surface samples. The highest concentration of barium was detected at approximately 4 feet in depth. However, the concentration of barium decreased to concentrations within the established background levels (W-C 1997a) with depth. The vertical extent of contamination was characterized by the soil borings. The analytical results from this investigation are shown in Tables 26-1a and 26-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

The Phase I RFI recommended completing a BRA for SWMU 94.

26.4.3 Investigation #2: Baseline Risk Assessment (BRA) for Appendix III SWMUs – Phase I

26.4.3.1 Non-Sampling Data Collection

No additional data was collected as part of the BRA. However, a human health and ecological risk assessment that considered both present and future potential receptors, and all appropriate exposure pathways, was performed on the data collected during the Phase I RFI.

26.4.3.2 Sampling Data Collection

No additional data was collected during the BRA.

26.4.3.3 Data Gaps

It was concluded that the data collected during the Phase I RFI was sufficient to complete a BRA. In addition, the data quality was deemed to be sufficient to meet the objectives of the Phase I RFI and the BRA. Therefore, no data gaps existed.

26.4.3.4 Results and Conclusions

Potential receptors at SWMU 94 for human health risks included occupational workers, hypothetical future construction workers, and hypothetical future trespassers. The receptors were assumed to be exposed to soil via ingestion, dermal contact, and inhalation pathways. The maximum potential excess human risk at SWMU 94 was 6×10^{-7} for occupational workers. The primary contributor to the risk was ingestion of PAHs in surface soils. This level fell below the USEPA's target risk range of 1×10^{-6} to 1×10^{-4} for risk from releases at hazardous waste sites, thus indicating that no unacceptable risk was expected. The concentrations of COCs identified during the BRA are shown in Tables 26-2a and 26-2b in Appendix B. A summary of human health risks at SWMU 94 are shown in Table 26-2c in Appendix B.

Potential human health risks from groundwater were evaluated using fate and transport modeling. The modeling indicated that contaminants would not reach groundwater at concentrations of potential concern. Therefore, this pathway was considered insignificant.

Results of the ecological risk assessment showed that no unacceptable ecological risks due to chemical releases are expected at SWMU 94.

Based on the results of the BRA, no unacceptable human health or ecological risks due to chemical releases are expected from this SWMU. Therefore, NFA was recommended at this SWMU.

26.4.4 Investigation #3: Corrective Measure Completion Report, Appendices II and III SWMUs

26.4.4.1 Non-Sampling Data Collection

A risk evaluation was performed using the data collected during the Corrective Measure Completion Report. The results of the risk evaluation are discussed below.

26.4.4.2 Sampling Data Collection

After the OWS and the two sand traps had been removed, soil samples were collected from the walls and bottoms of the resultant excavations and sent for chemical analyses (Figure 26-3 in Appendix A).

26.4.4.3 Data Gaps

It was concluded that the data collected during the Corrective Measure Completion Report was sufficient to complete a risk evaluation. In addition, the data quality was deemed to be sufficient to meet the objectives of the Corrective Measure Completion Report. Therefore, no data gaps existed.

26.4.4.4 Results and Conclusions

The OWS and the two sand traps at SWMU 94 were pumped dry and cleaned. Stained soils were excavated from outside the walls of the westernmost sand trap during its removal. The other two units were removed routinely and without incident.

Soil samples were collected from the walls of the OWS excavation at an approximate depth of 8.5 feet. Two soil samples were collected from the bottom of the excavation at an approximate depth of 9 feet. These samples were field analyzed using immunoassay method 4030. Next, a confirmatory sample was collected from the bottom of the excavation and analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, a duplicate of one of the samples collected from the bottom of the excavation was sent for laboratory analysis. No significant concentrations of TPH or BTEX compounds were detected in the duplicate sample. Finally, a composite soil sample collected from the excavation was also analyzed for VOCs and TCLP metals.

Soil samples were collected from the walls of the west sand trap excavation at an approximate depth of 6 feet. Two soil samples were collected from the bottom of the excavation at an approximate depth of 6.5 feet. These samples were field analyzed using immunoassay method 4030. Next, a confirmatory sample was collected from the bottom of the excavation and analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, a duplicate of one of the samples collected from the bottom of the excavation was sent for laboratory analysis. No significant concentrations of TPH or BTEX compounds were detected in the duplicate sample. Finally, a composite soil sample collected from the excavation was also analyzed for VOCs and TCLP metals.

Soil samples were collected from the walls of the east sand trap excavation at an approximate depth of 6 feet. Two soil samples were collected from the bottom of the excavation at an approximate depth of 6.5 feet. These samples were field analyzed using immunoassay method 4030. Next, a confirmatory sample was collected from the bottom of the excavation and analyzed for VOCs, SVOCs, TPH – DRO, total metals, and TCLP metals. In addition, a duplicate of one of the samples collected from the bottom of the excavation was sent for laboratory analysis. No significant concentrations of TPH or BTEX compounds were detected in the duplicate sample. Finally, a composite soil sample collected from the excavation was also analyzed for VOCs and TCLP metals.

Analytical results for soil samples analyzed by the laboratory were compared to the USEPA Region VI Human Health MSSLs for residential soil to determine if a significant release had occurred in the area of SWMU 94. Arsenic was the only compound that was detected in a

concentration that exceeded the corresponding MSSL. However, the maximum concentration of arsenic detected fell within the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring. The results of this investigation are shown in Tables 26-3a and 26-3b in Appendix B.

Because none of the other chemicals exceeded the corresponding MSSLs, the Corrective Measure Completion Report concluded that no chemical releases posing an unacceptable human health risk for any potential exposure pathway had occurred at this SWMU. Therefore, NFA was recommended at this SWMU.

26.5 SITE CONCEPTUAL MODEL

26.5.1 Nature and Extent of Contamination

The Phase I RFI conducted at SWMU 94 included the drilling and sampling of two borings to a depth of 10 feet. The analyses detected potentially significant concentrations of organic compounds and metals in the area of SWMU 94 at concentrations exceeding the corresponding RBCs.

The Corrective Measure Completion Report documented the removal of the OWS from this SWMU. In addition, soil samples were collected from the resultant excavation and sent for laboratory analysis. Arsenic was the only compound detected in a concentration that exceeded the corresponding MSSL. However, the maximum concentration of arsenic detected fell within the established background levels for metals at Cannon AFB (W-C 1997a), so the elevated concentration of arsenic was dismissed as naturally occurring.

Groundwater at SWMU 94 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the SWMU.

26.5.2 Environmental Fate

Contaminants encountered at OWS No. 5144 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at SWMU 94, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

26.6 SITE ASSESSMENTS

26.6.1 Summary

The Phase I RFI included a risk screening and the Corrective Measure Completion Report included a risk evaluation for SWMU 94. Based on the results of the risk screening and the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this SWMU. Therefore, NFA was recommended for SWMU 94.

26.6.2 Screening Assessments

26.6.2.1 Human Health

The Phase I RFI's risk screening consisted of a comparison of the maximum detected Phase I RFI concentrations to the highly conservative USEPA Region III RBCs for residential soil (USEPA 1994). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the RFI posed a significant human health risk. Region III RBCs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

Because organic compounds and barium were detected at concentrations slightly exceeding the corresponding RBCs, it was determined that a BRA was warranted for SWMU 94.

The Corrective Measure Completion Report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

The maximum arsenic concentration detected during the Corrective Measure Completion, 6.4 mg/kg, exceeded the Region VI MSSLs for both carcinogenic arsenic (0.32 mg/kg) and noncarcinogenic arsenic (2.2 mg/kg). However, the maximum concentration of arsenic detected falls within the established background levels for arsenic at Cannon AFB (W-C 1997a). Therefore, it has been dismissed as naturally occurring. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at SWMU 94.

26.6.2.2 Ecological

An ecological risk screening was not included as part of the Phase I RFI, BRA, or the Corrective Measure Completion Report, but a human health risk screening/evaluation was included in the Corrective Measure Completion Report investigation. In this investigation, the screening criteria were not exceeded by detected chemical concentrations attributable to SWMU contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of ecological and human health.

An ecological risk screening was not included as part of the BRA. However, an ecological risk assessment was included and is discussed below in Section 26.6.3.2.

26.6.3 Risk Assessments

26.6.3.1 Human Health

Potential receptors at this SWMU for human health risks included occupational workers, hypothetical workers performing intrusive actions, and hypothetical trespassers. Based on site conditions at SWMU 94, the most significant exposure pathways included inhalation of fugitive VOCs or dust, and direct contact with soil resulting in incidental ingestion or dermal absorption of chemicals from soil.

The BRA found that all hazard indices for subchronic and chronic exposures to site COCs fell below the USEPA's level of concern (1.0) for noncarcinogenic effects. In addition, the total carcinogenic risk for exposures at SWMU 94 fell below the USEPA's target risk range (1×10^{-4} to 1×10^{-6}). This indicated that no unacceptable risk of noncarcinogenic or carcinogenic effects was expected at SWMU 94 based on the results of the BRA.

Because no COPCs were detected at concentrations exceeding the corresponding screening criteria during the Corrective Measure Completion Report investigation at SWMU 94, a full-scale human health risk assessment was not warranted for this investigation.

26.6.3.2 Ecological

The ecological risk assessment portion of the BRA focused on the potential for adverse effects to occur to selected indicator species (chemical receptors) from environmental stressors (COCs). Potential risk from contaminants in soil to biota was considered greatest through indirect exposure of predatory birds (i.e., the robin) to SWMU-related chemicals bioaccumulated in the birds' prey (earthworms, etc.) that inhabits SWMU 94.

However, this risk is most likely insignificant because the SWMU 94 area represents only a very small percentage of the predatory birds' hunting range.

26.6.4 Other Applicable Assessments

26.6.4.1 Surface Water

SWMU 94 contained no surface water.

26.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this SWMU contained no means for groundwater discharges to occur.

26.6.4.3 Underground Storage Tanks (USTs)

OWS No. 5144 consisted of an underground OWS and two underground sand traps. All three units were removed in 1996.

26.6.4.4 Other

No other assessments have been conducted in the area of SWMU 94.

26.7 NO FURTHER ACTION PROPOSAL

26.7.1 Rationale

Based on the conclusions reached in the Phase I RFI and the Corrective Measure Completion Report, NFA has been recommended for SWMU 94.

26.7.2 Criterion

SWMU 94 is proposed for NFA based on NMED NFA Criterion 5: The SWMU has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

27.1 SUMMARY

SWMU 113, Landfill No. 5, has been listed as an Appendix I site. This section is intended to address all of Landfill No. 5 except Cell #3, which is currently undergoing long-term monitoring. A Phase I IRP Records Search (CH2M Hill 1983) first evaluated the existence of and potential for contamination in the area of SWMU 113. The report associated with this records search stated that Landfill No. 5 warranted further investigation.

A Phase II (Stage 1) IRP investigation (Radian 1986) included the installation and sampling of four groundwater monitoring wells. The analytical results from the groundwater samples indicated that no groundwater contamination attributable to past or ongoing activities at Landfill No. 5 exists (Radian 1986).

A Preliminary Review/Visual Site Inspection RCRA Facility Assessment (RFA) (A.T. Kearney 1987) noted that Cell #3 was undergoing RCRA closure and recommended additional groundwater and vadose zone monitoring to determine if contaminants had migrated beneath SWMU 113.

A subsequent Remedial Investigation (RI) for 18 IRP/SWMUs at Cannon AFB (W-C 1992) included the sampling of six monitoring wells in the area of Landfill No. 5 for Appendix IX constituents, as listed in 40 CFR 264. Slightly elevated concentrations of three metals were detected during this investigation. This RI also included a Baseline Risk Assessment (BRA) that concluded potential impacts to human health and the environment from SWMU 113 were insignificant.

A Phase I RFI, completed at Landfill No. 5 in 1995, included site topographic surveying and mapping, surface geophysical surveying, a soil gas investigation, and a surface and subsurface soil investigation. The RFI included a human health risk screen, which indicated that no unacceptable risk to human health from the chemicals detected during this investigation was present at SWMU 113. The RFI recommended the continued monitoring of groundwater quality to assess potential impacts from Cell #3 as the only action required at Landfill No. 5 (W-C 1998).

Based on the results of the Phase I RFI, NMED issued a letter addressed to Col. Clary, Commander Cannon AFB, dated February 17, 1998, that stated that the RFI was technically adequate and approved the report. However, the letter stipulated that post-closure care, including groundwater monitoring, must continue at Cell #3. Based on this, closure of all of Landfill No. 5 except Cell #3 is appropriate at this time. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of SWMU 113, except Cell #3.

27.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

27.2.1 Site Description

Landfill No. 5 (SWMU 113) is a 70-acre inactive landfill located in the southeast area of Cannon AFB (Figure 27-1). Past trenching and waste disposal activities occurred across approximately 30 acres in the eastern portion of the site. A 4-foot-high, barbed-wire fence with two locked entrances surrounds this area. The western 40 acres appear to have received only construction debris for purposes of backfilling natural depressions in the area. Overall, the landfill site has relatively flat topography and is sparsely vegetated with only a few trees. The general surface water runoff is toward the southeast, or into local surface depressions (W-C 1998).

Cell #3, located within the landfill premises, is a capped, RCRA-regulated unit that reportedly received hazardous waste through 1981. Wastes received at Cell #3 reportedly included waste oil and solvents in quantities estimated at 5 to 10 gallons per month. No waste was received at the unit from the end of 1981 until the cell's closure in 1983. Closure activities included the installation of an impermeable clay cap and the construction of an additional security fence within the area of Landfill No. 5.

27.2.2 Operational History

Landfill No. 5 was active between 1968 and 1984. Waste materials received at this site reportedly included domestic solvent waste, waste oils, and solvents; paints, paint removers, and thinners; pesticide containers; and various empty drums and cans. From 1968 to 1972, the mode of this landfill's operation included burning and burying waste in trenches (CH2M Hill 1983). After 1981, the only waste received at Landfill No. 5 was tree limbs and construction rubble, and the standard operation of the site included direct burial of waste in trenches.

In 1988, two groundwater monitoring wells were installed along the southeast boundary of Landfill No. 5 by the Tulsa District of USACE (W-C 1998). In 1992, two additional monitoring wells were installed along the eastern edge of Landfill No. 5 by USGS to meet RCRA release detection monitoring requirements (W-C 1998). Including the wells installed during the Phase II (Stage 1) IRP investigation (Radian 1986), eight monitoring wells had been installed in the vicinity of SWMU 113. Geoscience Consultants completed a core sampling project at Cell #3 in 1985, but no VOCs were detected above the reporting limit. This investigation is not addressed herein because it focused solely on Cell #3, and this document is intended to address all of Landfill No. 5 except Cell #3.

27.3 LAND USE

27.3.1 Current

Landfill No. 5 is currently closed and no longer receives waste. In addition, a locked security fence surrounds the area of this SWMU. Land use in the area of SWMU 113 can be classified as airfield/industrial.

27.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Land use in the area of SWMU 113 will remain industrial in nature.

27.4 INVESTIGATIVE ACTIVITIES

27.4.1 Summary

A Phase I IRP Records Search evaluated the potential existence of contamination at SWMU 113 and stated that this site warranted further investigation (CH2M Hill 1983); however, this records search did not include any investigative activities. A Phase II (Stage 1) IRP investigation indicated that no groundwater contamination attributable to past or ongoing activities existed at Landfill No. 5 (Radian 1986). A Preliminary Review/Visual Site Inspection RFA recommended additional groundwater and vadose zone monitoring to determine if contaminants from Cell #3 have migrated beneath SWMU 113 (A.T. Kearney 1987); however, this RFA did not include any additional investigative activities. A subsequent RI for 18 IRP/SWMUs included the collection of groundwater samples and a BRA that concluded potential impacts to human health and the environment from SWMU 113 were insignificant (W-C 1992). A Phase I RFI recommended the continued monitoring of groundwater quality to assess potential impacts from Cell #3 as the only action required at Landfill No. 5 (W-C 1998).

27.4.2 Investigation #1: Installation Restoration Program (IRP) Phase II – Confirmation/Quantification Stage 1 at Landfill No. 5 (SWMU 113)

27.4.2.1 Non-Sampling Data Collection

The Phase II (Stage 1) IRP investigation was a pure data collection effort.

27.4.2.2 Sampling Data Collection

The Phase II (Stage 1) IRP investigation included the installation of four groundwater monitoring wells and the collection and analysis of groundwater samples from these wells. One well was installed hydraulically upgradient from Landfill No. 5, and the other three wells were installed downgradient from the site (Figure 27-1 in Appendix A) in order to determine the nature, extent, and migration rate of any potential contaminants originating from this SWMU. Target analytes for the groundwater samples collected from the four wells included purgeable volatile aromatic compounds and purgeable halocarbon compounds, metals, and general water quality parameters.

No soil samples were collected during this investigation.

27.4.2.3 Data Gaps

The data quality was deemed to be sufficient to meet the objectives of the Phase II (Stage 1) IRP investigation. Therefore, no data gaps existed after the completion of this investigation.

27.4.2.4 Results and Conclusions

None of the groundwater samples were found to contain chemicals in concentrations that exceeded drinking water standards for any of the parameters tested. Low concentrations of metals were detected in all four samples, and trichlorofluoromethane was detected in one sample at a concentration of 2.1 micrograms per liter (μg/L). However, the sample found to contain trichlorofluoromethane was collected from the upgradient well, and the report noted that trichlorofluoromethane is a common laboratory contaminant (Radian 1986). The analytical results for this investigation are presented in Table 27-1 in Appendix B.

No soil samples were collected or analyzed during this investigation.

Based on the results of this investigation, the Phase II (Stage 1) IRP report stated that no groundwater contamination attributable to past or ongoing activities existed at Landfill No. 5.

27.4.3 Investigation #2: Remedial Investigation (RI) Report for 18 Solid Waste Management Units (SWMUs) at Landfill No. 5 (SWMU 113)

27.4.3.1 Non-Sampling Data Collection

The RI included a BRA performed using the results of this investigation. Based on the analytical results, the findings of the BRA and a comparison of soil data with risk-based RFI criteria and/or proposed RCRA action levels, the RI report concluded that potential impacts to human health and the environment are not significant from this SWMU (W-C 1992). The BRA is discussed in Section 27.6.3 below.

27.4.3.2 Sampling Data Collection

The data collection effort completed as part of the RI consisted of collecting five groundwater samples from the four monitoring wells installed during the Phase II (Stage 1) IRP investigation, and from one downgradient well installed by the Tulsa District of USACE in 1988 (well locations are shown in Figure 27-1). All five samples collected were analyzed for the Appendix IX constituents listed in 40 CFR 264. In addition, samples from the upgradient well and two of the downgradient wells were also analyzed for total metals. Due to laboratory missed holding times, one of the downgradient wells had to be resampled. This sample was analyzed for TCL VOCs only.

No soil samples were collected during this investigation.

27.4.3.3 Data Gaps

The data quality was deemed to be sufficient to meet the quality assurance objectives of the RI and the BRA. Therefore, no data gaps existed after the completion of the RI.

27.4.3.4 Results and Conclusions

No analytes, other than metals, were detected above the CRQL during the laboratory analysis of the groundwater samples collected as part of the RI. Barium and vanadium were detected in all five groundwater samples. However, the maximum detected concentration of barium (0.029 milligrams per liter (mg/L) fell below the corresponding maximum contaminant level (MCL) (1.0 mg/L); and although there is no established MCL for vanadium, the maximum detected concentration (0.036 mg/L) fell below the corresponding USEPA Region VI MSSL (0.26 mg/L). Lead was also detected in one groundwater sample, collected from a downgradient well, at a concentration of 0.016 mg/L. This concentration fell below the corresponding MCL (0.05 mg/L) for lead. The analytical results for this investigation are presented in Table 27-2.

No soil samples were collected or analyzed during this investigation.

Based on the analytical results, the findings of the BRA and a comparison of soil data with risk-based RFI criteria and/or proposed RCRA action levels, the RI report concluded that potential impacts to human health and the environment were not significant from this SWMU (W-C 1992).

27.4.4 Investigation #3: Phase I RCRA Facility Investigation (RFI) Report for Landfill No. 5 (SWMU 113/IRP No. LF-5)

27.4.4.1 Non-Sampling Data Collection

The RFI included site topographic surveying and mapping, and surface geophysical surveying to delineate the lateral extent of the landfill cells (exclusive of Cell #3) in the eastern two-thirds of SWMU 113. The RFI also included a human health risk screen based on the results of the soil gas investigation, and the surface and subsurface soil investigation. The risk screen indicated that no unacceptable risk to human health from the chemicals detected during the RFI was present at SWMU 113 (W-C 1998). The risk screen is discussed in Section 27.6.3 below.

27.4.4.2 Sampling Data Collection

A Phase I RFI was performed at SWMU 113 to determine whether a release of hazardous constituents to soils beneath Landfill No. 5 had occurred. Then, based on the results of a soil gas investigation, and a surface and subsurface soil investigation, potential risks to human health were evaluated.

The soil gas survey for VOCs was completed in two phases. The first phase included collecting and field screening soil gas samples from 800 locations within the area of SWMU 113. Samples were collected using direct push techniques, and the field screening was completed using a photoionization detector (PID). Based on the results of the field screening, 78 additional soil gas

samples were collected and analyzed for VOCs using a field gas chromatograph (GC). Of the 78 locations analyzed, 51 had results below the laboratory reporting limit of 1.2 parts per million (ppm) on a volume to volume basis (ppm/v). The VOCs that were detected were separated into three classes: petroleum-related or fuel additive compounds (i.e., benzene, toluene, ethylbenzene, xylenes [BTEX], and chloroethane); refrigerants or blowing agents (i.e., trichlorofluoromethane, dichlorodifluoromethane, and chloromethane); and solvents (i.e., methylene chloride, tetrachloroethene, trichloroethene, 1,1,1,2-tetrachloroethane, 1,1-trichloroethane, 1,1-dichloroethene, chlorobenzene, and trans 1,2-dichloroethene). The locations of the VOCs generally corresponded with landfill cell locations (Figure 27-3).

A surface and subsurface soil investigation was then designed based on the results of the soil gas investigation. The soil investigation include the drilling and sampling 30 analytical borings and three geotechnical borings. All borings were drilled to depths approximately 40 feet below the fill/native soil interface. Samples were collected at approximate 5-foot intervals and field screened. In total, 150 subsurface and 10 surface samples were submitted for the following analyses: TCL VOCs, TCL SVOCs, TAL metals, pesticides/PCBs, herbicides (60 samples), TOC (24 samples), and TRPH. In addition, Appendix IX analyses were conducted on the deepest sample from each boring.

27.4.4.3 Data Gaps

The analytical data, as qualified, was found to meet the QA objectives of the Phase I RFI specified in the validation protocols. Therefore, no data gaps existed after the completion of the Phase I RFI.

27.4.4.4 Results and Conclusions

Of the 78 soil gas samples that were collected and analyzed for VOCs using a field GC during the soil gas survey, 51 had results below the laboratory reporting limit of 1.2 ppm/v. The VOCs that were detected were separated into three classes: petroleum-related or fuel additive compounds (i.e., benzene, toluene, ethylbenzene, xylenes, and chloroethane); refrigerants or blowing agents (i.e., trichlorofluoromethane, dichlorodifluoromethane, and chloromethane); and solvents (i.e., methylene chloride, tetrachloroethene, trichloroethene, 1,1,1,2-tetrachloroethane, 1,1-trichloroethane, 1,1-dichloroethene, chlorobenzene, and trans 1,2-dichloroethene). The locations of the VOCs generally corresponded with landfill cell locations (Figure 27-3).

A total of eight VOCs were detected in samples collected from 16 locations scattered across Landfill No. 5. Ethylbenzene, styrene, and 4-methyl-2-pentanone were the only compounds detected at concentrations indicative of a potential release in the area of SWMU 113.

Twelve SVOCs were detected in subsurface samples collected from the 30 borings. However, all detected concentrations were just at or below the corresponding laboratory reporting limits.

Ten metals (aluminum, barium, chromium, copper, iron, magnesium, nickel, silver, vanadium, and zinc) were detected in at least one subsurface soil sample above the established background ranges for Cannon AFB (W-C 1997a). The frequency that the detected concentrations exceeded background levels was approximately 4 percent. Typically, the metal exceeding background in a

given boring was not detected above background levels in samples collected from immediately above or below the interval where the exceedance occurred. Thus, the detected concentrations of these metals are not likely due to contamination from Landfill No. 5.

Insignificant concentrations of Aroclor 1254 and TRPH were also detected during the Phase I RFI. No pesticides, herbicides, or cyanides were detected in any of the samples analyzed as part of this investigation. The analytical laboratory also identified a number of TICs. However, most of the TICs were non-toxic (potentially toxic TICs were evaluated during the human health risk screen). The results of this investigation are presented in Table 27-3.

Based on the results of a human health risk screen performed as part of this investigation, the Phase I RFI report recommended NFA for SWMU 113.

27.5 SITE CONCEPTUAL MODEL

27.5.1 Nature and Extent of Contamination

Samples collected from groundwater monitoring wells during the Phase II (Stage 1) IRP investigation and the RI were analyzed, and a BRA was performed on the chemicals detected during the RI.

Based on the results of topographic surveying and mapping, surface geophysical surveying, and a soil gas survey, 30 borings to maximum depths ranging from 51 to 81.5 feet were installed during the Phase I RFI at Landfill No. 5 to effectively delineate the extent of contamination at SWMU 113. Chemical analyses detected potentially elevated concentrations of metals, organic compounds, and PCBs in subsurface soil samples collected during the Phase I RFI at SWMU 113. Maximum concentrations of chemicals detected in subsurface soil during the Phase I RFI were compared to conservative, risk-based screening concentrations (i.e., proposed RCRA action levels for soil ingestion assuming residential use) during the human health risk screen.

27.5.2 Environmental Fate

Contaminants encountered at Landfill No. 5 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – volatilization of organics and movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

VOCs are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressure, high volatilization potential, and a high biodegradation rate.

SVOCs are likely to be relatively immobile due to low vapor pressure, low water solubility, and a tendency to adsorb to clays. In addition, these compounds have moderate to low biodegradation rates.

Based on the general native subsurface characteristics at SWMU 113, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface; however, they do persist for long periods of time. The potential precipitation of metals in the subsurface, thus limiting downward migration in the vadose zone, is evidenced by the caliche layers encountered in the borings drilled during the Phase I RFI.

27.6 SITE ASSESSMENTS

27.6.1 Summary

Based on the results of the Phase II (Stage 1) IRP investigation, a risk assessment was not warranted for SWMU 113. However, a BRA was conducted based on the results of the RI, and a human health risk screen was performed using the results of the Phase I RFI. The results of both assessments are discussed below.

27.6.2 Screening Assessments

27.6.2.1 Human Health

The chemicals of potential concern (COPCs) identified by the BRA for SWMU 113 included antimony and lead. These metals were initially screened by comparing their detected concentrations to MCLs, and then to RFI criteria and proposed RCRA action levels. Because none of the detected chemicals exceeded the corresponding MCLs, the comparison did not identify any chemicals of concern (COCs) at SWMU 113. Any COCs identified would have been subjected to a quantitative risk characterization.

The results of the human health risk screen found that one carcinogen, beryllium, had a maximum concentration (0.7 milligrams per kilogram [mg/kg]) that exceeded the corresponding proposed RCRA action level (0.2 mg/kg). Out of the 160 samples analyzed, the maximum concentration was the only detected concentration that exceeded the upper limit of the background range for beryllium (0.6 mg/kg). Assuming a 70-year soil ingestion exposure, the associated cancer risk for this 0.7 mg/kg concentration of beryllium was 4×10^{-6}, a level within the USEPA target risk range of 1×10^{-6} to 1×10^{-4}. No noncarcinogens were detected at concentrations exceeding the corresponding proposed RCRA action levels during the Phase I RFI.

27.6.2.2 Ecological

A single ecological risk assessment was included in the BRA for all 18 IRP/SWMU sites covered by the RI report. The ecological risk assessment addressed each chemical that was detected in the soils at Cannon AFB at concentrations determined to exceed background levels. Because none of the detected chemicals exceeded the corresponding MCLs, the comparison did not identify any COCs at SWMU 113. Any COCs identified would have been subjected to a quantitative risk characterization.

An ecological risk screening was not included as part of the Phase I RFI report, but a human health risk screen was included. In this evaluation the screening criteria were not significantly

exceeded by detected chemical concentrations attributable to SWMU 113 contamination. The proposed RCRA action levels for soil ingestion assuming residential use that were employed as screening criteria are highly conservative, and as such are protective of both human and ecological health.

27.6.3 Risk Assessments

27.6.3.1 Human Health

Because the BRA identified no COCs for human health risks at SWMU 113, a quantitative risk characterization was not warranted.

The Phase I RFI did not include a formal human health risk assessment for SWMU 113.

27.6.3.2 Ecological

Because the BRA identified no COCs for ecological health risks at SWMU 113, a quantitative risk characterization was not warranted.

The Phase I RFI did not include a formal ecological health risk assessment for SWMU 113.

27.6.4 Other Applicable Assessments

27.6.4.1 Surface Water

SWMU 113 is a closed landfill, and as such contains no surface water.

27.6.4.2 Groundwater

Groundwater at SWMU 113 was investigated during the Phase II (Stage 1) IRP investigation and the RI, both of which are discussed above.

27.6.4.3 Underground Storage Tanks (USTs)

There have never been USTs located at SWMU 113.

27.6.4.4 Other

A Phase I IRP Records Search evaluated the potential existence of contamination at SWMU 113 and stated that this site warranted further investigation (CH2M Hill 1983); however, this records search did not include any investigative activities. A Preliminary Review/Visual Site Inspection RFA recommended additional groundwater and vadose zone monitoring to determine if contaminants from Cell #3 had migrated beneath SWMU 113 (A.T. Kearney 1987); however, this RFA did not include any additional assessment activities.

Geoscience Consultants completed a core sampling project at Cell #3 in 1985, but no VOCs were detected above the reporting limit. This investigation is not addressed herein because it focused

solely on Cell #3, and this document is intended to address all of Landfill No. 5 except Cell #3. No other assessments have been conducted in the area of SWMU 113.

27.7 NO FURTHER ACTION PROPOSAL

27.7.1 Rationale

Based on the conclusions reached in the Phase II (Stage 1) IRP report, the RI, and the Phase I RFI, NFA has been recommended for SWMU 113. In addition, based on the results of the Phase I RFI, an NMED letter addressed to Col. Clary, Commander Cannon AFB, and dated February 17, 1998, stated that the RFI was technically adequate and approved the report. However, the letter stipulated that post-closure care, including groundwater monitoring, must continue at Cell #3. Based on this, closure of all of Landfill No. 5 except Cell #3 is appropriate at this time.

27.7.2 Criterion

SWMU 113 is proposed for NFA based on NMED NFA Criterion 4: A release from the AOC to the environment has occurred, but the AOC was characterized under another authority (NMED's Hazardous and Radioactive Materials Bureau) and a closure letter is available.

28.1 SUMMARY

Area of Concern (AOC) D, Asbestos Burial Pit, has been described as a demolition debris disposal pit, approximately 10 feet deep, located in the vicinity of the 7th hole on the Cannon AFB golf course. A Site Inspection (SI) of AOC D (IMS 1997) found chips of non-friable asbestos-containing material (ACM) near the ground surface in the area of this site. In a letter to Col. Clary, Commander Cannon AFB, on November 6, 1997, NMED stated the SI was technically adequate and approved the report.

The conclusions reached in the SI and the NMED letter are consistent in recommending that the only action required at AOC D is the removal and proper disposal of the exposed ACM. This action has been completed, and the action will be repeated in the future if additional ACM is exposed. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this AOC.

28.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

28.2.1 Site Description

AOC D reportedly consists of a pit used for the disposal of demolition debris, potentially including ACM. The site underlies portions of the tee box and fairway at the 7th hole of the Whispering Winds Golf Course (Figure 28-1). The area investigated measured approximately 150 feet by 590 feet.

28.2.2 Operational History

AOC D was reportedly used as a disposal site for debris derived from the demolition of numerous buildings at Cannon AFB in the 1950s. The site was discovered during a golf course expansion project when a bulldozer removed a layer of topsoil approximately 1 foot thick from the surface and exposed the chips of non-friable ACM. The potential ACM appeared to be pieces of siding from a building wall, each piece measuring approximately 2 inches square. The lateral extent of the debris was unknown, but the maximum depth was estimated to be 10 feet (IMS 1997).

Other accounts from some base personnel suggested that any debris present at AOC D may have simply fallen off barracks buildings that were temporarily stored in this area, not intentionally disposed of here (W-C 1996).

28.3 LAND USE

28.3.1 Current

The area of AOC D is currently used as the tee box and fairway of the 7th hole at the Whispering Winds Golf Course. Therefore, the land use in this area may be classified as recreational.

28.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Use classification will continue to remain recreational.

28.4 INVESTIGATIVE ACTIVITIES

28.4.1 Summary

An SI of AOC D (IMS 1997) found chips of non-friable ACM in the area of AOC D. No other contamination of any significance was detected in the area of this AOC. A letter from NMED recommended NFA beyond the proposed removal of any exposed ACM.

28.4.2 Investigation #1: Site Investigation (SI) Report, Area of Concern (AOC) D

28.4.2.1 Non-Sampling Data Collection

The SI included a risk evaluation, the results of which are discussed below. An EM-61 electromagnetic geophysical survey was also conducted in the area of AOC D prior to the SI field effort. These investigations found no significant metal (i.e., drums) or other debris buried at the site.

28.4.2.2 Sampling Data Collection

Nine borings were installed during the SI (boring locations are shown in Figure 28-1 in Appendix A). Eight of the nine borings were drilled to maximum depths of 10 feet, the ninth boring was drilled to a maximum depth of 25 feet based on the visible presence of potential transite debris near the surface of this boring. No other visual observation of potential contamination was made in any of the other borings. All headspace readings were below background levels.

Three samples were collected at depth intervals of 7, 15, and 25 feet from the deep boring and sent for laboratory analysis. Target analytes for all three samples included TCL VOCs, TCL SVOCs, TAL metals, and TRPH. In addition, two of the debris chips found in the near surface sample collected from the deep boring were sent for asbestos identification using polarized light microscopy (PLM).

28.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to determine the presence of potential contaminants in the area of AOC D. In addition, the data quality was deemed to be sufficient to meet the objectives of the SI. Therefore, no data gaps existed after the completion of the SI.

28.4.2.4 Results and Conclusions

Both chips of debris sent for asbestos identification using PLM were found to contain greater than 1 percent chrysotile asbestos. Therefore, based on this, the debris chips are an ACM. No organic compounds were detected above laboratory detection limits. All metals were detected at concentrations within established background ranges or below the USEPA Region VI Human Health Media-Specific Screening Levels (MSSLs). The vertical extent of contamination was adequately characterized by the soil borings. The analytical results from this investigation are shown in Tables 28-1a, 28-1b, 28-1c, and 28-1d in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

The SI recommended that the exposed chips of debris, an ACM, be removed.

28.5 SITE CONCEPTUAL MODEL

28.5.1 Nature and Extent of Contamination

The SI conducted at AOC D found ACM at levels of potential concern. Nine borings (eight to depths of 10 feet and one to a depth of 25 feet) were installed during the SI to effectively delineate the horizontal extent of contamination. No concentrations of organics and metals were detected at concentrations of potential concern. The vertical extent of contamination was characterized by the soil borings.

Groundwater at AOC D was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

28.5.2 Environmental Fate

The debris containing chrysotile asbestos can be expected to persist for long periods of time in the environment.

28.6 SITE ASSESSMENTS

28.6.1 Summary

The SI recommended that any exposed chips of asbestos-containing debris should be removed; NMED concurred in the letter referenced above.

28.6.2 Screening Assessments

28.6.2.1 Human Health

The greatest risk to human health from exposure to asbestos is via inhalation. However, the ACM found at AOC D did not appear to pose a significant health hazard in its observed condition. This is because the debris was classified as nonfriable, meaning the chips were not easily pulverized using normal hand pressure, and thus are unlikely to release fibers into the air. Therefore, barring any mechanical pressure or weathering, the asbestos fibers in any remaining chips of debris are unlikely to be respired by golfers or other people in the area.

28.6.2.2 Ecological

AOC D encompasses an area of mowed grass and golf course rough. It has been maintained as a near monoculture of grass and there was limited forage and biomass production. Therefore, it was not expected to be ecologically significant – nor would any such forage be considered attractive to native (relevant) New Mexico species. Based on this, AOC D did not contain any significant ecological component, and a formal ecological risk assessment was not warranted.

28.6.3 Risk Assessments

28.6.3.1 Human Health

Based on the findings of the SI, a formal human health risk assessment was not warranted for AOC D.

28.6.3.2 Ecological

Based on the conclusions of the SI, AOC D did not contain any significant ecological component such that a formal ecological risk assessment was warranted.

28.6.4 Other Applicable Assessments

28.6.4.1 Surface Water

AOC D contained no surface water.

28.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this AOC contained no means for groundwater discharges to occur.

28.6.4.3 Underground Storage Tanks (USTs)

There have never been USTs located at AOC D.

28.6.4.4 Other

No other assessments have been conducted in the area of AOC D.

28.7 NO FURTHER ACTION PROPOSAL

28.7.1 Rationale

The conclusions reached in the SI and the in letter from NMED were consistent in recommending that the exposed ACM be removed and disposed of properly. This has been completed, and it will be repeated in the future if additional ACM is observed. Based on this, NFA has been recommended for AOC D.

28.7.2 Criterion

AOC D is proposed for NFA based on NMED NFA Criterion 4: A release from the AOC to the environment has occurred, but the AOC was characterized under another authority (NMED's Hazardous and Radioactive Materials Bureau) and a closure letter is available.

29.1 SUMMARY

AOC E, Runway Rubble Pile, consists of a mound of asphalt and concrete debris stripped from a former runway and piled on the ground surface sometime between 1959 and 1966. A CERCLA SI of AOC E (W-C 1999) detected one VOC, one SVOC, two pesticides, and eleven metals at concentrations of potential concern in the surface soil. In addition, the SI also detected four VOCs, three SVOCs, two pesticides, and three metals at concentrations of potential concern in the subsurface soil. However, a risk evaluation determined that no evidence of a significant release in the area of AOC E existed, and the SI report recommended NFA at this AOC.

The conclusions reached in the SI report recommended NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this AOC.

29.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

29.2.1 Site Description

AOC E, the Runway Rubble Pile, measures approximately 1,000 feet long by 200 feet wide and has an average height of approximately 2 to 3 feet. The AOC is located approximately 120 feet east of a former runway that, in turn, is located east of the current runway (Figure 29-1 in Appendix A). The rubble pile trends north-south, parallel to the former runway.

29.2.2 Operational History

The Runway Rubble Pile was discovered in 1995 after a brush fire exposed the debris pile. A historical documents review (CH2M Hill 1983) indicated that the debris had been piled at the site sometime between 1959 and 1966. The debris is believed to have been stripped from a runway constructed during World War II during its demolition. No records were found that indicated any other past use of the site.

29.3 LAND USE

29.3.1 Current

The Runway Rubble Pile at AOC E was observed during the SI field activities to consist primarily of asphalt rubble with some concrete debris and gravel. The site is currently unused.

29.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the Runway Rubble Pile is still present at the Base and no plans exist to remove it. Use classification will continue to remain industrial in nature.

29.4 INVESTIGATIVE ACTIVITIES

29.4.1 Summary

A CERCLA SI (W-C 1999) detected VOCs, SVOCs, pesticides, and metals at concentrations of potential concern in the area of AOC E. However, a risk evaluation determined that no evidence of a significant release in the area of AOC E existed, and the SI report recommended NFA at this AOC.

29.4.2 Investigation #1: CERCLA Site Inspections at Areas of Concern (AOCs) E, F, G, and H

29.4.2.1 Non-Sampling Data Collection

The SI included a risk evaluation, the results of which are discussed below. An EM-61 electromagnetic geophysical survey and trenching activities were also conducted in the area of AOC E during the SI field effort. These investigations found no significant metal (i.e., drums) or other debris buried at the site.

29.4.2.2 Sampling Data Collection

Eight borings drilled to maximum depths of 40 feet using a drill rig were sampled during the SI. Soil samples were collected from the 0- to 2-foot, 3- to 5-foot, 8- to 10-foot, 18- to 20-foot, 28- to 30-foot, and 38- to 40-foot depth intervals in these borings. Four other borings drilled to maximum depths of 10 feet using a hand auger were also sampled. Soil samples were collected from the 0- to 2-foot, 3- to 5-foot, and 8- to 10-foot depth intervals in these borings. Borings were located near anomalies identified by the geophysical survey (boring locations are shown in Figure 29-1 in Appendix A). No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, TAL metals, and pesticides/PCBs. In total, 60 soil samples collected from the 12 borings were sent for chemical analyses.

29.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk evaluation and to determine that a significant release had not occurred in the area of AOC E. In addition, the data quality was deemed to be sufficient to meet the objectives of the CERCLA SI. Therefore, no data gaps existed after the completion of the SI.

29.4.2.4 Results and Conclusions

Low concentrations of one VOC, toluene, one SVOC, phenol, and two pesticides, DDT and DDE, were detected in at least one surface soil sample at AOC E. In addition, eleven metals (aluminum, antimony, beryllium, cadmium, chromium, iron, magnesium, nickel, potassium, vanadium, and zinc) were also detected above established background levels in at least one surface soil sample at AOC E. Low concentrations of four VOCs (carbon disulfide, methyl ethyl

ketone, methyl isobutyl ketone, and toluene), three SVOCs (di-n-butyl phthalate, di-n-octyl phthalate and n-nitrosodiphenylamine), and two pesticides (DDT and DDE) were detected in at least one subsurface soil sample at AOC E. In addition, ten metals (aluminum, arsenic, barium, beryllium, calcium, chromium, copper, lead, mercury, and potassium) were detected above background levels (W-C 1997a) in at least one subsurface soil sample at AOC E. The analytical results from this investigation are shown in Tables 29-1a and 29-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

The maximum detected concentrations of all organic compounds and of all metals that exceeded background levels in surface and subsurface soil samples were compared to USEPA Region VI Residential MSSLs (Tables 29-1c and 29-1d in Appendix B). The results of the risk evaluation found that the cumulative excess cancer risk for AOC E was 1×10^{-5} and the cumulative HI for noncarcinogenic health effects was estimated at 0.85 for surface soils and at 0.01 for subsurface soils. These levels all meet USEPA acceptable levels. Based on this, the SI report recommended NFA for AOC E.

29.5 SITE CONCEPTUAL MODEL

29.5.1 Nature and Extent of Contamination

The SI conducted at AOC E included the drilling and sampling of twelve borings to depths of 10 or 40 feet. VOCs, SVOCs, pesticides, and metals were detected at concentrations of potential concern. However, there was no evidence of a significant release in the area of AOC E, and the SI report recommended NFA at this AOC.

Groundwater at AOC E was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

29.5.2 Environmental Fate

Contaminants encountered at the Runway Rubble Pile could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

VOCs are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

SVOCs are likely to be relatively immobile due to low vapor pressure, low water solubility, and a tendency to adsorb to clays. In addition, these three compounds have moderate to low biodegradation rates.

Pesticides are likely to persist in the environment due to their extremely low vapor pressure, low water solubility, and tendency to readily adsorb to soil. These compounds also have low biodegradation rates.

Based on the general subsurface characteristics at AOC E, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but these compounds do persist for long periods of time.

29.6 SITE ASSESSMENTS

29.6.1 Summary

The SI report included a risk evaluation of AOC E. Based on the results of the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this AOC. Therefore, NFA was recommended for AOC E.

29.6.2 Screening Assessments

29.6.2.1 Human Health

The SI's risk screening consisted of comparing the maximum detected concentrations of all organic compounds and all metals that exceeded background levels, in surface and subsurface soil samples, to USEPA Region VI Residential MSSLs. Based on maximum detected concentrations, generic high-end exposure assumptions, and using the MSSLs as a baseline of 1×10^{-6} for carcinogenic risks and 1.0 for noncarcinogenic risks, the lifetime excess cancer risks and the cumulative adverse health effects were estimated for soils at AOC E. The results of the risk evaluation found that the cumulative excess cancer risk for AOC E was 1×10^{-5} and the cumulative HI for noncarcinogenic health effects was estimated at 0.85 for surface soils and at 0.01 for subsurface soils.

These levels all meet USEPA acceptable levels. Based on this, the SI recommended NFA for AOC E.

29.6.2.2 Ecological

An ecological risk screening was not included as part of the SI, but a human health risk screening was conducted. Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC E. The Region VI MSSLs, used as screening criteria, are highly conservative and, as such, are protective of ecological and human health.

29.6.3 Risk Assessments

29.6.3.1 Human Health

Because the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC E, a full-scale human health risk assessment was not warranted for AOC E.

29.6.3.2 Ecological

Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC E. In addition, the Region VI MSSLs, used as screening criteria in the human health risk evaluation, are highly conservative and, as such, are protective of ecological and human health. Therefore, an ecological risk assessment was not warranted for AOC E.

29.6.4 Other Applicable Assessments

29.6.4.1 Surface Water

AOC E contained no surface water.

29.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this AOC contained no means for groundwater discharges to occur.

29.6.4.3 Underground Storage Tanks (USTs)

No USTs are associated with the Runway Rubble Pile.

29.6.4.4 Other

No other assessments have been conducted in the area of AOC E.

29.7 NO FURTHER ACTION PROPOSAL

29.7.1 Rationale

Based on the conclusions reached in SI, NFA has been recommended for AOC E.

29.7.2 Criterion

AOC E is proposed for NFA based on NMED NFA Criterion 5: The AOC has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

30.1 SUMMARY

AOC F, Calibration Target Berm, consists of an earthen structure that was used as a backstop for bore sighting aircraft weaponry. A CERCLA SI of AOC F (W-C 1999) detected arsenic and lead at concentrations of potential concern. However, a risk evaluation determined that no evidence of a significant release in the area of AOC F existed, and the SI report recommended NFA at this AOC.

The conclusions reached in the SI report recommended NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this AOC.

30.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

30.2.1 Site Description

AOC F, the Calibration Target Berm, is irregularly shaped, approximately 15 feet high, and comprised mainly of sand soil with numerous rock fragments, sparse vegetation, and some debris. A former target support, constructed of telephone poles, iron bars, and concrete, is located approximately 150 feet north of the berm. The AOC is located to the southwest of the current small arms firing range (Figure 30-1 in Appendix A).

30.2.2 Operational History

The Calibration Target Berm was used as a backstop when bore sighting aircraft weaponry in the 1950s and 1960s.

30.3 LAND USE

30.3.1 Current

The irregularly shaped Calibration Target Berm at AOC F was observed during the SI field activities to be comprised mainly of sand soil with numerous rock fragments, sparse vegetation, and some debris. The site is currently unused.

30.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. However, the Calibration Target Berm is still present at the Base and no plans exist to remove it. Use classification will continue to remain industrial in nature.

30.4 INVESTIGATIVE ACTIVITIES

30.4.1 Summary

A CERCLA SI (W-C 1999) detected arsenic and lead at concentrations of potential concern in the area of AOC F. However, a risk evaluation determined that no evidence of a significant release in the area of AOC F existed, and the SI report recommended NFA at this AOC.

30.4.2 Investigation #1: CERCLA Site Inspections at Areas of Concern (AOCs) E, F, G, and H

30.4.2.1 Non-Sampling Data Collection

The SI included a risk evaluation, the results of the risk evaluation are discussed below.

30.4.2.2 Sampling Data Collection

Nine borings drilled to maximum depths of 4 feet from the top surface of the berm using a hand auger were sampled during the SI. The hand auger borings were completed in an approximate grid atop the berm. Soil samples were collected from the berm's surface and from the 1.5- to 2-foot and the 3.5- to 4-foot depth intervals in these borings. Nine other surface samples were collected from locations near the former target stand, between the stand and the berm, and around the berm at depths of 0- to 2-feet using a hand auger (boring locations are shown in Figure 30-1 in Appendix A). All samples were sieved using a 0.25-inch mesh screen to remove debris.

Target analytes for all borings included total antimony, arsenic, and lead. Thirty-six soil samples were sent for chemical analyses.

30.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk evaluation and to determine that a significant release had not occurred in the area of AOC F. In addition, the data quality was deemed to be sufficient to meet the objectives of the CERCLA SI. Therefore, no data gaps existed after the completion of the SI.

30.4.2.4 Results and Conclusions

Concentrations of arsenic and lead were detected above established background levels (W-C 1997a) in soil samples collected at AOC F. The analytical results from this investigation are shown in Tables 30-1a and 30-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

Concentrations of arsenic detected in surface soil exceeded both residential and industrial USEPA Region VI MSSLs (Tables 30-1c and 30-1d in Appendix B). The results of the risk evaluation found that the excess cancer risk from arsenic at AOC F was 2×10^{-6}, which fell within the USEPA target range of 1×10^{-4} to 1×10^{-6}. This indicated that no unacceptable adverse health effects were anticipated due to arsenic concentrations at AOC F.

Although concentrations of arsenic exceeded the corresponding MSSLs, all concentrations fell within the established USEPA Region VI background range for arsenic in soil (USEPA 1998). Arsenic often occurs naturally along with lead and has been used historically as a rodenticide. Therefore, the concentrations of arsenic detected may not be site-related. The concentrations of lead detected in soil at AOC F did not exceed the residential or the industrial MSSLs.

Therefore, the SI report recommended NFA for AOC F.

30.5 SITE CONCEPTUAL MODEL

30.5.1 Nature and Extent of Contamination

The SI conducted at AOC F included the drilling and sampling of nine shallow borings and the collection of nine surface samples. Arsenic and lead were detected at concentrations of potential concern. However, there was no evidence of a significant release in the area of AOC F, and the SI report recommended NFA at this AOC.

Groundwater at AOC F was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

30.5.2 Environmental Fate

Contaminants encountered at the Calibration Target Berm could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Based on the general subsurface characteristics at AOC F, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but these compounds do persist for long periods of time.

30.6 SITE ASSESSMENTS

30.6.1 Summary

The SI report included a risk evaluation of AOC F. Based on the results of the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this AOC. Therefore, NFA was recommended for AOC F.

30.6.2 Screening Assessments

30.6.2.1 Human Health

The SI's risk screening consisted of comparing the maximum detected concentrations of all metals that exceeded background levels (W-C 1997a), in surface and subsurface soil samples, to USEPA Region VI MSSLs. The results of the risk screening found that the excess cancer risk from arsenic at AOC F was 2×10^{-6}, which fell within the USEPA target range of 1×10^{-4} to 1×10^{-6}. This indicated that no unacceptable adverse health effects were anticipated due to arsenic concentrations at AOC F. The concentrations of lead detected in soil at AOC F did not exceed the residential or the industrial MSSLs.

Therefore, the SI report recommended NFA for AOC F.

30.6.2.2 Ecological

An ecological risk screening was not included as part of the SI, but a human health risk screening was conducted. The risk evaluation found that no unacceptable adverse health effects were anticipated due to arsenic or lead concentrations in soil at AOC F. The Region VI MSSLs, used as screening criteria, are highly conservative and, as such, are protective of ecological and human health.

30.6.3 Risk Assessments

30.6.3.1 Human Health

Because the risk evaluation found that no unacceptable adverse health effects were anticipated due to arsenic or lead concentrations in soil at AOC F, a full-scale human health risk assessment was not warranted for AOC F.

30.6.3.2 Ecological

The risk evaluation found that no unacceptable adverse health effects were anticipated due to arsenic or lead concentrations in soil at AOC F. In addition, the Region VI MSSLs, used as screening criteria in the human health risk evaluation, are highly conservative and, as such, are protective of ecological and human health. Therefore, an ecological risk assessment was not warranted for AOC F.

30.6.4 Other Applicable Assessments

30.6.4.1 Surface Water

AOC F contained no surface water.

30.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this AOC contained no means for groundwater discharges to occur.

30.6.4.3 Underground Storage Tanks (USTs)

No USTs are associated with the Calibration Target Berm.

30.6.4.4 Other

No other assessments have been conducted in the area of AOC F.

30.7 NO FURTHER ACTION PROPOSAL

30.7.1 Rationale

Based on the conclusions reached in SI, NFA has been recommended for AOC F.

30.7.2 Criterion

AOC F is proposed for NFA based on NMED NFA Criterion 5: The AOC has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

31.1 SUMMARY

AOC G, Disturbed Area - North Housing Site, consists of an area identified in historical aerial photographs from 1959 as the site of an unknown disturbance. A CERCLA SI of AOC G (W-C 1999) detected three VOCs and thirteen metals at concentrations of potential concern in the surface soil. In addition, the SI also detected five VOCs, nine SVOCs, and ten metals at concentrations of potential concern in the subsurface soil. However, a risk evaluation determined that no evidence of a significant release in the area of AOC G existed, and the SI report recommended NFA at this AOC.

The conclusions reached in the SI report recommended NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this AOC.

31.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

31.2.1 Site Description

AOC G, the Disturbed Area - North Housing Site, measured approximately 735 feet long by 320 feet wide and was located in the northwest corner of the Base housing area, in the northwest corner of the Base (Figure 31-1 in Appendix A). At least five housing units are located within the area of the disturbance. Although the disturbance was observed in 1959 historical aerial photographs, the site appeared inactive in 1966 historical aerial photographs. The reason for the disturbance is unknown.

31.2.2 Operational History

The Disturbed Area - North Housing Site was identified in 1959 historical aerial photographs, and the site appeared inactive in 1966 historical aerial photographs. The reason for the disturbance is unknown.

31.3 LAND USE

31.3.1 Current

The Disturbed Area - North Housing Site at AOC G currently contains at least five housing units. The portions of the Disturbed Area - North Housing Site that are not covered by the housing units are presently paved as streets and driveways, or landscaped.

31.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. The Disturbed Area - North Housing Site currently contains at least five housing units and no plans exist to remove the units or their occupants. Use classification will continue to remain residential in nature.

31.4 INVESTIGATIVE ACTIVITIES

31.4.1 Summary

A CERCLA SI (W-C 1999) detected VOCs, SVOCs, and metals at concentrations of potential concern in the area of AOC G. However, a risk evaluation determined that no evidence of a significant release in the area of AOC G existed, and the SI report recommended NFA at this AOC.

31.4.2 Investigation #1: CERCLA Site Inspections at Areas of Concern (AOCs) E, F, G, and H

31.4.2.1 Non-Sampling Data Collection

The SI included a risk evaluation, the results of which are discussed below. An EM-61 electromagnetic geophysical survey was also conducted across the northern half of AOC G during the SI field effort, but no data was downloaded or recorded. No anomalies were detected using the EM-61.

31.4.2.2 Sampling Data Collection

Eight borings drilled to maximum depths of 40 feet using a drill rig were sampled during the SI. Soil samples were collected from the 0- to 2-foot, 3- to 5-foot, 8- to 10-foot, 18- to 20-foot, 28- to 30-foot, and 38- to 40-foot depth intervals in these borings. Boring locations were distributed to cover as much of the Disturbed Area - North Housing Site as possible (boring locations are shown in Figure 31-1 in Appendix A). A uniform grid pattern was not possible due to the presence of buildings and utilities at the site, and neither the historical aerial photographs nor the EM-61 data suggested the need for specific boring placements. No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, TPH (DRO and GRO), TAL metals, herbicides, and pesticides/PCBs. Forty-eight soil samples collected from the eight borings were sent for chemical analyses.

31.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk evaluation and to determine that a significant release had not occurred in the area of AOC G. In addition, the data quality was deemed to be sufficient to meet the objectives of the CERCLA SI. Therefore, no data gaps existed after the completion of the SI.

31.4.2.4 Results and Conclusions

Low concentrations of three VOCs (methyl ethyl ketone, methyl isobutyl ketone, and toluene) were detected in at least one surface soil sample at AOC G. In addition, thirteen metals (aluminum, beryllium, calcium, chromium, iron, lead, magnesium, mercury, nickel, potassium, sodium, vanadium, and zinc) were also detected above established background levels in at least

one surface soil sample at AOC G. Low concentrations of five VOCs (carbon disulfide, chloromethane, methyl ethyl ketone, methyl isobutyl ketone, and toluene) and nine SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, di-n-butyl phthalate, di-n-octyl phthalate, fluoranthene, and pyrene) were detected in at least one subsurface soil sample at AOC G. In addition, ten metals (aluminum, barium, calcium, chromium, copper, lead, magnesium, mercury, potassium, and sodium) were detected above background levels in at least one subsurface soil sample at AOC G. The analytical results from this investigation are shown in Tables 31-1a and 31-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

The maximum detected concentrations of all organic compounds and of all metals that exceeded background levels (W-C 1997a) in surface and subsurface soil samples were compared to USEPA Region VI Residential MSSLs (Tables 31-1c and 31-1d in Appendix B). The results of the risk evaluation found that the cumulative excess cancer risk for AOC G was 1×10^{-7} for surface soils and 1×10^{-6} for subsurface soils, and the cumulative HI for noncarcinogenic health effects was estimated at 1.0 for surface soils and at 0.01 for subsurface soils. These levels all meet USEPA acceptable levels. Based on this, the SI report recommended NFA for AOC G.

31.5 SITE CONCEPTUAL MODEL

31.5.1 Nature and Extent of Contamination

The SI conducted at AOC G included the drilling and sampling of eight borings to a depth of 40 feet. VOCs, SVOCs, and metals were detected at concentrations of potential concern. However, there was no evidence of a significant release in the area of AOC G, and the SI report recommended NFA at this AOC.

Groundwater at AOC G was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

31.5.2 Environmental Fate

Contaminants encountered at the Disturbed Area - North Housing Site could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

VOCs are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

SVOCs are likely to be relatively immobile due to low vapor pressure, low water solubility, and a tendency to adsorb to clays. In addition, these compounds have moderate to low biodegradation rates.

Based on the general subsurface characteristics at AOC G, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

31.6 SITE ASSESSMENTS

31.6.1 Summary

The SI report included a risk evaluation of AOC G. Based on the results of the risk evaluation, no unacceptable human health risks due to chemical releases were expected from this AOC. Therefore, NFA was recommended for AOC G.

31.6.2 Screening Assessments

31.6.2.1 Human Health

The SI's risk screening consisted of comparing the maximum detected concentrations of all organic compounds and all metals that exceeded background levels (W-C 1997a), in surface and subsurface soil samples, to USEPA Region VI Residential MSSLs. Based on maximum detected concentrations, generic high-end exposure assumptions, and using the MSSLs as a baseline of 1×10^{-6} for carcinogenic risks and 1.0 for noncarcinogenic risks, the lifetime excess cancer risks and the cumulative adverse health effects were estimated for soils at AOC G. The results of the risk evaluation found that the cumulative excess cancer risk for AOC G was 1×10^{-7} for surface soils and 1×10^{-6} for subsurface soils, and the cumulative HI for noncarcinogenic health effects was estimated at 1.0 for surface soils and at 0.01 for subsurface soils.

These levels all meet USEPA acceptable levels. Based on this, the SI recommended NFA for AOC G.

31.6.2.2 Ecological

An ecological risk screening was not included as part of the SI, but a human health risk screening was conducted. Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC G. The Region VI MSSLs, used as screening criteria, are highly conservative and, as such, are protective of ecological and human health.

31.6.3 Risk Assessments

31.6.3.1 Human Health

Because the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC G, a full scale human health risk assessment was not warranted for AOC G.

31.6.3.2 Ecological

Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC G. In addition, the Region VI MSSLs, used as screening criteria in the human health risk evaluation, are highly conservative and, as such, are protective of ecological and human health. Therefore, an ecological risk assessment was not warranted for AOC G.

31.6.4 Other Applicable Assessments

31.6.4.1 Surface Water

AOC G contained no surface water.

31.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this AOC contained no means for groundwater discharges to occur.

31.6.4.3 Underground Storage Tanks (USTs)

No USTs are suspected to be associated with the Disturbed Area - North Housing Site.

31.6.4.4 Other

No other assessments have been conducted in the area of AOC G.

31.7 NO FURTHER ACTION PROPOSAL

31.7.1 Rationale

Based on the conclusions reached in SI, NFA has been recommended for AOC G.

31.7.2 Criterion

AOC G is proposed for NFA based on NMED NFA Criterion 5: The AOC has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

32.1 SUMMARY

AOC H, Disturbed Area - South Housing Site, consists of an area identified, in historical aerial photographs from 1951 as the site of a "blowout," which is a naturally occurring, low-lying feature common to this region. This feature appears as an unknown disturbance in 1954 historical aerial photographs.

A CERCLA SI of AOC H (W-C 1999) detected two VOCs, one SVOC, two pesticides, and eleven metals at concentrations of potential concern in the surface soil. In addition, the SI also detected five VOCs, two SVOCs, one pesticide, and eleven metals at concentrations of potential concern in the subsurface soil. However, a risk evaluation determined that no evidence of a significant release in the area of AOC H existed, and the SI report recommended NFA at this AOC.

The conclusions reached in the SI report recommended NFA at this site. Therefore, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this AOC.

32.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

32.2.1 Site Description

AOC G, the Disturbed Area - South Housing Site, was an irregularly shaped area that measured several hundred feet long by approximately 350 feet across. It was located in the northwest corner of the Base housing area, in the northwest corner of the Base, south of AOC G (Figure 32-1 in Appendix A). At least five housing units are located within the area of the disturbance. The disturbance appeared to be a blow out in 1951 historical aerial photographs, and the site appeared as an unknown disturbance in 1954 historical aerial photographs.

32.2.2 Operational History

The Disturbed Area - South Housing Site was identified as a blowout in 1951 historical aerial photographs, and the site appeared to contain a disturbance in 1954 historical aerial photographs. The reason for the disturbance is unknown.

32.3 LAND USE

32.3.1 Current

The Disturbed Area - South Housing Site at AOC G currently contains at least five housing units. The portions of the Disturbed Area - South Housing Site that are not covered by the housing units are presently paved as streets and driveways, or landscaped.

32.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. The Disturbed Area - South Housing Site currently contains at least five housing units and no plans exist to remove the units or their occupants. Use classification will continue to remain residential in nature.

32.4 INVESTIGATIVE ACTIVITIES

32.4.1 Summary

A CERCLA SI (W-C 1999) detected VOCs, SVOCs, pesticides, and metals at concentrations of potential concern in the area of AOC H. However, a risk evaluation determined that no evidence of a significant release in the area of AOC H existed, and the SI report recommended NFA at this AOC.

32.4.2 Investigation #1: CERCLA Site Inspections at Areas of Concern (AOCs) E, F, G, and H

32.4.2.1 Non-Sampling Data Collection

The SI included a risk evaluation, the results of which are discussed below.

32.4.2.2 Sampling Data Collection

Six borings drilled to a maximum depth of 40 feet using a drill rig were sampled during the SI. Soil samples were collected from the 0- to 2-foot, 3- to 5-foot, 8- to 10-foot, 18- to 20-foot, 28- to 30-foot, and 38- to 40-foot depth intervals in these borings (boring locations are shown in Figure 32-1 in Appendix A). No visual evidence of contamination was observed during this investigation.

Target analytes for all borings included VOCs, SVOCs, TPH (DRO and GRO), TAL metals, herbicides, and pesticides/PCBs. Thirty-six soil samples were sent for chemical analyses.

32.4.2.3 Data Gaps

It was concluded that the data available from this investigation was sufficient to complete a risk evaluation and to determine that a significant release had not occurred in the area of AOC H. In addition, the data quality was deemed to be sufficient to meet the objectives of the CERCLA SI. Therefore, no data gaps existed after the completion of the SI.

32.4.2.4 Results and Conclusions

Low concentrations of two VOCs (methyl isobutyl ketone and toluene) one SVOC (di-n-octyl phthalate), and two pesticides (DDT and DDE) were detected in at least one surface soil sample at AOC H. In addition, eleven metals (aluminum, antimony, arsenic, chromium, iron, lead,

magnesium, mercury, potassium, sodium, and vanadium) were detected above established background levels (W-C 1997a) in at least one surface soil sample at AOC H. Low concentrations of five VOCs (2-hexanone, benzene, methyl ethyl ketone, methyl isobutyl ketone, and toluene), two SVOCs (benzyl butyl phthalate and di-n-butyl phthalate), and one pesticide (DDE) were detected in at least one subsurface soil sample at AOC H. In addition, eleven metals (aluminum, barium, beryllium, calcium, chromium, cobalt, copper, lead, mercury, potassium, and zinc) were detected above background levels in at least one subsurface soil sample at AOC H. The analytical results from this investigation are shown in Tables 32-1a and 32-1b in Appendix B.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

The maximum detected concentrations of all organic compounds and of all metals that exceeded background levels (W-C 1997a) in surface and subsurface soil samples were compared to USEPA Region VI Residential MSSLs (Tables 32-1c and 32-1d in Appendix B). The results of the risk evaluation found that the cumulative excess cancer risk for AOC H was 1×10^{-5} for surface soils and 1×10^{-7} for subsurface soils, and the cumulative HI for noncarcinogenic health effects was estimated at 1.0 for surface soils and at 0.03 for subsurface soils. These levels all meet USEPA acceptable levels. Based on this, the SI report recommended NFA for AOC H.

32.5 SITE CONCEPTUAL MODEL

32.5.1 Nature and Extent of Contamination

The SI conducted at AOC H included the drilling and sampling of a total of six borings to a depth of 40 feet. VOCs, SVOCs, pesticides, and metals were detected at concentrations of potential concern. However, there was no evidence of a significant release in the area of AOC H, and the SI report recommended NFA at this AOC.

Groundwater at AOC H was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath the AOC.

32.5.2 Environmental Fate

Contaminants encountered at the Disturbed Area - South Housing Site could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

VOCs are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

SVOCs are likely to be relatively immobile due to low vapor pressure, low water solubility, and a tendency to adsorb to clays. In addition, these compounds have moderate to low biodegradation rates.

Pesticides are likely to persist in the environment due to their extremely low vapor pressure, low water solubility, and tendency to readily adsorb to soil. These compounds also have low biodegradation rates.

Based on the general subsurface characteristics at AOC H, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

32.6 SITE ASSESSMENTS

32.6.1 Summary

The SI report included a risk evaluation of AOC H. Based on the results of the risk evaluation no unacceptable human health risks due to chemical releases were expected from this AOC. Therefore, NFA was recommended for AOC H.

32.6.2 Screening Assessments

32.6.2.1 Human Health

The SI's risk screening consisted of comparing the maximum detected concentrations of all organic compounds and all metals that exceeded background levels (W-C 1997a), in surface and subsurface soil samples, to USEPA Region VI Residential MSSLs. Based on maximum detected concentrations, generic high-end exposure assumptions, and using the MSSLs as a baseline of 1×10^{-6} for carcinogenic risks and 1.0 for noncarcinogenic risks, the lifetime excess cancer risks and the cumulative adverse health effects were estimated for soils at AOC H. The results of the risk evaluation found that the cumulative excess cancer risk for AOC H was 1×10^{-5} for surface soils and 1×10^{-7} for subsurface soils, and the cumulative HI for noncarcinogenic health effects was estimated at 1.0 for surface soils and at 0.03 for subsurface soils.

These levels all meet USEPA acceptable levels. Based on this, the SI recommended NFA for AOC H.

32.6.2.2 Ecological

An ecological risk screening was not included as part of the SI, but a human health risk screening was conducted. Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC H. The Region VI MSSLs,

used as screening criteria, are highly conservative and, as such, are protective of ecological and human health.

32.6.3 Risk Assessments

32.6.3.1 Human Health

Because the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC H, a full-scale human health risk assessment was not warranted for this AOC.

32.6.3.2 Ecological

Both the estimated lifetime excess cancer risks and the estimated cumulative adverse health effects met acceptable USEPA levels for soils at AOC H. In addition, the Region VI MSSLs, used as screening criteria in the human health risk evaluation, are highly conservative and, as such, are protective of ecological and human health. Therefore, an ecological risk assessment was not warranted for AOC H.

32.6.4 Other Applicable Assessments

32.6.4.1 Surface Water

AOC H contained no surface water.

32.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this AOC contained no means for groundwater discharges to occur.

32.6.4.3 Underground Storage Tanks (USTs)

No USTs are associated with the Disturbed Area - South Housing Site.

32.6.4.4 Other

No other assessments have been conducted in the area of AOC H.

32.7 NFA PROPOSAL

32.7.1 Rationale

Based on the conclusions reached in SI, NFA has been recommended for AOC H.

32.7.2 Criterion

AOC H is proposed for NFA based on NMED NFA Criterion 5: The AOC has been characterized in accordance with the current applicable state and federal regulations, and the available data has indicated that the contaminants present pose an acceptable level of risk under current and projected future land use.

33.1 SUMMARY

DP-33, Drum Disposal Pit, was discovered in 1991 during earthwork operations in the northeast portion of Cannon AFB, near Engineers Way Road. During the earthwork operations, a buried drum was excavated and its content spilled onto surrounding soils. IT Corporation performed a Rapid Response Corrective Action at the site. The corrective action, documented in a Final Project Report (IT 1995), included the removal and offsite disposal of approximately 25 buried drums and approximately 610 cubic yards of impacted soils.

In a letter to Col. W.P. Ard, Commander 27th Support Group, dated December 12, 1996, NMED stated the corrective action was consistent with applicable regulations and protective of both human health and the environment. Therefore, NMED approved the Final Project Report and required NFA at the site. In accordance, a Class 3 modification to the Cannon AFB RCRA Part B Permit pursuant to 40 CFR 270.42(c) is warranted for closure of this site.

33.2 SITE DESCRIPTION AND OPERATIONAL HISTORY

33.2.1 Site Description

DP-33 was the site of a Rapid Response Corrective Action, which removed buried drums containing what appeared to be petroleum waste liquids. The corrective action resulted in an excavation measuring approximately 70 feet by 90 feet and 8 feet deep (Figure 33-1). In total, approximately 25 buried drums and approximately 610 cubic yards of impacted soils were excavated and sent off site for disposal. The site, discovered in 1991 during earthwork operations, was located in the northeast portion of Cannon AFB near Engineers Way Road (IT 1995).

33.2.2 Operational History

DP-33 reportedly was the historical location of an aircraft hangar. The hangar was demolished in the mid-1960s. Buried drums were first discovered here during earthwork operations in 1991.

33.3 LAND USE

33.3.1 Current

The area of DP-33 is currently used as an electrical equipment storage yard. The land use in this area may be classified as industrial.

33.3.2 Future/Proposed

Cannon AFB is an integral part of the defense system of the United States; therefore, the Base will remain active for the foreseeable future. Use classification will continue to remain industrial.

33.4 INVESTIGATIVE ACTIVITIES

33.4.1 Summary

During a Rapid Response Corrective Action, approximately 25 drums and approximately 610 cubic yards of soils were excavated from the area of DP-33. Confirmation samples were then collected from the limits of the resultant excavation and from the proposed backfill source areas, and NMED granted approval to backfill. A letter from NMED found the corrective action to be consistent with applicable regulations and protective of both human health and the environment.

33.4.2 Investigation #1: Rapid Response Corrective Action Report, DP-33

33.4.2.1 Non-Sampling Data Collection

The Rapid Response Corrective Action included a risk evaluation, the results of which are discussed in Section 33.6.2 below. Two exploratory trenches (one extending approximately 60 feet west of the main excavation and the other extending approximately 90 feet east of the main excavation) were also dug to further assess the potential presence of buried drums. No drums were encountered outside the main excavation.

33.4.2.2 Sampling Data Collection

Fourteen confirmation, profile and backfill samples were collected upon completion of the excavating activities at DP-33 (sample locations are shown in Figure 5-1 in Appendix A). Ten confirmation samples were collected from the excavation (two samples each from the floor and the four walls). Two composite samples were collected from each of the two stockpiles of excavated soil (one composed of soils removed from the immediate vicinity of the drums and the other composed of visually impacted soils from the excavation). Two samples were also collected from proposed backfill sources. The confirmation and backfill samples were analyzed for VOCs, SVOCs, PCBs/pesticides, total metals, and total petroleum hydrocarbons (TPH) (including diesel, JP-4 and TRPH). The profile samples were analyzed for Toxicity Characteristic Leaching Procedure (TCLP) VOCs, SVOCs, pesticides, metals, and TPH.

Two additional profile samples were later collected from each of the two soil stockpiles and analyzed for TRPH. Based on the TRPH results for one of the confirmation samples collected from the floor of the excavation, an additional confirmation sample was collected from a location 3 feet beneath the floor of the excavation to verify the extent of TRPH contamination. The samples of the proposed backfill materials were found to contain slightly elevated concentrations of TRPH (<200 mg/kg), so samples of an alternative backfill source were collected and analyzed for the same suite of analyses as the earlier samples.

Nine samples were also collected from the residual liquids found in the excavated drums. A field hazard categorization was performed on each sample.

33.4.2.3 Data Gaps

It was concluded that the data available from sample analysis was sufficient to determine the extent of contamination at DP-33, to dispose of the excavated materials properly, and to identify acceptable backfill soils. In addition, the data quality was deemed to be sufficient to meet the objectives of the Rapid Response Corrective Action. Therefore, no data gaps existed after the completion of the Rapid Response Corrective Action.

33.4.2.4 Results and Conclusions

One organic compound, xylene, was detected in the confirmation samples at a concentration above laboratory detection limits. Low concentrations of three pesticides, endosulfan, DDE and DDT, were also detected in the confirmation samples. Seventeen metals were detected in the confirmation samples, but only two metals, antimony and thallium, were detected at concentrations exceeding the USEPA Region VI Human Health MSSLs for residential properties. However, both compounds were detected at concentrations that were below the Region VI MSSLs for industrial sites (the appropriate classification for DP-33) and within established background ranges (W-C 1997a).

A slightly elevated concentration of TRPH (1,380 mg/kg) was also detected in one of the confirmation samples collected from the floor of the excavation. However, an additional sample was collected from a location proximate to this sample and at a depth 3 feet below the floor of the excavation and analyzed for total TRPH. Total TRPH was not detected above the laboratory detection limit in this sample (please note that the units in Table 33-1c should be mg/kg, not mg/L), demonstrating that concentrations of TRPH diminish within a few feet below the limits of the excavation. No other COPCs were detected in any of the confirmation samples. Thus the horizontal and vertical extents of contamination was adequately characterized by the soil samples. The analytical results from the confirmation samples are presented in Tables 33-1a and 33-1c in Appendix B.

The samples of the proposed backfill materials were found to contain slightly elevated concentrations of TRPH (<200 mg/kg), so samples of an alternative backfill source were collected and analyzed for the same suite of analyses as the earlier samples. TRPH and other chemicals were not detected at concentrations of potential concern in this third sample of proposed backfill material. The analytical results from the backfill samples are presented in Tables 33-1a and 33-1d in Appendix B.

Although 11 metals and TRPH were detected in the two disposal profile samples collected from the contaminated soil stockpiles and analyzed using TCLP methods, none of these analytes were detected at hazardous concentrations. Two additional disposal profile samples were later collected from the contaminated soil stockpiles and also analyzed for total TRPH, and again TRPH was not detected at hazardous concentrations in these samples (please note that the units in Table 33-1c should be mg/kg, not mg/L). The analytical results from the profile samples are presented in Tables 33-1b and 33-1c in Appendix B.

None of the nine residual liquid samples collected from the excavated drums exhibited hazardous characteristics when they were field hazard categorized.

Groundwater was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath DP-33.

33.5 SITE CONCEPTUAL MODEL

33.5.1 Nature and Extent of Contamination

The Rapid Response Corrective Action included the excavation and off-site disposal of approximately 25 drums (the exact number could not be determined due to the deteriorated condition of the drums) and approximately 610 cubic yards of soils from DP-33. Confirmation, backfill and profile samples were collected and analyzed. The samples demonstrated that the horizontal and vertical extent of contamination had been determined, so the excavation was backfilled using approved soils. Therefore, all significant contamination has been removed from DP-33.

Groundwater at DP-33 was not investigated because the potential impacts to groundwater were considered minimal. The potential was considered minimal since the depth to groundwater is greater than 250 feet, and the soil sampling results demonstrate that contaminants are not being transported significantly in a vertical direction beneath DP-33.

33.5.2 Environmental Fate

Contaminants encountered at DP-33 could potentially migrate into other environmental media through any of several transport mechanisms. The mechanisms include: air – movement within soil gas or the atmosphere, and wind transport of contaminants off site; leaching – through the vadose zone; and groundwater – movement via groundwater flow.

Organic compounds, including TRPH, are likely to be moderately to highly mobile in subsurface soil and are not likely to persist for long periods of time due to high vapor pressures, high volatilization potentials, and high biodegradation rates.

Based on the general subsurface characteristics at DP-33, including moderate to high clay content and an alkaline soil pH, metals are not likely to be very mobile in the subsurface, but they do persist for long periods of time.

33.6 SITE ASSESSMENTS

33.6.1 Summary

Approximately 25 drums and 610 cubic yards of soils were excavated from the area of DP-33. Confirmation samples were then collected from the limits of the resultant excavation and from the proposed backfill source areas, and NMED granted approval to backfill. A letter from NMED found the corrective action to be consistent with applicable regulations and protective of both human health and the environment.

33.6.2 Screening Assessments

33.6.2.1 Human Health

The Rapid Response Corrective Action report's risk evaluation consisted of a comparison of the maximum detected concentrations to the highly conservative USEPA Region VI MSSLs for residential soil (USEPA 1996). The purpose of this comparison was to evaluate whether the concentrations of potential contaminants detected during the fieldwork associated with the Corrective Measure Completion Report posed a significant human health risk. Region VI MSSLs were selected for the comparison because they were comprehensive, current, and derived using accepted risk assessment methodologies.

The maximum antimony and thallium concentrations detected during the Rapid Response Corrective Action exceeded the Region VI MSSLs for residential sites. However, the maximum detected concentrations of both metals were below the Region VI MSSLs for industrial sites (the appropriate classification for DP-33).

A slightly elevated concentration of TRPH (1,380 mg/kg) was also detected in one of the confirmation samples collected from the floor of the excavation. However, an additional sample was collected from a location proximate to this sample at a depth 3 feet below the floor of the excavation and analyzed for TRPH. TRPH was not detected in this sample, demonstrating that concentrations of TRPH diminish within a few feet below the limits of the excavation. No other COPCs were detected at concentrations exceeding the corresponding MSSLs at DP-33.

33.6.2.2 Ecological

An ecological risk screening was not included as part of the Rapid Response Corrective Action report, but a human health risk screening/evaluation was included. In this evaluation, the screening criteria were not significantly exceeded by detected chemical concentrations attributable to DP-33 contamination. The Region VI MSSLs, used as screening criteria, are highly conservative, and as such are protective of both human and ecological health.

33.6.3 Risk Assessments

33.6.3.1 Human Health

Based on the findings of the screening assessment, a formal human health risk assessment was not warranted for DP-33.

33.6.3.2 Ecological

A formal ecological risk assessment was not completed for DP-33.

33.6.4 Other Applicable Assessments

33.6.4.1 Surface Water

DP-33 contained no surface water.

33.6.4.2 Groundwater

Groundwater at Cannon AFB has been located at a depth greater than 250 feet; as such, this site contained no means for groundwater discharges to occur.

33.6.4.3 Underground Storage Tanks (USTs)

There have never been USTs located at DP-33.

33.6.4.4 Other

No other assessments have been conducted in the area of DP-33.

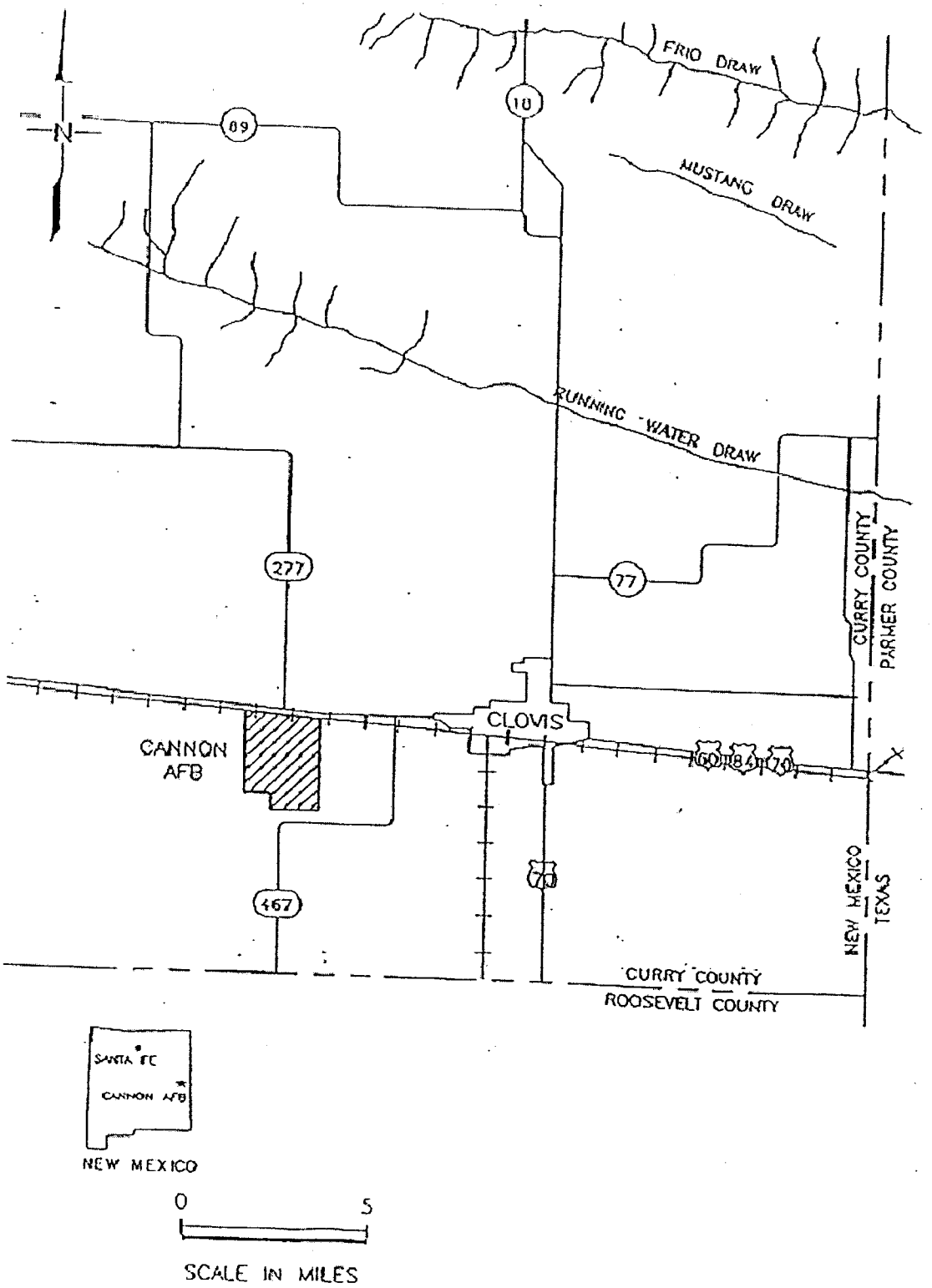
33.7 NO FURTHER ACTION PROPOSAL

33.7.1 Rationale

Approximately 25 buried drums and approximately 610 cubic yards of soils were excavated from DP-33 and disposed of off site. Confirmation, backfill and profile samples were collected and analyzed. The samples demonstrated that the horizontal and vertical extent of contamination had been determined, so the excavation was backfilled using approved soils. NMED then issued a letter that found the corrective action to be consistent with applicable regulations and protective of both human health and the environment. Based on this, NFA has been recommended for DP-33.

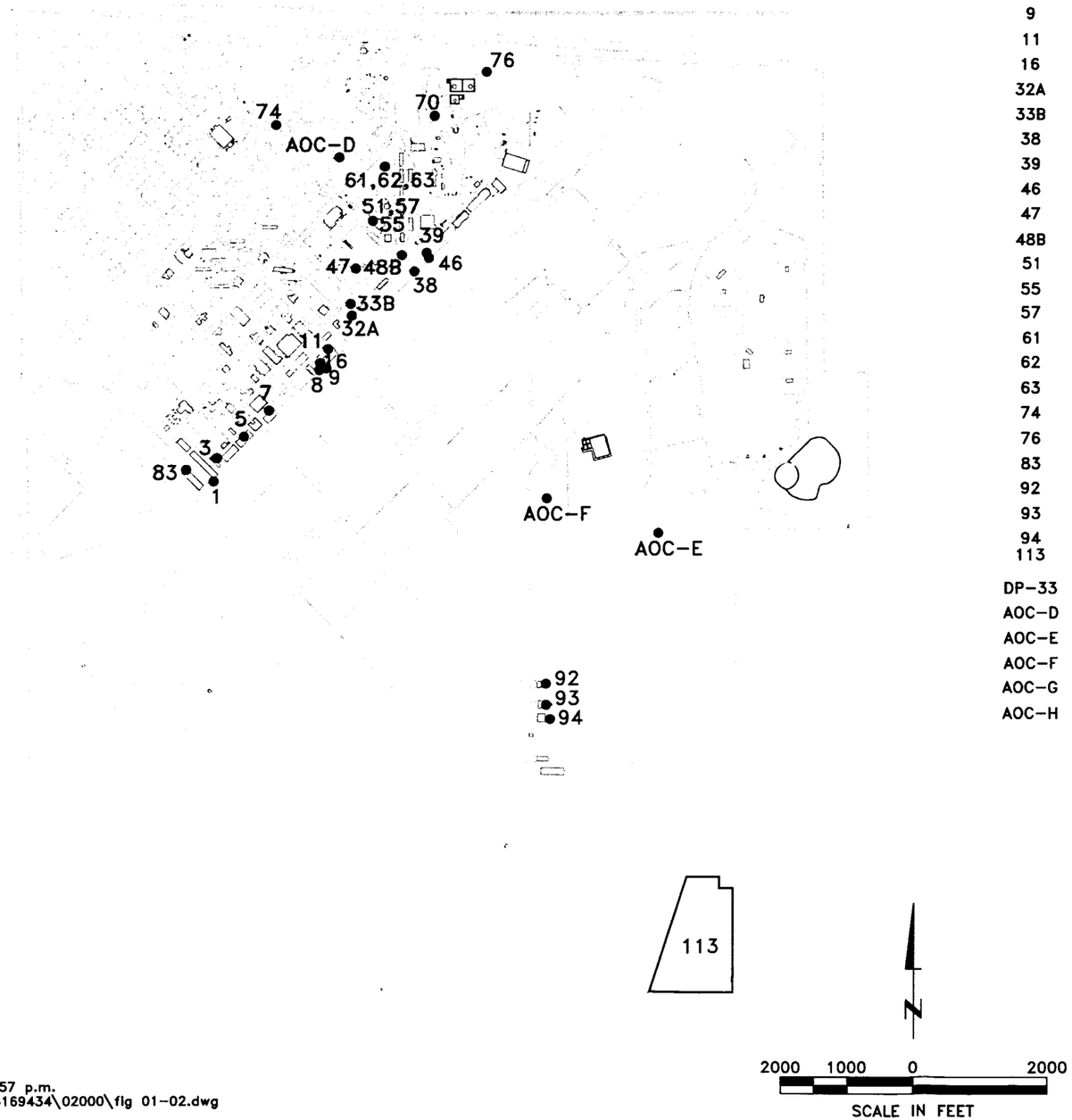
33.7.2 Criterion

DP-33 is proposed for NFA based on NMED NFA Criterion 4: A release from the site to the environment has occurred, but the site was characterized under another authority (NMED's Ground Water Protection and Remediation Bureau) and a closure letter is available.



June 23, 2000 11:06:06 a.m.
Drawing: T:\CANNON\M9602V\T6500\FIG3-3.DWG (DAP)

DRN. BY: TSSM	DATE: 03/24/99	REGIONAL MAP CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG. No.
CHK'D. BY:	REVISIONS: 0		45FM9602NN.00	1-1



LEGEND

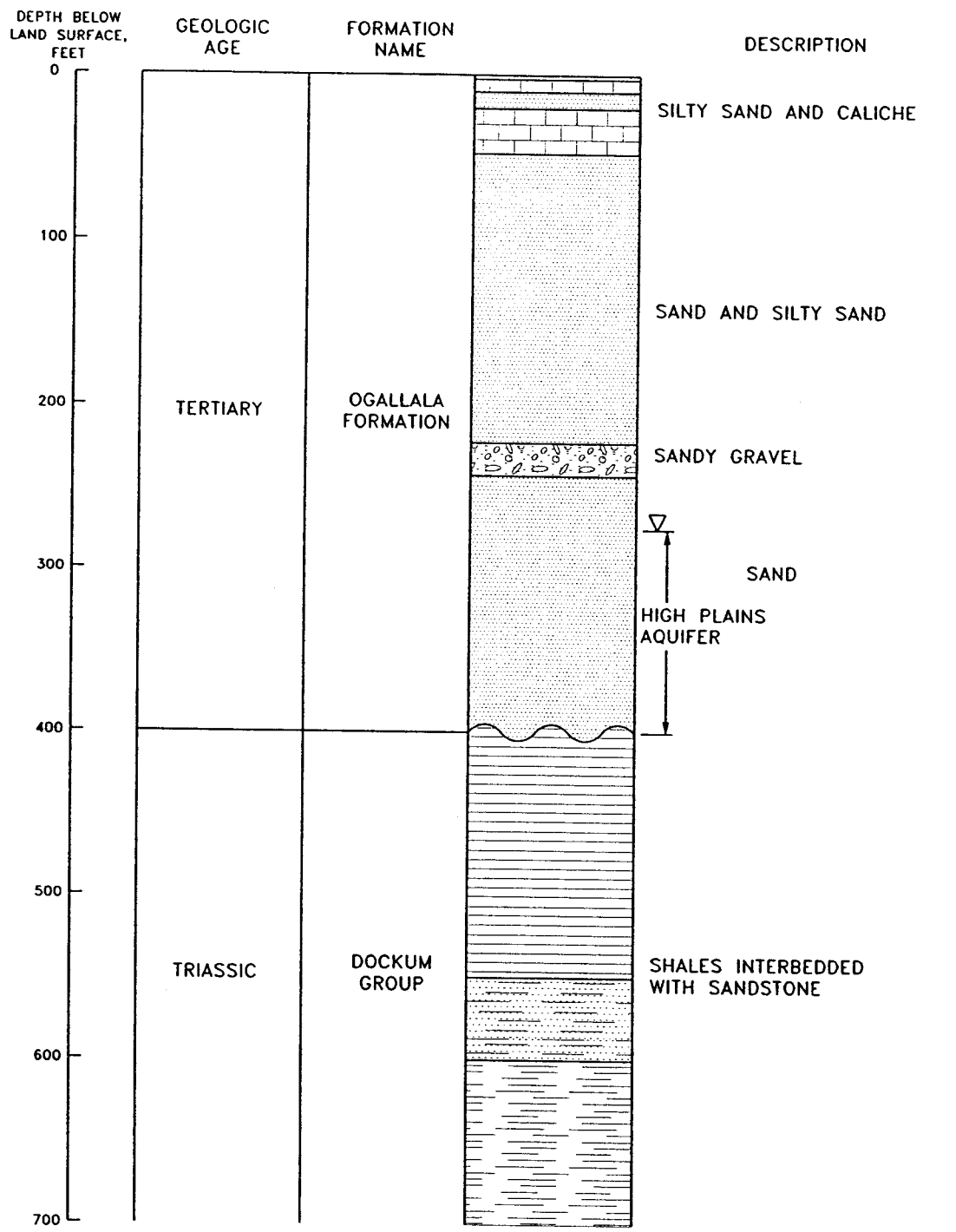
3	SOILD WASTE MANAGEMENT UNIT
●	(SWMU) LOCATION AND NUMBER

SWMU No.	DESIGNATED AREA
1	OIL/WATER SEPARATOR No. 119
3	OIL/WATER SEPARATOR No. 108
5	OIL/WATER SEPARATOR No. 121
7	OIL/WATER SEPARATOR No. 129
8	OIL/WATER SEPARATOR No. 165
9	POL AIRCRAFT WASHRACK DRAIN SYSTEM
11	OIL/WATER SEPARATOR No. 170
16	OIL/WATER SEPARATOR No. 680
32A	OIL/WATER SEPARATOR No. 186 (#1 – EAST)
33B	OIL/WATER SEPARATOR No. 186 (#2 – WEST)
38	OIL/WATER SEPARATOR No. 194
39	OIL/WATER SEPARATOR No. 195
46	OIL/WATER SEPARATOR No. 196
47	OIL/WATER SEPARATOR No. 494
48B	ABOVEGROUND OVERFLOW CAPACITY TANK
51	OIL/WATER SEPARATOR No. 375
55	LEAD ACID BATTERY ACCUMULATION POINT
57	OIL/WATER SEPARATOR No. 379
61	SAND TRAP No. 5077a
62	SAND TRAP No. 5077b
63	OIL/WATER SEPARATOR No. 5077
74	LF-1 LANDFILL No. 1
76	WP-14 SLUDGE WEATHERING PIT
83	ST-27 SUMP
92	OIL/WATER SEPARATOR No. 5120
93	OIL/WATER SEPARATOR No. 5121
94	OIL/WATER SEPARATOR No. 5144
113	LF-5 LANDFILL No. 5
DP-33	DRUM DISPOSAL PIT
AOC-D	ASBESTOS DISPOSAL PIT (ON GOLF COURSE)
AOC-E	RUNWAY RUBBLE PILE
AOC-F	CALIBRATION TARGET BERM
AOC-G	DISTURBED AREA – NORTH HOUSING SITE
AOC-H	DISTURBED AREA – SOUTH HOUSING SITE

October 11, 2004 4:50:57 p.m.
Drawing: T:\CANNON\16169434\02000\fig 01-02.dwg

SITE PLAN AND LOCATIONS
INVESTIGATED SWMU SITES
CANNON AIR FORCE BASE CLOVES, NEW MEXICO

DRN. BY: DPG	DATE: 10/08/04	PROJECT NO. 16169434	FIG. NO. 1-2
CHK'D. BY: .	DATE: 10/08/04		



LEGEND

LITHOLOGIC CONTACT

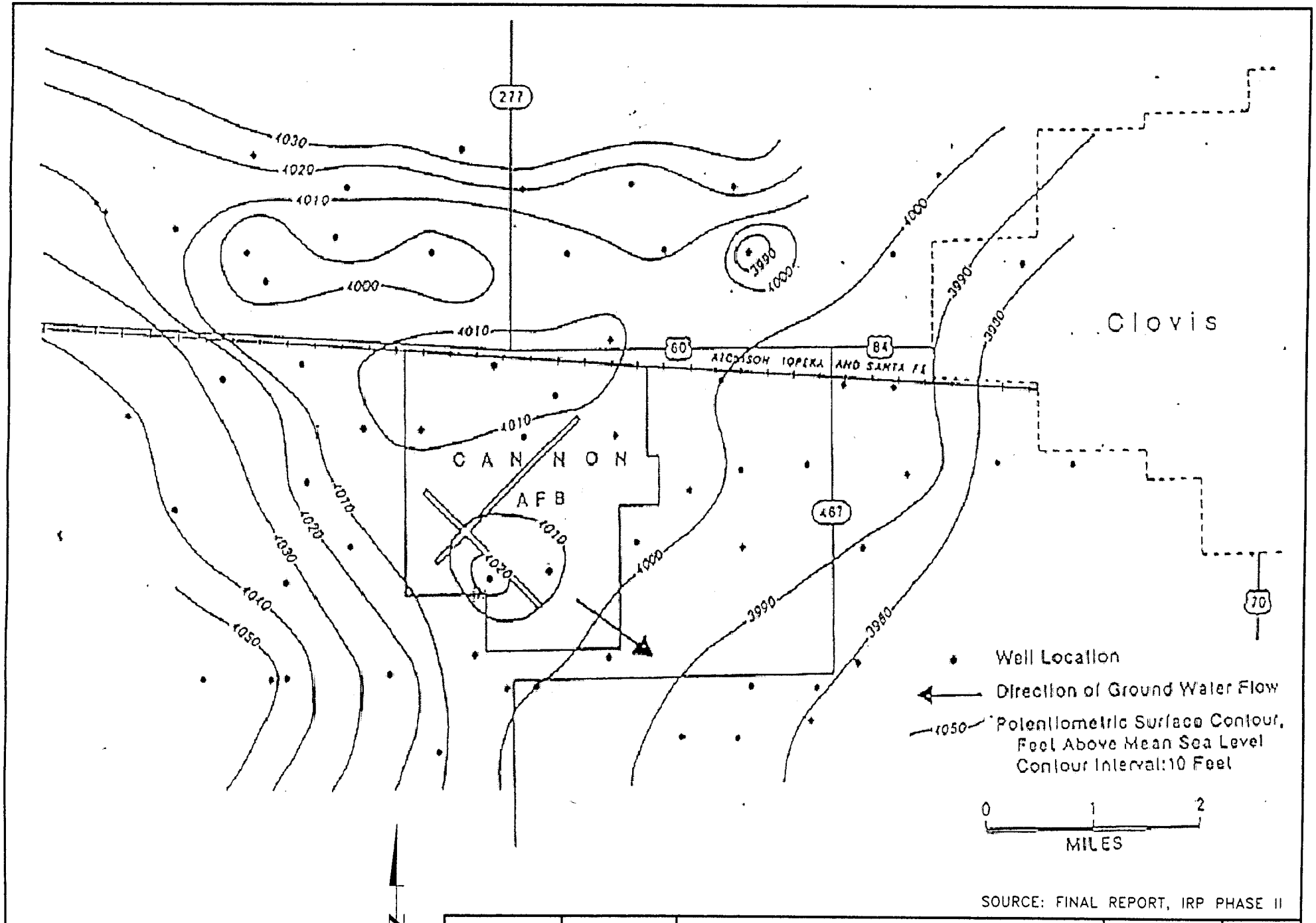
EROSINOAL UNCONFORMITY

WATER LEVEL

SOURCE: MODIFIED FROM GUTENTAG ET.AL., 1984

t:\cannon\m9602v\16500\fig3-1.dgn

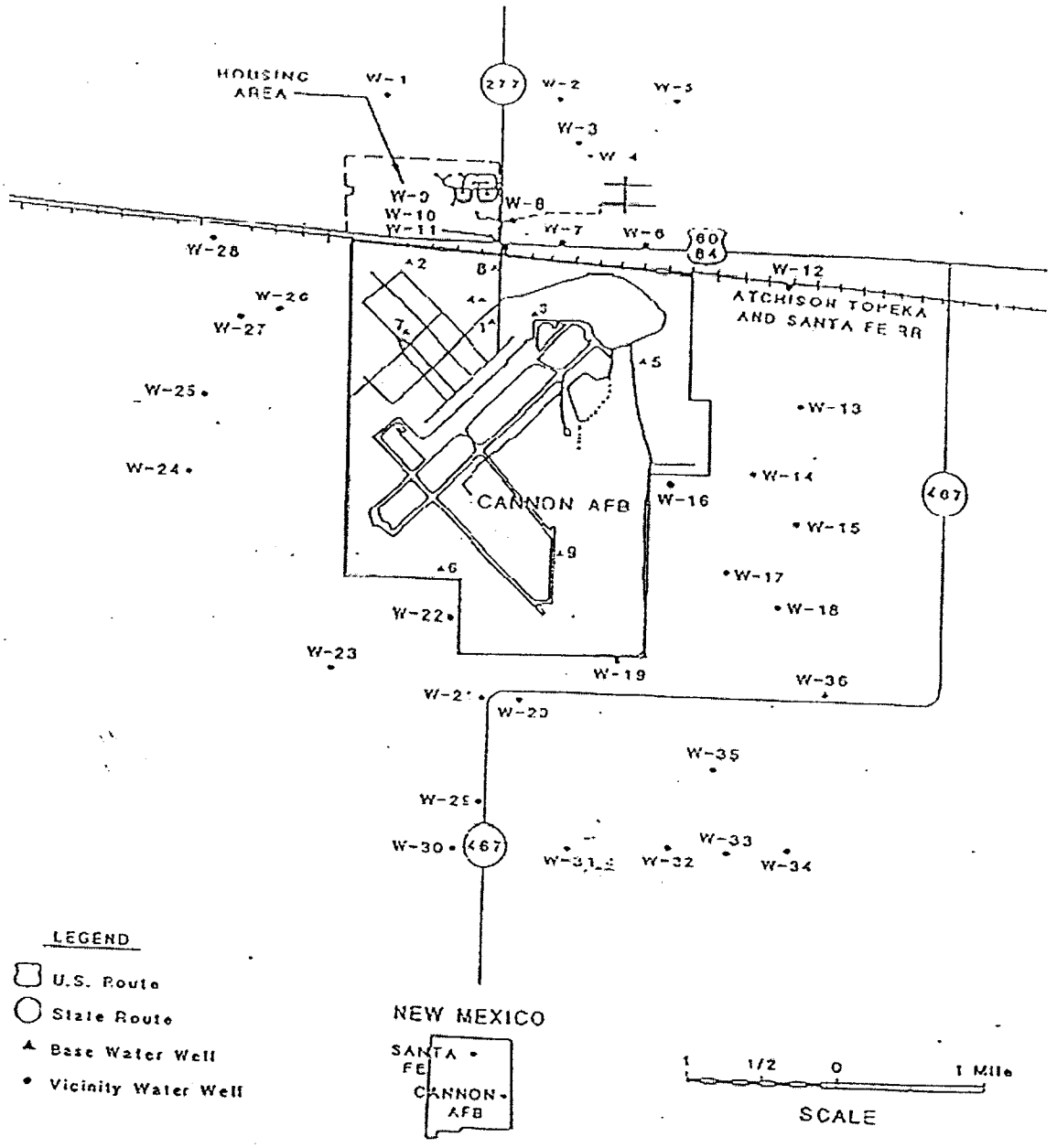
DRN BY TSSM	DATE: 03/24/99	GENERALIZED GEOLOGIC STRATA AT CANNON AIR FORCE BASE NEW MEXICO	PROJECT NO. 45FM9602NN.00	FIG. No. 1-3
CHK'D BY	REVISION 0			



SOURCE: FINAL REPORT, IRP PHASE II

June 23, 2000 11:09:00 a.m.
Drawing: T:\CANNON\M9602V\T6500\FIG3-2.DWG (DAP)

DRN BY TSSM	DATE 07/06/98	POTENTIOMETRIC SURFACE CONTOUR MAP, VICINTY OF CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG. No.
CHK'D BY	REVISIONS: 0		45FM9602NN.00	1-4

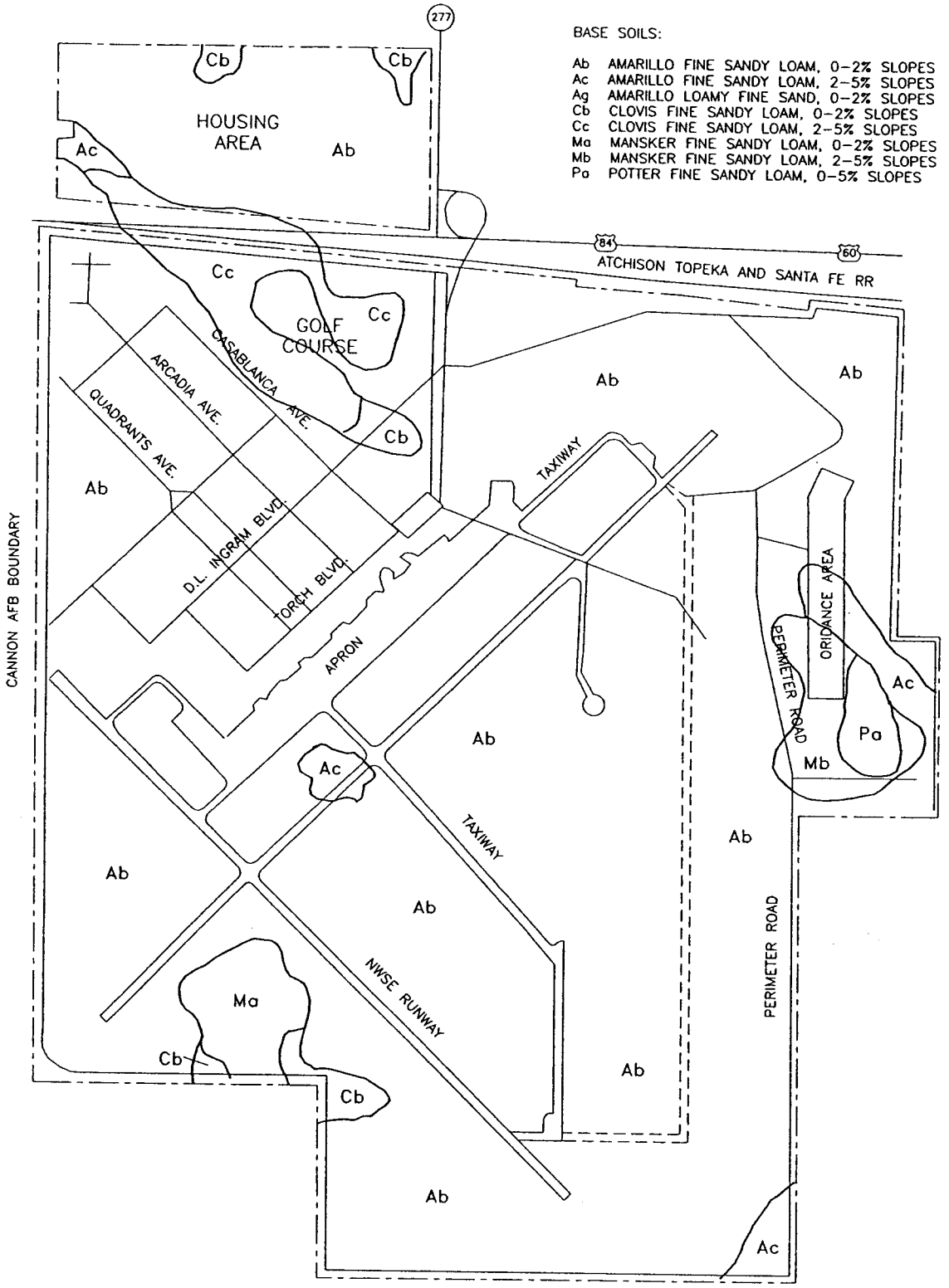


SOURCE: MODIFIED FROM GUTENTAG ET. AL., 1984

June 23, 2000 11:06:06 a.m.
Drawing: T:\CANNON\M9602V\T6500\FIG3-3.DWG (DAP)

N

DRN. BY: TSSM	DATE: 03/24/99	WATER WELL LOCATIONS ON AND NEAR CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG. No.
CHK'D. BY:	REVISIONS: 0		45FM9602NN.00	1-5



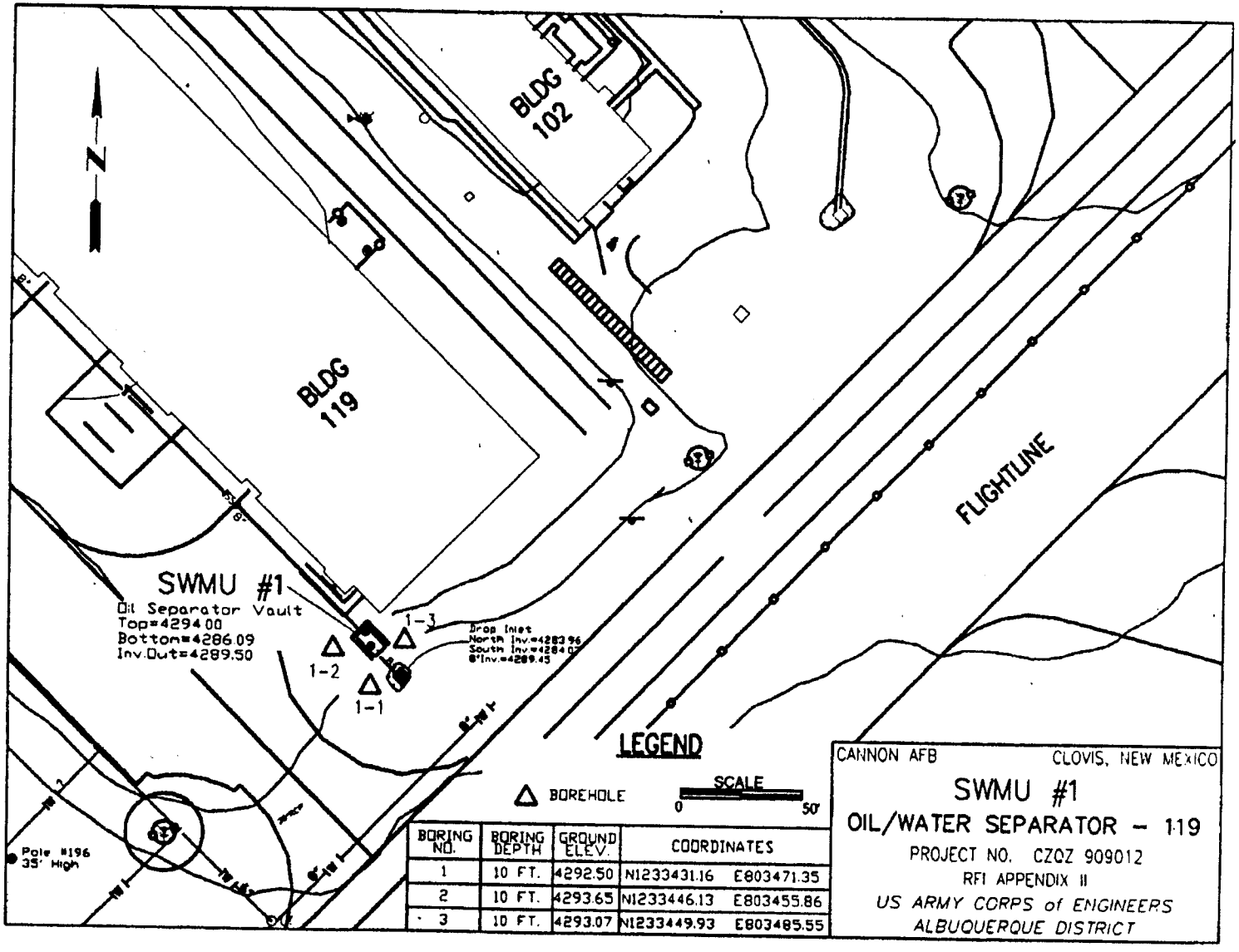
SOURCE: USDA-S.C.S., SOIL SURVEY OF CURRY COUNTY N.M., 1958

March 24, 1999 11:28:12 a.m.
Drawing: T:\CANNON\M9602V\T6500\FIG3-4.DWG (TSM)

N

2000 1000 0 2000
SCALE IN FEET

DRN. BY: TSSM	DATE: 03/24/99	DISTRIBUTION OF SOILS, BY TYPE CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.	FIG. No.
CHK'D. BY:	REVISIONS: 0		45FM9602NN.00	1-6



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT.	4292.50	N1233431.16	E803471.35
2	10 FT.	4293.65	N1233446.13	E803455.86
3	10 FT.	4293.07	N1233449.93	E803485.55

Figure 2-1
SWMU 1
Source: LRL Science, Inc., 1993

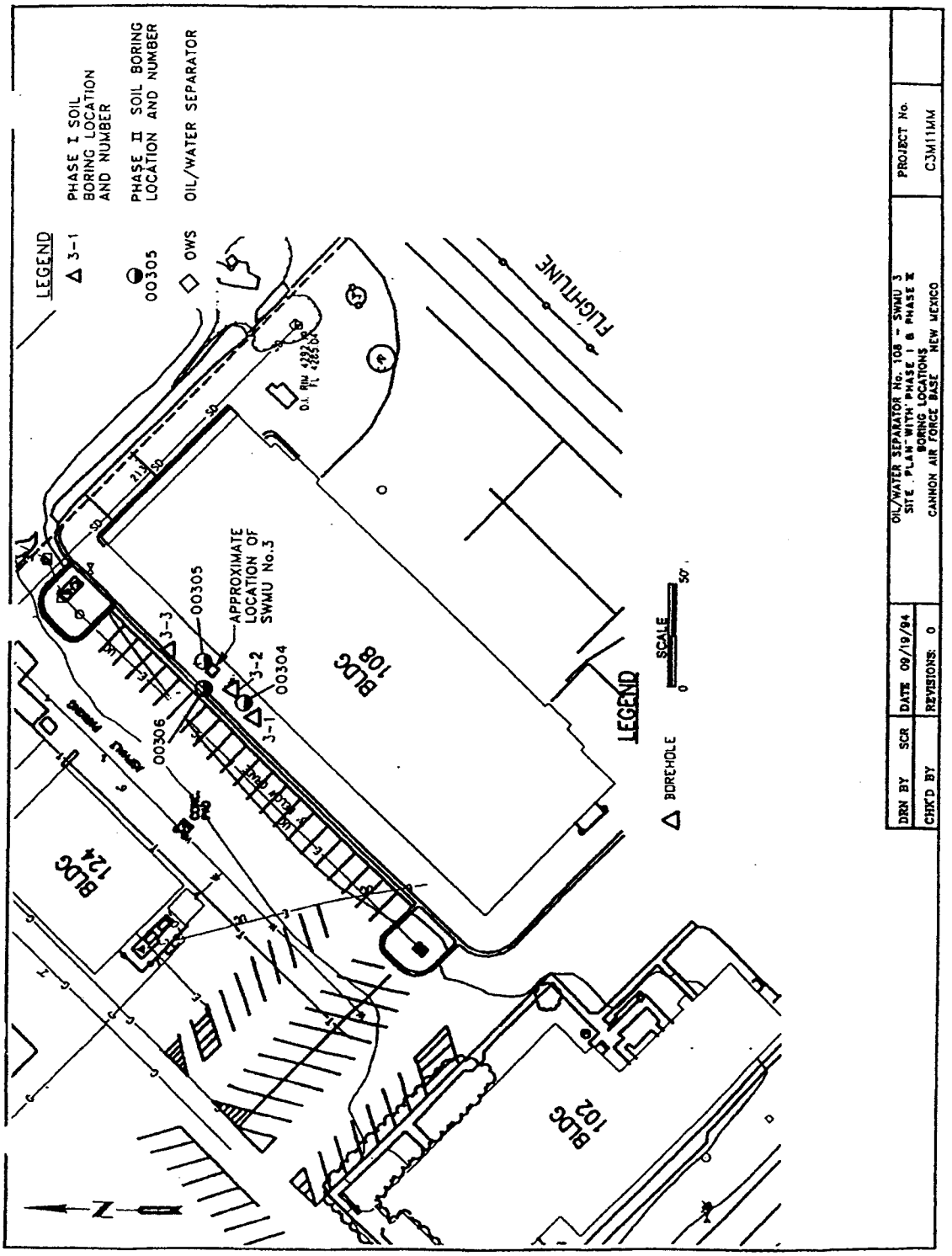


Figure 3-1

SWMU 3

Source: Woodward-Clyde, 1997

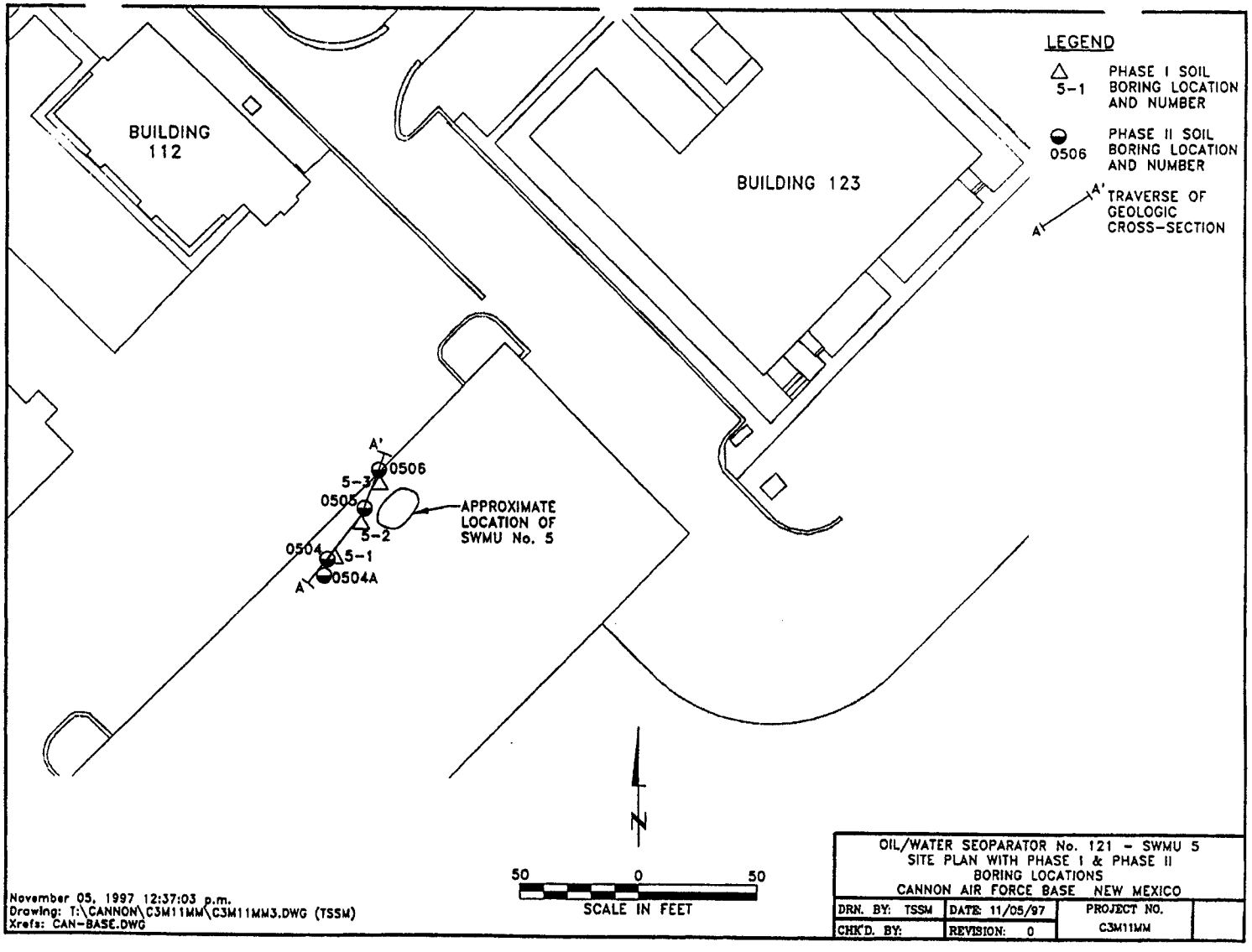
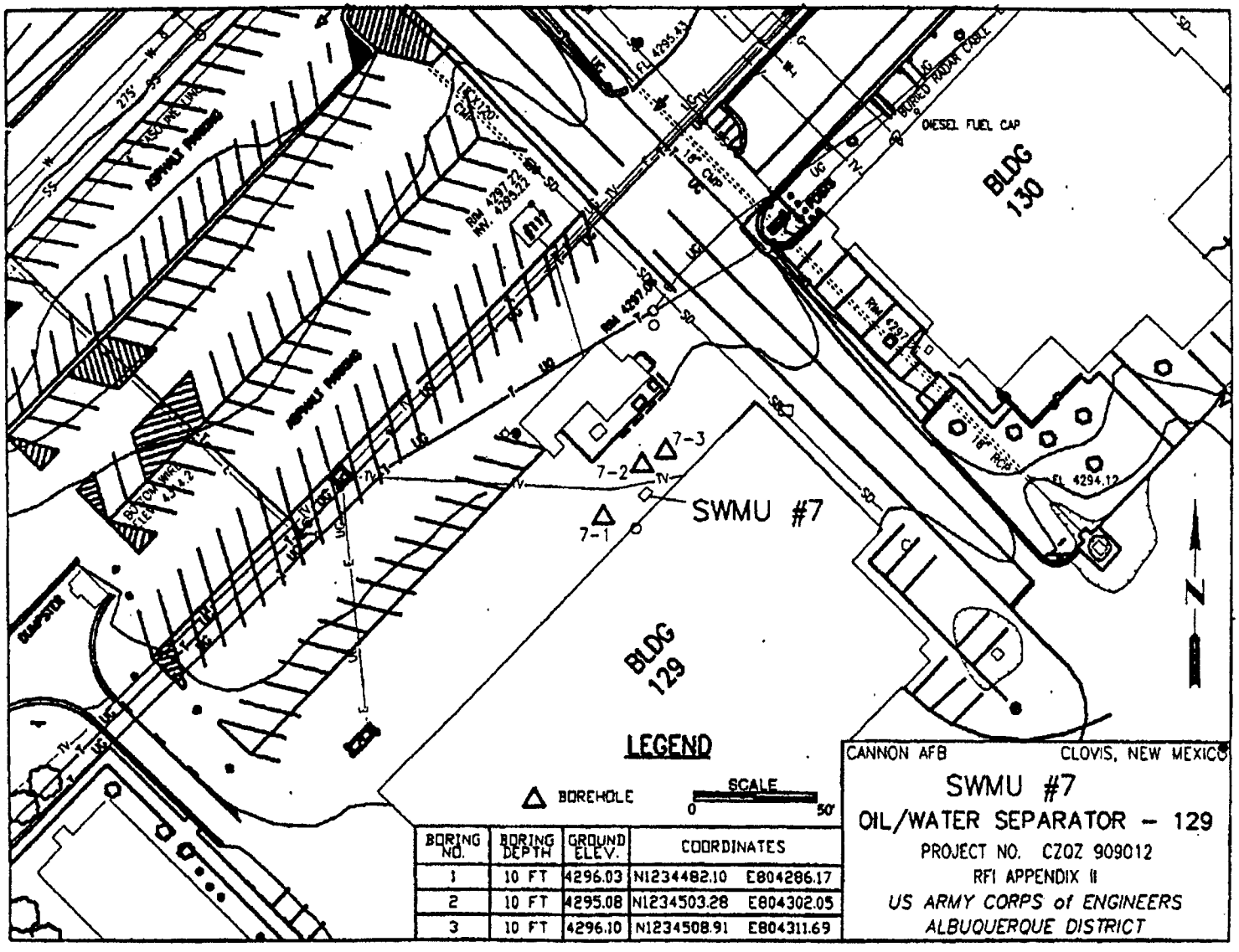


Figure 4-1

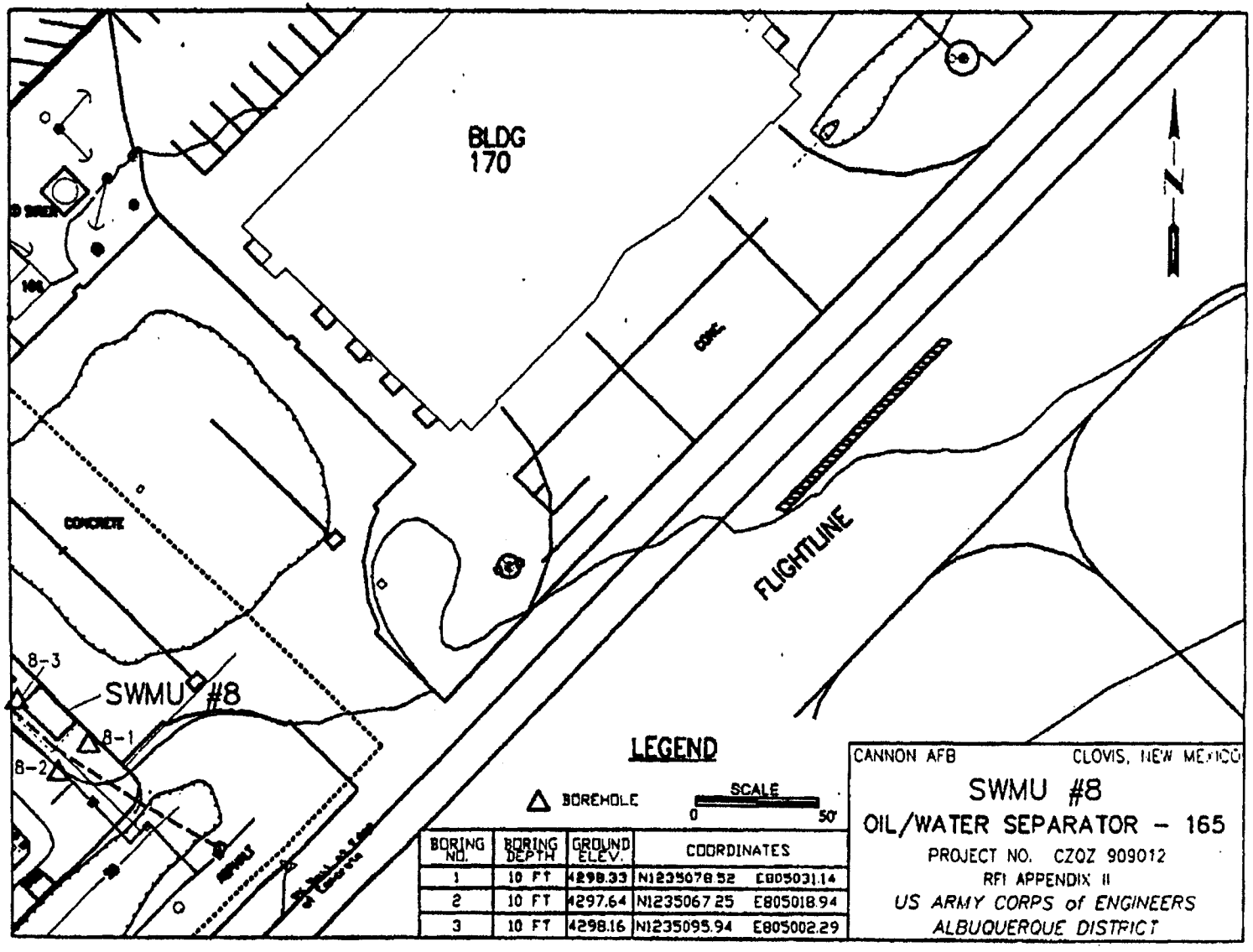
SWMU 5 Source: Woodward-Clyde, 1997



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4296.03	N1234482.10	E804286.17
2	10 FT	4295.08	N1234503.28	E804302.05
3	10 FT	4296.10	N1234508.91	E804311.69

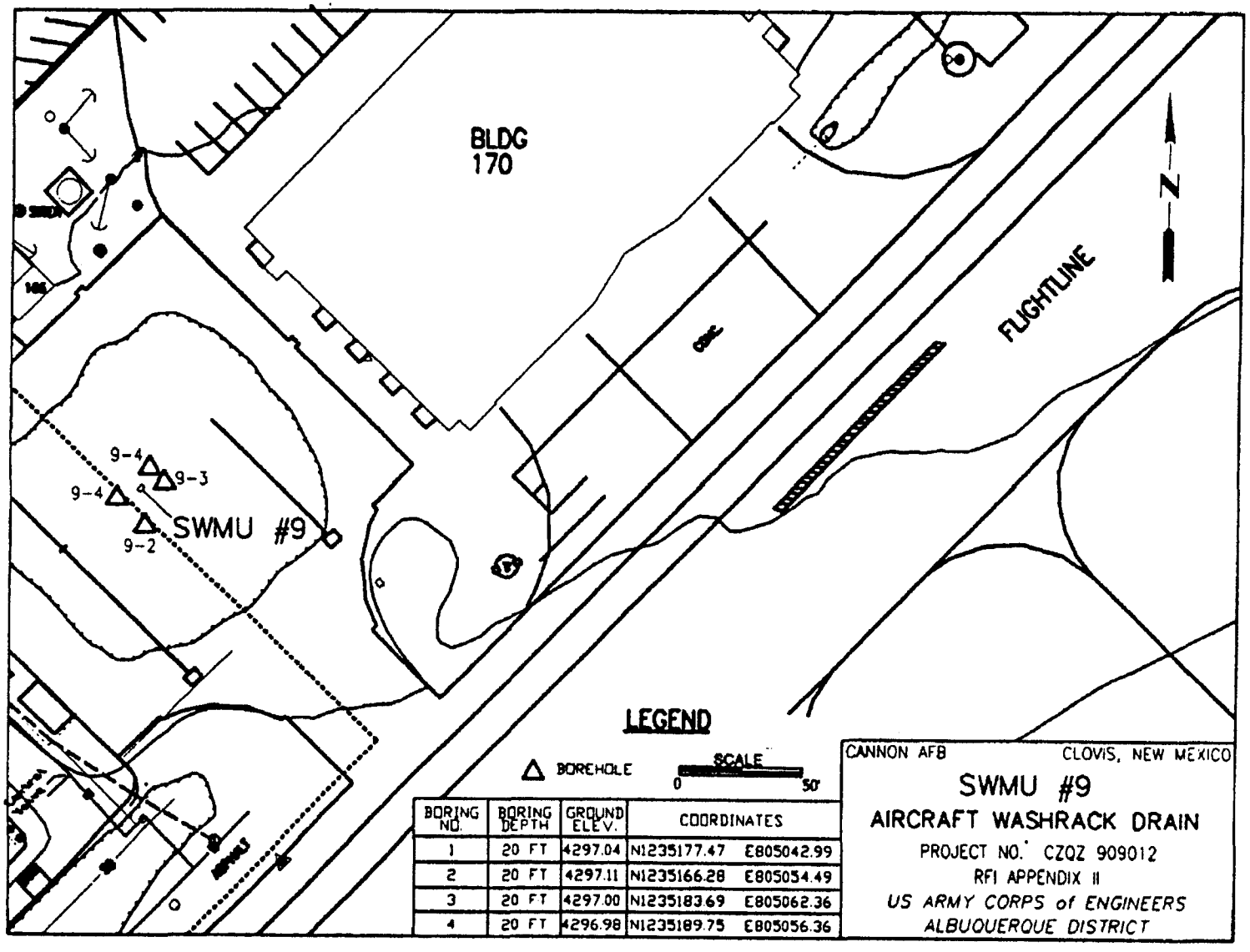
Figure 5-1

SWMU 7 Source: LRL Sciences, Inc., 1997



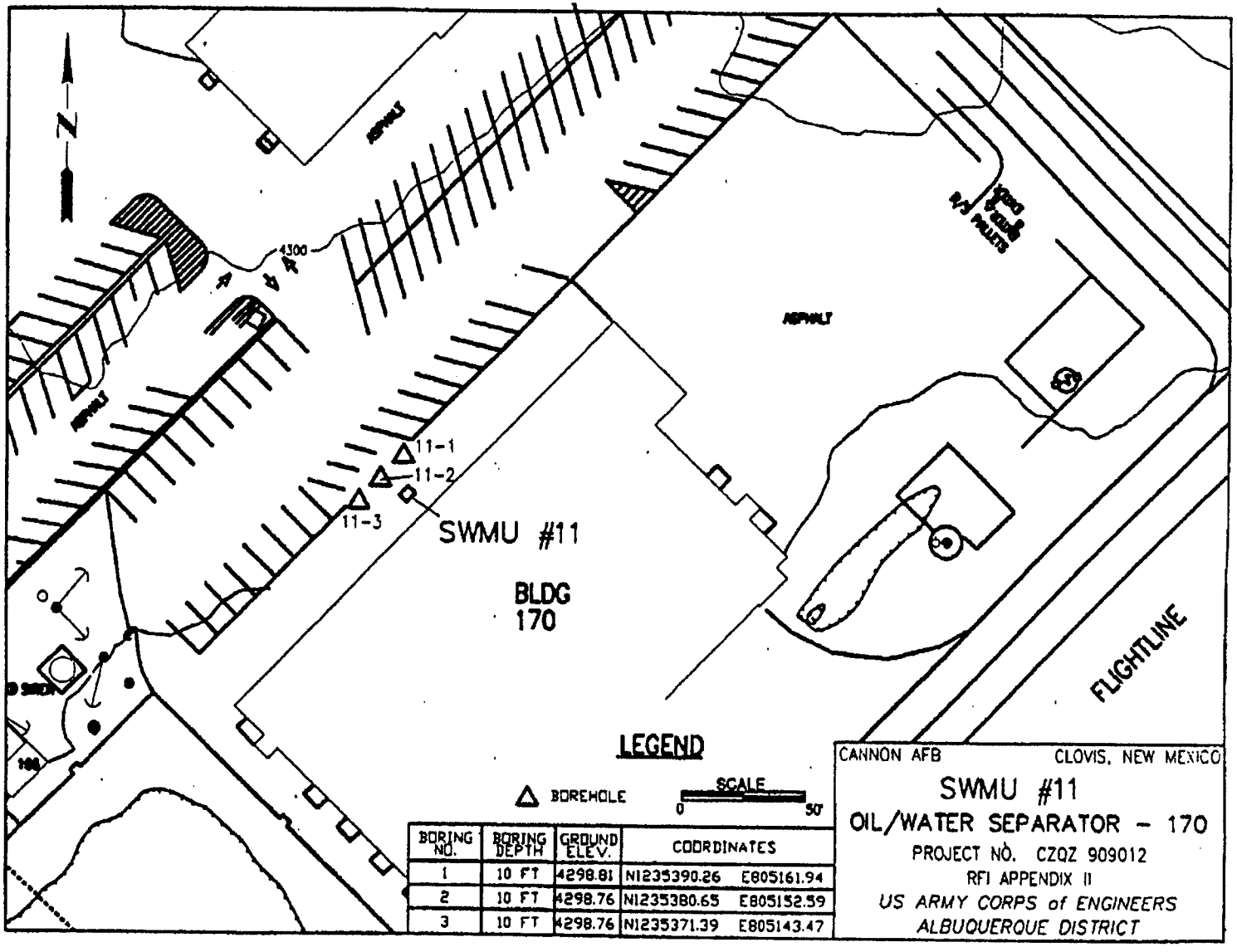
BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4298.33	N1235078.52	E805031.14
2	10 FT	4297.64	N1235067.25	E805018.94
3	10 FT	4298.16	N1235095.94	E805002.29

Figure 6-1
SWMU 8
Source: LRL Sciences, Inc., 1993



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	20 FT	4297.04	N1235177.47	E805042.99
2	20 FT	4297.11	N1235166.28	E805054.49
3	20 FT	4297.00	N1235183.69	E805062.36
4	20 FT	4296.98	N1235189.75	E805056.36

Figure 7-1
SWMU 9
Source: LRL Sciences, Inc., 1993



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4298.81	N1235390.26	E805161.94
2	10 FT	4298.76	N1235380.65	E805152.59
3	10 FT	4298.76	N1235371.39	E805143.47

Figure 8-1
SWMU 11
Source: LRL Sciences, Inc., 1993

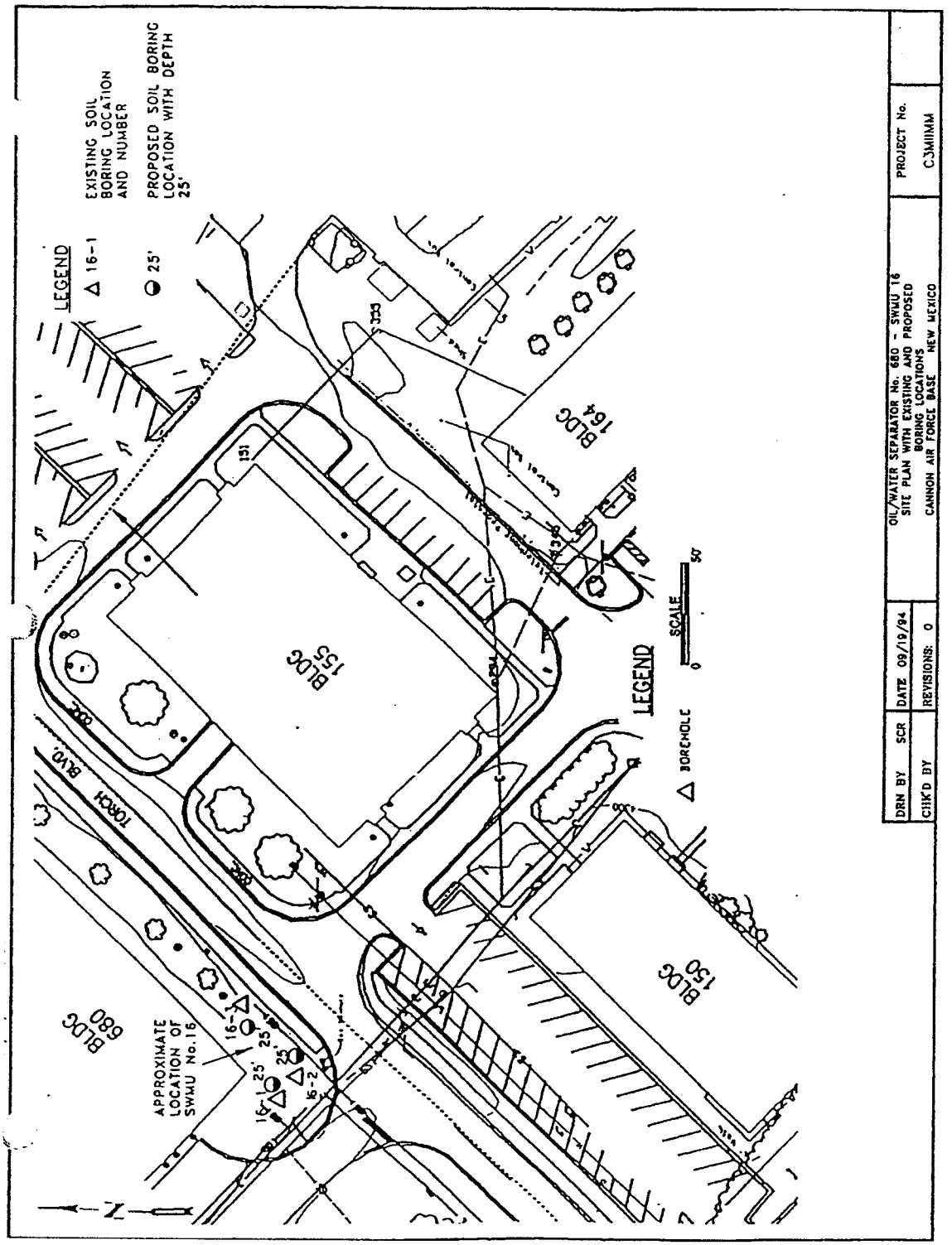
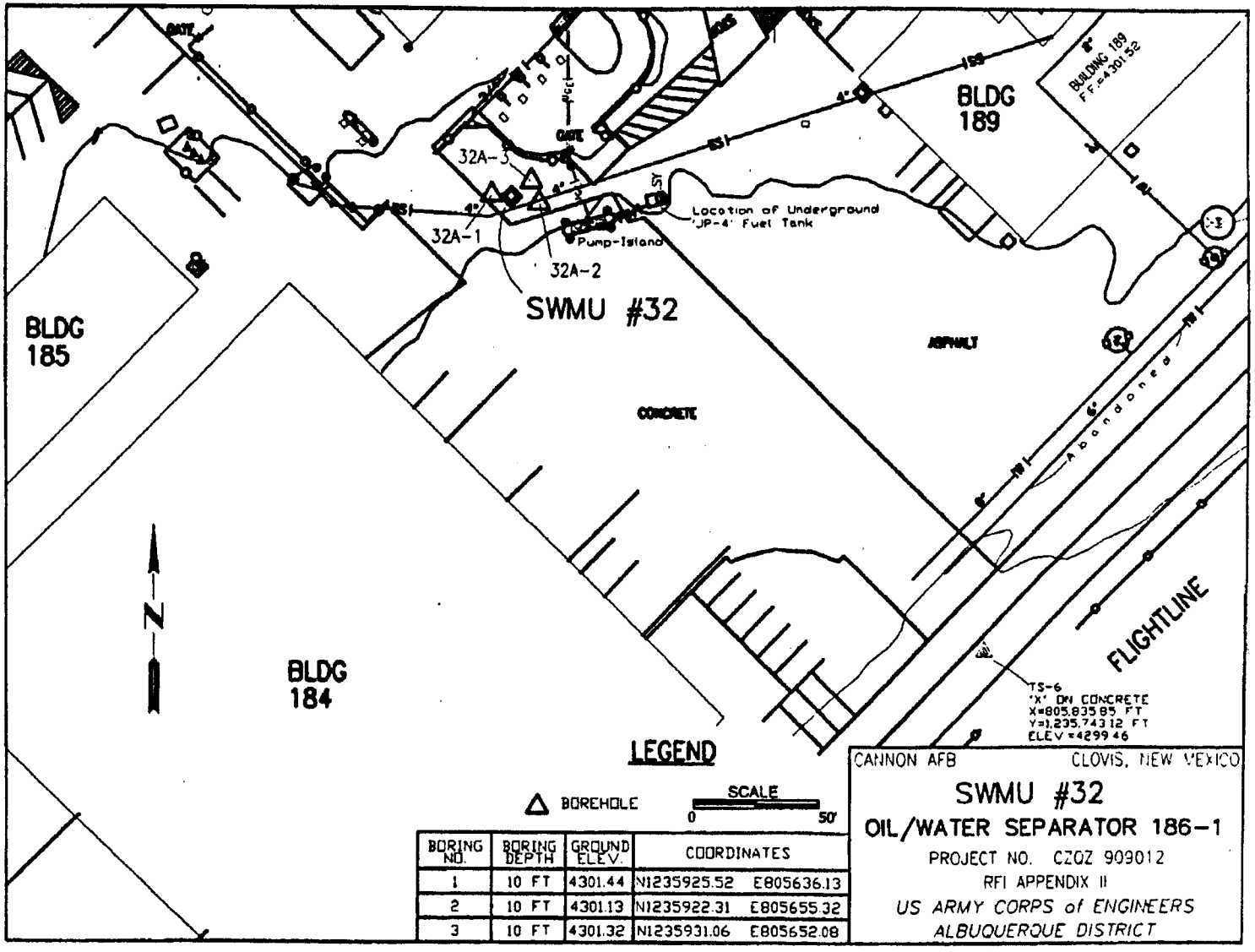


Figure 9-1

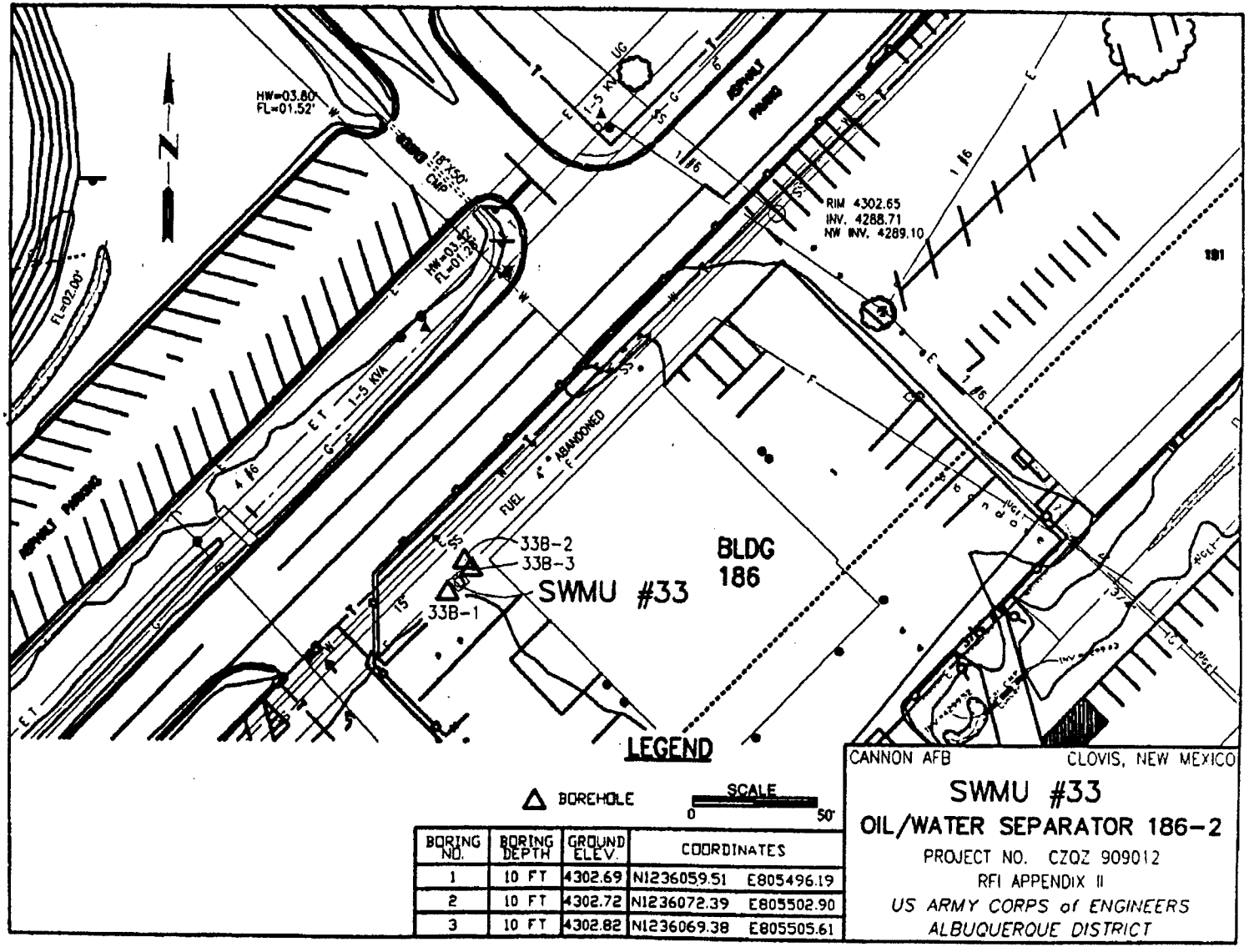
SWMU 16

Source: Woodward-Clyde, 1997



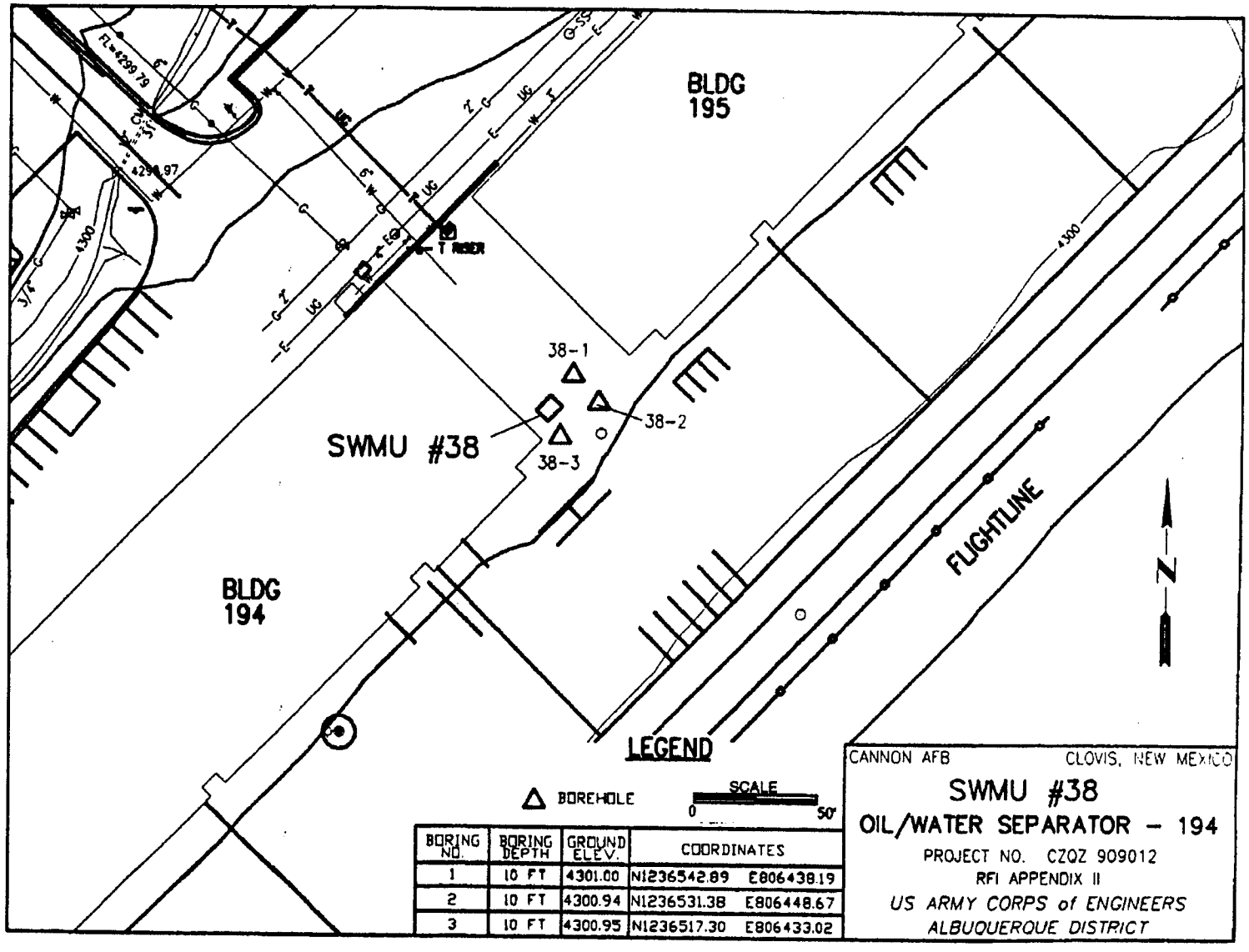
BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4301.44	N1235925.52	E805636.13
2	10 FT	4301.13	N1235922.31	E805655.32
3	10 FT	4301.32	N1235931.06	E805652.08

Figure 10-1
SWMU 32A
Source: LRL Sciences, Inc., 1993



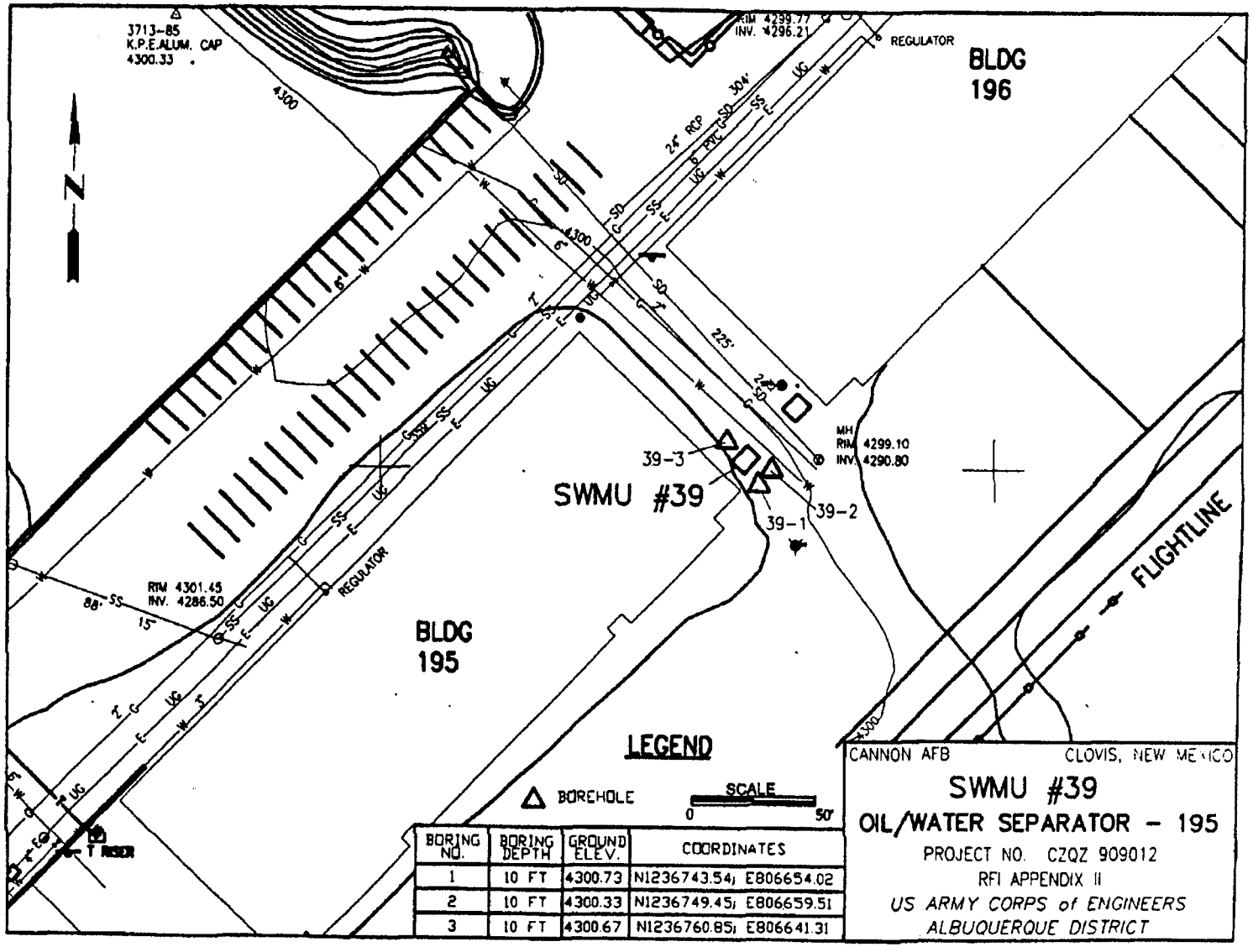
BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4302.69	N1236059.51	E805496.19
2	10 FT	4302.72	N1236072.39	E805502.90
3	10 FT	4302.82	N1236069.38	E805505.61

Figure 11-1
SWMU 33B
Source: LRL Sciences, Inc., 1993



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES	
1	10 FT	4301.00	N1236542.89	E806438.19
2	10 FT	4300.94	N1236531.38	E806448.67
3	10 FT	4300.95	N1236517.30	E806433.02

Figure 12-1
SWMU 38
Source: LRL Sciences, Inc., 1993



BORING NO.	BORING DEPTH	GROUND ELEV.	COORDINATES
1	10 FT	4300.73	N1236743.54, E806654.02
2	10 FT	4300.33	N1236749.45, E806659.51
3	10 FT	4300.67	N1236760.85, E806641.31

Figure 13-1
SWMU 39
Source: LRL Sciences, Inc., 1993

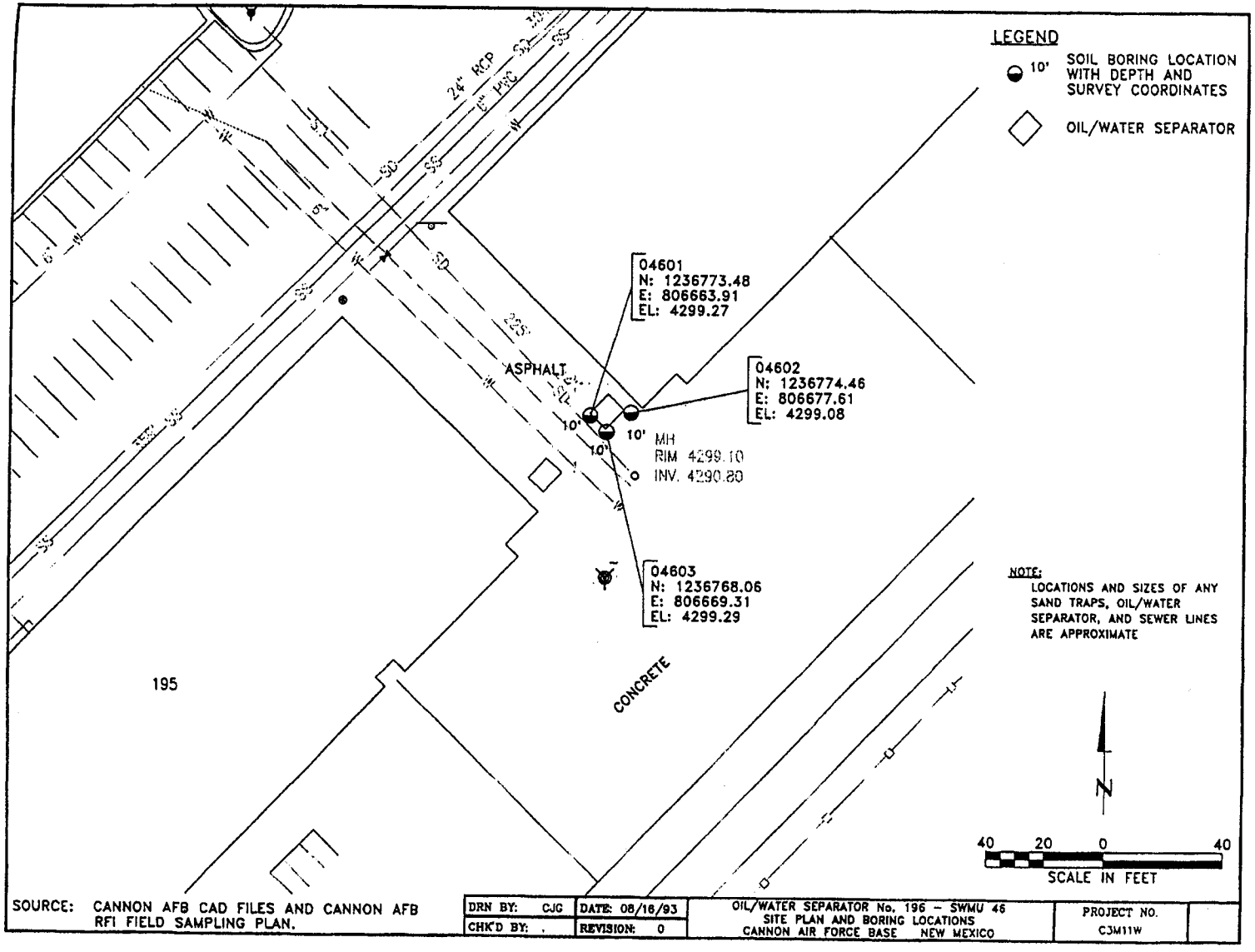


Figure 14-1
SWMU 46
Source: Woodward-Clyde, 1994

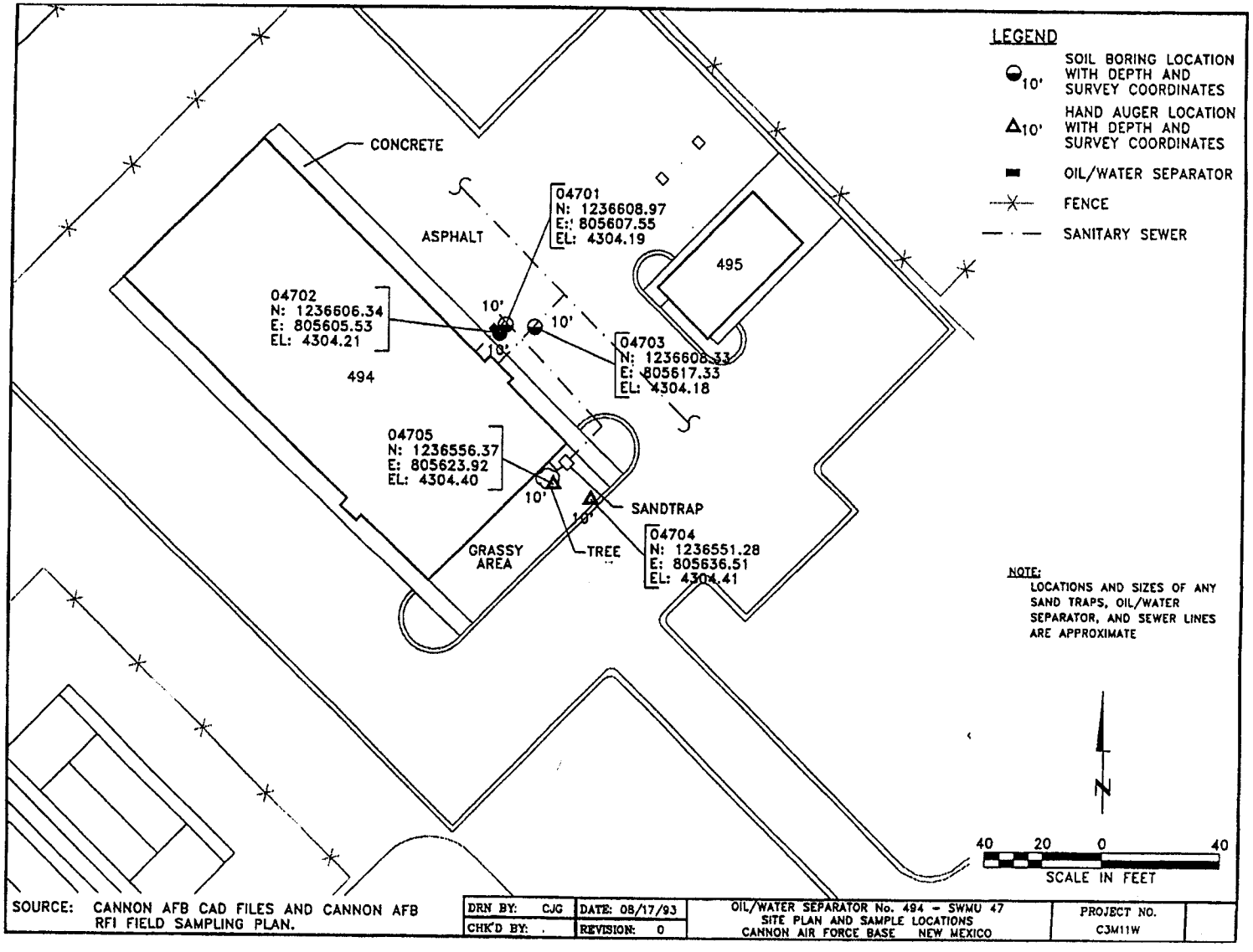
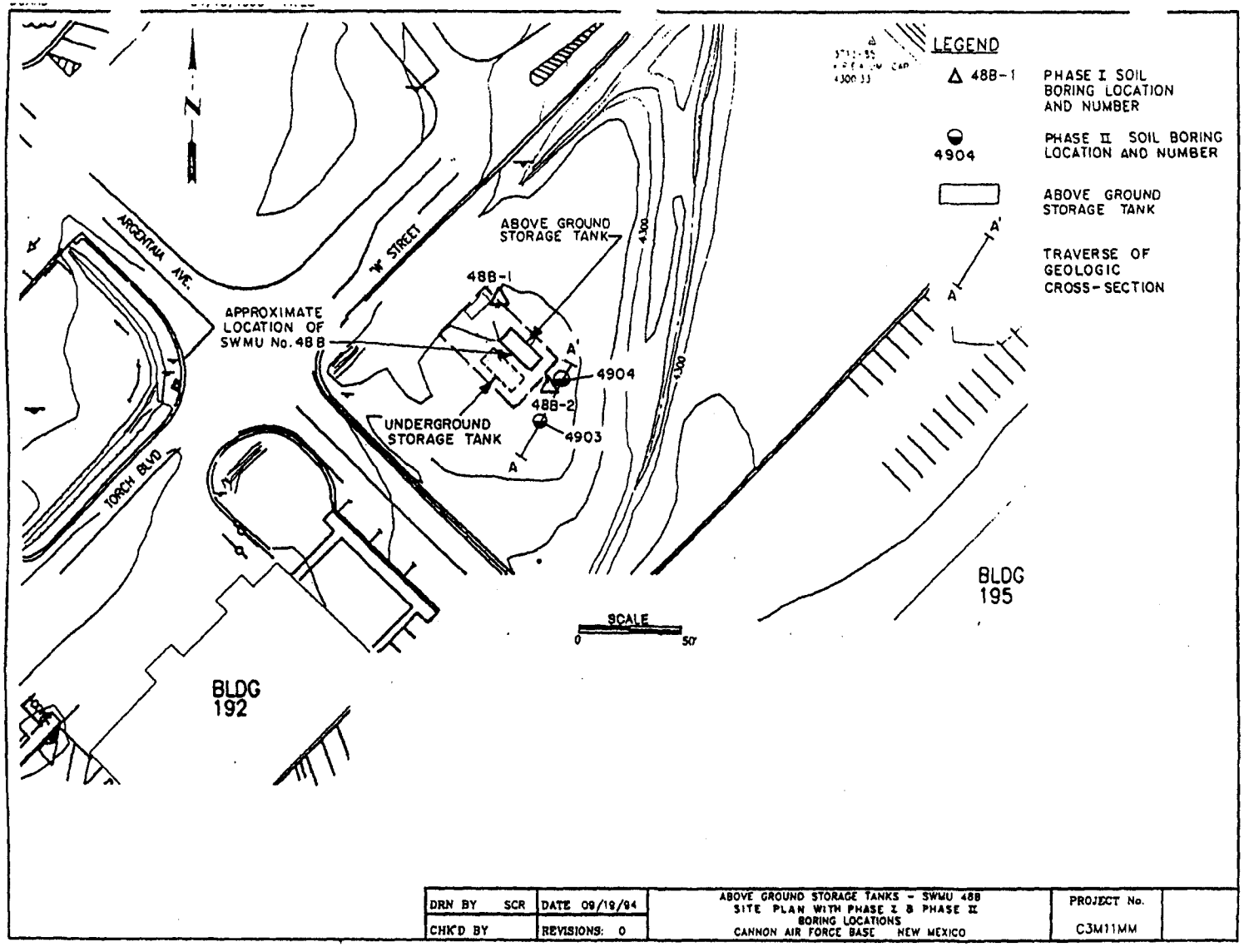


Figure 15-1
SWMU 47
Source: Woodward-Clyde, 1994



DRN BY SCR	DATE 09/19/94	ABOVE GROUND STORAGE TANKS - SWMU 48B SITE PLAN WITH PHASE I & PHASE II BORING LOCATIONS CANNON AIR FORCE BASE NEW MEXICO	PROJECT No.
CHK'D BY	REVISIONS: 0		C3M11MM

Figure 16-1
SWMU 48B
Source: Woodward-Clyde, 1997

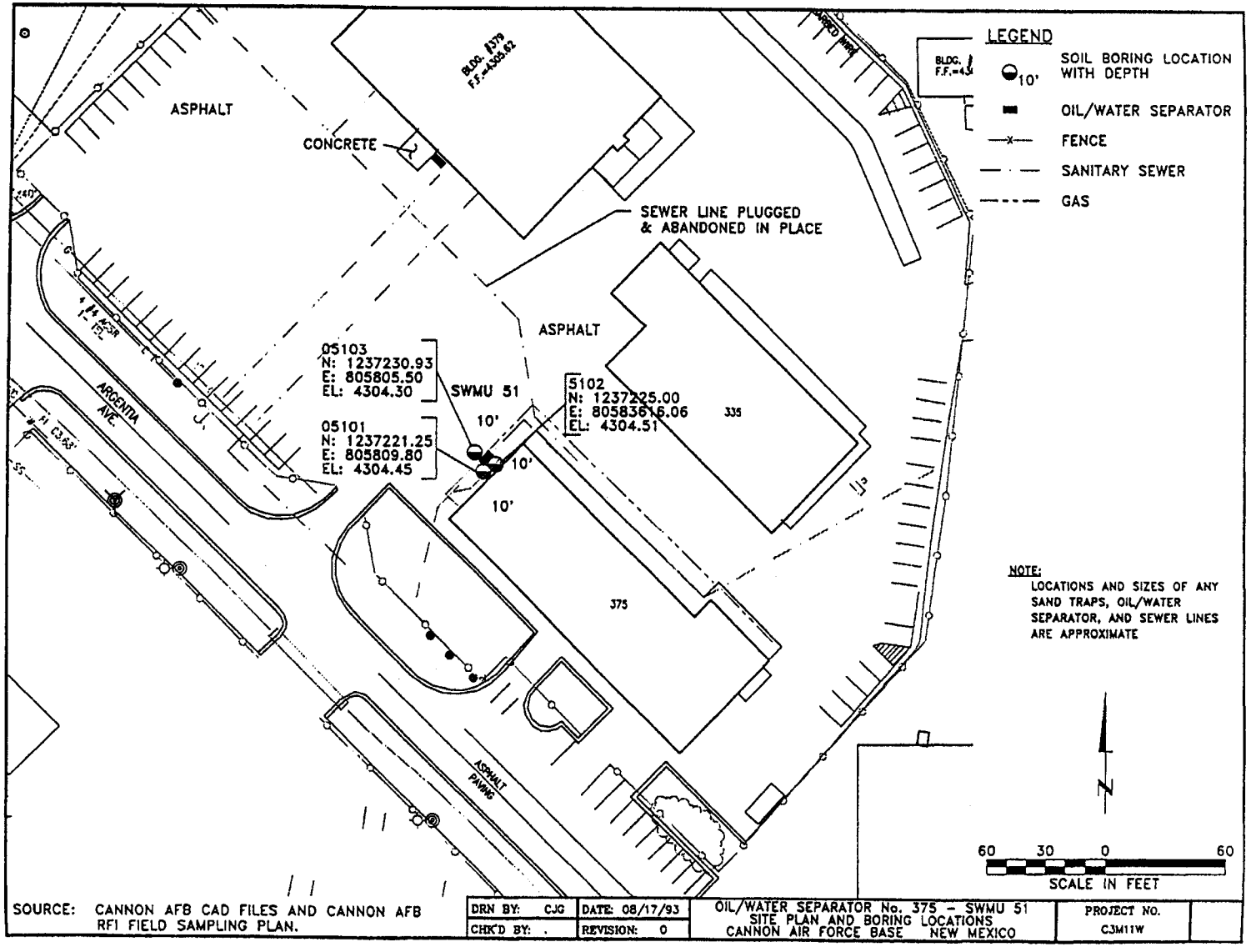


Figure 17-1
SWMU 51
Source: Woodward-Clyde, 1994

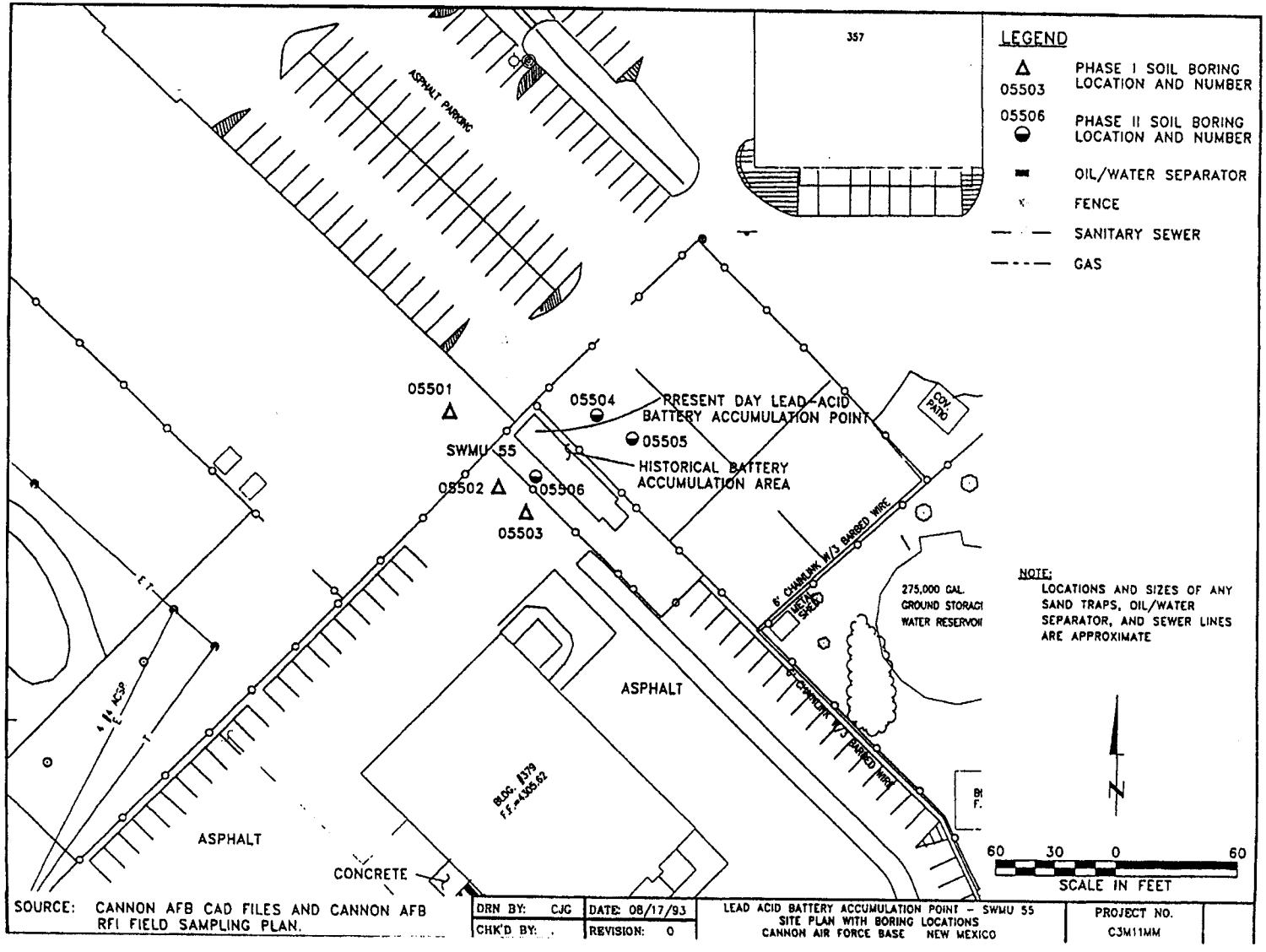


Figure 18-1
SWMU 55
Source: Woodward-Clyde, 1997

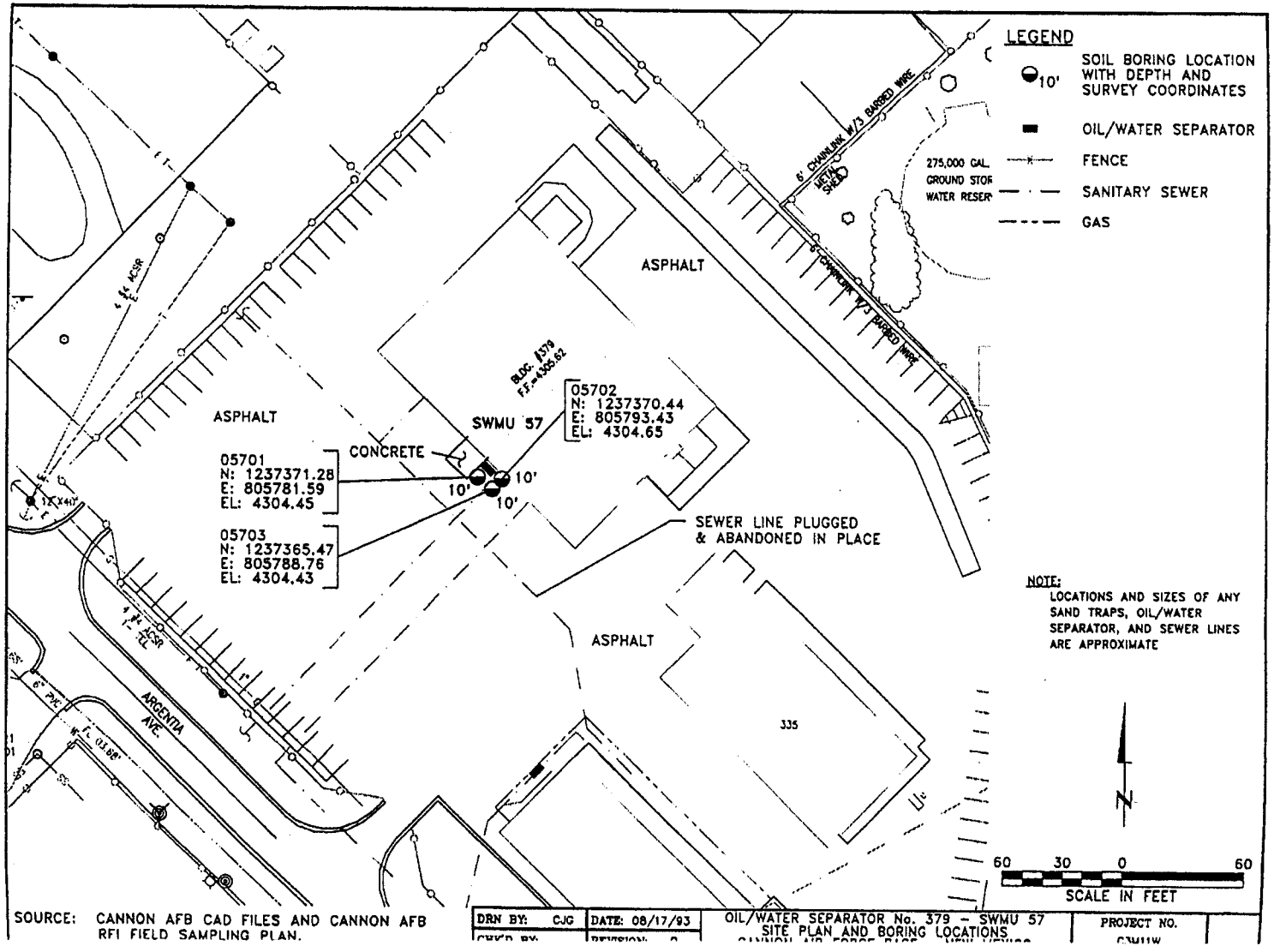


Figure 19-1
SWMU 57
Source: Woodward-Clyde, 1994

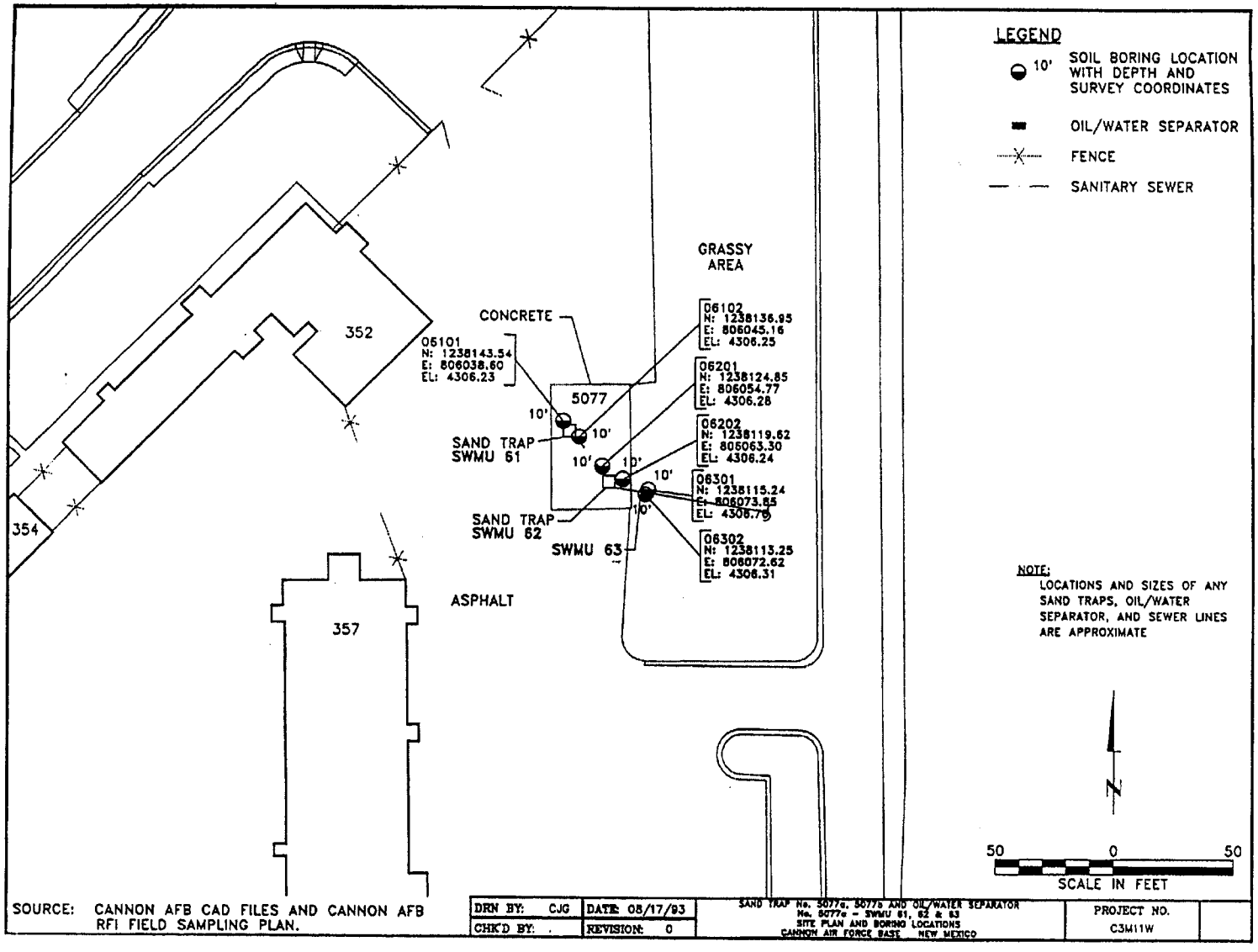


Figure 20-1

SWMUs 61, 62 and 63

Source: Woodward-Clyde, 1994

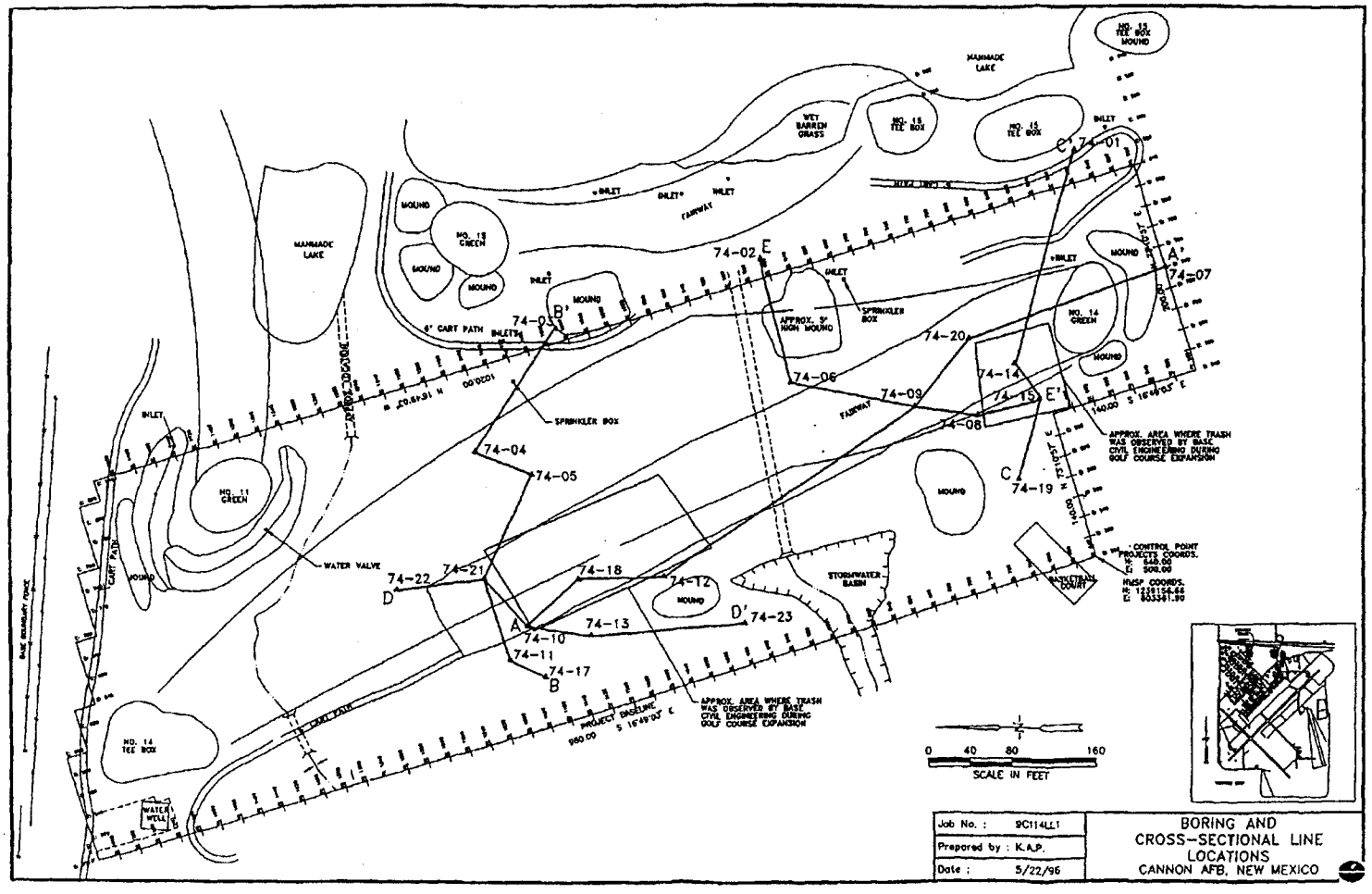


Figure 21-1
SWMU 74
Source: Woodward-Clyde, 1997

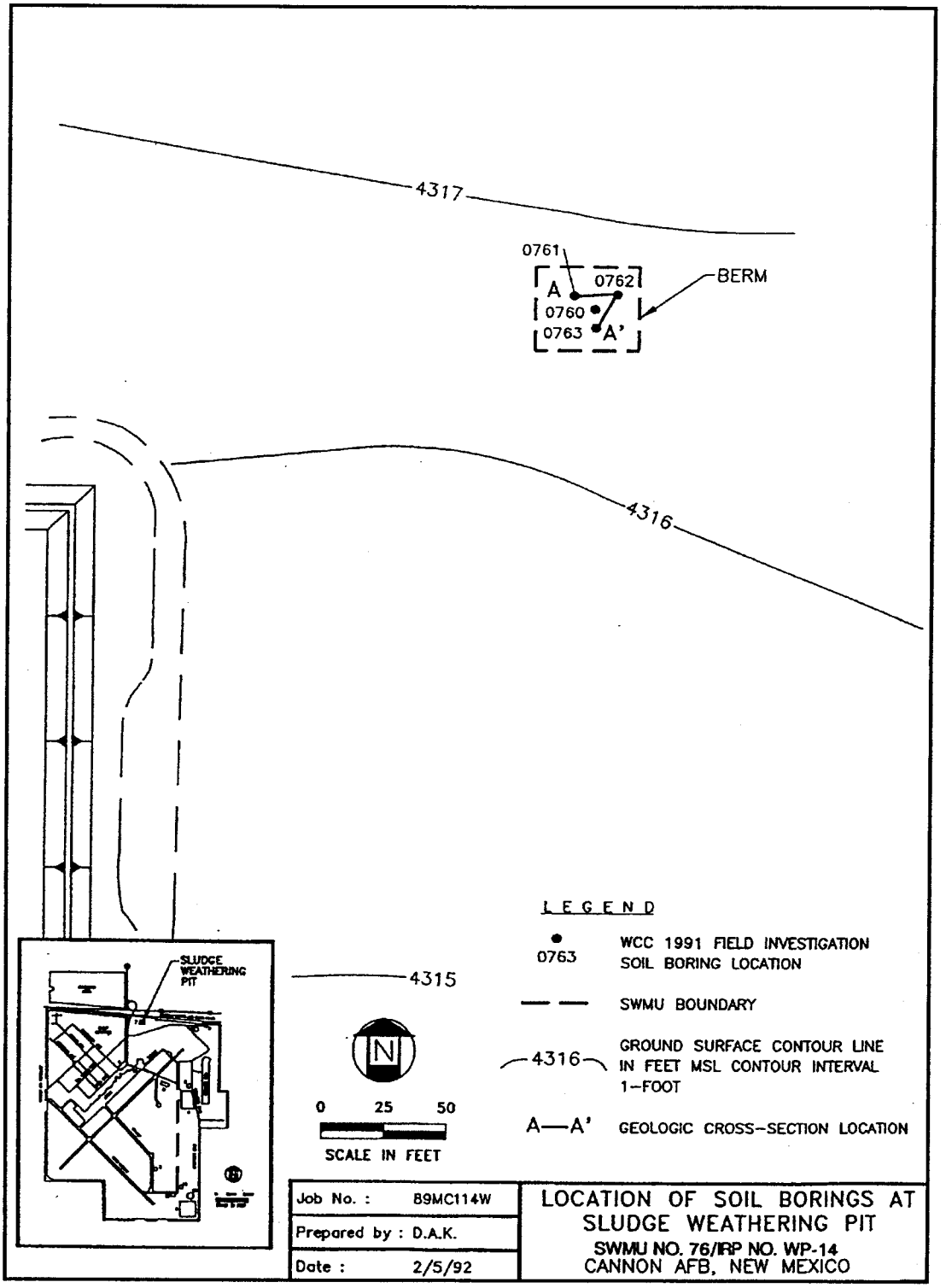
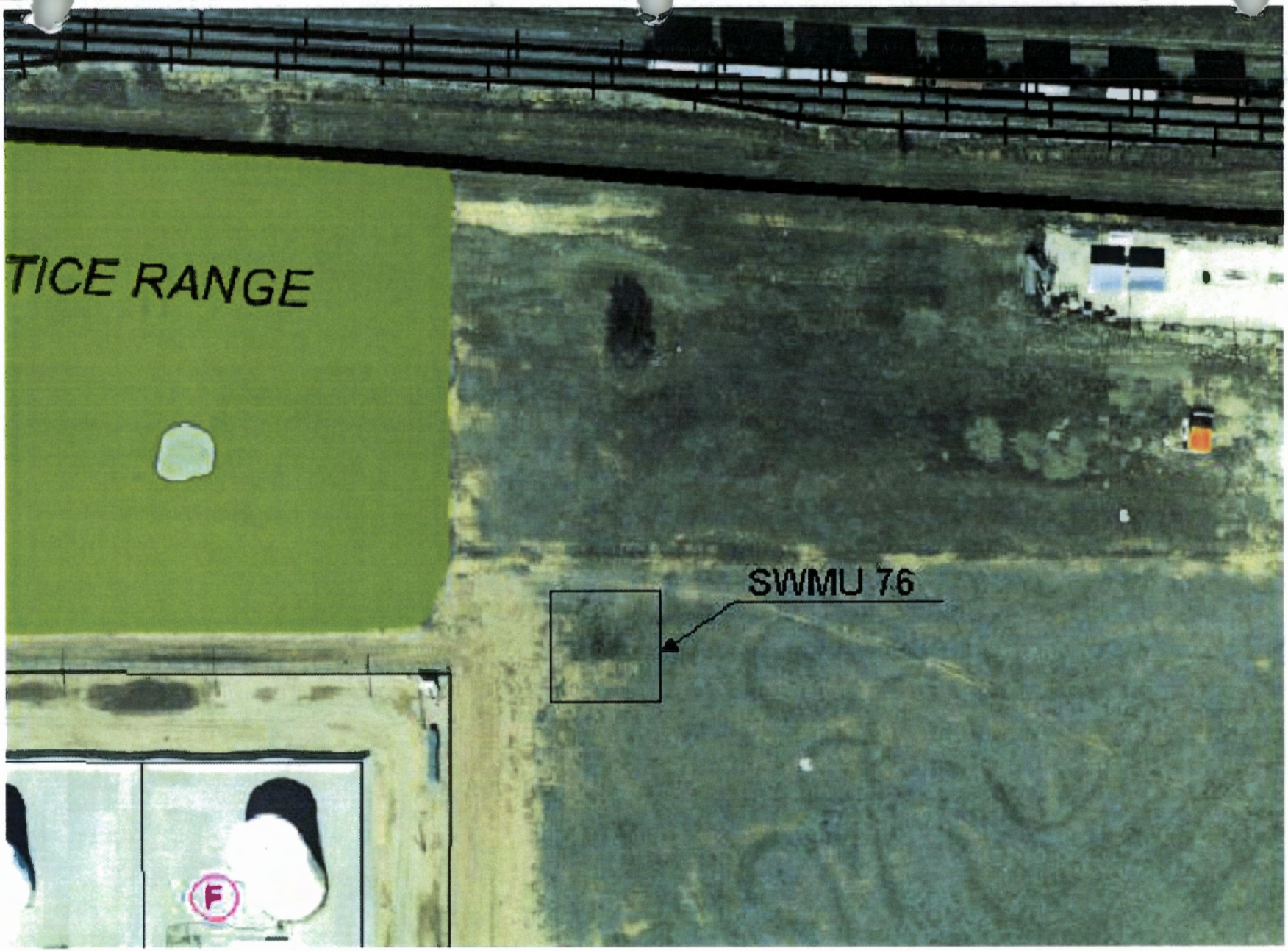


Figure 22-1

SWMU 76

Source: Woodward-Clyde, 1992



SWMU 76 AREA SAMPLED
(JUNE 2004)
CANNON AIR FORCE BASE CLOVES, NEW MEXICO

DRN. BY: DPG	DATE: 10/08/04	PROJECT NO. 16169434	FIG. NO. 22-2
CHK'D. BY: DPG	DATE: 10/08/04		

October 11, 2004 4:51:21 p.m.
Drawing: T:\CANNON\16169434\02000\fig 01-03.dwg

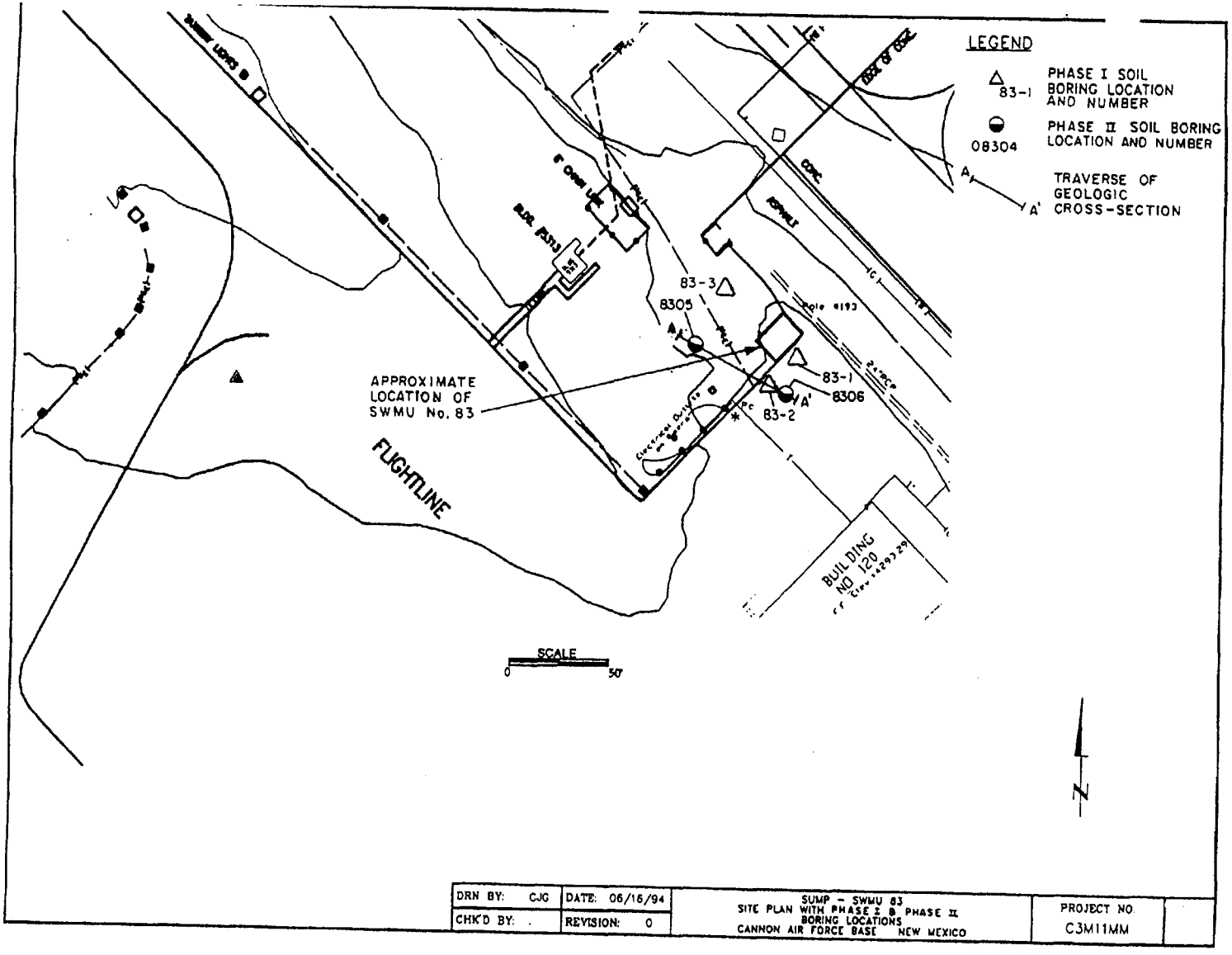


Figure 23-1
SWMU 83
Source: Woodward-Clyde, 1997

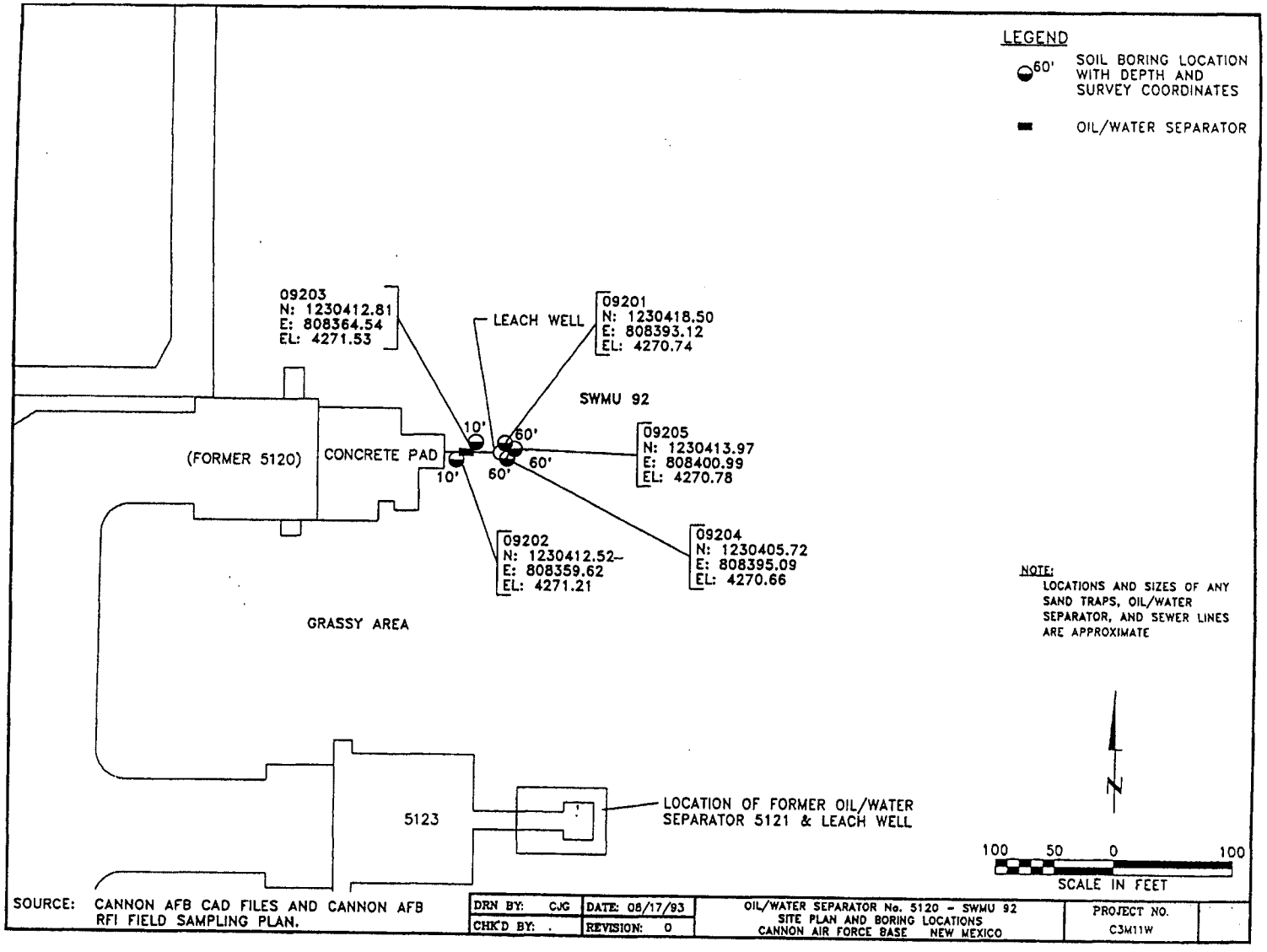


Figure 24-1
SWMU 92
Source: Woodward-Clyde, 1994

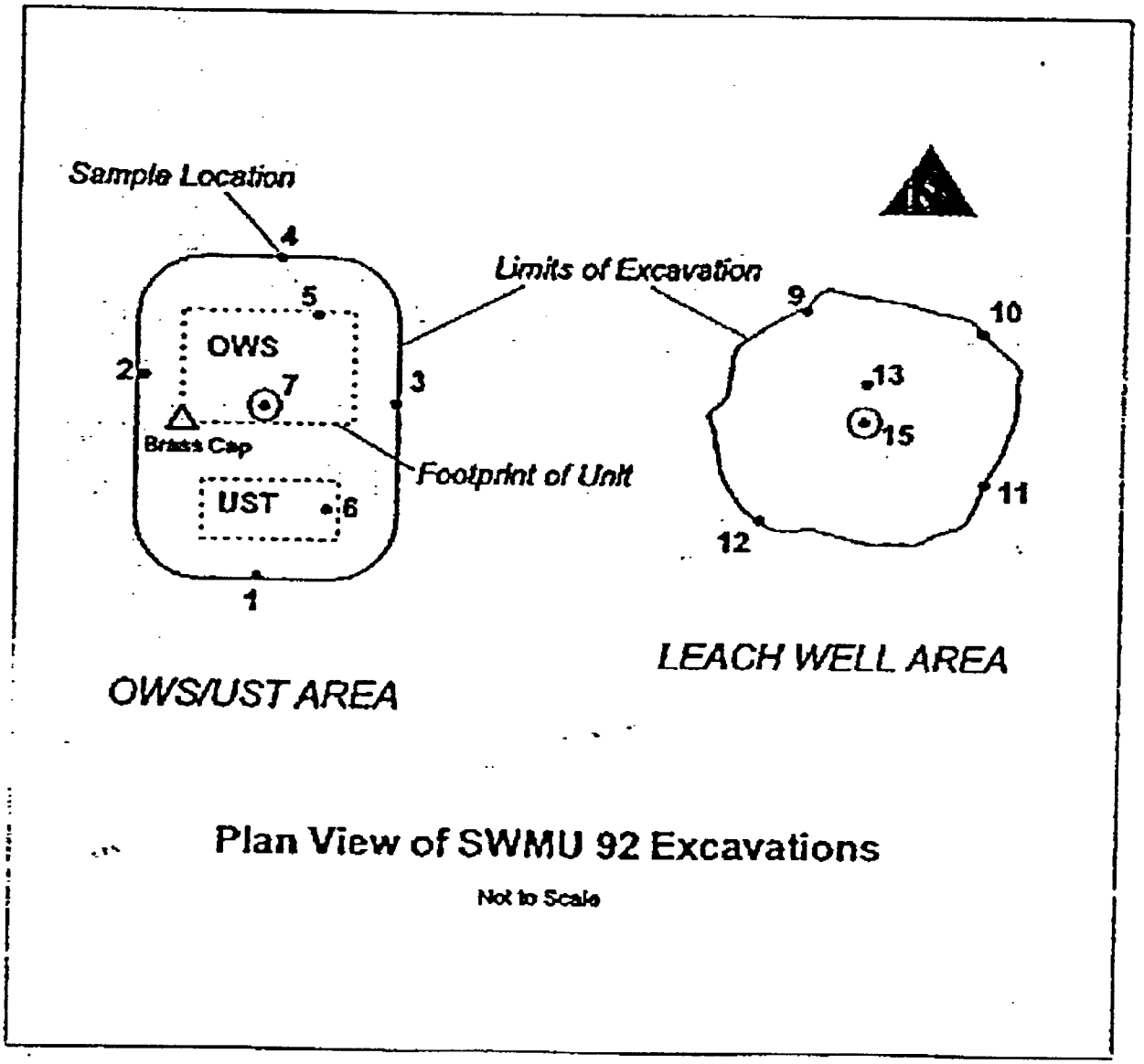


Figure 24-3

SWMU 92

Source: U.S. Army Corps of Engineers, 1999

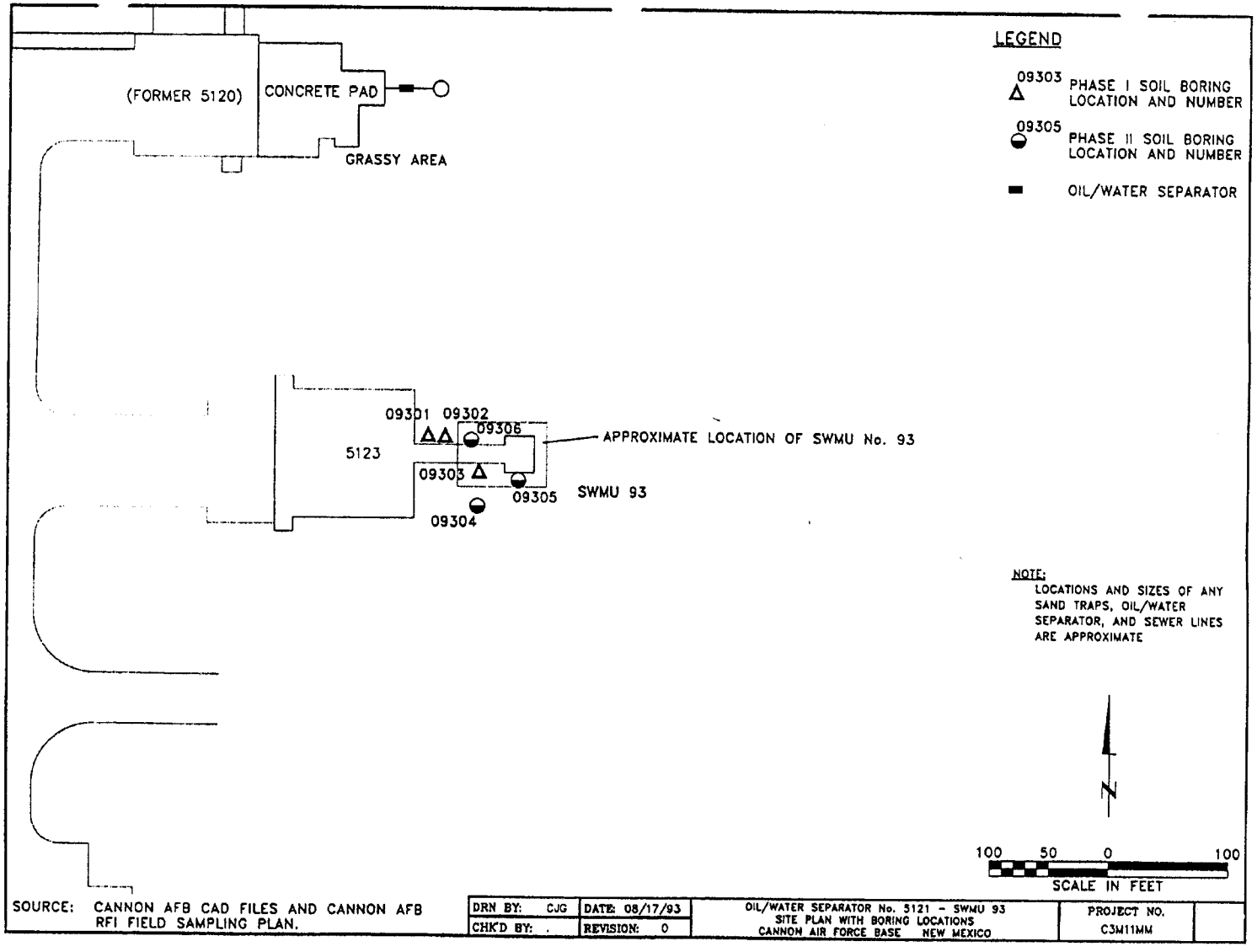


Figure 25-1
SWMU 93

Source: Woodward-Clyde, 1997

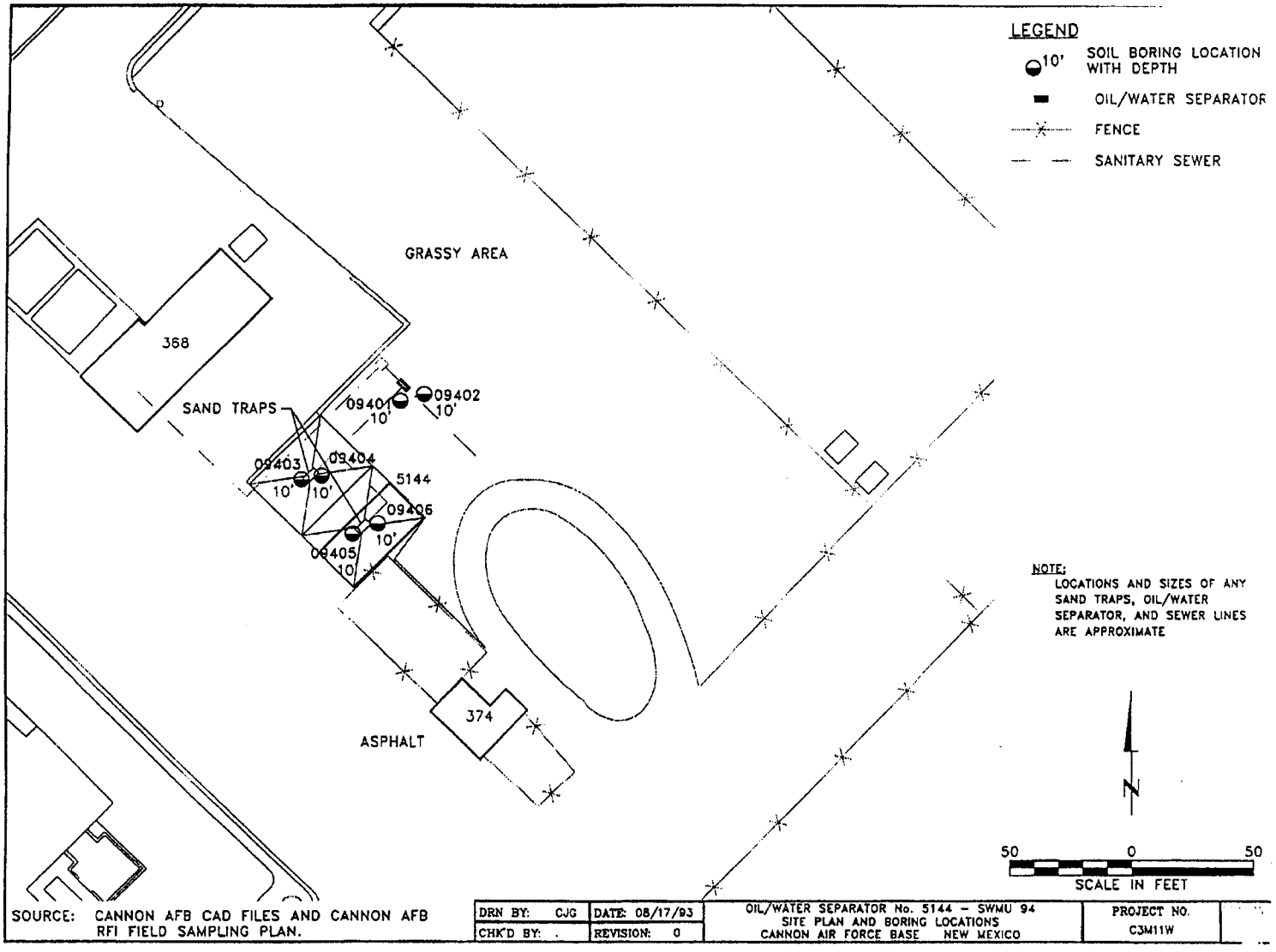


Figure 26-1
SWMU 94
Source: Woodward-Clyde, 1994

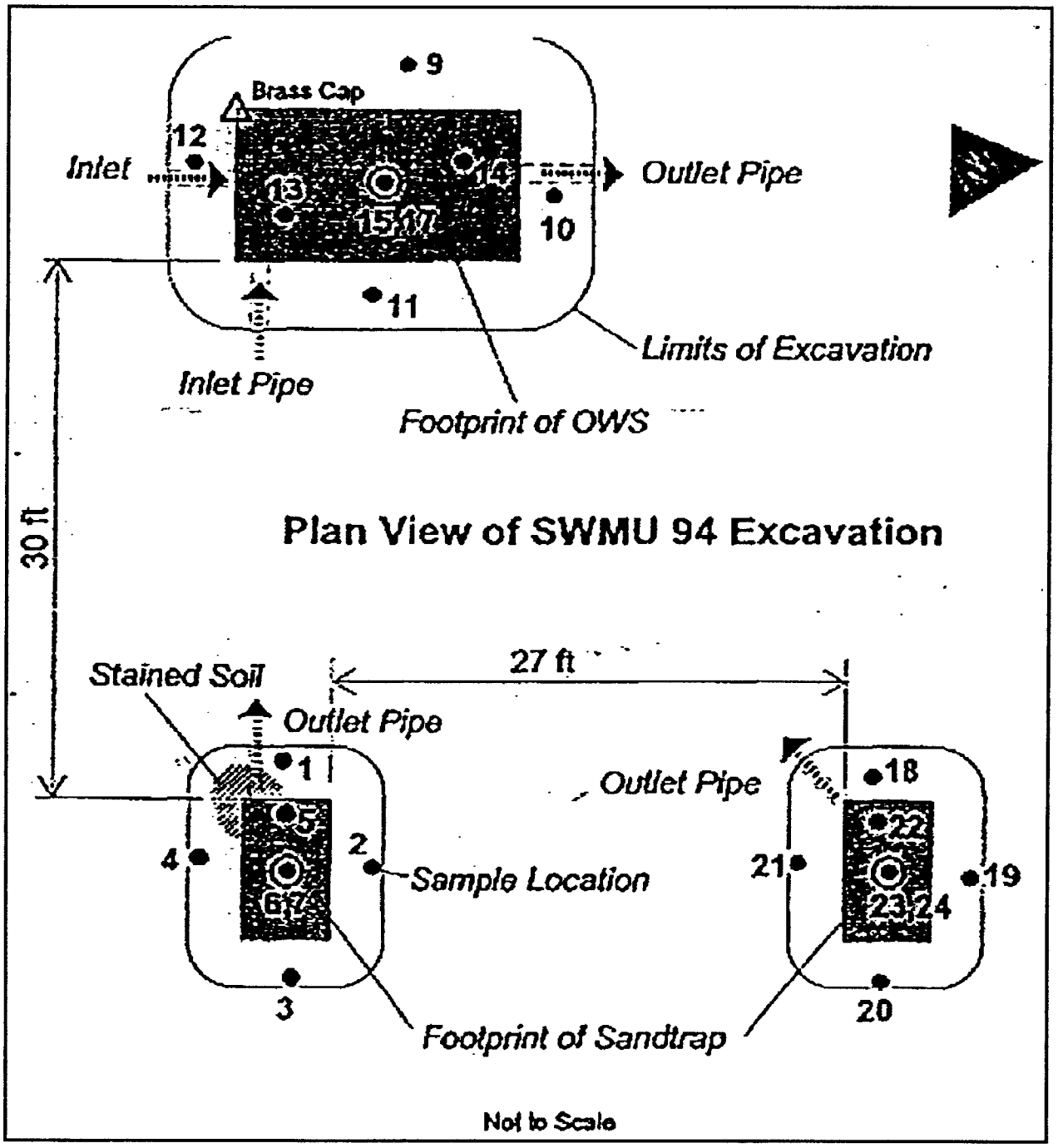


Figure 26-3

SWMU 94

Source: U.S. Army Corps of Engineers, 1999

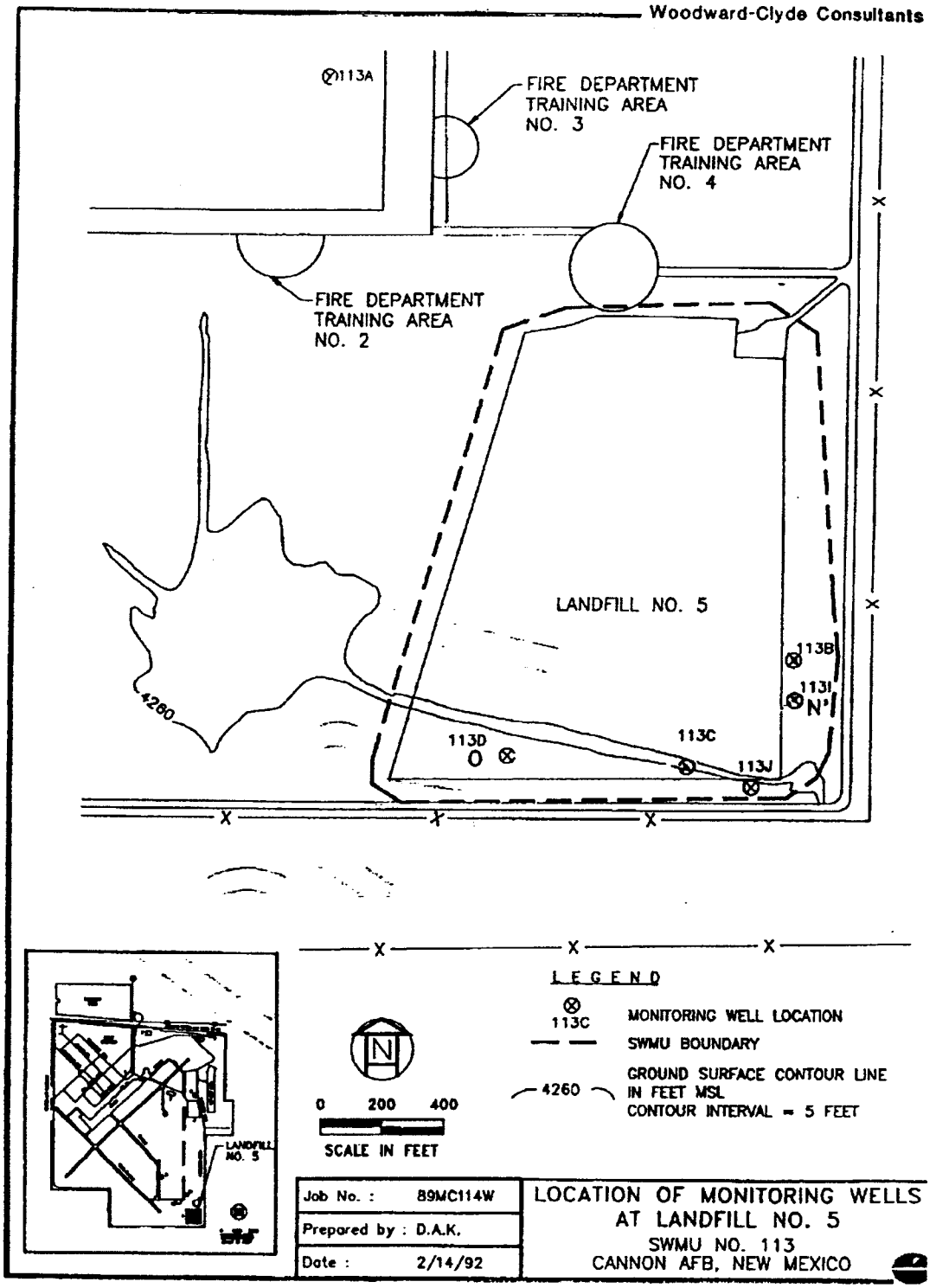


Figure 27-1

SWMU 113

Source: Woodward-Clyde, 1992

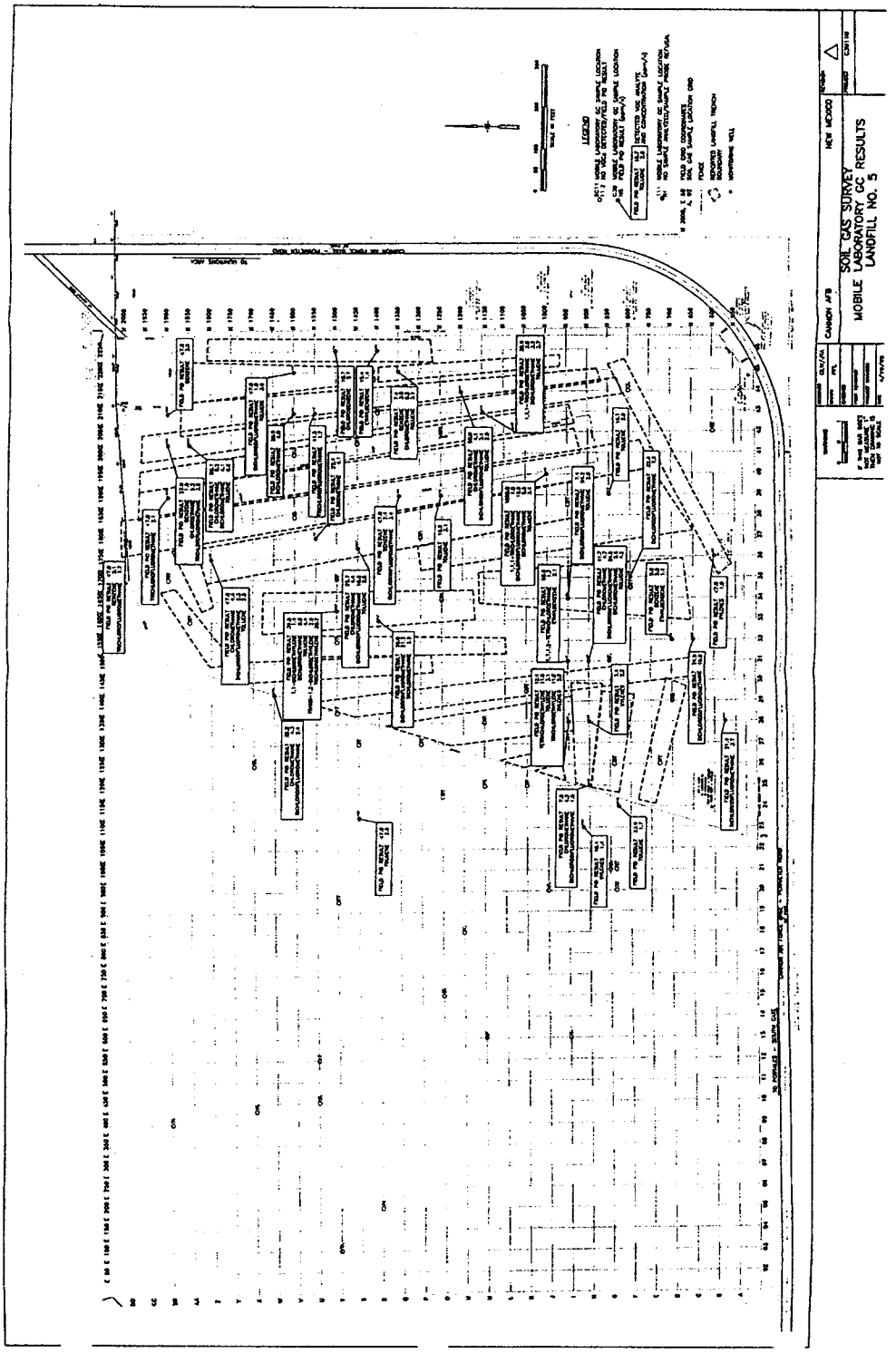


Figure 27-3

SWMU 113

Source: Woodward-Clyde, 1998

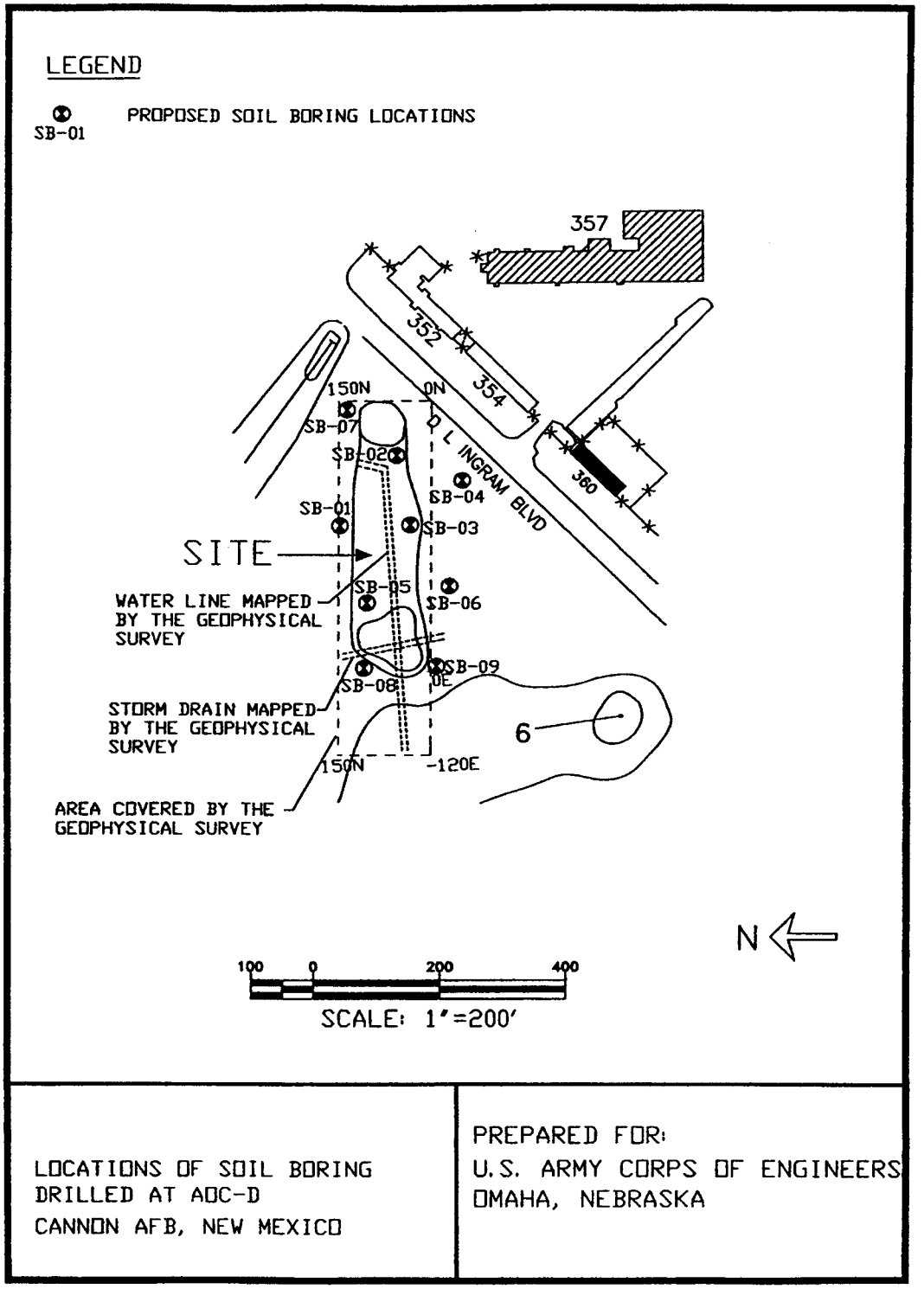


Figure 28-1

AOC D

Source: IMS, P.C., 1997

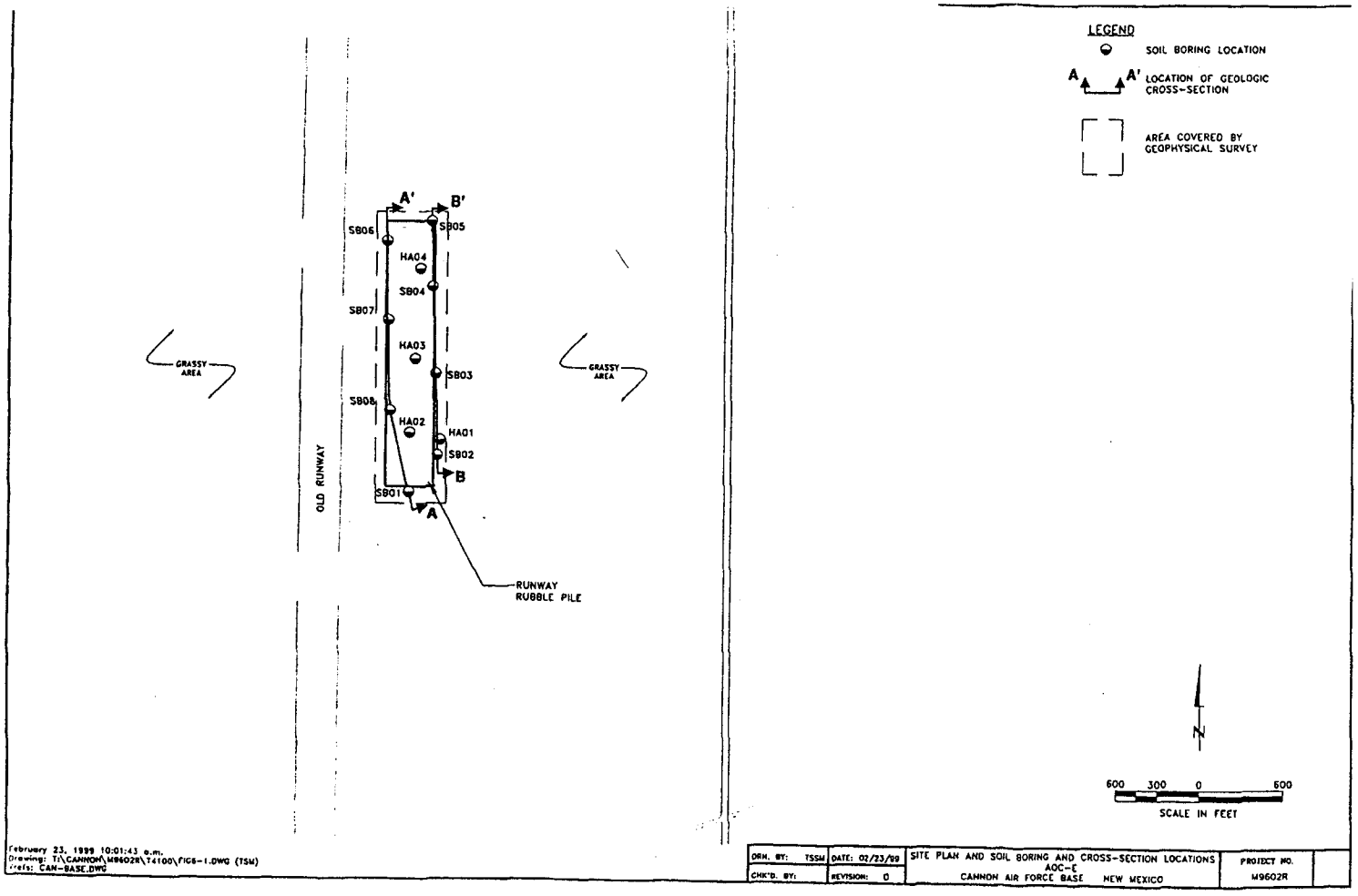


Figure 29-1
AOC E
Source: URS Greiner Woodward Clyde, 1999

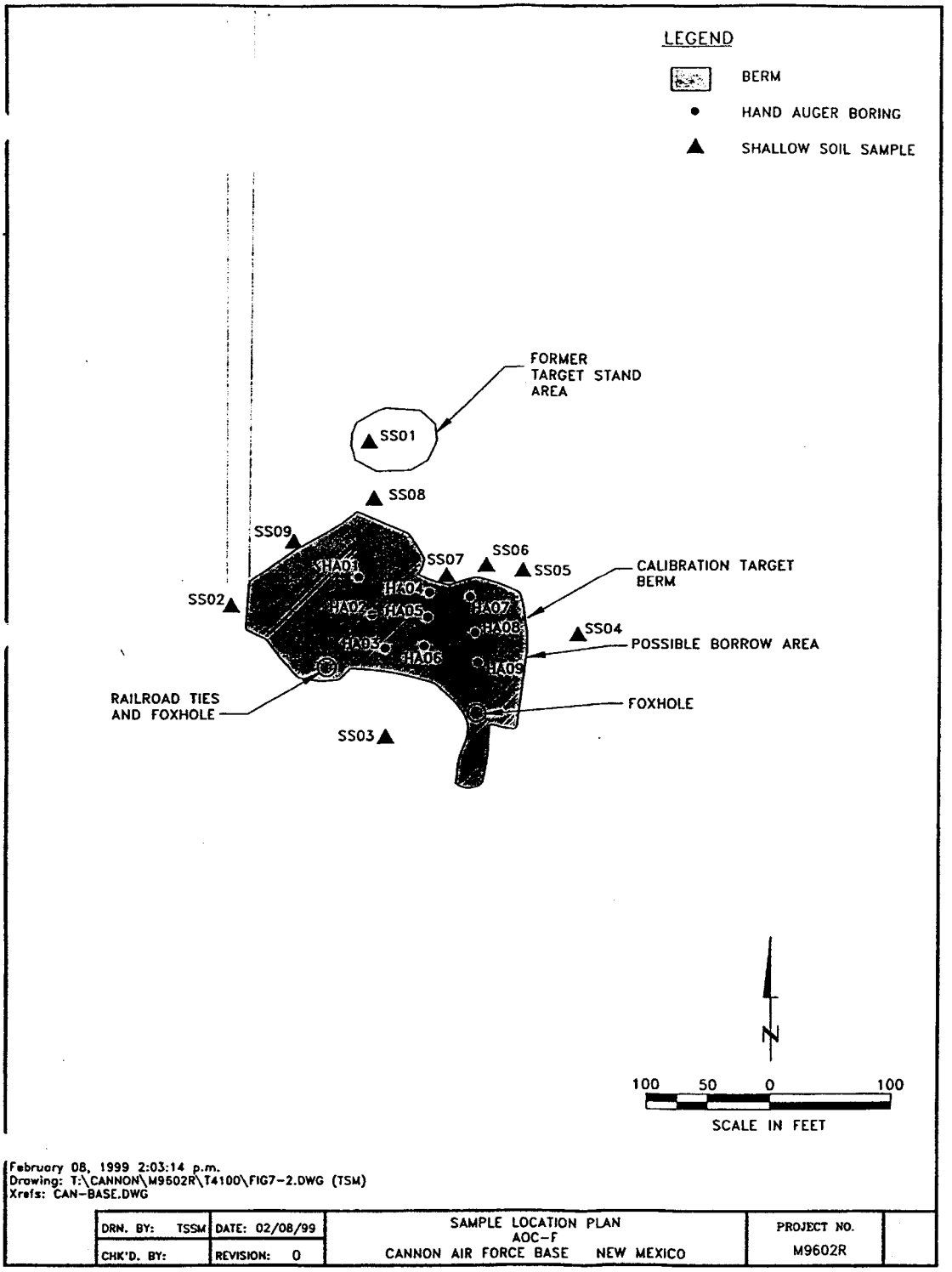


Figure 30-1

AOC F

Source: URS Greiner Woodward Clyde, 1999

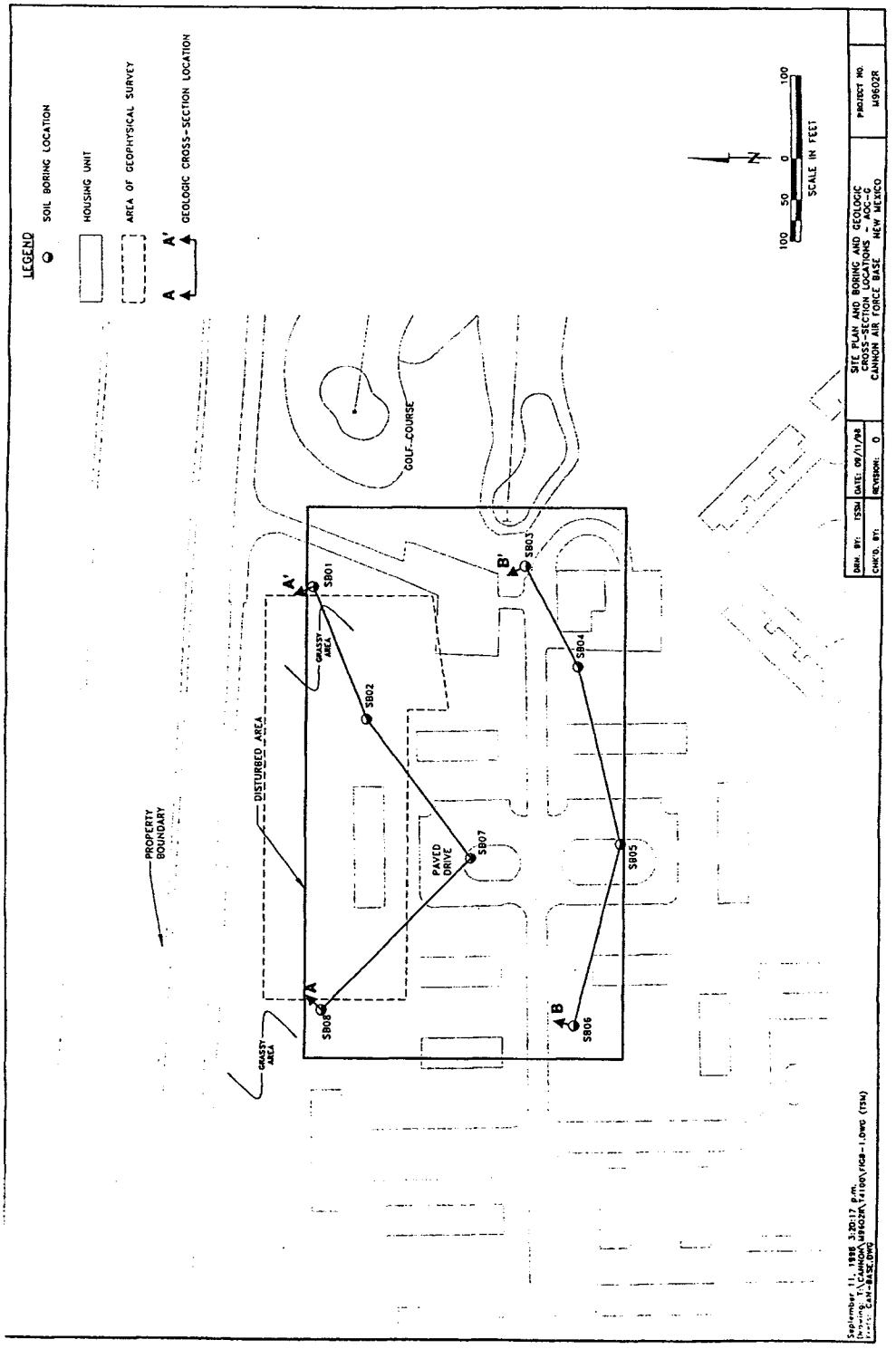


Figure 31-1

AOC G

Source: URS Greiner Woodward Clyde, 1999

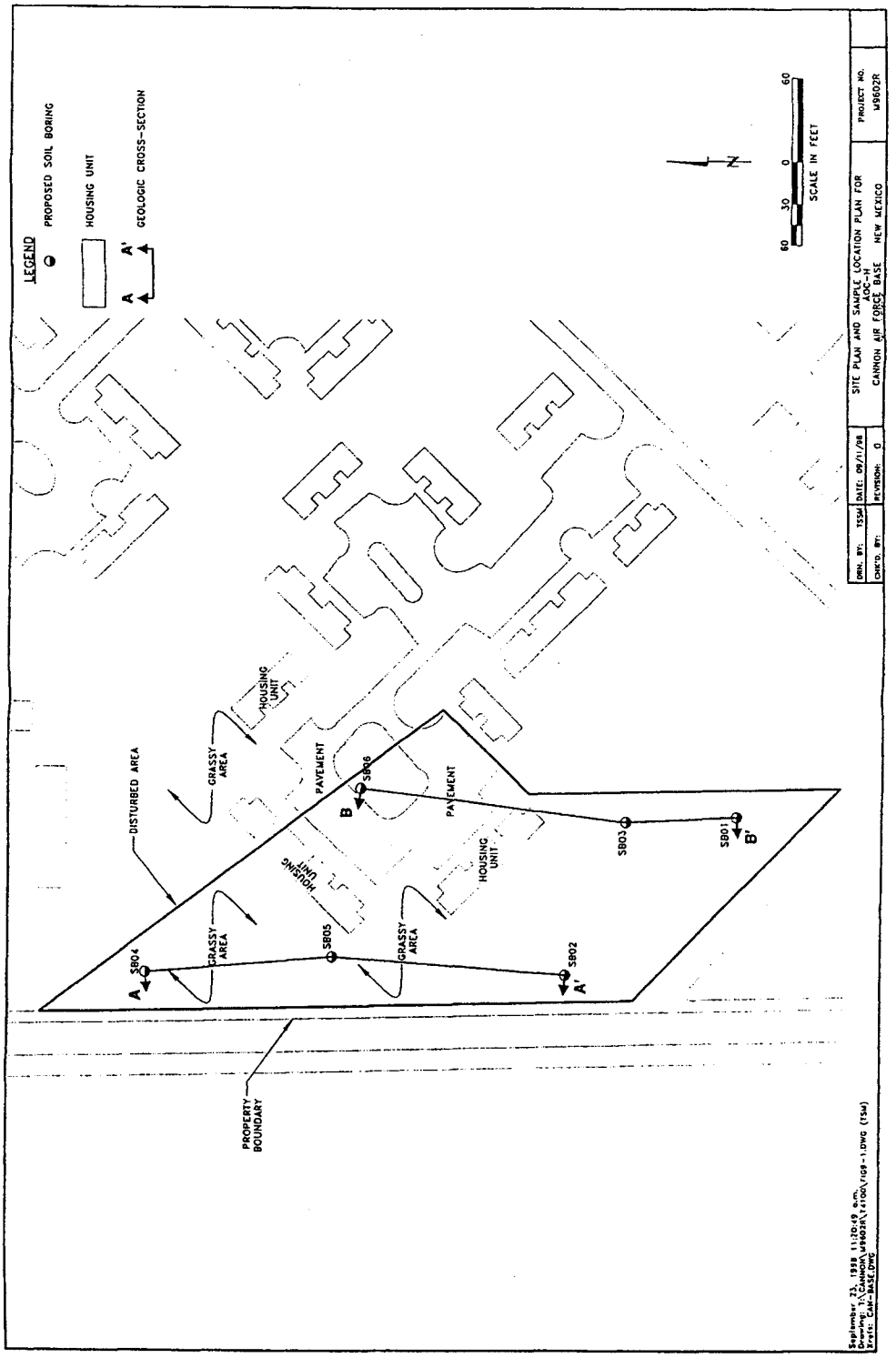


Figure 32-1

AOC H

Source: URS Greiner Woodward Clyde, 1999

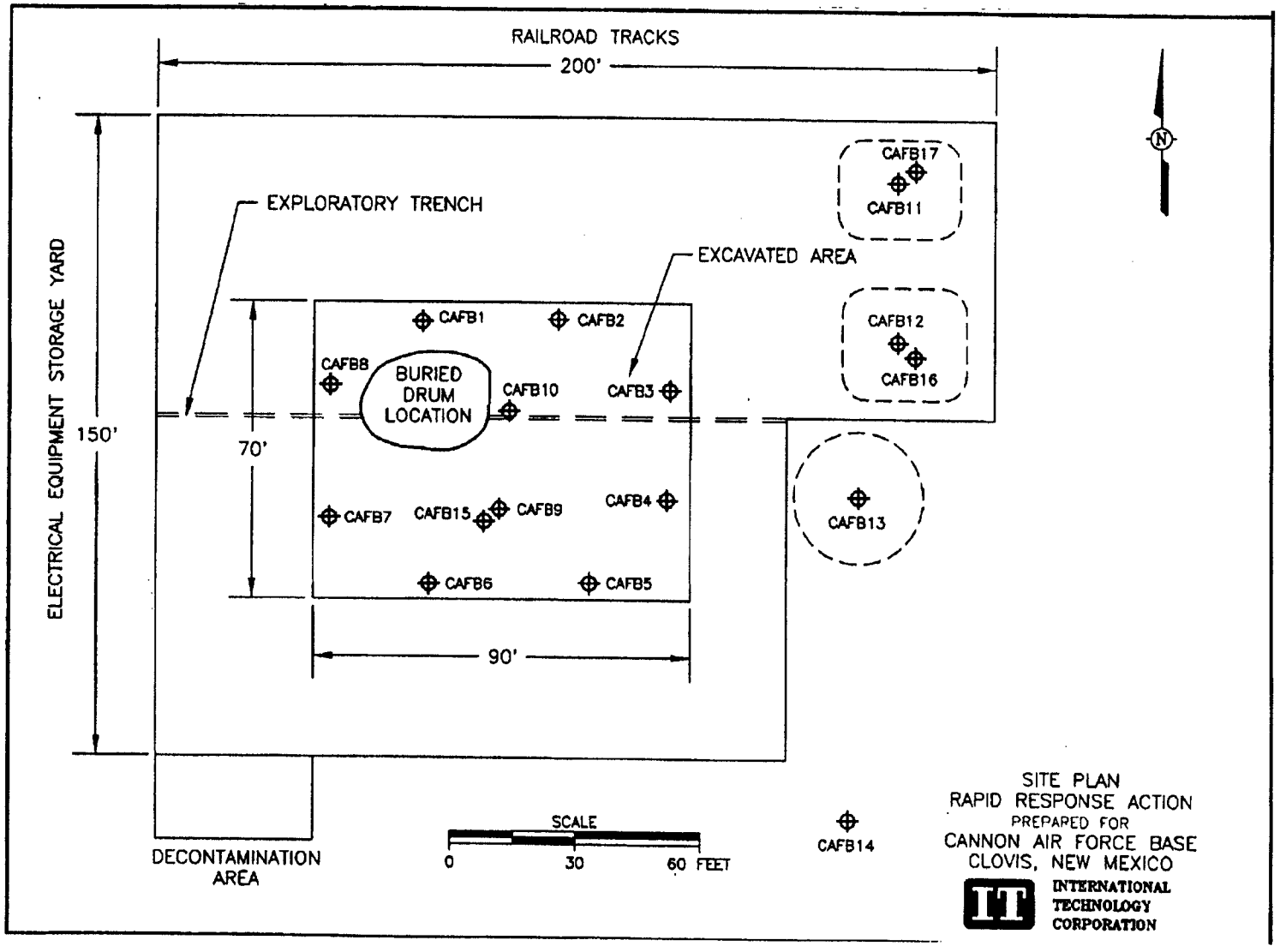


Figure 33-1
DP-33
Source: IT Corp., 1995

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Table 1-1
Summary of Background Elemental Concentrations[1] in Soil Samples[2] at Cannon AFB, New Mexico
Introduction

Element	Mean (x)		Standard Deviation (s)		95% Upper Tolerance Limit of Background Concentrations (UTLs)	
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil
Aluminum	5,508	5,932	1,964	2,183	8,950	12,214
Antimony	ND (3)	ND (3)	ND (3)	ND (3)	3.15 (3)	16 (3)
Arsenic	2.1	2.1 (4)	0.48	0.96 (4)	3.6	4.3 (4)
Barium	100	210	165	199	670	890
Beryllium	0.35 (4)	0.35 (4)	0.13 (4)	0.17 (4)	0.78 (4)	0.73 (4)
Cadmium	ND (3)	ND (3)	ND (3)	ND (3)	0.435 (3)	1.3 (3)
Calcium	5,645	89,410	11,366	64,611	44,800	237,498
Chromium (total)	7.1	5.6	1.3	2.33	10.5	13.3
Cobalt	2.9	2.6 (4)	1.0	1.4 (4)	6.6	4.7 (4)
Copper	6.8	3.8 (4)	4.6	1.97 (4)	18.3	8.3 (4)
Iron	6,458	5,148	1,349	2,262	10,100	13,148
Lead	6.8	4.7	1.6	1.7	12	8.7
Magnesium	1,066	4,260	390	3,856	1,930	19,300
Manganese	139	83	51	50	307	333
Mercury	0.025 (4)	ND (3)	0.016 (4)	ND (3)	0.056 (4)	0.019 (3)
Nickel	5.5	5.9 (4)	1.6	2.41 (4)	11	14.9 (4)
Potassium	1,345	1,222	413	417	2,691	2,512
Selenium	ND (3)	0.47 (4)	ND (3)	0.31 (4)	0.26 (3)	1.1 (4)
Silver	--- (5)	ND (3)	--- (5)	ND (3)	0.4 (5)	2.65 (3)
Sodium	91	351 (4)	10	253 (4)	102	1,227 (4)
Thallium	ND (3)	ND (3)	ND (3)	ND (3)	0.6 (3)	2.65 (3)
Vanadium	14.9	16	2.8	5.2	23.3	32.8
Zinc	15.4	12.1	5.2	4.8	32.2	30.6

(1) All concentrations are in milligrams per kilogram (mg/kg).

(2) From report entitled "Naturally Occurring Concentrations of Inorganics and Background Concentrations of Pesticides at Cannon Air Force Base, New Mexico" (W-C 1997).

(3) Analytical data were reported as nondetect; therefore, a mean and standard deviation was not calculated. One-half the highest reporting limit is used as the 95% UTL. The actual mean, standard deviation, and UTL may be less than these values.

(4) Values determined from a data set including one-half of the reporting limits for nondetects.

(5) Silver was detected in only one sample; therefore, a mean and standard deviation was not calculated. The single detected concentration is used as the 95% UTL.

Table 1-2
Federal- and State-Protected Animals Potentially Occurring in the Vicinity of Cannon AFB (Curry County)
Introduction

Common Name	Scientific Name	Federal Status	State Status
Birds			
Mississippi kite	*Ictinia mississippiensis*		Endangered (Group 2)
Baird's sparrow	*Ammodramus baridii*		Endangered (Group 2)
Bald eagle	*Haliaeetus leucocephalus*	Endangered	Endangered (Group 2)
Peregrine falcon	*Falco perigrinus*	Endangered	Endangered (Group 1)
Mammals			
Black-footed ferret	*Mustela nigripes*	Endangered	Possibly Extinct

Endangered (Group 1): Species whose prospects of survival or recruitment within the state are in jeopardy

Endangered (Group 2): Species whose prospects of survival or recruitment within the state are likely to become jeopardized in the foreseeable future.

Possibly Extinct: Potentially no longer in existence in the state.

Source: Lee Wan and Associates 1990

Table 2-1a
Concentration (µg/kg) of VOCs
SWMU 1

248mg/kg 704000 mg/kg

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Toluene	Acetone
1	CAN001-1191-031A	Surface	9J	R
	CAN001-1191-032B	2.5	11U	11UJ
2	CAN001-1192-031A	Surface	36J	10UJ
	CAN001-1192-032B	2.5	11U	24J
3	CAN001-1193-031A	Surface	4J	R
	CAN001-1193-032B	2.5	11U	11UJ

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Science, Inc., 1993

Table 2-1b
Concentration (mg/kg) of Total Metals
SWMU 1

Borehole Number	Sample Number (CAN001-119)	Sample Depth (feet)	Chromium		Mercury		Nickel		Silver	
1	1-021A	0	13.6	J	0.01	UJ	8	J	5.8	J
	1-022B	2.5	4.8	J	0.11	UJ	4.8	J	*	R
	1-023C	5	8.6	J	0.11	UJ	6.3	J	*	R
	1-024D	10	7.2	J	0.01	UJ	5.2	J	*	R
2	2-021A	0	14.7	J	0.01	UJ	5.8	J	*	R
	2-022B	2.5	8.5	J	0.11	UJ	6.5	J	*	R
(QAD)	2-721B	2.5	8.8		**0.15**		6.7		0.41	U
(QCD)	2-821B	2.5	4.5	J	0.02	UJ	5.2	J	*	R
	2-023C	5	10.2	J	0.11	UJ	**9.2**	J	*	R
	2-024D	10	4.1	J	0.11	UJ	5.1	UJ	*	R
3	3-021A	0	**34.6**	U	0.1	UJ	8	J	*	R
	3-022B	2.5	7.5	J	0.11	UJ	7	J	*	R
	3-023C	5	9.3	J	0.02	UJ	**9.6**	J	*	R
	3-024D	10	4.4		0.11	J	5.5	UJ	0.85	U
Background (95% UCL) (1)			12.50		0.13		9.00		2.20	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Science, Inc., 1993

Table 2-2a
Summary of Soil Sample Results
SWMU 1

Table 4.1-1

SUMMARY OF SWMU 1 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX pprn	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals >bkgd* mg/Kg
1	5	OWS	0.02	<100	10	ND	ND	NT	NT	NT
2	11	OWS	ND	<20	<10	ND	ND	NT	NT	NT
3	4	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	11	OWS	ND	<20	<10	NT	NT	NT	NT	NT
5	11	OWS	ND	<20	<10	NT	NT	NT	NT	NT
6	11	OWS	ND	<20	<10	ND	NT	NT	NT	NT
7	11	OWS	NT	NT	NT	NT	ND	ND	ND	Ba

ND indicates non-detect
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 2-2b
Maximum Soil Sample Concentrations Results
SWMU 1

SWMU 1 Maximum Soil Sample Concentrations							
Sample No.	Total Metals mg/Kg		TCLP Metals mg/L	Background Conc. Region V1/ Cannon AFB[1] mg/Kg		UTL	Region VI Residential RBSL mg/Kg
7	Arsenic 3.9	< 3.0	< 0.40	1.1-16.7	3.6	4.3	0. 32 C
	Barium 5450	1390	1.2	430	805	890	5300.0 N
	Chromium 22	9.9	<0.02	38	13.3	13.3	31 C
	Nickel 1560	9.1	NT	16	11.4	14.9	1500.0N
	Lead 400	7.6	< 0.05	10-18	7.1	8.1	400.0 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 3-1a
Concentration (µg/kg) of VOCs
SWMU 3

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Toluene	Acetone
			284 mg/kg	70600
1	CAN003-1081-031A	Surface	8J	11UJ
	CAN003-1081-032C	5.0	11U	11UJ
	CAN003-1081-831C	5.0		8J (QCD)
2	CAN003-1082-031A	Surface	11U	11UJ
	CAN003-1082-032C	5.0	11U	11UJ
3	CAN003-1083-031A	Surface	11UJ	11UJ
	CAN003-1083-032C	5.0	11U	11UJ

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at the same lab as normal sample.

Source: LRL Sciences, Inc., 1993

Table 3-1b
Concentration (mg/kg) of Total Metals
SWMU 3

Borehole Number	Sample Number (CAN003-108)	Sample Depth (feet)	Barium 5450	Chromium 234	Mercury 6.11	Nickel 1560	Silver 391
1	1-021A	0	614	**17.8** J	0.01 U	8.1	1.6
	1-022B	2.5	70.4	10.7 J	0.02 U	7.3 J	0.85 U
	1-023C	5	63.6	6.2 J	0.02 U	7.5 J	0.93 U
(QAD)	1-721C	5	112	**10.2**	**0.15**	**10.3**	0.41 U
(QCD)	1-821C	5	80.9	8.5 J	0.02 U	8.3 J	0.93 U
	1-024D	10	54.3	4.8 J	0.1 U	4.8 J	0.92 U
2	2-021A	0	483	6.1 J	0.01 U	9.2 J	21.1 U
	2-022B	2.5	101	7.2 J	0.02 U	9.6 J	0.93 U
	2-023C	5	91.8	6.5 J	0.01 U	6.9 J	0.89 U
	2-024D	10	**816**	3 J	0.01 U	4.4 J	0.88 U
3	3-021A	0	632	**16.4** J	0.01 U	7.5	1
	3-022B	2.5	196	7.7 J	0.02 U	6.8	0.92 U
	3-023C	5	66.5	5.9 J	0.03 U	8.5	0.95 U
	3-024D	10	753	2.7 J	0.02 U	4.4	0.98
Background (95% UCL) (1)			642.00	12.50	0.13	9.00	2.20

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0304-0000			CAN003-0304-0005			CAN003-0304-6005 [1]			CAN003-0304-0010			CAN003-0304-0015			CAN003-0304-0020		
LAB SAMPLE NUMBER	0397770006SA			0397770013SA			0397770017SA			0397770014SA			0397770015SA			0397770016SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
✓Acetone	11	10		<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methylene chloride 145	<	5.2	U	3	5.7	J	3.9	5.7	J	2.9	5.7	J	3.4	5.5	J	4	5.7	J
Toluene 248	11	5.2		<	5.7	U	5	5.7	J	<	5.7	U	<	5.5	U	<	5.7	U
Semivolatile Organics (µg/kg)																		
Benzo(a)anthracene 0.621 R	130	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Benzo(a)pyrene 0.0621	220	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Benzo(b)fluoranthene 0.621	140	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Benzo(g,h,i)perylene	39	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
bis(2-Ethylhexyl)phthalate 341	<	350	U	300	370	J	640	380		170	380	J	230	360	J	350	380	J
Chrysene 621	470	350		<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
1200 Di-n-octyl phthalate	<	350	U	<	370	U	890	380		<	380	U	<	360	U	<	380	U
Dibenz(a,h)anthracene 0.621	58	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Fluoranthene 2250	49	350	J	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Phenanthrene 1800	<	350	U	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Pyrene 2300	<	350	U	<	370	U	<	380	U	<	380	U	<	360	U	<	380	U
Metals (mg/kg)																		
Aluminum 71800	2380	21		10500	11.3		8700	11.4		5200	22.9		4670	54.9		6260	23	
Arsenic 3.9	4.6	0.52		2.1	0.57		2.3	0.57		1.6	0.57		1.5	0.55		1	0.57	
Barium 5450	951	2.1	J	106	1.1		184	1.1		107	2.3		914	5.5		1510	2.3	
150 Beryllium	<	0.42	U	0.51	0.23		0.53	0.23		0.3	0.46	J	<	1.1	U	<	0.46	U
Calcium	132000	42		35000	22.6		38600	22.8		199000	45.8		301000	110		208000	45.9	
Chromium 234	3.2	2.1		9.1	1.1		8.9	1.1		3.5	2.3		<	5.5	U	3.7	2.3	
Cobalt 1520	1.9	2.1	J	4.7	1.1		4.9	1.1		2.8	2.3		<	5.5	U	<	2.3	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] MS/MSD for the preceeding sample number.

Page 1 of 6

Source: Woodward-Clyde, 1997

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0304-0000			CAN003-0304-0005			CAN003-0304-6005 (1)			CAN003-0304-0010			CAN003-0304-0015			CAN003-0304-0020		
LAB SAMPLE NUMBER	0397770006SA			0397770013SA			0397770017SA			0397770014SA			0397770015SA			0397770016SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																		
Copper 3130	5.5	4.2	J	7.8	2.3		16.9	2.3		3.6	4.6	J	3.7	11	J	2	4.6	J
Iron 23500	5460	21		9660	11.3		9240	11.4		3900	22.9		2810	54.9		3410	23	
Lead 400	4.1	0.52	J	8.8	0.57		9.9	1.1		3.4	1.1		1.8	0.55		4.7	0.57	
Magnesium 1550	1540	42		2470	22.6		2330	22.8		4470	45.8		4900	110		11200	45.9	
Manganese	618	2.1	J	184	1.1		219	1.1		54.8	2.3		26.3	5.5		25.6	2.3	
Nickel 1560	6.4	8.4	J	8.4	4.5		8.8	4.6		7.5	9.2	J	<	22	U	5.8	9.2	J
Potassium	372	1050	J	2060	566		1910	569		1020	1150	J	968	2750	J	893	1150	J
Vanadium 548	25.3	2.1		18.5	1.1		19.5	1.1		9.3	2.3		7.9	5.5		12	2.3	
Zinc 23500	18.6	4.2		24.4	2.3		24.1	2.3		9.8	4.6		8.2	11	J	8	4.6	
TRPH (mg/kg)																		
Total Petroleum Hydrocarbons	1120	126	J	51.2	45.2		615	45.6		<	45.8	U	<	43.9	U	<	45.9	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
(1) MS/MSD for the preceeding sample number.

Page 2 of 6

Source: Woodward-Clyde, 1997

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0305-0000			CAN003-0305-0005			CAN003-0305-0361[2]			CAN003-0305-0010			CAN003-0305-0015			CAN003-0305-0020		
LAB SAMPLE NUMBER	0397770007SA			0397770008SA			0397770009SA			0397770010SA			0397770011SA			0397770012SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	11	U	7.8	11	J	8.5	11	J	<	11	U	<	11	U	3.9	12	J
Methylene chloride	<	5.4	U	1.2	5.7	J	<	5.6	U	<	5.6	U	<	5.7	U	3.4	5.8	J
Toluene	<	5.4	U	<	5.7	U	<	5.6	U	3.2	5.6	J	<	5.7	U	<	5.8	U
Semivolatile Organics (µg/kg)																		
Benzo(a)anthracene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Benzo(a)pyrene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Benzo(b)fluoranthene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Benzo(g,h,i)perylene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
bis(2-Ethylhexyl)phthalate	<	300	U	<	370	U	<	510	U	<	370	U	<	380	J	300	390	J
Chrysene	44	360	J	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Di-n-octyl phthalate	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Dibenz(a,h)anthracene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Fluoranthene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Phenanthrene	<	360	U	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Pyrene	47	360	J	<	370	U	<	370	U	<	370	U	<	380	U	<	390	U
Metals (mg/kg)																		
Aluminum	2770	10.9		8670	22.7		6550	22.4		4690	11.2		8150	11.4		6560	58.3	
Arsenic	3.9	0.54		2.4	0.57		2	0.56		2.6	0.56		1.8	0.57		1.2	0.58	
Barium	682	1.1	J	147	2.3	J	303	2.2	J	162	1.1	J	702	1.1	J	398	5.8	
Beryllium	<	0.22	U	0.42	0.45	J	0.26	0.45	J	0.44	0.22		0.63	0.23		<	1.2	U
Calcium	89400	21.7		117000	45.4		149000	44.8		73500	22.4		113000	22.9		279000	117	
Chromium	4.3	1.1		5.9	2.3		5	2.2		5	1.1		5.8	1.1		<	5.8	U
Cobalt	2.2	1.1		3	2.3		3.4	2.2		3.4	1.1		3.2	1.1		<	5.8	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[2] Duplicate sample for the preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0305-0000			CAN003-0305-0005			CAN003-0305-0361[1]			CAN003-0305-0010			CAN003-0305-0015			CAN003-0305-0020		
LAB SAMPLE NUMBER	0397770007SA			0397770008SA			0397770009SA			0397770010SA			0397770011SA			0397770012SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																		
Copper 3130	4.6	2.2	J	5.8	4.5	J	4.5	4.5	J	5	2.2	J	3.7	2.3	J	5.5	11.7	J
Iron 23500	4750	10.9		7460	22.7		6210	22.4		5950	11.2		5980	11.4		3690	58.3	
Lead 400	4.6	0.54	J	4.4	1.1	J	3.8	0.56	J	4.4	1.1	J	5	0.57	J	1.6	0.58	
Magnesium	1280	21.7		2810	45.4		3620	44.8		2620	22.4		4660	22.9	J	20600	117	
Manganese	389	1.1	J	94.5	2.3	J	95.6	2.2	J	110	1.1	J	80.3	1.1		30.7	5.8	
Nickel 1560	3.4	4.3	J	7.4	9.1	J	5.4	9	J	7.4	4.5		6.2	4.6		<	23.3	U
Potassium	462	543	J	1580	1140		1400	1120		1220	559		2000	572		963	2920	J
Vanadium 548	18.4	1.1		16.8	2.3		18.5	2.2		21.5	1.1		14.4	1.1		15.2	5.8	
Zinc 23500	13.6	2.2		17.6	4.5		14.6	4.5		13.6	2.2		15.2	2.3		<	11.7	U
TRPH (mg/kg)																		
Total Petroleum Hydrocarbons	191	43.5	J	<	45.4	U	<	44.8	U	<	44.7	U	<	45.7	U	<	46.7	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate sample for the preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0306-0000			CAN003-0306-0005			CAN003-0306-0010			CAN003-0306-0015			CAN003-0306-0020		
LAB SAMPLE NUMBER	0397770001SA			0397770002SA			0397770003SA			0397770004SA			0397770005SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)															
Acetone	9.8	11	J	7.6	11	J	2.5	11	J	<	11	U	6.5	12	J
Methylene chloride 165	1.8	5.4	J	2.5	5.7	J	2.3	5.6	J	1.9	5.5	J	<	6	U
Toluene 243	1.5	5.4	J	<	5.7	U	<	5.6	U	<	5.5	U	<	6	U
Semivolatile Organics (µg/kg)															
Benzo(a)anthracene 6.21	42	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Benzo(a)pyrene 0.621	100	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Benzo(b)fluoranthene 6.21	70	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Benzo(g,h,i)perylene	<	360	U	<	380	U	<	370	U	<	360	U	<	390	U
bis(2-Ethylhexyl)phthalate	<	540	U	<	380	U	<	370	U	<	360	U	<	530	U
Chrysene 62.1	130	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Di-n-octyl phthalate	540	360		<	380	U	<	370	U	<	360	U	<	390	U
Dibenz(a,h)anthracene	<	360	U	<	380	U	<	370	U	<	360	U	<	390	U
Fluoranthene 2250	71	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Phenanthrene 300	52	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Pyrene 200	190	360	J	<	380	U	<	370	U	<	360	U	<	390	U
Metals (mg/kg)															
Aluminum	2640	21.7		7240	23		3800	22.3		4390	11		6960	23.9	
Arsenic	4.8	0.54		2.3	0.57		1.5	0.56		1.4	0.55		0.91	0.6	
Barium	1530	2.2	J	110	2.3	J	421	2.2	J	107	1.1	J	1090	2.4	J
Beryllium	<	0.43	U	0.46	0.46		<	0.45	U	0.36	0.22		<	0.48	U
Calcium	145000	43.3		156000	46		154000	44.6		56900	21.9		190000	47.8	
Chromium	4.6	2.2		5.3	2.3		1.6	2.2	J	4.1	1.1		4.5	2.4	
Cobalt	2.1	2.2	J	4.5	2.3		1.4	2.2	J	2.8	1.1		1.9	2.4	J

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1997

Table 3-2
Summary of Compounds Detected in Soil Samples
SWMU 3

LOCATOR	CAN003-0306-0000			CAN003-0306-0005			CAN003-0306-0010			CAN003-0306-0015			CAN003-0306-0020		
LAB SAMPLE NUMBER	0397770001SA			0397770002SA			0397770003SA			0397770004SA			0397770005SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.															
Copper	6.3	4.3	J	6.8	4.6	J	2.5	4.5	J	2.8	2.2	J	3.5	4.8	J
Iron	5730	21.7		6830	23		3270	22.3		3870	11		3700	23.9	
Lead	5.4	0.54	J	6.9	2.9	J	2.6	1.1	J	3.8	0.55	J	2.2	0.6	J
Magnesium	1940	43.3		3200	46		2880	44.6		2310	21.9		22500	47.8	
Manganese	625	2.2	J	113	2.3	J	45.4	2.2	J	67.6	1.1	J	37.9	2.4	J
Nickel	4.9	8.7	J	8.3	9.2	J	<	8.9	U	3.7	4.4	J	6.6	9.6	J
Potassium	307	1080	J	1530	1150		893	1120	J	1250	548		1120	1190	J
Vanadium	23.2	2.2		17.2	2.3		9.5	2.2		12.1	1.1		16.9	2.4	
Zinc	15.6	4.3		17.2	4.6		7.8	4.5		10.1	2.2		9.3	4.8	
TRPH (mg/kg)															
Total Petroleum Hydrocarbons	771	43.3	J	<	46	U	<	44.6	U	<	43.8	U	<	47.8	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
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U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1997

Table 4-1a
Concentration (µg/kg) of VOCs
SWMU 5

Borehole Number	Cannon Number	Depth (ft.)	Chemical: Acetone
1	CAN005-1211-031A	Surface	11UJ
	CAN005-1211-032D	10.0	12UJ
2	CAN005-1212-031A	Surface	11UJ
	CAN005-1212-032D	10.0	14J
3	CAN005-1213-031A	Surface	11UJ
	CAN005-1213-032D	10.0	11UJ
	CAN005-1213-831D	10.0	16J (QCD)

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected

U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at same lab as normal sample.

Source: LRL Sciences, Inc., 1993

Table 4-1b
Concentration (mg/kg) of Total Metals
SWMU 5

Borehole Number	Sample Number (CAN005-121)	Sample Depth (feet)	Barium	Mercury		Nickel	
1	1-021A	0	341	0.1	U	7.3	
	1-022B	2.5	68.5	0.1	U	**10.1**	
	1-023C	5	90.3	0.1	U	6.5	
	1-024D	10	37.9	0.1	U	7.6	
2	2-021A	0	357	0.1	U	6	UJ
	2-022B	2.5	60.9	0.1	U	**12.7**	
	2-023C	5	118	0.1	U	7.4	
	2-024D	10	344	0.1	U	**10.1**	
3	3-021A	0	337	0.1	U	6.6	
	3-022B	2.5	65.4	0.1	U	9.9	
	3-023C	5	73.1	0.1	U	7.7	
	3-024D	10	597	0.1	U	5.9	
(QAD)	3-721D	10	749	**0.2**		8.1	
(QCD)	3-821D	10	714	0.1	U	5.2	
Background (95% UCL) (1)			642.00	0.13		9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 4-2a
Summary of Compounds Detected in Soil
SWMU 5

LOCATOR	CAN005-0504-0000			CAN005-0504-0005			CAN005-0504-0010			CAN005-0504-0015			CAN005-0504-6015[1]			CAN005-0504-0020		
LAB SAMPLE NUMBER	0397760006SA			0397760007SA			0397760008SA			0397760009SA			0397760011SA			0397760010SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone 744000 ms/kg	13	11		7.7	12	J	6.8	11	J	<	11	U	9.7	11	J	<	11	U
Methylene chloride 165	3.1	5.7	J	3.2	5.8	J	3.1	5.7	J	3.1	5.7	J	1.3	5.7	J	3.3	5.7	J
Toluene 248	1.2	5.7	J	3.2	5.8	J	<	5.7	U	2.6	5.7	J	<	5.7	U	<	5.7	U
Semivolatile Organics (ug/kg)																		
bis(2-Ethylhexyl)phthalate 347	<	370	U	<	380	U	<	380	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)																		
Aluminum 77800	6310	11.3		14300	11.6		7810	11.4		5760	11.3		4350	11.3		7830	11.4	
Arsenic 3.9	2.2	0.57		2.7	0.58		2.2	0.57		2.1	0.57		2.3	0.57		1.4	0.57	
Barium 5450	142	1.1		95.8	1.2		360	1.1		222	1.1		152	1.1		231	1.1	
Beryllium	0.41	0.23		0.62	0.23		0.57	0.23		0.45	0.23		0.37	0.23		0.33	0.23	
Calcium	66600	22.6		37700	23.2		94900	22.8		71100	22.6		69400	22.6		111000	22.8	
Chromium 234	6	1.1		11.4	1.2		5.7	1.1		4.8	1.1		6.3	1.1		5.4	1.1	
Cobalt 1520	3.1	1.1		4.3	1.2		3.4	1.1		3.1	1.1		2.9	1.1		2.4	1.1	
Copper 3130	6.2	2.3		8.4	2.3		5.4	2.3		4.2	2.3		4.4	2.3		2.6	2.3	
Iron 23500	6880	11.3		11200	11.6		6410	11.4		5530	11.3		5400	11.3		5290	11.4	
Lead 400	11.7	5.7		8.9	0.58		8.3	5.7		8.9	2.8		9.8	1.1		3.4	0.57	
Magnesium	3280	22.6		2630	23.2		3110	22.8		3160	22.6		2850	22.6		6000	22.8	
Manganese	109	1.1	J	171	1.2	J	93.1	1.1	J	99.9	1.1	J	93.7	1.1	J	39.3	1.1	
Nickel 1560	5.8	4.5		10.4	4.6		6.4	4.6		5.4	4.5		7.9	4.5		<	4.6	U
Potassium	1190	566		2420	580		1730	571		1560	565		1270	565		1670	569	
Thallium 5.16	<	0.57	UJ	<	0.58	UJ	<	1.1	U	<	0.57	UJ	<	0.57	UJ	<	1.1	UJ
Vanadium 548	17	1.1		21.2	1.2		17.4	1.1		11.9	1.1		13.9	1.1		14.5	1.1	
Zinc 23500	15.9	2.3		26.6	2.3		16.2	2.3		13.7	2.3		12	2.3		12.3	2.3	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	185	45.3		87.7	46.4		131	45.7		170	45.2		197	45.2		209	45.5	

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J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] MS/MSD for the preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 4-2a
Summary of Compounds Detected in Soil
SWMU 5

LOCATOR	CAN005-0504-0028			CAN005-0504-0033			CAN005-0505-0005			CAN005-0505-0010			CAN005-0505-0562[1]			CAN005-0505-0015			CAN005-0505-0020		
LAB SAMPLE NUMBER	0453690010SA			0453690011SA			0397760013SA			0397760014SA			0397760017SA			0397760015SA			0397760016SA		
COLLECT DATE	10/24/95			10/24/95			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																					
Acetone	<	11	U	<	11	U	3.7	11	J	4.7	11	J	<	11	U	5.2	11	J	5.4	11	J
Methylene chloride	<	5.7	U	<	5.5	U	2.9	5.7	J	2.6	5.5	J	2.7	5.5	J	3	5.7	J	3.1	5.7	J
Toluene	<	5.7	U	<	5.5	U	<	5.7	U	2.5	5.5	J	<	5.5	U	<	5.7	U	<	5.7	U
Semivolatile Organics (ug/kg)																					
bis(2-Ethylhexyl)phthalate	400	380		<	360	U	<	390	U	<	360	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)																					
Aluminum	4130	22.8		4630	10.9		3960	22.6		8770	22.1		9980	22.2		10600	11.3		6400	22.8	
Arsenic	0.95	0.57		0.69	0.55		2.5	0.57		1.8	0.55		1.6	0.55		1.2	0.57		2	0.57	
Barium	84	2.3	J	25.5	1.1	J	129	2.3		451	2.2		694	2.2		156	1.1		468	2.3	
Beryllium	<	0.46	U	0.23	0.22		0.29	0.45	J	0.62	0.44		0.49	0.44		0.67	0.23		<	0.46	U
Calcium	139000	45.6		18600	21.9		133000	45.2		118000	44.2		155000	44.3		77100	22.6		191000	45.5	
Chromium	8.6	2.3		3.8	1.1		3.6	2.3		2.7	2.2		4.2	2.2		7.3	1.1		4	2.3	
Cobalt	1.8	2.3	J	1.4	1.1		2.8	2.3		2.6	2.2		2.1	2.2	J	3.5	1.1		1.5	2.3	J
Copper	1.5	4.6	J	1.3	2.2	J	5.5	4.5		3.5	4.4	J	3.8	4.4	J	4.6	2.3		3.4	4.6	J
Iron	2690	22.8		3860	10.9		4940	22.6		5240	22.1		5900	22.2		8000	11.3		4240	22.8	
Lead	1.6	0.57		2.2	0.55		4.3	0.57		5.3	0.55		6	0.55		6.1	1.1		2.3	0.57	
Magnesium	8890	45.6		3770	21.9		2290	45.2		3200	44.2		3770	44.3		4720	22.6		5810	45.5	
Manganese	24.2	2.3		29.3	1.1		57.4	2.3	J	98.8	2.2	J	98.9	2.2		110	1.1	J	32.8	2.3	J
Nickel	7.4	9.1	J	4.2	4.4	J	8.1	9	J	5.5	8.8	J	5	8.9	J	7.8	4.5		5.5	9.1	J
Potassium	708	1140	J	1170	546		992	1130	J	1590	1100		1670	1110		2570	565		1270	1140	
Thallium	10.2	2.3		10.3	1.1		<	1.1	U	<	2.2	U	<	5.5	UJ	<	1.1	UJ	<	1.1	UJ
Vanadium	7.2	4.6		6.8	2.2		13.5	2.3		9.5	2.2		12	2.2		20.1	1.1		9.9	2.3	
Zinc							11.3	4.5		15.3	4.4		16.3	4.4		20.6	2.3		10.7	4.6	
TRPH (mg/kg)																					
Total Recoverable Petroleum Hydrocarbons	<	45.6	U	<	43.7	U	<	45.2	U	<	44.2	U	<	44.3	U	<	45.2	U	<	45.5	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate sample for the preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 4-2a
Summary of Compounds Detected in Soil
SWMU 5

LOCATOR	CAN005-0506-0000			CAN005-0506-0005			CAN005-0506-0010			CAN005-0506-0561[1]			CAN005-0506-0015			CAN005-0506-0020		
LAB SAMPLE NUMBER	0397740001SA			0397740002SA			0397740003SA			0397740006SA			0397740004SA			0397740005SA		
COLLECT DATE	12/11/94			12/11/94			12/11/94			12/11/94			12/11/94			12/11/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	11	U	<	11	U	<	11	U	<	10	U	<	11	U	<	11	U
Methylene chloride	1.8	5.6	UJ	2.7	5.6	UJ	1.8	5.7	UJ	<	5.1	U	1.7	5.7	J	<	5.6	U
Toluene	<	5.6	U	<	5.6	U	<	5.7	U	<	5.1	U	<	5.7	U	<	5.6	U
Semivolatile Organics (ug/kg)																		
bis(2-Ethylhexyl)phthalate	<	370	U	<	370	U	<	380	U	<	340	U	<	370	U	<	370	U
Metals (mg/kg)																		
Aluminum	5920	22.6		7530	22.5		6230	11.4		9090	10.2		6960	22.7		9270	11.2	
Arsenic	2.6	0.56		2.5	0.56		2.2	0.57		2.2	0.51		1.9	0.57		0.96	0.56	
Barium	528	2.3		143	2.3		305	1.1		196	1		1170	2.3		123	1.1	
Beryllium	<	0.45	U	0.4	0.45	J	0.51	0.23		0.51	0.2		0.32	0.45	J	0.5	0.22	
Calcium	197000	45.2		135000	45		86400	22.8		79500	20.5		217000	45.4		55100	22.3	
Chromium	4	2.3		5.4	2.3		5.3	1.1		6.6	1		6.3	2.3		6.3	1.1	
Cobalt	1.7	2.3	J	3	2.3		3.4	1.1		3.2	1		2.9	2.3		2.7	1.1	
Copper	3.9	4.5	J	6.8	4.5		4.6	2.3		4.5	2		3.6	4.5	J	3.9	2.2	
Iron	3940	22.6		6880	22.5		5990	11.4		6990	10.2		4640	22.7		7140	11.2	
Lead	4.3	0.56		5.2	0.56		5.4	0.57	J	5.5	0.51	J	3.4	0.57	J	2.7	0.56	
Magnesium	5380	45.2	J	2770	45	J	3010	22.8	J	3200	20.5	J	4690	45.4		3860	22.3	J
Manganese	57.6	2.3		102	2.3		110	1.1		105	1		51.1	2.3		110	1.1	
Nickel	9.9	9		8.6	9	J	6.3	4.6		6.3	4.1		6.8	9.1	J	5.9	4.5	
Potassium	946	1130	J	1610	1130		1440	570		1740	512		1400	1140		2290	558	
Thallium	<	1.1	U	<	1.1	UJ	0.13	1.1	J	0.19	1	UJ	<	1.1	UJ	<	1.1	UJ
Vanadium	11.9	2.3		15.7	2.3		18.9	1.1		17.8	1		13.9	2.3		16.9	1.1	
Zinc	10.8	4.5		16.3	4.5		14.7	2.3		17.7	2		12.4	4.5		19.2	2.2	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	507	45.2	J	<	45	UJ	<	45.6	UJ	<	41	UJ	<	45.4	UJ	<	44.6	UJ

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate sample for the preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 4-2b
Comparison of Maximum Detected Metal Concentrations in Soil to Residential RBCs
SWMU 5

Chemical	Maximum Detected Concentration (mg/kg)	Residential Soil Risk-Based Concentration(1) (mg/kg)	Exceeds RBC?
Acetone	0.013	7,800	NO
Methylene Chloride	0.0033	85	NO
Toluene	0.0032	16,000	NO
Bis(2-ethylhexyl) phthalate	0.400	46	NO
Manganese	277	390	NO
Nickel	10.4	1600	NO

(1) EPA Region III Risk-Based Concentrations for Residential Soil (EPA 1994).

Source: Woodward-Clyde, 1997

Table 5-1a
Concentration (µg/kg) of VOCs
SWMU 7

Borehole Number	Cannon Number	Depth (ft.)	Chemical			
			Toluene	Acetone	1,1,1-Trichloroethane	Xylene
			248	704(22)	551	132
1	CAN007-1291-031A	Surface	15J	10UJ	5J	7J
	CAN007-1291-032C	5.0	20J (RE)	40 (RE)	11U	11J (RE)
	CAN007-1291-032C	5.0	11J	11U		11U
2	CAN007-1292-031A	Surface	11U	11U	11U	11U
	CAN007-1292-032C	5.0	11U	11U	11U	11U
3	CAN007-1293-031A	Surface	6J	10UJ	10U	10U
	CAN007-1293-032C	5.0	11U	24J	11U	11U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
RE = laboratory repeat
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc., 1993

Table 5-1b
Concentration (mg/kg) of Total Metals
SWMU 7

Borehole Number	Sample Number (CAN007-129)	Sample Depth (feet)	Arsenic 3.9		Chromium 234		Mercury 6.11		Nickel 1560
1	1-021A	0	5.2	J	38.7	J	0.01	U	8.1
	1-022B	2.5	2.7	J	8.1	J	0.02	U	8.2
	1-023C	5	2.1	J	5.5	J	0.01	U	7.3
(QAD)	1-721C	5	3.1	UJ	8		0.2		
(QCD)	1-821C	5	2.2	J	5.5	J	0.01	U	7.1
	1-024D	10	0.98	J	6.5	J	0.01	U	7.5
2	2-021A	0	31.8	J	20.6	J	0.01	U	7.5
	2-022B	2.5	13.6	J	7.6	J	0.02	U	8.2
	2-023C	5	3.1	J	8		0.02	U	9.8
	2-024D	10	4.3	J	5.2	J	0.02	U	7.8
3	3-021A	0	4.8	J	15.6	J	0.01	U	7.5
	3-022B	2.5	2.8	J	6.3	J	0.07	U	6.3
	3-023C	5	3.3	J	3.6	J	0.02	U	6.4
	3-024D	10	4.4	J	5.3	J	0.01	U	7
Background (95% UCL) (1)			15.50		12.50		0.13		9.00

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 5-2a
Summary of Soil Sample Results
SWMU 7

SUMMARY OF SWMU 7 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals >bkgd* mg/Kg
1	8	OWS	ND	<20	10	NT	NT	NT	NT	NT
2	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
3	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	8	OWS	ND	<20	<50	ND	ND	NT	NT	NT
5	8	OWS	ND	<20	<50	NT	NT	NT	NT	NT
6	8	OWS	ND	<20	<50	ND	ND	NT	NT	NT
7	8	OWS	NT	NT	NT	NT	ND	ND	ND[1]	< bkgd
8	n/a	excavated material	NT	NT	NT	ND	ND	NT	NT	NT
9	NOT	USED	NT	NT	NT	NT	NT	NT	NT	NT
10	n/a	excavated material	NT	NT	NT	NT	NT	NT	NT	NT

[1] Di-n-butylphthalate at 10 mg/Kg
ND indicates non-detect
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 5-2b
Maximum Soil Sample Concentrations
SWMU 7

SWMU 7 Maximum Soil Sample Concentrations						
Sample No.	Total Metals mg/Kg		TCLP Metals mg/L	Background Conc. Region VI/ Cannon AFB' mg/Kg		Region VI Residential RBSL mg/Kg
7	Arsenic	< 3.0	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	215	0.7	430	805	5300 N
	Chromium	6.8	0.04	38	13.3	31 C
	Nickel	8.4	NT	16	11.4	1500 N
	Lead	6.7	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C – carcinogenic

'CAFB Background Investigation, 1997
NT – not tested

Source: US Army Corps of Engineers, 1999

Table 6-1a
Concentration (µg/kg) of BTEX
SWMU 8

Borehole Number	Cannon Number	Depth (ft.)	Chemical				
			Benzene	Ethly Benzene	Toluene	Xylene	BTEX Total
1	CAN008-1651-011C	5.0	2U	2U	2U	2U	2U
	CAN008-1651-012D	10.0	2U	2U	2U	2U	2U
2	CAN008-1652-011C	5.0	2U	2U	2U	2U	2U
	CAN008-1652-012D	10.0	2U	2U	2U	2U	2U
3	CAN008-1653-011C	5.0	2UJ	2UJ	2UJ	2J	2J
	CAN008-1653-012D	10.0	2U	2U	2U	2U	2U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc., 1993

Table 6-1b
Concentration (mg/kg) of Total Metals
SWMU 8

Borehole Number	Sample Number (CAN008-165)	Sample Depth (feet)	Barium 5450		Chromium 234	Nickel	
1	1-021A	0	203	J	12.2	8.9	U
	1-022B	2.5	194	J	9.3	**13.6**	
(QAD)	1-721B	2.5	204		12.3	**9.7**	
(QCD)	1-821B	2.5	155	J	11.3	**9.1**	
	1-023C	5	107	J	**13.2**	**11.4**	
	1-024D	10	423	J	5.7	8.3	
2	2-021A	0	198	J	11.2	7.9	
	2-022B	2.5	100	J	12.5	**11**	
	2-023C	5	71.1	J	**12.9**	**12.2**	
	2-022D	10	712	J	4.3	4.9	
3	3-021A	0	250	J	8.3	7.7	
	3-022B	2.5	196	J	8.3	7.4	
(QAD)	3-721B	2.5	195		12.5	8.4	
(QCD)	3-821B	2.5	208	J	8.6	7.3	
	3-023C	5	209	J	8.3	7.7	
	3-022D	10	**812**	J	2.1	2	
Background (95% UCL) (1)			642.00		12.50	9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 6-2a
Summary of Soil Sample Results
SWMU 8

SUMMARY OF SWMU 8 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals >bkgd* mg/Kg
1	12	OWS	ND	<20	<10	ND	ND	NT	NT	NT
2	12	OWS	ND	ND	<10	NT	NT	NT	NT	NT
3	12	OWS	ND	ND	<10	NT	NT	NT	NT	NT
4	12	OWS	ND	<20	<10	NT	NT	NT	NT	NT
5	12	OWS	ND	<20	ND	NT	NT	NT	NT	NT
6	7	OWS	ND	<20	ND	ND	ND	NT	NT	NT
7	7	OWS	ND	<20	<10	NT	NT	NT	NT	NT
7QA	7	OWS	NT	NT	NT	NT	NT	ND	ND	As[4], Se[5]
8	12	OWS	NT	NT	NT	NT	ND	ND	ND[1]	Cr[3]
9	12	OWS	NT	NT	NT	NT	ND	ND	ND[2]	< bkgd
10	n/a	SWMU 8 & 9	NT	NT	NT	NT	ND	ND	ND	NT

[1] Di-n-butylphthalate at 17 mg/Kg found in sample and laboratory method blank
[2] Di-n-butylphthalate at 9.1 mg/Kg found in sample and laboratory method blank
[3] Chromium at 10.7 mg/Kg.
[4] Arsenic at 3.6 mg/Kg.
[5] Selenium at 0.6 mg/Kg.
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

ND indicates non-detect
NT indicates not tested

Source: US Army Corps of Engineers, 1999

Table 6-2b
Maximum Soil Sample Concentrations
SWMU 8

SWMU 8 Maximum Soil Sample Concentrations						
Sample No.	Total Metals mg/Kg		TCLP Metals mg/L	Background Conc. Region V1/ Cannon AFB' mg/Kg		Region VI Residential RBSL mg/Kg
7QA	Arsenic	3.61	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	202	0.84	430	805	5300 N
8	Chromium	10.7	<0.020	38	13.3	31 C
7QA	Lead	8.04	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

'CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 7-1a
Concentration (µg/kg) of VOCs
SWMU 9

Borehole Number	Cannon Number	Depth (ft.)	Chemical			
			Toluene 243	Acetone 704000	Xylene 132	Tetrachloro ethene 9.83 mg/kg
1	CAN009-AWD1-031A	Surface	11U	28	R	14
	CAN009-AWD1-032D	10.0	12U	12U	12U	12U
2	CAN009-AWD2-031A	Surface	56U	56U	56U	56U
	CAN009-AWD2-032D	10.0	11U	16	11U	11U
	CAN009-AWD2-831D			11U (QCD)		
3	CAN009-AWD3-031A	Surface	58U	250	58U	58U
	CAN009-AWD3-032D	10.0	11U	R	11U	11U
4	CAN009-AWD4-031A	Surface	43J	170	52J	58U
	CAN009-AWD4-032D	10.0	11U	11U	11U	11U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at the same lab as the normal sample.

Source: LRL Sciences, Inc., 1993

Table 7-1b
Concentration (mg/kg) of Total Metals
SWMU 9

Borehole Number	Sample Number (CAN009-AWD)	Sample Depth (feet)	Barium 5450 mg/kg		Chromium 234		Nickel 1560
1	1-021A	0	**840**	J	**19.5**	J	5.9
	1-022C	5	161	J	8.1	J	7.3
	1-023D	10	**1380**	J	3.2	J	3.6
(QAD)	1-721D	10	**1240**		5		4.5
(QCD)	1-821D	10	181	J	5.8	J	5.1
	1-024E	15	100	J	7.3	J	6.8
	1-025F	20	97.7	J	4.3	J	3
2	2-021A	0	623	J	**22.3**	J	7.7
	2-022C	5	149	J	11.3	J	8.4
	2-023D	10	256	J	5.6	J	5.9
(QAD)	2-721D	10	207		7.5		5.8
(QCD)	2-821D	10	171	J	6.1	J	6.4
	2-024E	15	99.4	J	8	J	6.5
	2-025F	20	532	J	5.8	J	4.8
3	3-021A	0	603	J	**17.7**	J	**10.5**
	3-022C	5	220	J	5.1	J	6.1
	3-023D	10	274	J	5.3	J	5.7
	3-024E	15	184	J	7.2	J	6.7
	3-025F	20	253	J	5.9	J	4.3
4	4-021A	0	457	J	**26.9**	J	10
	4-022C	5	215	J	**13.1**	J	8.5
	4-023D	10	**820**	J	5.1	J	4.4
	4-024E	15	86.7	J	8	J	7.4
	4-025F	20	55.6	J	6.1		4.3
Background (95% UCL) (1)			642.00		12.50		9.00

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 7-2a
Summary of Soil Sample Results
SWMU 9

SUMMARY OF SWMU 9 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals >bkgd* mg/Kg
1	8	Sandtrap	ND	<20	<10	NT	NT	NT	NT	NT
2	8	Sandtrap	ND	<20	<10	NT	NT	NT	NT	NT
3	8	Sandtrap	0.8	<100	<10	ND	ND	NT	NT	NT
4	8	Sandtrap	ND	20	<10	NT	NT	NT	NT	NT
5	8	Sandtrap	ND	<100	<10	NT	NT	NT	NT	NT
6	8	Sandtrap	0.4	<20	<10	NT	NT	NT	NT	NT
7	4	Sandtrap	1.3	<100	<50	ND	ND	NT	NT	NT
8	4	Sandtrap	1.7	<100	<50	NT	NT	NT	NT	NT
9	8	Sandtrap	NT	NT	NT	NT	ND	ND	ND[1]	< bkgd
10	n/a	excavated soil	NT	NT	NT	ND	ND	NT	NT	NT
11	6	trench floor	NT	NT	NT	NT	NT	NT	NT	NT
12	6	trench floor	0.3	<100	<50	ND	ND	NT	NT	NT
13	6	trench floor	0.2	<100	<10	NT	NT	NT	NT	NT
14	6	trench floor	1.4	<100	<10	NT	NT	NT	NT	NT
15	6	trench floor	2.1	<100	<10	NT	NT	NT	NT	NT
16	n/a	excavated soil	NT	NT	NT	ND	ND	NT	NT	NT
17	3	trench sidewall	22.3	<100	<300	ND	ND	NT	NT	NT
18	3	trench sidewall	0.3	<100	<10	NT	NT	NT	NT	NT
19	3	trench sidewall	ND	<100	<50	NT	NT	NT	NT	NT
20	3	trench sidewall	ND	<100	<10	NT	NT	NT	NT	NT

[1] Only contaminant identified: Di-n-butylphalate at 15 mg/Kg. ND indicates non-detect
ND indicates non-detect
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 7-2b
Maximum Soil Sample Concentrations
SWMU 9

SWMU 9 Maximum Soil Sample Concentrations						
Sample No.	Total Metals mg/Kg		TCLP Metals mg/L	Background Conc. Region V1/ Cannon AFB' mg/Kg		Region VI Residential RBSL mg/Kg
9	Arsenic	< 3.0	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	155	1.2	430	805	5300 N
	Chromium	4.4	< 0.02	38	13.3	31 C
	Nickel	4.5	NT	16	11.4	1500 N
	Selenium	2.5	< 0.05	10-18	1.1	380 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

'CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 8-1a
Concentration (µg/kg) of VOCs
SWMU 11

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Toluene	Methylene Chloride
1	CAN011-1701-031A	Surface	58U	58U
	CAN011-1701-032D	10.0	11U	11U
2	CAN011-1702-031A	Surface	11U	6J
	CAN011-1702-032D	10.0	10U	6J
3	CAN011-1703-031A	Surface	13	11U
	CAN011-1703-032D	10.0	11U	11U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc., 1993

Table 8-1b
Concentration (mg/kg) of Total Metals
SWMU 11

Borehole Number	Sample Number (CAN011-170)	Sample Depth (feet)	Chromium		Mercury		Nickel	
1	1-021A	0	14.3	UJ	0.02	U	4.9	J
	1-022B	2.5	11.1	UJ	0.02	U	**9.6**	
	1-023C	5	5.3	UJ	0.02	U	4.5	J
	1-024D	10	6.7	UJ	0.1	U	4.6	J
(QAD)	1-721D	10	5.3		**0.26**		4.7	
(QCD)	1-821D	10	5.1	UJ	0.01	U	4.2	J
2	2-021A	0	9.2	UJ	0.03	U	5.2	J
	2-022B	2.5	8.4	UJ	0.02	U	**9.6**	J
	2-023C	5	5.6	UJ	0.02	U	3.6	J
	2-024D	10	3.7	UJ	0.03	U	3.2	
3	3-021A	0	15.1	UJ+	0.02	U	7.3	J
	3-022B	2.5	8	UJ	0.1	U	**10.6**	J
	3-023C	5	3.1	UJ	0.01	U	5.1	J
	3-024D	10	1.1	UJ	0.01	U	3.8	J
Background (95% UCL) (1)			12.50		0.13		9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 8-2a
Summary of Soil Sample Results
SWMU 11

SUMMARY OF SWMU 11 SOIL SAMPLE RESULTS										
No.	Depth	Location	PID units	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
2	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
3	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	8	OWS	ND	<20	10	ND	ND	NT	NT	NT
5	9	OWS	ND	<20	<50	ND	ND	NT	NT	NT
6	9	OWS	ND	ND	<50	ND	NT	NT	NT	NT
7	9	OWS	NT	NT	NT	NT	ND	ND	ND	< bkgd
8	N/A	excavated material	NT	NT	NT	ND	ND	NT	NT	NT

ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 8-2b
Maximum Soil Sample Concentrations
SWMU 11

SWMU 11 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Barium	456	1.8	430	805	5300 N
	Chromium	5.4	<0.02	38	13.3	31 C
	Nickel	6.6	NT	16	11.4	1500 N
	Lead	7.6	<0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 9-1
Concentration (mg/kg) of Total Metals
SWMU 16

Borehole Number	Sample Number (CAN016-680)	Sample Depth (feet)	Lead		Mercury		Nickel
1	1-021A	0	20.5		0.03	U	8.1
	1-022B	2.5	10.1		0.03	U	6.9
	1-023C	5	9.2		0.02	U	9.3
	1-024D	10	4.3		0.01	U	7
2	2-021A	0	21.5		0.1	U	7
	2-022B	2.5	16.3		0.05	U	7.9
	2-023C	5	7		0.1	U	9.3
	2-024D	10	8		0.01	U	3.7
3	3-021A	0	41.3		0.02	U	6.2
	3-022B	2.5	14.9	J	0.02	U	6.7
(QAD)	3-721B	2.5	17.7		0.24		5.9
(QCD)	3-821B	2.5	13.7		0.02	U	5.5
	3-023C	5	8.3		0.1	U	9.6
	3-024D	10	12		0.01	U	6
Background (95% UCL) (1)			25.80		0.13		9.00

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 10-1a
Concentration (µg/kg) of VOCs
SWMU 32A

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Acetone	Xylene
1	CAN32A-1861-031A	Surface	11UJ	11U
	CAN32A-1861-032C	5.0	12UJ	12U
	CAN321-1861-831C		12J (QCD)	
2	CAN32A-1862-031A	Surface	12UJ	34
	CAN32A-1862-032C	5.0	12UJ	12U
3	CAN32A-1863-031A	Surface	11UJ	11U
	CAN321-1863-032C	5.0	12UJ	12U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected

U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QAD = duplicate analyzed at the same lab as the normal sample.

Source: LRL Sciences, Inc., 1993

Table 10-1b
Concentration (mg/kg) of Total Metals
SWMU 32A

Borehole Number	Sample Number (CAN32A-186)	Sample Depth (feet)	Barium		Mercury		Nickel	
1	1-021A	0	140	J	0.01	U	5.5	
	1-022B	2.5	84.4	J	0.02	U	**10.3**	
	1-023C	5	122	J	0.1	U	4.6	J
(QAD)	1-721C	5	161		**0.27**		6.5	
(QCD)	1-821C	5	82.2	J	0.01	U	5	J
	1-024D	10	81.9	J	0.01	U	4.6	J
2	2-012A	0	505	J	0.01	U	4.6	J
	2-022B	2.5	83.1	J	0.02	U	8.4	J
	2-023C	5	91	J	0.01	U	5.3	J
	2-024D	10	38.3	J	0.01	U	5.1	J
3	3-021A	0	346	J	0.01	U	4.8	J
	3-022B	2.5	121	J	0.02	U	4.6	J
	3-023C	5	123	J	0.01	U	4.7	J
	3-024D	10	**1480**	J	0.01	U	6	J
Background (95% UCL) (1)			642.00		0.13		9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc., 1993

Table 10-2a
Summary of Soil Sample Results
SWMU 32A

SUMMARY OF SWMU 32a SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	9	OWS	ND	<20	<10	NT	NT	NT	NT	NT
2	9	OWS	ND	<20	<10	ND	ND	NT	NT	NT
3	9	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	9	OWS	ND	<20	<10	NT	NT	NT	NT	NT
5	9.5	OWS	ND	<20	<10	ND	ND	NT	NT	NT
6	9.5	OWS	ND	<20	<10	NT	NT	NT	NT	NT
7	10	OWS	NT	NT	NT	NT	ND	ND	ND	< bkgd
8	n/a	excavated material	NT	NT	NT	ND	ND	NT	NT	NT

ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 10-2b
Maximum Soil Sample Concentration of Metals
SWMU 32A

SWMU 11 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Arsenic	< 3.0	< 0.4	1.12-16.7	3.6	0.32 C
	Barium	125	1.4	430	805	5300 N
	Chromium	9.3	<0.02	38	13.3	31 C
	Nickel	6.5	NT	16	11.4	1500 N
	Lead	4.8	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Note: The above table header should have read "SWMU 32A," not "SWMU 11."
Source: US Army Corps of Engineers, 1999

Table 11-1a
Concentration (µg/kg) of VOCs
SWMU 33B

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Acetone	Xylene
1	CAN33B-1861-031A	Surface	8J	11U
	CAN33B-1861-032D	10.0	12J	13U
2	CAN33B-1862-031A	Surface	15J	12U
	CAN33B-1862-032D	10.0	12UJ	12U
	CAN33B-1862-831D		13 (QCD)	
3	CAN33B-1863-031A	Surface	7J	6J
	CAN3B-1863-032D	10.0	7J	12U
	CAN33B-1863-831D		15 (QCD)	

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected

U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at the same laboratory as the normal sample

Source: LRL Sciences, Inc, 1993

Table 11-1b
Concentration (µg/kg) of BTEX
SWMU 33B

Borehole Number	Cannon Number	Depth (ft.)	Chemical				
			Benzene	Ethly Benzene	Toluene	Xylene	BTEX Total
1	CAN33B-1861-011B	2.5	2U	2U	2U	2U	2U
	CAN33B-1861-012C	5.0	2U	2U	7	2U	7
2	CAN33B-1862-011B	2.5	2U	2U	2U	2U	2U
	CAN33B-1862-012C	5.0	2U	2U	2U	2U	2U
3	CAN33B-1863-011B	2.5	2U	2U	2U	2U	2U
	CAN33B-1863-012C	5.0	2U	2U	2U	2U	2U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc, 1993

Table 11-1c
Concentration (mg/kg) of Total Metals
SWMU 33B

Borehole Number	Sample Number (CAN33B-186)	Sample Depth (feet)	Arsenic		Barium		Chromium		Nickel	
1	1-021A	0	4.9	J	270	J	6.2		6.1	J
	1-022B	2.5	2.2	J	79.9	J	7		7.4	J
	1-023C	5	2.7	J	80.4	J	7.2		5.8	J
	1-024D	10	2.7	J	108	J	6.3		5.1	J
2	2-021A	0	4.4	J	435	J	**53.5**		7.6	J
	2-022B	2.5	3.3	J	99.5	J	6		7	J
	2-023C	5	2.9	J	139	J	3.6		3.3	J
	2-024D	10	3.1	J	336	J	3.3		2.7	J
(QAD)	2-721D	10	2.5		423		3.6		4	
(QCD)	2-821D	10	2.7	J	234	J	3.1	U	3.6	J
3	3-021A	0	5.2	J	560	J	**41.3**		9.4	J
	3-022B	2.5	**32.4**	J	53.2	J	5.8		5.9	J
	3-023C	5	2.1	J	306	J	4.9		3.6	J
	3-024D	10	1.7	J	654	J	3.2	U	3.2	J
	3-721D	10	2.8		**1130**		3		3.2	
	3-821D	10	3.6	J	754	J	5.2		3.4	J
Background (95% UCL) (1)			15.50		642.00		12.50		9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc, 1993

Table 11-2a
Summary of Soil Sample Results
SWMU 33B

SUMMARY OF SWMU 33b SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
2	8	OWS	0.1	<20	<10	ND	ND	NT	NT	NT
3	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
5	9	OWS	ND	ND	ND	NT	NT	NT	NT	NT
6	9	OWS	0.3	<20	<10	ND	ND	NT	NT	NT
7	9	OWS	NT	NT	NT	NT	ND	ND	ND	< bkgd
8	n/a	excavated material	ND	<20	10	NT	NT	NT	NT	NT

ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 11-2b
Maximum Soil Sample Concentration of Metals
SWMU 33B

SWMU 33b Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Arsenic	< 3.0	< 0.40	1.12-16.7	3.6	0.32 C
	Barium	125	1.1	430	805	5300 N
	Cadmium	0.22	< 0.05	0.01-1.0	1.3	38 N
	Chromium	6.1	< 0.02	38	13.3	31 C
	Nickel	5.8	NT	16	11.4	1500 N
	Lead	4.6	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 12-1a
Concentration (µg/kg) of VOCs
SWMU 38

Borehole Number	Cannon Number	Depth (ft.)	Chemical		
			Acetone	Toluene	1,1,1-Trichloroethane
1	CAN038-1941-031A	Surface	13J	11U	11U
	CAN038-1941-032B	2.5	13	12U	12U
	CAN038-1941-831B		11U (QC)		
2	CAN038-1942-031A	Surface	11UJ	11U	11U
	CAN038-1942-032B	2.5	17J	12U	12U
3	CAN038-1943-031A	Surface	10UJ	5J	8J
	CAN038-1943-032B	2.5	11UJ	11U	11U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc, 1993

Table 12-1b
Concentration (mg/kg) of Total Metals
SWMU 38

Borehole Number	Sample Number (CAN038-194)	Sample Depth (feet)	Chromium		Nickel	
1	1-021A	0	10.6	UJ	7.8	J
	1-022B	2.5	10.4	UJ	**9.2**	
(QAD)	1-721B	2.5	**13.9**		**10.6**	
(QCD)	1-821B	2.5	10.2	UJ	9	J
	1-023C	5	12.1	UJ	**11**	J
	1-024D	10	3	UJ	3.7	J
2	2-021A	0	6.6	UJ	6.9	J
	2-022B	2.5	9.8	UJ	9	J
	2-023C	5	9.2	UJ	9.7	J
	2-024D	10	6.8	UJ	6.6	J
3	3-021A	0	12	UJ	7.3	J
	3-022B	2.5	8.6	UJ	6.2	J
	3-023C	5	11	UJ	**10.4**	J
	3-024D	10	3.4	UJ	3.9	J
Background (95% UCL) (1)			12.50		9.00	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc, 1993

Table 12-2a
Summary of Soil Sample Results
SWMU 38

SUMMARY OF SWMU 38 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	n/a	excavated soils	ND	<20	<10	NT	NT	NT	NT	NT
2	12	OWS	ND	ND	<10	NT	NT	NT	NT	NT
3	12	OWS	ND	ND	<10	NT	NT	NT	NT	NT
4	12	OWS	0.1	<20	<10	ND	ND	NT	NT	NT
5	12	OWS	ND	<20	ND	ND	ND	NT	NT	NT
6	14	OWS	ND	<20	ND	NT	NT	NT	NT	NT
7	7	OWS	ND	<20	<10	NT	NT	NT	NT	NT
8	12	OWS	NT	NT	NT	NT	ND	ND	ND[1]	< bkgd

[1] Only contaminant identified: Di-n-butylphthalate at 13.0 mg/Kg, which was also found in the laboratory method blank.
ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 12-2b
Maximum Soil Sample Concentration of Metals
SWMU 38

SWMU 38 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Barium	54.4	1.2	430	642	5300 N
	Chromium	8	< 0.02	38	13.3	31 C
	Nickel	6.5	NT	16	11.4	1500 N
	Lead	4.2	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 13-1a
Concentration (µg/kg) of VOCs
SWMU 39

Borehole Number	Cannon Number	Depth (ft.)	Chemical	
			Acetone	Toluene
1	CAN039-1951-031A	Surface	R	12J
	CAN039-1951-032C	5.0	R	12U
2	CAN039-1952-031A	Surface	5J	10U
	CAN039-1952-032C	5.0	38	12U
3	CAN039-1953-031A	Surface	10U	10U
	CAN039-1953-032C	5.0	9J	12U
	CAN039-1953-831C		11U (QCD)	

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected

U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at the same laboratory as the normal sample.

Source: LRL Sciences, Inc, 1993

Table 13-1b
Concentration (mg/kg) of Total Metals
SWMU 39

Borehole Number	Sample Number (CAN039-195)	Sample Depth (feet)	Barium		Chromium		Lead		Nickel
1	1-021A	0	341	J	6.4	J	5.2	J	5.8
	1-022B	2.5	81.5	J	9.9	J	8.1	J	8.3
	1-023C	5	89.7	J	10.2	J	**163**	J	9.3
	1-024D	10	530	J	3.6	J	4.2	J	5.2
2	2-021A	0	464	J	10.5	J	4.2	J	4.3
	2-022B	2.5	79.8	J	12.5	J	6.7	J	9.7
	2-023C	5	66.4	J	8.8	J	52	J	8.7
	2-024D	10	187	J	4.9	J	5.2	J	5.2
3	3-021A	0	589	J	10.9	J	5.5	J	5.5
	3-022B	2.5	79.1	J	11.8	J	7.5	J	9.1
	3-023C	5	93.2	J	9.9	J	8.4	J	8.5
(QAD)	3-721C	5	113		**14.9**		9		11.8
(QCD)	3-821C	5	102	J	11.2	J	9.1	J	10.2
	3-024D	10	**2200**	J	3.7	J	3.6	J	4.3
Background (95% UCL) (1)			642.00		12.50		25.80		9.00

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Sciences, Inc, 1993

Table 13-2a
Summary of Soil Sample Results
SWMU 39

SUMMARY OF SWMU 39 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX pprn	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	8.5	OWS	ND	<15	<50	NT	NT	NT	NT	NT
2	8.5	OWS	ND	<15	<10	NT	NT	NT	NT	NT
3	8.5	OWS	ND	<15	<50	NT	NT	NT	NT	NT
4	8.5	OWS	ND	<15	<10	NT	NT	NT	NT	NT
5	9	OWS	0.3	<15	<10	ND	ND	NT	NT	NT
6	9	OWS	0.1	<15	<10	NT	NT	NT	NT	NT
7	9	OWS	NT	NT	NT	NT	ND	ND	ND[1]	Cr, Pb[2]
8	n/a	OWS	ND	<100	<10	NT	NT	NT	NT	NT

[1] Only contaminant identified: Di-n-butylphthalate at 27 mg/Kg, which was also found in the laboratory method blank.
[2] Chromium at 11.2 mg/Kg, Lead at 15.4 mg/Kg.
ND indicates non-detect, or below detection limit
NT indicates not tested

Source: US Army Corps of Engineers, 1999

Table 13-2b
Maximum Soil Sample Concentration of Metals
SWMU 39

SWMU 39 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Barium	99.6	1.2	430	805	5300 N
	Chromium	11.2	< 0.02	38	13.3	31 C
	Nickel	8.9	NT	16	11.4	1500 N
	Lead	15.4	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 14-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 46

LOCATOR	CAN046-0461-0000			CAN046-0461-0002			CAN046-0462-0000			CAN046-0462-0002			CAN046-0463-0000			CAN046-0463-0002		
LAB SAMPLE NUMBER	03140300 10SA			03140300 11SA			03140100 13SA			03140100 14SA			03140300 15SA			03140300 16SA		
COLLECT DATE	09/24/93			09/24/93			09/23/93			09/23/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Ethylbenzene 10000	1.5	5.9	J	<	6	U	<	5.7	U	<	5.9	U	<	5.3	U	<	5.8	U
Toluene 248	2.6	5.9	J	1.5	6	J	<	5.7	U	<	5.9	U	1.2	5.3	J	15	5.8	
1,1,1-Trichloroethane 551	<	5.9	U	<	6	U	<	5.7	U	4.3	5.9	J	<	5.3	U	<	5.8	U
Xylenes (total) 132	5.4	5.9	J	2.5	6	J	<	5.7	U	<	5.9	U	2.6	5.3	J	<	5.8	U
Semivolatile Organics (ug/kg)																		
Benzo(b)fluoranthene 6.21	<	390	J										46	350	J			
Fluoranthene 2250	47	390	J										48	350	J			
Fluorene 3130	40	390	J										<	350	U			
Pyrene 2300	<	390	U										70	350	J			
Metals (mg/kg)																		
~~Aluminum~~	9270	11.9		10200	11.9		5210	11.4		6250	23.4		9290	10.6	J	9300	11.6	
Antimony 31.3	6.7	7.1	J	6.7	7.2	J	<	6.8	U	<	14.1	U	<	6.4	U	<	7	U
Arsenic 3.9	2.5	0.59		2.9	0.6		1.6	0.57		1.3	0.59		2.2	0.53		2.8	0.58	
Barium 5450	188	1.2		587	1.2		77.3	1.1		632	2.3		144	1.1	J	381	1.2	
Beryllium 156	0.56	0.24		0.51	0.24		0.52	0.23		0.6	0.47		0.49	0.21		0.54	0.23	
~~Calcium~~	66400	23.8		85200	23.9		2290	22.8		129000	46.8		26200	21.2		61200	23.2	
Chromium 234	7.3	1.2		6.2	1.2		6.2	1.1		3.5	2.3		8.1	1.1	J	7.7	1.2	
Cobalt 1520	3.6	1.2		3.7	1.2		3.5	1.1		3.5	2.3		3.3	1.1		3.7	1.2	
Copper 3130	7.4	2.4		6.1	2.4		5.7	2.3		6.1	4.7		6.7	2.1	J	8.1	2.3	
~~Iron~~	8300	11.9		8040	11.9		6650	11.4		5880	23.4		8490	10.6		9140	11.6	
Lead 400	23.1	3		29.4	6		5.8	0.57		3.5	0.59		20.2	2.7		17.1	2.9	

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A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 46

LOCATOR	CAN046-0461-0000			CAN046-0461-0002			CAN046-0462-0000			CAN046-0462-0002			CAN046-0463-0000			CAN046-0463-0002		
LAB SAMPLE NUMBER	0314030010SA			0314030011SA			0314010013SA			0314010014SA			0314030015SA			0314030016SA		
COLLECT DATE	09/24/93			09/24/93			09/23/93			09/23/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Magnesium	2370	23.8		2740	23.9		977	22.8		2180	46.8		1900	21.2		2580	23.2	
Manganese	153	1.2		132	1.2		224	1.1		118	2.3		172	1.1		172	1.2	
Nickel 1560	8.4	4.8		8.5	4.8		6.6	4.6		<	9.4	U	8.1	4.2		9.2	4.6	
Potassium	1680	595		1890	597		1150	569		1340	1170		1800	531	J	1890	579	
Thallium 516	<	0.59	U	0.12	0.6	J	<	0.57	U	<	1.2	J	<	0.53	U	0.13	0.58	J
Vanadium 548	17.8	1.2		18.9	1.2		16.9	1.1		14.4	2.3		18.5	1.1		22.2	1.2	
Zinc [illegible]	22	2.4		20.9	2.4		14.1	2.3		14.9	4.7		22.1	2.1	J	23.9	2.3	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	225	47.6		91	47.8		<	45.5	U	<	46.8	U	326	42.4		295	46.3	
Water Quality (percent)																		
Water	16	0.1		16	0.1		12	0.1		15	0.1		5.8	0.1		14	0.1	

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R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 46

LOCATOR	CAN046-0461-0004			CAN046-0461-0008			CAN046-0462-0004			CAN046-0462-0008			CAN046-0463-0004			CAN046-0463-0008		
LAB SAMPLE NUMBER	0314030012SA			0314030013SA			0314010015SA			0314010016SA			0314030017SA			0314030018RA		
COLLECT DATE	09/24/93			09/24/93			09/23/93			09/23/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	3.7	5.8	J	<	6	U	<	6.1	U	<	5.8	U	2.1	5.8	J	2.4	5	J
Xylenes (total)	<	5.8	U	<	6	U	<	6.1	U	<	5.8	U	3.3	5.8	J	<	5	U
Semivolatile Organics (ug/kg)																		
Fluoranthene				<	390	U												
Phenanthrene				<	390	U												
Metals (mg/kg)																		
Aluminum	10200	11.5		4210	59.8		2580	61.2		1970	57.5		9190	11.6				
Antimony	<	6.9	U	<	35.9	U	<	36.7	U	<	34.5	U	6.3	7	J			
Arsenic	2.6	0.58		2.2	0.6		1.8	0.61		1.5	0.58		2.5	0.58				
Barium	163	1.2		1290	6		140	6.1		275	5.8		132	1.2				
Beryllium	0.54	0.23		<	1.2	U	<	1.2	U	<	1.2	U	0.59	0.23				
Calcium	46200	23		204000	120		255000	122		243000	115		25800	23.2				
Chromium	8.1	1.2		<	6	U	<	6.1	U	<	5.8	U	8.7	1.2				
Cobalt	3.6	1.2		<	6	U	<	6.1	U	<	5.8	U	4	1.2				
Copper	7.2	2.3		4	12	J	<	12.2	U	<	11.5	U	7.6	2.3				
Iron	8810	11.5		3580	59.8		2490	61.2		1590	57.5		9210	11.6				
Lead	20.5	2.9		3.1	0.6		2.8	1.2		1.8	0.58		18.5	2.9				
Magnesium	2220	23		3820	120		3180	122		3050	115		2010	23.2				
Manganese	171	1.2		39.6	6		30.8	6.1		22.1	5.8		206	1.2				
Nickel	8.9	4.6		<	23.9	U	<	24.5	U	<	23	U	8.4	4.6				
Potassium	1880	575		1260	2990	J	<	3060	U	447	2880	J	1990	580				

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J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 46

LOCATOR	CAN046-0461-0004			CAN046-0461-0008			CAN046-0462-0004			CAN046-0462-0008			CAN046-0463-0004			CAN046-0463-0008		
LAB SAMPLE NUMBER	0314030012SA			0314030013SA			0314010015SA			03140100016SA			0314030017SA			0314030018RA		
COLLECT DATE	09/24/93			09/24/93			09/23/93			09/23/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Thallium	0.13	0.58	J	<	1.2	U	<	1.2	J	<	1.2	J	<	0.58	U			
Vanadium	19.2	1.2		14.4	6		9.8	6.1		6	5.8		20	1.2				
Zinc	23.3	2.3		8.1	12	J	<	12.2	U	4.3	11.5	J	22.4	2.3				
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	146	46		<	47.9	U	<	49	U	<	46	U	155	46.4				
Water Quality (percent)																		
Water	13	0.1		16	0.1		18	0.1		13	0.1		14	0.1				

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 46

LOCATOR	CAN046-0463-0008		
LAB SAMPLE NUMBER	0314030018SA		
COLLECT DATE	09/24/93		
	Result	RL	Qual
Volatile Organics (ug/kg)			
Toluene	<	580	U
Xylenes (total)	<	580	U
Semivolatile Organics (ug/kg)			
Fluoranthene	45	380	J
Phenanthrene	39	380	J
Metals (mg/kg)			
Aluminum	4030	57.6	
Antimony	<	34.6	U
Arsenic	1.7	0.58	
Barium	165	5.8	
Beryllium	<	1.2	U
Calcium	224000	115	
Chromium	<	5.8	U
Cobalt	<	5.8	U
Copper	4.4	11.5	J
Iron	3330	57.6	
Lead	2.2	0.58	
Magnesium	3530	115	
Manganese	39.7	5.8	
Nickel	<	23	U
Potassium	977	2880	J

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 46

LOCATOR	CAN046-0463-0001		
LAB SAMPLE NUMBER	0314030018SA		
COLLECT DATE	09/24/93		
	Result	RL	Qual
Thallium	<	1.2	U
Vanadium	13.9	5.8	
Zinc	<	11.5	U
TPH (mg/kg)			
Total Petroleum Hydrocarbons	<	46.1	U
Water Quality (percent)			
Water	13	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix ___.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 14-1c
Comparison of Maximum Concentrations with RBCs
SWMU 46

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN046-0462-0002	1,1,1-Trichloroethane	0.0043	700	N
CAN046-0461-0002	**Antimony**	**6.7**	**3**	**Y**
CAN046-0461-0008	**Barium**	**1290**	**600**	**Y**
CAN046-0463-0000	Benzo(b)fluoranthene	0.046	0.07	N
CAN046-0463-0002	Copper	8.1	300	N
CAN046-0461-0000	Ethylbenzene	0.0015	800	N
CAN046-0463-0000	Fluoranthene	0.048	300	N
CAN046-0461-0000	Fluorene	0.04	300	N
CAN046-0461-0002	Lead (3)	29.4	500	N
CAN046-0463-0002	Nickel	9.2	200	N
CAN046-0463-0008	Phenanthrene	0.039	NTF	N
CAN046-0463-0000	Pyrene	0.07	200	N
CAN046-0463-0002	Thallium	0.13	6	N
CAN046-0463-0002	Toluene	0.015	2000	N
CAN046-0463-0000	Total Petroleum Hydrocarbons (4)	326	1000	N
CAN046-0461-0000	Xylenes (total)	0.0054	20000	N
CAN046-0463-0002	Zinc	23.9	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) EPA suggests 500-1,000 mg/kg as allowable concentration for residential soils based on EPA's IUBK Lead Model (EPA 1990)

(4) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 14-2a
Summary of Soil Sample Results
SWMU 46

SUMMARY OF SWMU 46 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	4	OWS	ND	<15	<50	NT	NT	NT	NT	NT
2	4	OWS	ND	<15	<10	NT	NT	NT	NT	NT
3	4	OWS	0.1	<100	<10	NT	NT	NT	NT	NT
4	4	OWS	ND	<100	<50	ND	ND	NT	NT	NT
5	10	OWS	ND	<15	<50	NT	NT	NT	NT	NT
6	10	OWS	ND	<100	<50	ND	NT	NT	NT	NT
7	10	OWS	NT	NT	NT	NT	ND	ND	ND	Pb[1]
8	n/a	OWS	ND	<15	<50	NT	NT	NT	NT	< bkgd

ND indicates non-detect, or below detection limit
NT indicates not tested
[1] Lead at 13.8 mg/Kg.
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 14-2b
Maximum Soil Sample Concentration of Metals
SWMU 46

SWMU 46 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Barium	163	1.4	430	805	5300 N
	Chromium	7.2	< 0.02	38	13.3	31 C
	Nickel	7.1	NT	16	11.4	1500 N
	Lead	13.8	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 15-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 47

LOCATOR	CAN047-0471-0000			CAN047-0471-0002			CAN047-0472-0000			CAN047-0472-0001			CAN047-0473-0000			CAN047-0473-0002		
LAB SAMPLE NUMBER	0312760009SA			0312760010SA			0312780001SA			0312780002SA			0312790003SA			0312790004SA		
COLLECT DATE	09/14/93			09/14/93			09/14/93			09/14/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	<	5.9	J	<	5.7	U	<	5.6	U	1.6	5.8	J	1.8	5.5	J	<	5.6	U
Xylenes (total)	<	5.9	U	<	5.7	U	<	5.6	U	<	5.8	U	2.8	5.5	J	<	5.6	U
Semivolatile Organics (ug/kg)																		
Benzo(b)fluoranthene	<	390	U				<	370	U									
Butyl benzyl phthalate	<	390	U				<	370	U									
Fluoranthene	<	390	U				<	370	U									
Pyrene	<	390	U				<	370	U									
Metals (mg/kg)																		
Aluminum	9090	11.8		6390	11.3		4150	11.2	J	4730	11.5		4810	11		5680	11.1	
Antimony	<	7.1	U	1.5	6.8	J	<	6.7	U	<	6.9	U	<	6.6	U	<	6.7	U
Arsenic	2.7	0.59		1.9	0.57		2.5	0.56		2.2	0.58		2.5	0.55		2.3	0.56	
Barium	97.5	1.2	J	172	1.1	J	123	1.1	J	127	1.2	J	118	1.1	J	107	1.1	J
Beryllium	0.67	0.24		0.51	0.23		0.47	0.22		0.45	0.23		0.39	0.22		0.56	0.22	
Cadmium	<	0.59	U	0.61	0.57		<	0.56	U	<	0.58	U	0.69	0.55		0.57	0.56	
Calcium	4560	23.6		33300	22.6		23500	22.4		76900	23		25200	22		47000	22.3	
Chromium	10.8	1.2		7.2	1.1		4.8	1.1	J	4.5	1.2		7.2	1.1		7.1	1.1	
Cobalt	5.4	1.2		4.3	1.1		2.6	1.1		3.2	1.2		2.5	1.1		3.6	1.1	
Copper	9.3	2.4		8.3	2.3		4.9	2.2		6	2.3		6.5	2.2		7.3	2.2	
Iron	9720	11.8		6570	11.3		5140	11.2		4850	11.5		5900	11		6790	11.1	

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J = Estimated value.
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Source: Woodward-Clyde, 1994

Table 15-1a
Summary of Chemicals Reported for Near-Surface Soil Samples Collected
SWMU 47

LOCATOR	CAN047-0471-0000			CAN047-0471-0002			CAN047-0472-0000			CAN047-0472-0002			CAN047-0473-0000			CAN047-0473-0002		
LAB SAMPLE NUMBER	0312760009SA			0312760010SA			0312780001SA			0312780002SA			0312790003SA			0312790004SA		
COLLECT DATE	09/14/93			09/14/93			09/14/93			09/14/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Lead	9	0.59		6.7	0.57		7.2	0.56		4.6	0.58		9.4	1.1		7.9	2.8	
Magnesium	1910	23.6		1870	22.6		1310	22.4	J	1760	23		1510	22		1990	22.3	
Manganese	240	1.2	J	162	1.1	J	147	1.1	J	118	1.2	J	180	1.1	J	135	1.1	J
Nickel	9.6	4.7		8.3	4.5		5.3	4.5	J	6.4	4.6		5.8	4.4		8	4.5	
Potassium	1860	589		1420	566		997	561	J	1140	576		1120	550		1390	557	
Selenium	<	0.59	U	<	1.1	J	<	0.56	U	<	1.2	J	<	0.55	U	<	1.1	J
Silver	0.53	1.2	J	0.62	1.1	J	<	1.1	U	<	1.2	U	0.33	1.1	J	<	1.1	U
Sodium	347	589	J	609	566		<	561	U	<	576	U	363	550	J	294	557	J
Vanadium	24.6	1.2		16.4	1.1		14.5	1.1		13.4	1.2		15.4	1.1		16.4	1.1	
Zinc	21.7	2.4		15.3	2.3		12.5	2.2		12	2.3		15.8	2.2		15.4	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	47.1	U	<	45.2	U	56.2	44.8		<	46.1	U	46.2	44		<	44.6	U
Water Quality (percent)																		
Water	15	0.1		12	0.1		11	0.1		13	0.1		9.2	0.1		10	0.1	

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Source: Woodward-Clyde, 1994

Table 15-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 47

LOCATOR	CAN047-0474-0000			CAN047-0474-0002			CAN047-0475-0000			CAN047-0475-0002		
LAB SAMPLE NUMBER	0311900001SA			0311900002SA			0311900005SA			0311900006SA		
COLLECT DATE	09/10/93			09/10/93			09/10/93			09/10/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)												
Toluene	2.4	5.3	J	2.6	5.5	J	1.2	5.2	J	4.8	5.5	J
Xylenes (total)	2.6	5.3	J	2	5.5	J	6.4	5.2		6.2	5.5	
Semivolatile Organics (ug/kg)												
Benzo(b)fluoranthene	46	350	J				48	340	J			
Butyl benzyl phthalate	100	350	J				210	340	J			
Fluoranthene	41	350	J				39	340	J			
Pyrene	44	350	J				35	340	J			
Metals (mg/kg)												
Aluminum	5180	10.6		8670	11		5220	10.4		7530	10.9	
Antimony	<	6.4	U	<	6.6	U	<	6.3	U	<	6.6	U
Arsenic	2	0.53		3	0.55		2.5	0.52		2.8	0.55	
Barium	110	1.1	J	89.7	1.1	J	89	1	J	145	1.1	J
Beryllium	0.38	0.21		0.64	0.22		0.34	0.21		0.39	0.22	
Cadmium	<	0.53	U	<	0.55	U	<	0.52	U	<	0.55	U
Calcium	17000	21.2		6680	22.1		8040	20.8		38300	21.9	
Chromium	6.4	1.1		9.3	1.1		7	1		8.2	1.1	
Cobalt	2.6	1.1		4.6	1.1		2.6	1		3.8	1.1	
Copper	8.2	2.1		8.3	2.2		7.6	2.1		8.6	2.2	
Iron	5880	10.6		9970	11		5990	10.4		8240	10.9	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 47

LOCATOR	CAN047-0474-0000			CAN047-0474-0002			CAN047-0475-0000			CAN047-0475-0002		
LAB SAMPLE NUMBER	0311900001SA			0311900002SA			0311900005SA			0311900006SA		
COLLECT DATE	09/10/93			09/10/93			09/10/93			09/10/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Lead	15.4	1.1		9.7	1.1		15	2.6		9.8	1.1	
Magnesium	1430	21.2		1740	22.1		1340	20.8		2190	21.9	
Manganese	141	1.1	J	211	1.1	J	133	1	J	198	1.1	J
Nickel	5.9	4.2		8	4.4		5.8	4.2		7.7	4.4	
Potassium	1240	530		1730	551		1430	521		1450	547	
Selenium	0.24	1.1	J	<	1.1	J	<	1	J	<	1.1	J
Silver	<	1.1	U	<	1.1	U	<	1	U	<	1.1	U
Sodium	<	530	U	<	551	U	<	521	U	<	547	U
Vanadium	13.8	1.1		21.8	1.1		13.7	1		18.7	1.1	
Zinc	32.2	2.1		24.8	2.2		29.1	2.1		18.9	2.2	
TPH (mg/kg)												
Total Petroleum Hydrocarbons	74.2	42.4		56.5	44.1		76.6	41.7		198	43.7	
Water Quality (percent)												
Water	5.7	0.1		9.3	0.1		4.1	0.1		8.5	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. QUAL=Qualification

U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 47

LOCATOR	CAN947-0471-0004			CAN947-0471-0008			CAN947-0472-0004			CAN947-0472-0008			CAN947-0473-0004			CAN947-0473-0008		
LAB SAMPLE NUMBER	0312760011SA			0312760012SA			0312780003SA			0312780004SA			0312790005SA			0312790006SA		
COLLECT DATE	09/14/93			09/14/93			09/14/93			09/14/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)																		
Aluminum	3410	23		4210	11.1		2540	59.8		2970	22.4	J	3300	22.2		5130	11.2	
Antimony	<	13.8	U	1.5	6.7	J	<	35.9	U	<	13.4	U	<	13.3	U	<	6.7	U
Arsenic	2.2	0.58		1.3	0.56		1.7	0.6		1.2	0.56		2	0.56		2.1	0.56	
Barium	428	2.3	J	398	1.1	J	133	6	J	205	2.2	J	132	2.2	J	325	1.1	J
Beryllium	0.26	0.46	J	0.36	0.22		<	1.2	U	0.25	0.45	J	0.27	0.44	J	0.58	0.22	
Cadmium	3.3	1.2		1.3	0.56		<	3	U	<	1.1	U	1.5	1.1		1.4	0.56	
Calcium	201000	46.1		109000	22.2		255000	120		138000	44.8		134000	44.4		107000	22.5	
Chromium	2.3	2.3		3.1	1.1		<	6	U	<	2.2	U	<	2.2	U	4.6	1.1	
Cobalt	2.9	2.3		1.8	1.1		<	6	U	<	2.2	U	1.3	2.2	J	2.8	1.1	
Copper	<	4.6	U	3	2.2		<	12	U	1.5	4.5	J	3.5	4.4	J	3.7	2.2	
Iron	3330	23		2640	11.1		2420	59.8		2060	22.4		3630	22.2		5200	11.2	
Lead	3	2.9		5.8	1.1		2.9	1.2		4.4	0.56		5.3	2.8		5.1	1.1	
Magnesium	3050	46.1		4110	22.2		2940	120		2770	44.8		2260	44.4		3580	22.5	
Manganese	54.2	2.3	J	48.9	1.1	J	27.7	6	J	38	2.2	J	40.3	2.2	J	106	1.1	J
Nickel	<	9.2	U	4.3	4.4	J	<	23.9	U	<	9	U	4.5	8.9	J	5.8	4.5	
Potassium	<	1150	U	1010	556		558	2990	J	703	1120	J	803	1110	J	1310	562	
Silver	<	2.3	U	0.64	1.1	J	<	6	U	<	2.2	U	<	2.2	U	<	1.1	U
Sodium	458	1150	J	163	556	J	<	2990	U	<	1120	U	496	1110	J	252	562	J
Vanadium	14.7	2.3		8.7	1.1		9.4	6		6.6	2.2		11.3	2.2		20.2	1.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 47

LOCATOR	CAN047-0471-0004			CAN047-0471-0008			CAN047-0472-0004			CAN047-0472-0008			CAN047-0473-0004			CAN047-0473-0008		
LAB SAMPLE NUMBER	0312760011SA			0312760012SA			0312780003SA			0312780004SA			0312790005SA			0312790006SA		
COLLECT DATE	09/14/93			09/14/93			09/14/93			09/14/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Zinc	8.7	4.6		7.5	2.2		10	12	J	6.3	4.5		9.6	4.4		11.9	2.2	
Water Quality (percent)																		
Water	13	0.1		10	0.1		16	0.1		11	0.1		10	0.1		11	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 47

LOCATOR	CAN047-0474-0004			CAN047-0474-0008			CAN047-0475-0004			CAN047-0475-0008		
LAB SAMPLE NUMBER	0311900003SA			0311900004SA			0311900007SA			0311900008SA		
COLLECT DATE	09/10/93			09/10/93			09/10/93			09/10/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)												
Aluminum	4270	22.6		4570	22.6		4370	11.2		6660	11.2	
Antimony	<	13.6	U	<	13.6	U	<	6.7	U	<	6.7	U
Arsenic	2.3	0.57		2	0.56		2.1	0.56		2.5	0.56	
Barium	155	2.3	J	341	2.3	J	157	1.1	J	426	1.1	J
Beryllium	<	0.45	U	0.23	0.45	J	0.15	0.22	J	0.48	0.22	
Cadmium	<	1.1	U	<	1.1	U	<	0.56	U	<	0.56	U
Calcium	196000	45.3		215000	45.2		176000	22.4		166000	22.3	
Chromium	4.2	2.3		5.2	2.3		4.7	1.1		6.6	1.1	
Cobalt	2.5	2.3		2.1	2.3	J	2	1.1		2.1	1.1	
Copper	3.8	4.5	J	3	4.5	J	5.5	2.2		3.5	2.2	
Iron	3980	22.6		3720	22.6		4090	11.2		5440	11.2	
Lead	3.5	1.1		3.4	1.1		3.6	1.1		5.1	1.1	
Magnesium	2690	45.3		3940	45.2		2370	22.4		4270	22.3	
Manganese	53.4	2.3	J	43.2	2.3	J	63	1.1	J	74.2	1.1	J
Nickel	5.1	9.1	J	5.6	9	J	6.7	4.5		6.3	4.5	
Potassium	806	1130	J	830	1130	J	833	559		1190	558	
Silver	<	2.3	U	<	2.3	U	0.38	1.1	J	<	1.1	U
Sodium	528	1130	J	<	1130	U	207	559	J	<	558	U
Vanadium	13	2.3		14.8	2.3		10.6	1.1		19.4	1.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 47

LOCATOR	CAN047-0474-0004			CAN047-0474-0008			CAN047-0475-0004			CAN047-0475-0008		
LAB SAMPLE NUMBER	0311900003SA			0311900004SA			0311900007SA			0311900008SA		
COLLECT DATE	09/10/93			09/10/93			09/10/93			09/10/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Zinc	10.9	4.5		11.7	4.5		16	2.2		27.4	2.2	
Water Quality (percent)												
Water	12	0.1		11	0.1		11	0.1		10	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. QUAL=Qualification

U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 15-1c
Comparison of Maximum Concentrations with RBCs
SWMU 47

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN047-0475-0000	Benzo(b)fluoranthene	0.048	0.07	N
CAN047-0475-0000	Butyl benzyl phthalate	0.21	2000	N
CAN047-0471-0000	Cobalt	5.4	NTF	N
CAN047-0471-0000	Copper	9.3	300	N
CAN047-0475-0000	Di-n-butyl phthalate	0.051	800	N
CAN047-0474-0000	Fluoranthene	0.041	300	N
CAN047-0471-0000	Nickel	9.6	200	N
CAN047-0474-0000	Pyrene	0.044	200	N
CAN047-0471-0008	Silver	0.64	20	N
CAN047-0471-0002	Sodium	609	NTF	N
CAN047-0475-0002	Toluene	0.0048	2000	N
CAN047-0475-0002	Total Petroleum Hydrocarbons (3)	198	1000	N
CAN047-0475-0000	Xylenes (total)	0.0064	20000	N
CAN047-0474-0000	Zinc	32.2	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 15-2a
Summary of Soil Sample Results
SWMU 47

SUMMARY OF SWMU 47 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
A/1	7.5	Sandtrap	0.0	<20	<50	NT	NT	NT	NT	NT
A/2	7.5	Sandtrap	0.0	<20	<50	NT	NT	NT	NT	NT
A/3	7.5	Sandtrap	0.2	<20	<50	ND	ND	NT	NT	NT
A/4	7.5	Sandtrap	0.1	<20	<50	NT	NT	NT	NT	NT
A/5	7.5	Sandtrap	0.3	<100	<50	ND	0.0266	NT	NT	NT
A/6	7.5	Sandtrap	0.1	<20	<50	NT	NT	NT	NT	NT
A/7	7.5	Sandtrap	NT	NT	NT	NT	ND	ND	ND[1]	< bkgd
A/8	n/a	excavated material	NT	NT	NT	ND	ND	NT	NT	NT
B/1	6	OWS	0.0	<20	<10	ND	ND	NT	NT	NT
B/2	6	OWS	0.0	<20	<10	NT	NT	NT	NT	NT
B/3	6	OWS	0.0	<20	<10	NT	NT	NT	NT	NT
B/4	6	OWS	0.0	<20	<10	NT	NT	NT	NT	NT
B/5	6	OWS	0.0	<20	<10	ND	ND	NT	NT	NT
B/6	6	OWS	0.0	<20	<10	NT	NT	NT	NT	NT
B/7	6	OWS	NT	NT	NT	NT	ND	ND	ND	Ag[3]
B/7QC	6	OWS	NT	NT	NT	NT	ND	ND	ND[2]	Ag[4]
B/8	n/a	excavated material	NT	NT	NT	ND	NT	NT	NT	NT

[1] Only contaminant identified: Di-n-butylphthalate at 22.0 mg/Kg, which was also found in the method blank.
[2] Only contaminant identified: Di-n-butylphthalate at 12.0 mg/Kg, which was also found in the method blank.
[3] Silver at 3.1 mg/Kg.
[4] Silver at 2.9 mg/Kg.
ND indicates non-detect, or below detection limit

Source: US Army Corps of Engineers, 1999

Table 15-2b
Maximum Soil Sample Concentration of Metals
SWMU 47

SWMU 47 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
B/7QC	Silver	2.9	< 0.04	0.01-5	2.65	380 N
	Arsenic	1.63 TCLP	< 0.40	1.1-16.7	3.6	0.32 C/2.2 N
	Cadmium	0.31	0.01	0.01-1.0	1.3	38 N
B/7	Barium	367	1.6	430	805	5300 N
	Lead	2.2	< 0.05	10-18	7.1	400 N
	Selenium	< 2.5	0.06	0.2	1.1	380 N
	Chromium	8.8	0.02	38	13.3	31 C
	Nickel	6.3	NT	16	11.4	1500 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 16-1a
Concentration (µg/kg) of VOCs
SWMU 48B

Borehole Number	Cannon Number	Depth (ft.)	Chemical		
			Acetone	Xylene	Methylene Chloride
1	CAN48A-UST1-031A	Surface	11U	11U	11U
	CAN48A-UST1-032C	5.0	R	R	-R
2	CAN48A-UST2-031A	Surface	11U	11U	11U
	CAN48A-UST2-032C	5.0	12U	12U	20U
3	CAN48A-UST3-031A	Surface	11U	11U	14U
	CAN48A-UST3-032C	5.0	10U	11U	15U
1	CAN48B-UST1-031A	Surface	R	12U	12U
	CAN48B-UST1-032C	5.0	51U	12U	37
2	CAN48B-UST2-031A	Surface	110	75	150
	CAN48B-UST2-032C	5.0	33	12U	32
	CAN48B-UST2-831C		39 (QCD)		36 (QCD)

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected

U = not detected at CRQL
UJ = estimated as non-detect at CRQL
QCD = duplicate analyzed at the same laboratory as the normal sample.

Source: LRL Science, Inc., 1993

Table 16-1b
Concentration (µg/kg) of BTEX
SWMU 48B

Borehole Number	Cannon Number	Depth (ft.)	Chemical				
			Benzene	Ethyl Benzene	Toluene	Xylene	BTEX Total
1	CAN48A-UST1-011D	10.0	10U	20	10U	110	130
	CAN48A-UST1-012F	20.0	2U	2U	2U	2U	2U
	CAN48A-UST1-013G	30.0	2U	2U	2U	2U	2U
2	CAN48A-UST2-011D	10.0	1000U	4200	1200	32000	37400
	CAN48A-UST2-012F	20.0	10000U	16000	10000U	100000	116000
	CAN48A-UST2-013G	30.0	2U	2U	2U	2U	2U
3	CAN48A-UST3-011D	10.0	2U	2U	2U	2U	2U
	CAN48A-UST3-012F	20.0	2U	2U	2U	2U	2U
	CAN48A-UST3-013G	30.0	2U	2U	2U	2U	2U
1	CAN48B-UST1-011D	10.0	2U	2U	2U	2U	2U
	CAN48B-UST1-012F	20.0	2U	2U	2U	2U	2U
	CAN48B-UST1-013G	30.0	2U	2U	2U	2U	2U
2	CAN48B-UST2-011D	10.0	2U	2U	2U	2U	2U
	CAN48B-UST2-012F	20.0	2U	2U	2U	2U	2U
	CAN48B-UST2-013G	30.0	2U	2U	2U	2U	2U

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Science, Inc., 1993

Table 16-1c
Concentration (mg/kg) of Total TAL Metals
SWMU 48B

Boring Number	Sample Number (CAN48A-UST)	Sample Depth (feet)	Barium	Calcium	Magnesium	Nickel	Thallium	Vanadium
1	1-021A	0	729 J	**224000**	9100	9.2 J	0.33 R	10.4 J
	1-022C	5	155 J	**156000**	2410	7.5 J	0.34 R	10.7 J
(QAD)	1-721C	5	159	**125000**	3220	7.7	0.23 U	18.4
(QCD)	1-821C	5	57.2 J	**5640**	2920	12.9 J	0.34 R	20.1 J
	1-023D	10	194 J	**40500**	3020	8.6 J	0.31 R	**28.9** J
	1-024F	20	34.9 J	**35500**	3520	7 J	0.32 R	14.7 J
	1-025G	30	125 J	**64100**	10400	6.4 J	0.32 R	14.7 J
2	2-021A	0	638 J	**270000**	10300	9.5 J	0.34 R	11.2 J
	2-022C	5	190 J	**75700**	3350	8.7 J	0.37 R	17.5 J
	2-023D	10	1760 J	**211000**	6520	5.6 J	0.35 R	13.2 J
	2-024F	20	363 J	**148000**	11400	4.6 J	0.33 R	18.1 J
	2-025G	30	365 J	**88000**	5830	5.6 J	0.33 R	11.6 J
3	3-021A	0	705 J	**230000**	11600	9.3 J	0.32 R	12 J
	3-022C	5	377 J	**153000**	4390	7.9 J	0.33 R	15.7 J
	3-023D	10	383 J	**282000**	4700	3.3 J	3.2 R	8 J
	3-024F	20	673 J	**150000**	13399	5.5 J	0.34 R	17.6 J
	3-025G	30	39.5 J	**60800**	3890	4 J	0.32 R	9.7 J
	(CAN48B-UST)							
1	1-021A	0	492 J	**20600** J	8660 J	8.2 J	5.4 UJ	10.2 J
	1-022C	5	1320 J	**241000**	3550 J	5.3 J	5.8 UJ	7.1 J
	1-023D	10	406 J	**156000** J	3260 J	5.1 J	5.6 UJ	8.8 J
	1-024F	20	149 J	**20400** J	**16700** J	3.7 J	5.7 UJ	15.1 J
	1-025G	30	26.2 J	**24400** J	3210 J	2.7 J	5.4 UJ	6.9 J
2	2-021A	0	445 J	**22700** J	8250 J	7.1 J	5.3 UJ	12.5
	2-022C	5	236 J	**163000** J	2510 J	6 J	5.7 UJ	8.6 J
(QAD)	2-721C	5	258	**250000**	3810	4.7	0.25 U	11.2
(QCD)	2-821C	5	153 J	**276000** J	4110 J	4 J	6 UJ	7.5
	2-023D	10	461 J	**255000** J	4080 J	3.3 J	5.6 UJ	6.5 J
	2-024F	20	126 J	**142000** J	14900 J	4.6 J	5.6 J	13.1 J
	2-025G	30	15.7 J	**4950** J	2400 J	4 J	5.3 UJ	7.6 J
Background (95% UCL) (1)			642.00	18640.00	11790.00	9.00	1.20	25.30

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

(1) Background data is described in Section 1.7.

Source: LRL Science, Inc., 1993

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4903-0000			CAN049-4903-0005			CAN049-4903-0010			CAN049-4903-4962[1]			CAN049-4903-0015			CAN049-4903-0020			CAN049-4903-0025		
LAB SAMPLE NUMBER	0398680001SA			0398680002SA			0398680003SA			0398680010SA			0398680004SA			0398680005SA			0398680006SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																					
Acetone	8	11	J	<	12	U	6.7	11	J	7.1	11	J	6.3	11	J	<	12	U	7	11	J
Carbon disulfide	<	5.5	U	<	5.8	U	<	5.6	U	<	5.6	U	<	5.5	U	<	5.8	U	<	5.7	U
Methylene chloride	3	5.5	J	3.3	5.8	J	2.8	5.6	J	3	5.6	J	2.8	5.5	J	3.3	5.8	J	3.2	5.7	J
Toluene	3	5.5	J	1.7	5.8	J	1.8	5.6	J	2.5	5.6	J	1.3	5.5	J	2.3	5.8	J	1.5	5.7	J
Semivolatile Organics (µg/kg)																					
bis(2-Ethylhexyl)phthalate	<	360	U	<	380	U	<	370	U	<	370	U	<	370	U	<	380	U	<	380	U
Fluoranthene	<	360	U	<	380	U	<	370	U	<	370	U	<	370	U	<	380	U	<	380	U
Metals (mg/kg)																					
Aluminum	16300	11		9850	23.2		6440	22.4		7430	22.2		3410	55.3		6840	23.1		10000	11.4	
Arsenic	3.9	0.55		2.4	0.58		1.3	0.56		1.6	0.56		0.69	0.55		0.89	0.58		1.3	0.57	
Barium	389	1.1	J	151	2.3	J	144	2.2	J	131	2.2	J	192	5.5	J	227	2.3	J	152	1.1	J
Beryllium	0.65	0.22		0.43	0.46	J	0.37	0.45	J	0.34	0.44	J	<	1.1	U	<	0.46	U	0.28	0.23	
Calcium	58500	22.1	J	158000	46.5	J	175000	44.9	J	156000	44.4	J	280000	111	J	184000	46.3	J	103000	22.8	J
Chromium	12.2	1.1		6.2	2.3		3.9	2.2		4	2.2		<	5.5	U	4.5	2.3		8.5	1.1	
Cobalt	4.3	1.1		3.2	2.3		2.3	2.2		2.7	2.2		1.4	5.5	J	<	2.3	U	1.8	1.1	
Copper	8.7	2.2		4.4	4.6	J	2.7	4.5	J	2.5	4.4	J	<	11.1	U	2.6	4.6	J	2.2	2.3	J
Iron	11500	11		7190	23.2		4980	22.4		5360	22.2		2140	55.3		3740	23.1		5340	11.4	
Lead	7.5	0.55		4.2	1.2		3.3	1.1		2.8	0.56		1.2	0.55		1.9	0.58		2.4	0.57	
Magnesium	4360	22.1	J	3720	46.5	J	3320	44.9	J	3230	44.4	J	6190	111	J	17000	46.3	J	14000	22.8	J
Manganese	184	1.1	J	82	2.3	J	54.9	2.2	J	57.6	2.2	J	19.8	5.5	J	28.9	2.3	J	31.1	1.1	J
Mercury	<	0.11	U	0.6	0.58		<	0.11	U	<	0.11	U	<	0.11	U	<	0.12	U	<	0.11	U
Nickel	10.2	4.4		7.6	9.3	J	8.3	9	J	7.7	8.9	J	4.8	22.1	J	7.9	9.3	J	5.7	4.6	
Potassium	2390	551		1570	1160		1420	1120		1630	1110		397	2770	J	1080	1160	J	1820	569	

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4903-0000			CAN049-4903-0005			CAN049-4903-0010			CAN049-4903-4962[1]			CAN049-4903-0015			CAN049-4903-0020			CAN049-4903-0025		
LAB SAMPLE NUMBER	0398680001SA			0398680002SA			0398680003SA			0398680010SA			0398680004SA			0398680005SA			0398680006SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																					
Sodium	<	551	U	<	1160	U	<	1120	U	<	1110	U	<	2770	U	<	1160	U	348	569	J
Thallium	<	1.1	UJ	<	1.2	UJ	<	1.1	UJ	<	1.1	UJ	<	1.1	UJ	<	2.3	UJ	<	2.3	UJ
Vanadium	23.8	1.1		18.8	2.3		13.7	2.2		13.8	2.2		7.9	5.5		19.6	2.3		16.9	1.1	
Zinc	28.6	2.2		18.1	4.6		13.7	4.5		14.2	4.4		6.9	11.1	J	9.5	4.6		10.4	2.3	
TRPH (mg/kg)																					
Total Recoverable Petroleum Hydrocarbons	<	44.1	U	<	46.5	U	<	44.9	U	<	44.4	U	<	44.3	U	<	46.3	U	<	45.5	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
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U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4903-0030			CAN049-4903-0035			CAN049-4903-0040			CAN049-4904-0000			CAN049-4904-0005			CAN049-4904-4961[1]			CAN049-4904-0010		
LAB SAMPLE NUMBER	0398680007SA			0398680008SA			0398680009SA			0397900010SA			0397900011SA			0397900016SA			0397900012SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																					
Acetone	6.4	12	J	9.3	11	J	5.5	11	J	14	11		<	12	U	<	12	U	<	11	U
Carbon disulfide	<	5.9	U	1.2	5.5	J	<	5.4	U	<	5.5	U	<	6	U	<	5.9	U	<	5.6	U
Methylene chloride	3.2	5.9	J	3.1	5.5	J	3	5.4	J	4.7	5.5	UJ	<	6	U	1.7	5.9	UJ	1.6	5.6	J
Toluene	1.8	5.9	J	1.2	5.5	J	1.3	5.4	J	<	5.5	U	<	6	U	<	5.9	U	<	5.6	U
Semivolatile Organics (µg/kg)																					
bis(2-Ethylhexyl)phthalate	<	390	U	<	360	U	<	360	U	<	370	U	<	400	U	<	390	U	<	370	U
Fluoranthene	<	390	U	<	360	U	<	360	U	<	370	U	<	400	U	<	390	U	<	370	U
Metals (mg/kg)																					
Aluminum	10700	11.9		7660	10.9		4580	10.8		6540	50		2930	50		2840	59.4		4770	50	
Arsenic	1.1	0.59		1.1	0.55		0.56	0.54		2.2	5	J	1.6	0.5		1.5	1.2		2.7	0.5	
Barium	186	1.2	J	124	1.1	J	43.9	1.1	J	481	5		712	5		1060	5.9		2350	5	
Beryllium	0.28	0.24		0.23	0.22		0.14	0.22	J	<	1	U	<	1	U	<	1.2	U	<	1	U
Calcium	12800	23.7	J	59200	21.8	J	30700	21.5	J	196000	100		250000	100		335000	119		293000	100	
Chromium	6.8	1.2		5.6	1.1		3.6	1.1		3.5	5	J	<	5	U	<	5.9	U	<	5	U
Cobalt	1.8	1.2		1.1	1.1		1.7	1.1		4.7	5	J	<	5	U	<	5.9	U	2.2	5	J
Copper	4.5	2.4		2.4	2.2		1.8	2.2	J	6.2	10	J	<	10	U	3.9	11.9	J	2.1	10	J
Iron	6110	11.9		4720	10.9		3890	10.8		4680	50		2140	50		2390	59.4		3400	50	
Lead	3.2	0.59		2.4	0.55		1.7	0.54		3.1	1		1.5	0.5		1.9	0.59		1.9	0.5	
Magnesium	17100	23.7	J	7110	21.8	J	5030	21.5	J	8880	100		4120	100		4940	119		7960	100	
Manganese	38.7	1.2	J	42.3	1.1	J	34	1.1	J	82.9	5	J	21	5	J	21	5.9	J	33.8	5	J
Mercury	<	0.12	U	<	0.11	U	<	0.11	U	<	0.1	U	<	0.1	U	<	0.12	U	<	0.1	U
Nickel	5.7	4.7		4.8	4.4		4.3	4.3		14.5	20	J	<	20	U	<	23.7	U	<	20	U
Potassium	2100	594		1610	546		914	539		915	2500	J	504	2500	J	<	2970	U	690	2500	J

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J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4903-0030			CAN049-4903-0035			CAN049-4903-0040			CAN049-4904-0000			CAN049-4904-0005			CAN049-4904-4961[1]			CAN049-4904-0010		
LAB SAMPLE NUMBER	0398680007SA			0398680008SA			0398680009SA			0397900010SA			0397900011SA			0397900016SA			0397900012SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																					
Sodium	256	594	J	<	546	U	<	539	U	<	2500	U	<	2500	U	<	2970	U	<	2500	U
Thallium	<	1.2	UJ	<	1.1	UJ	<	1.1	UJ	<	2	U	<	1	U	<	1.2	U	0.28	2	J
Vanadium	19	1.2		10.9	1.1		11.3	1.1		14.6	5		8	5		9.3	5.9		15.9	5	
Zinc	12.5	2.4		9.9	2.2		7.3	2.2		13.2	10		6.9	10	J	5.7	11.9	J	7.5	10	J
TRPH (mg/kg)																					
Total Recoverable Petroleum Hydrocarbons	<	47.5	U	<	43.7	U	<	43.1	U	<	44.4	U	<	47.9	U	<	47.5	U	<	44.9	U

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U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4904-0015			CAN049-4904-0020			CAN049-4904-0025			CAN049-4904-0030			CAN049-4904-0035			CAN049-4904-0040		
LAB SAMPLE NUMBER	0397900013SA			0397900014SA			0397900015SA			0397900017SA			0397900018SA			0398680011SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	13	11		9.2	11	J	5.9	11	J	<	11	U	6.5	11	J	9.1	11	J
Carbon disulfide	<	5.6	U	<	5.7	U	<	5.7	U	<	5.4	U	<	5.3	U	<	5.3	U
Methylene chloride	2	5.6	UJ	<	5.7	U	1.3	5.7	UJ	<	5.4	U	<	5.3	U	2.4	5.3	J
Toluene	<	5.6	U	<	5.7	U	<	5.7	U	<	5.4	U	<	5.3	U	1.5	5.3	J
Semivolatile Organics (µg/kg)																		
bis(2-Ethylhexyl)phthalate	780	370		42	380	J	89	380	J	<	360	U	<	350	U	<	350	U
Fluoranthene	210	370	J	<	380	U	<	380	U	<	360	U	<	350	U	<	350	U
Metals (mg/kg)																		
Aluminum	3480	50		3280	20		3340	20		3540	10.8		1960	10.5		4050	10.6	
Arsenic	1.6	0.5		1	0.5		1.2	0.5		0.99	0.54		0.56	0.53		0.57	0.53	
Barium	609	5		378	2		94.3	2		46	1.1		25.3	1.1		29.3	1.1	J
Beryllium	<	1	U	<	0.4	U	<	0.4	U	0.17	0.22	J	<	0.21	U	0.11	0.21	J
Calcium	214000	100		145000	40		127000	40		28000	21.5		32100	21		32900	21.3	J
Chromium	<	5	U	2	2		2.1	2		2.7	1.1		1.4	1.1		3.1	1.1	
Cobalt	1.9	5	J	1.1	2	J	<	2	U	1.1	1.1		1.2	1.1		1.5	1.1	
Copper	<	10	U	2.8	4	J	2.2	4	J	1.5	2.2	J	1.2	2.1	J	1.5	2.1	J
Iron	1970	50		2060	20		2300	20		3340	10.8		1790	10.5		3320	10.6	
Lead	1.2	0.5		1.5	0.5		1.8	0.5		2.5	0.54		1.6	0.53		1.5	0.53	
Magnesium	11500	100		13300	40		8620	40		4680	21.5		2010	21		4530	21.3	J
Manganese	19.6	5	J	19.9	2	J	22	2	J	26.8	1.1	J	33	1.1	J	37.4	1.1	J
Mercury	<	0.1	U	<	0.1	U	<	0.1	U	<	0.11	U	<	0.11	U	<	0.11	U
Nickel	<	20	U	<	8	U	3.5	8	J	3.5	4.3	J	1.9	4.2	J	3.5	4.3	J
Potassium	504	2500	J	336	1000	J	584	1000	J	910	538		563	526		824	532	

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U = Nondetected value. RL = Reporting Limit.
(1) Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2a
Summary of Compounds Detected in Soil Samples
SWMU 48B

LOCATOR	CAN049-4904-0015			CAN049-4904-0020			CAN049-4904-0025			CAN049-4904-0030			CAN049-4904-0035			CAN049-4904-0040		
LAB SAMPLE NUMBER	0397900013SA			0397900014SA			0397900015SA			0397900017SA			0397900018SA			0398680011SA		
COLLECT DATE	12/12/94			12/12/94			12/12/94			12/12/94			12/12/94			12/12/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																		
Sodium	<	2500	U	<	1000	U	<	1000	U	<	538	U	<	526	U	<	532	U
Thallium	<	2	U	<	1	U	<	1	UJ	<	1.1	UJ	<	1.1	UJ	<	1.1	UJ
Vanadium	18.5	5		18	2		11.5	2		10.3	1.1		5.6	1.1		9.6	1.1	
Zinc	5.1	10	J	4.7	4		4.2	4		5.8	2.2		4.5	2.1		6.4	2.1	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	594	44.9		<	45.5	U	<	45.6	U	<	43	U	<	42.1	U	<	42.6	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
(1) Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 16-2b
Comparison of Maximum Soil Concentrations to RBCs for Residential Soil
SWMU 48B

Chemical	Maximum Detected Concentration (mg/kg)	Residential Soil Risk-Based Concentration(1) (mg/kg)	Exceeds RBC?
Acetone	0.014	7,800	NO
Carbon Disulfide	0.0012	7,800	NO
Methylene Chloride	0.0047	85	NO
Toluene	0.003	16,000	NO
Bis(2-ethylhexyl)phthalate	0.78	46	NO
Fluoranthene	0.21	3,100	NO
Barium	2,350	5,500	NO
Mercury	0.6	23	NO
Nickel	14.5	1,600	NO
Thallium	0.28	6.3	NO
Zinc	28.6	23,000	NO

(1) EPA Region III Risk-Based Concentrations for Residential Soil (EPA 1994).

Source: Woodward-Clyde, 1997

Table 17-1
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 51

LOCATOR	CAN051-0511-0000			CAN051-0511-0002			CAN051-0512-0000			CAN051-0512-0002			CAN051-0513-0000			CAN051-0513-0002		
LAB SAMPLE NUMBER	0312760001SA			0312760002SA			0312790007SA			0312790016SA			0312760005SA			0312760006SA		
COLLECT DATE	09/14/93			09/14/93			09/15/93			09/15/93			09/14/93			09/14/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	6.6	5.9		<	5.7	U	<	5.3	U	4.8	5.9	J	2.3	5.8	J	3.6	5.5	J
Xylenes (total)	1.3	5.9	J	<	5.7	U	1.6	5.3	J	<	5.9	U	<	5.8	U	1.4	5.5	J
Semivolatile Organics (ug/kg)																		
Anthracene							<	350	U				<	380	U	47	370	J
Benzo(a)anthracene							<	350	U				<	380	U	600	370	
Benzo(a)pyrene							<	350	U				<	380	U	830	370	
Benzo(b)fluoranthene							<	350	U				<	380	U	1700	370	
Benzo(g,h,i)perylene							<	350	U				<	380	U	520	370	
Carbazole							<	350	U				<	380	U	79	370	J
Chrysene							<	350	U				<	380	U	970	370	
Fluoranthene							<	350	U				<	380	U	2000	370	
Indeno(1,2,3-cd)pyrene							<	350	U				<	380	U	510	370	
Phenanthrene							<	350	U				<	380	U	800	370	
Pyrene							<	350	U				<	380	U	2000	370	
Metals (mg/kg)																		
Aluminum	8120	11.7		5180	11.5		4910	10.5		5260	23.4		7120	11.5		4010	11.1	
Antimony	<	7	U	1.7	6.9	J	<	6.3	U	<	14	U	<	6.9	U	1.8	6.6	J
Arsenic	2.3	0.59		2.1	0.57		2.1	0.53		2	0.59		2.3	0.58		4.5	0.55	
Barium	115	1.2	J	105	1.1	J	433	1.1		118	2.3		84.7	1.2	J	495	1.1	J
Beryllium	0.62	0.23		0.4	0.23		0.29	0.21	J	0.4	0.47	J	0.56	0.23		0.35	0.22	
Calcium	5360	23.4		43400	22.9		17400	21.1		137000	46.8		7630	23.1		48100	22.1	
Chromium	9.7	1.2		5.6	1.1		7.4	1.1	J	6	2.3		9.2	1.2		7.1	1.1	
Cadmium	<	0.59	J	0.81	0.57	J	<	0.53	U	1.6	1.2		<	0.58	J	0.99	0.55	J

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 17-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 51

LOCATOR	CAN051-0511-0000			CAN051-0511-0002			CAN051-0512-0000			CAN051-0512-0002			CAN051-0513-0000			CAN051-0513-0002		
LAB SAMPLE NUMBER	0312760001SA			0312760002SA			0312790007SA			0312790016SA			0312760005SA			0312760006SA		
COLLECT DATE	09/14/93			09/14/93			09/15/93			09/15/93			09/14/93			09/14/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Cobalt	4.3	1.2		3.1	1.1		2.5	1.1		1.3	2.3	J	4.5	1.2		3.4	1.1	
Copper	9.4	2.3		6.2	2.3		5.2	2.1	J	5.1	4.7		8.1	2.3		5.7	2.2	
Iron	9120	11.7		5380	11.5		6900	10.5		5320	23.4		7720	11.5		5710	11.1	
Lead	9.1	0.59		5.6	1.1		6.5	0.53		3.9	1.2		9	0.58		5.9	1.1	
Magnesium	1680	23.4		1570	22.9		1440	21.1		1940	46.8		1520	23.1		1460	22.1	
Manganese	228	1.2		124	1.1		197	1.1		87.2	2.3		246	1.2		272	1.1	
Nickel	8.9	4.7		6.7	4.6		5.3	4.2		5.1	9.4	J	8.3	4.6		5.8	4.4	
Potassium	1510	585		1100	573		773	527		1100	1170	J	1440	577		782	554	
Silver	0.62	1.2	J	0.71	1.1	J	0.53	1.1	J	1.9	2.3	J	0.62	1.2	J	0.7	1.1	J
Sodium	203	585	J	304	573	J	309	527	J	630	1170	J	190	577	J	167	554	J
Vanadium	21.7	1.2		15.4	1.1		13.8	1.1		12.4	2.3		19.1	1.2		16.3	1.1	
Zinc	22.2	2.3		15.1	2.3		15.9	2.1		14.1	4.7		19.3	2.3		13.7	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	46.8	U	<	45.9	U	173	42.2	J	551	46.8		<	46.2	U	2690	221	
Water Quality (percent)																		
Water	15	0.1		13	0.1		5.1	0.1		15	0.1		13	0.1		9.7	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit

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Source: Woodward-Clyde, 1994

Table 17-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 51

LOCATOR	CAN051-0511-0004			CAN051-0511-0008			CAN051-0513-0004			CAN051-0512-0004			CAN051-0512-0008			CAN051-0513-0004		
LAB SAMPLE NUMBER	0312760003SA			0312760004SA			0312790017SA			0316040001SA			0312790018SA			0312760007SA		
COLLECT DATE	09/14/93			09/14/93			09/15/93			09/15/93			09/15/93			09/14/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane	<	5.8	U	<	5.7	U	4.2	6.2	J				<	5.5	U	<	5.9	U
1,2-Dichloropropane	<	5.8	U	<	5.7	U	2.4	6.2	J				<	5.5	U	<	5.9	U
Tetrachloroethene	<	5.8	U	<	5.7	U	26	6.2					<	5.5	U	<	5.9	U
Toluene	<	5.8	U	<	5.7	U	3.5	6.2	J				1.7	5.5	J	<	5.9	U
Semivolatile Organics (ug/kg)																		
Chrysene							56	410	J	<	410	U						
Metals (mg/kg)																		
Aluminum	3050	23.3		3830	11.4		2310	24.9					2690	55		2960	23.6	
Arsenic	2.2	0.58		2.4	0.57		2	0.62					2.4	0.55		2	0.59	
Barium	330	2.3	J	190	1.1	J	1100	2.5					1150	5.5		1370	2.4	J
Beryllium	0.26	0.47	J	0.34	0.23		0.29	0.5	J				<	1.1	U	<	0.47	U
Cadmium	2.3	1.2	J	1.6	0.57	J	2.7	1.2					3.4	2.8		2.4	1.2	J
Calcium	198000	46.5		97900	22.8		236000	49.7					263000	110		202000	47.2	
Chromium	<	2.3	U	3.7	1.1		<	2.5	U				<	5.5	U	3.2	2.4	
Cobalt	2.8	2.3		3	1.1		<	2.5	U				<	5.5	U	2.9	2.4	
Copper	2.6	4.7	J	4	2.3		3.3	5	J				2.7	11	J	2.1	4.7	J
Iron	2810	23.3		3980	11.4		1920	24.9					2110	55		2710	23.6	
Lead	2.6	2.9	J	5.8	1.1		5.1	12.4	J				1.4	5.5	J	1.9	3	J
Magnesium	2290	46.5		2540	22.8		2810	49.7					3830	110		3070	47.2	
Manganese	42.3	2.3		90.7	1.1		29	2.5					36.5	5.5		47.6	2.4	
Nickel	4.6	9.3	J	5.5	4.6		2.7	9.9	J				<	22	U	3.6	9.4	J
Potassium	725	1160	J	896	570		462	1240	J				611	2750	J	<	1180	U

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 17-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 51

LOCATOR	CAN051-0511-0004			CAN051-0511-0008			CAN051-0512-0004			CAN051-0512-0004			CAN051-0512-0008			CAN051-0513-0004		
LAB SAMPLE NUMBER	0312760003SA			0312760004SA			0312790017SA			0316040001SA			0312790018SA			0312760007SA		
COLLECT DATE	09/14/93			09/14/93			09/15/93			09/15/93			09/15/93			09/14/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Silver	1.1	2.3	J	0.62	1.1	J	1.5	2.5	J				2.5	5.5	J	<	2.4	U
Sodium	700	1160	J	543	570	J	824	1240	J				904	2750	J	<	1180	U
Vanadium	14	2.3		17.5	1.1		8.5	2.5					7.5	5.5		14.2	2.4	
Zinc	8.5	4.7		11.5	2.3		8.3	5					6	11	J	8.4	4.7	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	46.5	U	182	45.6		3150	249					664	44		<	47.2	U
Water Quality (percent)																		
Water	14	0.1		12	0.1		20	0.1		20	0.1		9.2	0.1		15	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 17-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 51

LOCATOR	CAN051-0513-0008		
LAB SAMPLE NUMBER	0312760008SA		
COLLECT DATE	09/14/93		
	Result	RL	Qual
Volatile Organics (ug/kg)			
1,2-Dichloroethane	<	5.5	U
1,2-Dichloropropane	<	5.5	U
Tetrachloroethene	<	5.5	U
Toluene	<	5.5	U
Semivolatile Organics (ug/kg)			
Chrysene	<	360	U
Metals (mg/kg)			
Aluminum	3060	21.9	
Arsenic	2.1	0.55	
Barium	1010	2.2	J
Beryllium	<	0.44	U
Cadmium	2	1.1	J
Calcium	196000	43.9	
Chromium	2.9	2.2	
Cobalt	3.2	2.2	
Copper	2.8	4.4	J
Iron	2470	21.9	
Lead	1.8	2.7	J
Magnesium	3840	43.9	
Manganese	65.1	2.2	
Nickel	5.2	8.8	J
Potassium	785	1100	J

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. QUAL=Qualification

U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 17-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 51

LOCATOR	CAN051-0513-0008		
LAB SAMPLE NUMBER	0312760008SA		
COLLECT DATE	09/14/93		
	Result	RL	Qual
Silver	1.1	2.2	J
Sodium	<	1100	U
Vanadium	12.3	2.2	
Zinc	8	4.4	
TPH (mg/kg)			
Total Petroleum Hydrocarbons	<	43.9	U
Water Quality (percent)			
Water	8.8	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 17-1c
Comparison of Maximum Concentrations with RBCs
SWMU 51

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN051-0512-0004	1,2-Dichloroethane 5.07	0.0042	0.8	N
CAN051-0512-0004	1,2-Dichloropropane 10	0.0024	30	N
CAN051-0513-0002	Anthracene	0.047	2000	N
CAN051-0513-0002	Antimony	1.8	3	N
CAN051-0513-0004	**Barium**	**1370**	**600**	**Y**
CAN051-0513-0002	**Benzo(a)anthracene**	**0.6**	**0.07**	**Y**
CAN051-0513-0002	**Benzo(a)pyrene**	**0.83**	**0.01**	**Y**
CAN051-0513-0002	**Benzo(b)fluoranthene**	**1.7**	**0.07**	**Y**
CAN051-0513-0002	Benzo(g,h,i)perylene	0.52	NTF	N
CAN051-0512-0008	Cadmium 74.1	3.4	8	N
CAN051-0513-0002	Carbazole	0.079	4	N
CAN051-0513-0002	Chrysene 621	0.97	2	N
CAN051-0511-0000	Copper	9.4	300	N
CAN051-0513-0002	Fluoranthene 2550	2	300	N
CAN051-0513-0002	**Indeno(1,2,3-cd)pyrene** 6.21	**0.51**	**0.04**	**Y**
CAN051-0513-0002	Phenanthrene 1800	0.8	NTF	N
CAN051-0513-0002	Pyrene 2300	2	200	N
CAN051-0512-0008	Silver	2.5	20	N
CAN051-0512-0004	Tetrachloroethene 9.83	0.026	1	N
CAN051-0511-0000	Toluene 248	0.0066	2000	N
CAN051-0512-0004	**Total Petroleum Hydrocarbons (3)**	**3150**	**1000**	**Y**
CAN051-0512-0000	Xylenes (total) 132	0.0016	20000	N
CAN051-0511-0000	Zinc	22.2	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 17-2
Summary of Human Health Risks
SWMU 51

Receptor/Pathway	Average Exposure			Reasonable Maximum Exposure		
	Cancer Risk	Subchronic H.I.	Chronic H.I.	Cancer Risk	Subchronic H.I.	Chronic H.I.
Occupational Worker (Surface Soil)*						
– Dermal Contact	0.00		3×10^{-10}	0.00		3×10^{-8}
– Ingestion	0.00		7×10^{-7}	0.00		6×10^{-5}
– Inhalation of VOCs	0.00		1×10^{-7}	0.00		2×10^{-6}
– Inhalation of Particulates	0.00		0.00	0.00		0.00
	0.00		8×10^{-7}	0.00		6×10^{-5}
Construction Worker (Total Soil)						
– Dermal Contact	8×10^{-13}	3×10^{-10}		1×10^{-11}	5×10^{-9}	
– Ingestion	9×10^{-10}	2×10^{-4}		1×10^{-8}	4×10^{-3}	
– Inhalation of VOCs	1×10^{-11}	1×10^{-6}		6×10^{-11}	5×10^{-6}	
– Inhalation of Particulates	6×10^{-13}	2×10^{-6}		3×10^{-12}	7×10^{-6}	
	9×10^{-10}	2×10^{-4}		1×10^{-8}	4×10^{-3}	
Trespasser (Surface Soil)*						
– Dermal Contact	0.00	9×10^{-12}		0.00	2×10^{-9}	
– Ingestion	0.00	2×10^{-7}		0.00	2×10^{-5}	
– Inhalation of VOCs	0.00	3×10^{-8}		0.00	5×10^{-7}	
– Inhalation of Particulates	0.00	0.00		0.00	0.00	
	0.00	2×10^{-7}		0.00	2×10^{-5}	

Note: Apparent inconsistencies in summation of risks are due to rounding of risk values. See Appendix C for nonrounded risk values.

* No carcinogenic contaminants were found in the surface soil at SWMU 51.

Source: Woodward-Clyde, 1994

Table 17-3a
Summary of Soil Sample Results
SWMU 51

SUMMARY OF SWMU 51 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	10	OWS	0.4	ND	<10	ND	ND	NT	NT	NT
2	9	OWS	0.0	ND	ND	ND	ND	NT	NT	NT
3	9	OWS	0.0	ND	ND	NT	NT	NT	NT	NT
4	9	OWS	0.0	ND	ND	NT	NT	NT	NT	NT
5	5.5	OWS	127	>600	>300	ND	7200	NT	NT	NT
6	10	OWS	ND	<20	<10	ND	ND	NT	NT	NT
7	10	OWS	NT	NT	NT	NT	ND	ND	ND[1]	< bkgd
8	n/a	excavated material	NT	NT	NT	ND	ND	NT	NT	NT
9	5.5	OWS	1	<20	<10	NT	NT	NT	NT	NT
10	6	OCV	0.1	<20	<10	ND	ND	NT	NT	NT
11	8	OCV	ND	<20	<10	NT	NT	NT	NT	NT
12	6	OCV	ND	<20	<10	NT	NT	NT	NT	NT
13	8	OCV	ND	<20	<10	NT	NT	NT	NT	NT
14	8	OCV	NT	NT	NT	NT	ND	ND	ND	Ba, Cr, Ni[3]
15QA	8	OCV	NT	NT	NT	NT	ND	ND[2]	ND	Se[4]

[1] Only contaminant identified: bis(2-Ethylhexyl)phthalate at 4.0 mg/Kg.
[2] Only contaminant identified: naphthalene at 0.0154 mg/Kg, and 1, 2, 4-trimethlbenzene at 0.0033 mg/Kg.
[3] Barium at 1,070 mg/Kg, Chromium at 26.3 mg/Kg, Nickel at 14.4 mg/Kg.
[4] Selenium at 0.838 mg/Kg.
ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 17-3b
Maximum Soil Sample Concentration of Metals
SWMU 51

SWMU 51 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
15	Arsenic	3.5	< 0.40	1.1-16.7	3.6	0.32 C
	Mercury	0.014	< 0.0010	0.10	0.019	23 N
	Selenium	0.838	< 1.0	0.2	1.1	380 N
14	Barium	1070	0.8	430	805	5300 N
	Chromium	26.3	< 0.02	38	13.3	31 C
	Nickel	14.4	NT	16	11.4	1500 N
7	Lead	7.6	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 18-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 55

LOCATOR	CAN055-0551-0000			CAN055-0551-0003			CAN055-0552-0000			CAN055-0552-0003			CAN055-0553-0000			CAN055-0553-0003		
LAB SAMPLE NUMBER	0312750001SA			0312750002SA			0313820009SA			0313820010SA			0313820004SA			0313820005SA		
COLLECT DATE	09/15/93			09/15/93			09/22/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)																		
Lead	6.1	0.56		4.5	2.8		6.3	0.57		3.3	1.2		8	1.1		3.9	0.58	
Water Quality (percent)																		
Water	10	0.1		11	0.1		12	0.1		14	0.1		11	0.1		14	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

Source: Woodward-Clyde, 1994

Table 18-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 55

LOCATOR	CAN055-0551-0008			CAN055-0551-0013			CAN055-0551-0018			CAN055-0552-0008			CAN055-0552-0013			CAN055-0552-0018		
LAB SAMPLE NUMBER	0312750003SA			0312750004SA			0312750005SA			0313820011SA			0313820012SA			0313820013SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)																		
Lead	4.6	2.8		1.2	5.3	J	0.96	1.1	J	4.6	0.67		1	0.57		3.6	0.58	
Water Quality (percent)																		
Water	9.2	0.1		6.3	0.1		10	0.1		25	0.1		12	0.1		14	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 18-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 55

LOCATOR	CAN055-0553-0008			CAN055-0553-0013			CAN055-0553-0018		
LAB SAMPLE NUMBER	0313820006SA			0313820007SA			0313820008SA		
COLLECT DATE	09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)									
Lead	3.5	0.6		2.1	1.3		1.9	0.69	
Water Quality (percent)									
Water	16	0.1		26	0.1		28	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5504-0000			CAN055-5504-5561[1]			CAN055-5504-0005			CAN055-5504-0010			CAN055-5504-0015			CAN055-5504-0020		
LAB SAMPLE NUMBER	0398680012SA			0398680017SA			0398680013SA			0398680014SA			0398680015SA			0398680016SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Barium	468	5.6	J	498	2.2	J	136	1.1	J	1120	1.1		115	1.1	J	90.7	1.1	J
Beryllium	<	1.1	U	0.26	0.45	J	0.54	0.22		0.44	0.23		0.42	0.22		0.76	0.23	
Cadmium	<	2.8	U	0.47	1.1	J	<	0.56	U	<	0.56	U	<	0.56	U	<	0.57	U
Calcium	230000	112	J	213000	44.9	J	41400	22.2	J	83000	22.5		60600	22.2	J	11000	22.9	J
Chromium	<	5.6	U	4.7	2.2		9.3	1.1		7.6	1.1		7	1.1		9.9	1.1	
Cobalt	4.4	5.6	J	2.3	2.2		3.6	1.1		3.3	1.1		2.4	1.1		3.4	1.1	
Copper	5	11.2	J	5.1	4.5		6.9	2.2		4.8	2.3		4.5	2.2		6.7	2.3	
Iron	4220	56		4860	22.5		9300	11.1		7120	11.3		6570	11.1		10500	11.5	
Lead	5.7	1.1		7.1	1.1		5.4	0.56		4.5	0.56		4.6	0.56		7.3	0.57	
Magnesium	5360	112	J	5100	44.9	J	2480	22.2	J	3750	22.5		3490	22.2	J	5460	22.9	J
Manganese	90.7	5.6	J	94	2.2	J	131	1.1	J	97.9	1.1		94.1	1.1	J	68.5	1.1	J
Nickel	7.9	22.4	J	9.4	9		9.1	4.4		7.5	4.5		5.9	4.4		8.2	4.6	
Potassium	788	2800	J	1150	1120		2110	556		1820	563		2190	556		3340	573	
Vanadium	13.2	5.6		15.2	2.2		16.8	1.1		17.8	1.1		14.8	1.1		24.9	1.1	
Zinc	11.2	11.2		12.7	4.5		22.1	2.2		17.8	2.3		15.8	2.2		27.3	2.3	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	1650	179		1640	180		50.1	44.5		<	45	U	<	44.5	U	<	45.9	U

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R = Rejected value.
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[1] Duplicate for preceding sample number.
D = Sample was diluted for analysis.
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Source: Woodward-Clyde, 1997

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5504-0000			CAN055-5504-5561[1]			CAN055-5504-0005			CAN055-5504-0010			CAN055-5504-0015			CAN055-5504-0020		
LAB SAMPLE NUMBER	0398680012SA			0398680017SA			0398680013SA			0398680014SA			0398680015SA			0398680016SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	11	U	<	11	U	8.3	11	J	<	11	U	<	11	U	<	11	U
Methylene chloride	3	5.6	J	<	5.6	U	3	5.6	J	<	5.6	U	<	5.6	U	<	5.7	U
Toluene	7.4	5.6		3.1	5.6	J	1.8	5.6	J	<	5.6	U	<	5.6	U	<	5.7	U
Semivolatile Organics (µg/kg)																		
Anthracene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(a)anthracene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(a)pyrene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(b)fluoranthene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(g,h,i)perylene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(k)fluoranthene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
bis(2-Ethylhexyl)phthalate	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Carbazole	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Chrysene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Dibenz(a,h)anthracene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Diethyl phthalate	<	370	U	38	370	J	<	370	U	<	370	U	<	370	U	<	380	U
Fluoranthene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Indeno(1,2,3-cd)pyrene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Phenanthrene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Pyrene	<	370	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)																		
Aluminum	6100	56		6930	22.5		12300	11.1		9930	11.3		8780	11.1		13300	11.5	
Antimony	<	33.6	UJ	<	13.5	UJ	<	6.7	UJ	<	6.8	U	<	6.7	UJ	<	6.9	UJ
Arsenic	3.4	0.56		3.6	0.56		2.3	0.56		2.3	0.56		1.9	0.56		3.2	0.57	

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[1] Duplicate for preceding sample number.
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Source: Woodward-Clyde, 1997

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5505-0000			CAN055-5505-0005			CAN055-5505-0010			CAN055-5505-0015			CAN055-5505-0020			CAN055-5506-0000		
LAB SAMPLE NUMBER	0398700005SA			0398700007SA			0398700008SA			0398700012SA			0398700009SA			0398700002SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone	<	11	U	13	11		12	12		<	11	U	<	12	U	18	11	J
Methylene chloride	<	5.6	U	<	5.7	U	2	5.8	J	<	5.6	U	2.7	5.9	J	4	5.4	J
Toluene	<	5.6	UJ	<	5.7	UJ	<	5.8	UJ	<	5.6	UJ	<	5.9	UJ	15	5.4	J
Semivolatile Organics (µg/kg)																		
Anthracene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	800	3600	J
Benzo(a)anthracene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	2700	3600	J
Benzo(a)pyrene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	4000	3600	
Benzo(b)fluoranthene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	3600	3600	
Benzo(g,h,i)perylene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	3000	3600	J
Benzo(k)fluoranthene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	3700	3600	
bis(2-Ethylhexyl)phthalate	860	3700	J	<	380	U	<	380	U	<	370	U	<	390	U	<	3600	U
Carbazole	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	<	3600	U
Chrysene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	3100	3600	J
Dibenz(a,h)anthracene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	1100	3600	J
Diethyl phthalate	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	<	3600	U
Fluoranthene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	5700	3600	
Indeno(1,2,3-cd)pyrene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	2600	3600	J
Phenanthrene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	3200	3600	J
Pyrene	<	3700	U	<	380	U	<	380	U	<	370	U	<	390	U	6200	3600	
Metals (mg/kg)																		
Aluminum	6020	11.2		6920	11.5		5950	23.1		2620	55.7		9790	11.8		3030	21.6	
Antimony	<	6.7	UJ	<	6.9	UJ	<	13.8	UJ	<	33.4	UJ	<	7.1	UJ	7.1	12.9	J
Arsenic	2.5	0.56		2.2	0.57		2.2	0.58		2.3	0.56		1.8	0.59		4.5	0.54	

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(1) Duplicate for preceding sample number.

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Source: Woodward-Clyde, 1997

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5505-0000			CAN055-5505-0005			CAN055-5505-0010			CAN055-5505-0015			CAN055-5505-0020			CAN055-5506-0000		
LAB SAMPLE NUMBER	0398700005SA			0398700007SA			0398700008SA			0398700012SA			0398700009SA			0398700002SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Barium	153	1.1	J	184	1.1	J	156	2.3	J	867	5.6	J	398	1.2	J	723	2.2	J
Beryllium	0.41	0.22		0.45	0.23		0.47	0.46		<	1.1	U	0.48	0.24		0.29	0.43	J
Cadmium	<	0.56	U	<	0.57	U	<	1.2	U	<	2.8	U	<	0.59	U	<	1.1	U
Calcium	41700	22.3		78300	22.9		127000	46.1		275000	111		55200	23.6		150000	43.1	
Chromium	5.9	1.1		5.5	1.1		3.8	2.3		<	5.6	U	6.8	1.2		3.3	2.2	
Cobalt	3.2	1.1		3.6	1.1		3.3	2.3		<	5.6	U	1.6	1.2		3.3	2.2	
Copper	5.9	2.2		5.7	2.3		3.3	4.6	J	<	11.1	U	2.6	2.4		5.5	4.3	
Iron	6210	11.2		6010	11.5		4760	23.1		1580	55.7		5990	11.8		3960	21.6	
Lead	5.9	0.56		5.3	0.57		4.1	0.58		0.85	0.56		3	0.59		17.3	2.7	
Magnesium	1940	22.3		2250	22.9		4750	46.1		6920	111		11900	23.6		3260	43.1	
Manganese	153	1.1	J	112	1.1	J	55.2	2.3	J	22	5.6	J	34.5	1.2	J	336	2.2	J
Nickel	7.3	4.5		8.5	4.6		8.6	9.2	J	7.3	22.3	J	8.5	4.7		7.6	8.6	J
Potassium	1140	558		1250	573		1410	1150		336	2780	J	1640	591		481	1080	J
Vanadium	12.6	1.1		13.1	1.1		17.8	2.3		13	5.6		24	1.2		14.8	2.2	
Zinc	16.3	2.2		14.5	2.3		12.5	4.6		5	11.1	J	11.9	2.4		18.4	4.3	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	1540	178		<	45.8	U	<	46.1	U	<	44.6	U	<	47.3	U	11500	1730	

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Source: Woodward-Clyde, 1997

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5506-5562[1]			CAN055-5506-0005			CAN055-5506-0010			CAN055-5506-0015			CAN055-5506-0020		
LAB SAMPLE NUMBER	0398700011SA			0398700004SA			0398700006SA			0398700010SA			0398700003SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)															
Acetone	<	11	U	<	11	U	11	11		<	11	U	<	11	U
Methylene chloride	3.2	5.4	J	<	5.7	U	2	5.6	J	1.3	5.6	J	<	5.7	U
Toluene	28	5.4	J	<	5.7	UJ	<	5.6	UJ	<	5.6	UJ	<	5.7	UJ
Semivolatile Organics (µg/kg)															
Anthracene	780	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(a)anthracene	2600	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(a)pyrene	3800	3600		<	370	U	<	370	U	<	370	U	<	380	U
Benzo(b)fluoranthene	2700	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(g,h,i)perylene	2400	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(k)fluoranthene	3900	3600		<	370	U	<	370	U	<	370	U	<	380	U
bis(2-Ethylhexyl)phthalate	<	3600	U	<	370	U	<	370	U	<	370	U	<	380	U
Carbazole	400	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Chrysene	2900	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Dibenz(a,h)anthracene	<	3600	U	<	370	U	<	370	U	<	370	U	<	380	U
Diethyl phthalate	<	3600	U	<	370	U	<	370	U	<	370	U	<	380	U
Fluoranthene	4800	3600		<	370	U	<	370	U	<	370	U	<	380	U
Indeno(1,2,3-cd)pyrene	2400	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Phenanthrene	3200	3600	J	<	370	U	<	370	U	<	370	U	<	380	U
Pyrene	5600	3600		<	370	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)															
Aluminum	3250	21.7		6470	11.3		4530	11.2		5420	11.2		6650	22.8	
Antimony	<	13	UJ	<	6.8	UJ	2.9	6.7	J	<	6.7	UJ	<	13.7	UJ
Arsenic	5.4	0.54		2.3	0.57		2.2	1.1		1.5	0.56		1.9	0.57	

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Source: Woodward-Clyde, 1997

Table 18-2a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 55

LOCATOR	CAN055-5506-5562[1]			CAN055-5506-0005			CAN055-5506-0010			CAN055-5506-0015			CAN055-5506-0020		
LAB SAMPLE NUMBER	0398700011SA			0398700004SA			0398700006SA			0398700010SA			0398700003SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Barium	851	2.2	J	148	1.1	J	254	1.1	J	97.7	1.1	J	111	2.3	J
Beryllium	0.28	0.43	J	0.44	0.23		0.31	0.22		0.42	0.22		0.55	0.46	
Cadmium	<	1.1	U	<	0.57	U	0.34	0.56	J	<	0.56	U	0.82	1.1	J
Calcium	172000	43.4		61800	22.7		96900	22.3		50400	22.4		137000	45.6	
Chromium	2.6	2.2		5.9	1.1		3.9	1.1		4.8	1.1		4.8	2.3	
Cobalt	3	2.2		4	1.1		2.9	1.1		2.6	1.1		1.7	2.3	J
Copper	6	4.3		7	2.3		2.9	2.2		3.3	2.2		3.7	4.6	J
Iron	4420	21.7		5970	11.3		4190	11.2		5060	11.2		4860	22.8	
Lead	18	2.7		6	0.57		4.1	0.56		4.5	0.56		4.2	0.57	
Magnesium	3840	43.4		1960	22.7		2930	22.3		3460	22.4		6380	45.6	
Manganese	258	2.2	J	122	1.1	J	69.7	1.1	J	51.7	1.1	J	40.9	2.3	J
Nickel	8.7	8.7		9.3	4.5		6	4.5		5.7	4.5		6.5	9.1	J
Potassium	482	1080	J	1310	567		1120	558		1550	561		1780	1140	
Vanadium	16.9	2.2		13.6	1.1		14.1	1.1		15	1.1		13.7	2.3	
Zinc	18.8	4.3		15.1	2.3		10.6	2.2		12.7	2.2		12.5	4.6	
TRPH (mg/kg)															
Total Recoverable Petroleum Hydrocarbons	10700	911		<	45.3	U	<	44.7	U	<	44.9	U	<	45.6	U

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Source: Woodward-Clyde, 1997

Table 18-2b

Comparison of Maximum Soil Concentrations to RBCs for Residential Soil

SWMU 55

Chemical	Maximum Detected Concentration (mg/kg)	Residential Soil Risk-Based Concentration(1) (mg/kg)	Exceeds RBC?	Estimated Risk(3)	Risk Type	Industrial Soil Risk-based Concentration(2) (mg/kg)	Exceeds RBC?	Estimated Risk(3)
Acetone	0.018	7,800	NO					
Methylene Chloride	0.004	85	NO					
Toluene	0.015	16,000	NO					
Anthracene	0.8	23,000	NO					
Benzo(a)anthracene	2.7	0.88	YES	3 x 10-6	Carcinogenic	3.9	NO	
Benzo(a)pyrene	4	0.088	YES	5 x 10-5	Carcinogenic	0.39	YES	1 x 10-5
Benzo(b)fluoranthene	3.6	0.88	YES	4 x 10-6	Carcinogenic	3.9	NO	
Benzo(k)fluoranthene	3.7	8.80	NO					
Benzo(g,h,i)perylene	3	NA(a)	NA					
Bis(2-ethylhexyl)phthalate	0.86	46	NO					
Chrysene	3.1	88	NO					
Dibenzo(a,h)anthracene	1.1	0.088	YES	1 x 10-5	Carcinogenic	0.39	YES	3 x 10-6
Fluoranthene	5.7	3,100	NO					
Indeno(1,2,3-cd)pyrene	2.6	0.88	YES	3 x 10-6	Carcinogenic	3.9	NO	
Phenanthrene	3.2	NA(a)	NA					
Pyrene	6.2	2,300	NO					
TRPH	11,500	NA(a)	NA					
Antimony	7.1	31	NO					
Cadmium	0.82	39	NO					
Manganese	336	390	NO					

(1) EPA Region III Risk-Based Concentrations for residential soil (EPA 1994).
(2) EPA Region III Risk-Based Concentrations for industrial soil (EPA 1994).
(3) Estimated risk based on residential exposures to the maximum Phase II concentrations that exceeded previously evaluated Phase I levels.
Estimated risk = 1×10^{-6} * concentration/RBC.
(a) EPA has not established a toxicity factor for these chemicals, so RBCs could not be calculated.
NA = Not Applicable

Source: Woodward-Clyde, 1997

Table 18-2c
Potential Cumulative Risk
SWMU 55

Chemical[1]	Carcinogen?	Phase II Concentration (mg/kg)	Residential RBC (mg/kg)	Industrial RBC (mg/kg)	Risk Residential[2]	Hazard Residential[3]	Risk Industrial[2]	Hazard Industrial[3]
Acetone	No	0.018	7,800	100,000		0.000002		0.0000002
Methylene chloride	Yes	0.004	85	380	4.71E-11		1.05E-11	
Toluene	No	0.015	16,000	200,000		0.000001		0.00000008
Anthracene	No	0.8	23,000	310,000		0.00003		0.000003
Benzo(a)anthracene	Yes	2.7	0.88	3.9	3.07E-06		6.92E-07	
Benzo(a)pyrene	Yes	4	0.088	0.39	4.55E-05		1.03E-05	
Benzo(b)fluoranthene	Yes	3.6	0.88	3.9	4.09E-06		9.23E-07	
Benzo(k)fluoranthene	Yes	3.7	8.8	39	4.20E-07		9.49E-08	
Benzo(g,h,i)perylene		3	NA	NA				
Bis(2-ethylhexyl) phthalate	Yes	0.86	46	200	1.87E-08		4.30E-09	
Chrysene	No	3.1	88	390		0.04		0.008
Dibenzo(a,h)anthracene	Yes	1.1	0.088	0.39	1.25E-05		2.82E-06	
Fluoranthene	No	5.7	3,100	41,000		0.002		0.00014
Indeno(1,2,3-c,d)pyrene	Yes	2.6	0.88	3.9	2.95E-06		6.67E-07	
Phenanthrene	No	3.2	NA	NA				
Pyrene	No	6.2	2,300	31,000		0.003		0.0002
Antimony	No	7.1	31	410		0.2		0.02
Cadmium	No	0.82	39	510		0.02		0.002
Manganese	No	336	390	5,100		0.9		0.07
Totals					7E-05	1	2E-05	0.09
Phase I Risk[4]					NA	NA	NA	NA
Cumulative Risk[5]					NA	NA	NA	NA

(1) Chemicals with maximum Phase II concentration exceeding Phase I concentrations
(2) Risk = 1E-06 x concentration/RBC
(3) Hazard = concentration/RBC
(4) Not Applicable: Phase I risk assessment was not conducted.
(5) Not Applicable: Phase I risk assessment was not conducted.

Source: Woodward-Clyde, 1997

Table 19-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 57

LOCATOR	CAN057-0571-0000			CAN057-0571-0002			CAN057-0572-0000			CAN057-0572-0002			CAN057-0573-0000			CAN057-0573-0002		
LAB SAMPLE NUMBER	0312740017SA			0312740018SA			0312790012SA			0312790013SA			0312790008SA			0312790009SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Ethylbenzene	<	5.6	U	<	5.6	U	1.7	5.6	J	<	5.6	U	<	5.5	U	<	5.6	U
Toluene	3.8	5.6	J	<	5.6	U	4.5	5.6	J	<	5.6	U	<	5.5	U	<	5.6	U
Xylenes (total)	7.5	5.6		<	5.6	U	9	5.6		<	5.6	U	<	5.5	U	<	5.6	U
Metals (mg/kg)																		
Aluminum	4790	11.1		7530	11.3		9450	11.2		6780	11.1		8100	11.1		8420	11.2	
Arsenic	2	0.56		1.6	0.56		2.7	0.56		2.1	0.56		2.2	0.55		2	0.56	
Barium	180	1.1		93.7	1.1		106	1.1	J	56.9	1.1	J	71.7	1.1	J	82.7	1.1	J
Beryllium	0.33	0.22		0.58	0.23		0.6	0.22		0.54	0.22		0.52	0.22		0.58	0.22	
Cadmium	0.95	0.56		0.62	0.56				R			R			R			R
Calcium	63800	22.2	J	23700	22.5		19700	22.5		3740	22.3		4730	22.2		38900	22.4	
Chromium	4.4	1.1		7.9	1.1		9.7	1.1	J	7.9	1.1	J	9.5	1.1	J	7.6	1.1	J
Cobalt	2.4	1.1		4.2	1.1		3.7	1.1		3.8	1.1		3.1	1.1		3.7	1.1	
Copper	4.5	2.2		7.9	2.3		7.3	2.2		6.3	2.2		7.2	2.2		7.3	2.2	
Iron	4360	11.1		7210	11.3		9390	11.2		7770	11.1		8720	11.1		8010	11.2	
Lead	6.4	0.56		6.2	0.56		9.2	0.56	J	7.2	0.56	J	7.8	0.55	J	5.9	0.56	J
Magnesium	2520	22.2		1810	22.5		1980	22.5		1680	22.3		1550	22.2		2260	22.4	
Manganese	106	1.1		177	1.1		178	1.1		156	1.1		162	1.1		138	1.1	
Nickel	6	4.4		8.9	4.5		8	4.5		8.1	4.5		7.1	4.4		8.9	4.5	
Potassium	937	556		1460	563		1700	562		1420	557		1520	554		1760	559	
Silver	0.66	1.1	J	0.63	1.1	J	0.53	1.1	J	0.59	1.1	J	0.61	1.1	J	<	1.1	UJ
Sodium	<	556	U	<	563	U	309	562	J	291	557	J	365	554	J	220	559	J

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 19-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 57

LOCATOR	CAN057-0571-0000			CAN057-0571-0002			CAN057-0572-0000			CAN057-0572-0002			CAN057-0573-0000			CAN057-0573-0002		
LAB SAMPLE NUMBER	0312740017SA			0312740018SA			0312790012SA			0312790013SA			0312790008SA			0312790009SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Vanadium	13.5	1.1		17	1.1		19	1.1		16	1.1		18.3	1.1		15.5	1.1	
Zinc	14.1	2.2		18.4	2.3		20.1	2.2		16.1	2.2		22.5	2.2		21	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	144	44.4		78.4	45		160	44.9		<	44.5	U	<	44.3	U	<	44.8	U
Water Quality (percent)																		
Water	10	0.1		11	0.1		11	0.1		10	0.1		9.8	0.1		11	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 19-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 57

LOCATOR	CAN057-0571-0004			CAN057-0571-0008			CAN057-0572-0004			CAN057-0572-0008			CAN057-0573-0004		
LAB SAMPLE NUMBER	0312740019SA			0312740020SA			0312790014SA			0312790015SA			0312790010SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)															
Toluene	1.6	5.9	J	<	5.7	U	<	5.8	U	9.2	5.6		<	6	U
Xylenes (total)	1.7	5.9	J	<	5.7	U	<	5.8	U	<	5.6	U	<	6	U
Metals (mg/kg)															
Aluminum	3860	23.8		4740	22.9		5050	23.1		5590	22.3		2700	59.7	
Arsenic	1.7	0.59		1.6	0.57		1.9	0.58		1.9	0.56		1.7	0.6	
Barium	167	2.4		192	2.3		126	2.3	J	303	2.2	J	165	6	J
Beryllium	<	0.48	U	<	0.46	U	0.38	0.46	J	0.4	0.45	J	<	1.2	U
Cadmium	3.1	1.2		1.9	1.1	J			R			R			R
Calcium	228000	47.5		127000	45.7	J	179000	46.3		123000	44.6		254000	119	
Chromium	<	2.4	U	2.8	2.3		2.6	2.3	J	3.5	2.2	J	<	6	UJ
Cobalt	2.4	2.4		<	2.3	U	2.2	2.3	J	2.8	2.2		<	6	U
Copper	<	4.8	U	<	4.6	U	3.9	4.6	J	3.6	4.5	J	4.2	11.9	J
Iron	3260	23.8		4140	22.9		4070	23.1		4890	22.3		2430	59.7	
Lead	3	0.59		5.7	0.57	J	2.2	2.9	J	3.6	2.8	J	2.2	3	J
Magnesium	2860	47.5		3450	45.7		2440	46.3		3170	44.6		2860	119	
Manganese	47.1	2.4		82.4	2.3	J	49.6	2.3		93.4	2.2		28.7	6	
Nickel	4.7	9.5	J	<	9.1	U	5	9.3	J	5.6	8.9	J	<	23.9	U
Potassium	<	1190	U	<	1140	U	951	1160	J	1220	1120		704	2990	J
Silver	<	2.4	U	<	2.3	U	0.95	2.3	J	1.6	2.2	J	<	6	UJ
Sodium	<	1190	U	418	1140	J	346	1160	J	326	1120	J	1450	2990	J
Vanadium	10.5	2.4		18.9	2.3	J	9	2.3		12.6	2.2		6.8	6	
Zinc	9	4.8		14	4.6		10.9	4.6		11.9	4.5		10.6	11.9	J
TPH (mg/kg)															
Total Petroleum Hydrocarbons	<	47.5	U	49.4	45.7		<	46.3	U	<	44.6	U	<	47.8	U
Water Quality (percent)															
Water	16	0.1		12	0.1		14	0.1		10	0.1		16	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
A complete summary of chemical results are presented in Appendix A.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 19-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 57

LOCATOR	CAN057-0573-0008		
LAB SAMPLE NUMBER	0312790011SA		
COLLECT DATE	09/15/93		
	Result	RL	Qual
Volatile Organics (ug/kg)			
Toluene	2.5	5.4	J
Xylenes (total)	2.3	5.4	J
Metals (mg/kg)			
Aluminum	2870	54.1	
Arsenic	2.4	0.54	
Barium	457	5.4	J
Beryllium	<	1.1	U
Cadmium			R
Calcium	261000	108	
Chromium	<	5.4	UJ
Cobalt	<	5.4	U
Copper	1.8	10.8	J
Iron	2180	54.1	
Lead	0.91	1.1	J
Magnesium	3330	108	
Manganese	38.1	5.4	
Nickel	<	21.7	U
Potassium	707	2710	J
Silver	2.7	5.4	J
Sodium	1150	2710	J
Vanadium	5.9	5.4	
Zinc	11.1	10.8	
TPH (mg/kg)			
Total Petroleum Hydrocarbons	<	43.3	U
Water Quality (percent)			
Water	7.7	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review. A complete summary of chemical results are presented in Appendix A.

J = Estimated value.

R = Rejected value. QUAL=Qualification

U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 19-1c
Comparison of Maximum Concentrations with RBCs
SWMU 57

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN057-0571-0004	Cadmium	3.1	8	N
CAN057-0571-0002	Copper	7.9	300	N
CAN057-0572-0000	Ethylbenzene	0.0017	800	N
CAN057-0573-0008	Silver	2.7	20	N
CAN057-0572-0008	Toluene	0.0092	2000	N
CAN057-0572-0000	Total Petroleum Hydrocarbons (3)	160	1000	N
CAN057-0572-0000	Xylenes (total)	0.009	20000	N
CAN057-0573-0000	Zinc	22.5	2000	N

(1) All units in mg/kg

(2) Risk-based concentration

(3) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 19-2a
Summary of Soil Sample Results
SWMU 57

SUMMARY OF SWMU 57 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	8	OWS	ND	<20	<10	ND	ND	NT	NT	NT
2	8	OWS	ND	<20	ND	NT	NT	NT	NT	NT
3	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
4	8	OWS	ND	<20	<10	NT	NT	NT	NT	NT
5	8	OWS	ND	<20	<10	ND	ND	NT	NT	NT
6	8	OWS	ND	<20	ND	ND	NT	NT	NT	NT
7	8	OWS	NT	NT	NT	NT	ND	ND	ND[1]	Ag[2]
8	N/A	OWS	NT	NT	NT	ND	ND	NT	NT	NT

[1] Only contaminant identified: Di-n-butylphthalate found in sample (13 mg/Kg) and laboratory method blank.
[2] Silver at 1.4 mg/Kg.
ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration, see Section 4.3, References, item #3.

Source: US Army Corps of Engineers, 1999

Table 19-2b
Maximum Soil Sample Concentration of Metals
SWMU 57

SWMU 57 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Silver	1.4	<0 0.04	0.01-5	2.65	380 N
	Arsenic	0.78	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	162.8	0.8	430	805	5300 N
	Cadmium	0.21	< 0.005	0.01-1	1.3	38 N
	Chromium	8.7	0.02	38	13.3	31 C
	Nickel	6.4	NT	16	11.4	1500 N
	Lead	9.3	< 0.05	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: US Army Corps of Engineers, 1999

Table 20-1a
Summary of Chemicals Reported for Subsurface Soil
SWMUs 61-63

LOCATOR	CAN061-0611-0004			CAN061-0611-0008			CAN061-0612-0004			CAN061-0612-0008			CAN062-0621-0004			CAN062-0621-0008		
LAB SAMPLE NUMBER	03137900009SA			03137900010SA			03137900013SA			03137900014SA			03140200011SA			03140200012SA		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Benzene	<	5.7	U	<	5.7	U	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U
Chlorobenzene	<	5.7	U	<	5.7	U	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U
1,1-Dichloroethene	<	5.7	U	<	5.7	U	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U
Toluene	<	5.7	U	2.1	5.7	J	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U
Trichloroethene	<	5.7	U	<	5.7	U	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U
Semivolatile Organics (ug/kg)																		
Acenaphthene	<	380	U							<	390	U				<	370	U
4-Chloro-3-methylphenol	<	380	U							<	390	U				<	370	U
2-Chlorophenol	<	380	U							<	390	U				<	370	U
1,4-Dichlorobenzene	<	380	U							<	390	U				<	370	U
2,4-Dinitrotoluene	<	380	U							<	390	U				<	370	U
4-Nitrophenol	<	1800	U							<	1900	U				<	1800	U
N-Nitroso-di-n-propylamine	<	380	U							<	390	U				<	370	U
Pentachlorophenol	<	1800	U							<	1900	U				<	1800	U
Phenol	<	380	U							<	390	U				<	370	U
Pyrene	<	380	U							<	390	U				<	370	U
1,2,4-Trichlorobenzene	<	380	U							<	390	U				<	370	U
Metals (mg/kg)																		
Aluminum	4480	11.5		4970	22.7		5350	11.2		3650	23.6		4260	10.9		3670	11.2	
Antimony	<	6.9	U	<	13.6	U	<	6.7	U	<	14.2	U	<	6.6	U	<	6.7	U
Arsenic	1.8	0.57		1.5	0.57		1.3	0.56		1.7	0.59		1.9	0.55		2.4	0.56	
Barium	82.7	1.1		316	2.3		54.8	1.1		727	2.4		28.4	1.1		158	1.1	
Beryllium	0.31	0.23		0.33	0.45	J	0.36	0.22		0.35	0.47	J	0.4	0.22		0.39	0.22	
Cadmium	1.7	0.57		3	1.1		0.69	0.56		2.6	1.2		<	0.55	U	1.3	0.56	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1a
Summary of Chemicals Reported for Subsurface Soil
SWMUs 61-63

LOCATOR	CAN061-0611-0004			CAN061-0611-0008			CAN061-0612-0004			CAN061-0612-0008			CAN062-0621-0004			CAN062-0621-0008		
LAB SAMPLE NUMBER	0313790009SA			0313790010SA			0313790013SA			0313790014SA			0314020011SA			0314020012SA		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/24/93			09/24/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Calcium	101000	22.9		151000	45.4		30400	22.4		183000	47.3		1570	21.8		82500	22.4	
Chromium	3.6	1.1		2.3	2.3		5.5	1.1		2.6	2.4		5.9	1.1		3	1.1	
Cobalt	2.4	1.1		1.7	2.3	J	2.6	1.1		<	2.4	U	1.9	1.1		1.8	1.1	
Copper	3.2	2.3		1.6	4.5	J	3.8	2.2		2.5	4.7	J	4.2	2.2		2.8	2.2	
Iron	4010	11.5		2490	22.7		5320	11.2		2640	23.6		4930	10.9		3460	11.2	
Lead	3.4	2.9		3.3	5.7	J	3.4	1.1		3.6	0.59		4.6	0.55		4.8	0.56	
Magnesium	1970	22.9		3210	45.4		1470	22.4		3510	47.3		1470	21.8		2860	22.4	
Manganese	52.1	1.1	J	53.8	2.3	J	54.6	1.1	J	44.2	2.4	J	62.3	1.1		78.3	1.1	
Mercury	<	0.11	U	<	0.11	U	<	0.11	U	<	0.12	U	<	0.11	U	<	0.11	U
Nickel	5.2	4.6		3	9.1	J	6.3	4.5		4.6	9.5	J	5.8	4.4		4.7	4.5	
Potassium	838	573		734	1130	J	998	561		616	1180	J	1300	546		1100	560	
Selenium	<	1.1	J	<	1.1	J	<	1.1	J	<	1.2	J	<	0.55	U	<	0.56	J
Silver	0.64	1.1	J	1.2	2.3	J	0.58	1.1	J	1.7	2.4	J	0.34	1.1	J	<	1.1	U
Sodium	<	573	U	<	1130	U	<	561	U	<	1180	U	223	546	J	173	560	J
Thallium	<	1.1	J	<	1.1	J	<	0.56	U	<	1.2	J	<	0.55	U	<	1.1	J
Vanadium	10.5	1.1		5.6	2.3		12.3	1.1		8.8	2.4		13.4	1.1		15.4	1.1	
Zinc	9.7	2.3		7.4	4.5		17.2	2.2		6.6	4.7		10.3	2.2		9.4	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	45.8	U	<	45.4	U	<	44.8	U	<	47.3	U	<	43.7	U	<	44.8	U
Water Quality (percent)																		
Water	13	0.1		12	0.1		11	0.1		15	0.1		8.4	0.1		11	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1a
Summary of Chemicals Reported for Subsurface Soil
SWMUs 61-63

LOCATOR	CAN062-0622-0004			CAN062-0622-0008		
LAB SAMPLE NUMBER	0314010003SA			0314010004SA		
COLLECT DATE	09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)						
Benzene	<	5.4	U	<	5.7	U
Chlorobenzene	<	5.4	U	<	5.7	U
1,1-Dichloroethene	<	5.4	U	<	5.7	U
Toluene	<	5.4	U	<	5.7	U
Trichloroethene	<	5.4	U	<	5.7	U
Semivolatile Organics (ug/kg)						
Acenaphthene				<	380	U
4-Chloro-3-methylphenol				<	380	U
2-Chlorophenol				<	380	U
1,4-Dichlorobenzene				<	380	U
2,4-Dinitrotoluene				<	380	U
4-Nitrophenol				<	1800	U
N-Nitroso-di-n-propylamine				<	380	U
Pentachlorophenol				<	1800	U
Phenol				<	380	U
Pyrene				<	380	U
1,2,4-Trichlorobenzene				<	380	U
Metals (mg/kg)						
Aluminum	3930	10.8		3040	22.9	
Antimony	<	6.5	U	<	13.7	U
Arsenic	1.2	0.54		1.1	0.57	
Barium	45	1.1	J	334	2.3	J
Beryllium	0.41	0.22		0.59	0.46	
Cadmium	<	0.54	U	<	1.1	U

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1a
Summary of Chemicals Reported for Subsurface Soil
SWMUs 61-63

LOCATOR	CAN062-0622-0004			CAN062-0622-0008		
LAB SAMPLE NUMBER	0314010003SA			0314010004SA		
COLLECT DATE	09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual
Calcium	2160	21.5		136000	45.8	
Chromium	5.3	1.1		<	2.3	U
Cobalt	2.1	1.1		2.1	2.3	J
Copper	3.5	2.2		2.1	4.6	J
Iron	4610	10.8		2470	22.9	
Lead	4.2	0.54		4	0.57	
Magnesium	1300	21.5		3510	45.8	
Manganese	75	1.1		56.3	2.3	
Mercury	<	0.11	U	<	0.11	U
Nickel	5.5	4.3		4.5	9.2	J
Potassium	938	538		740	1140	J
Selenium	<	0.54	U	<	1.1	J
Silver	<	1.1	J	<	2.3	J
Sodium	295	538	J	<	1140	U
Thallium	<	0.54	U	<	1.1	J
Vanadium	12.9	1.1		9.5	2.3	
Zinc	9.7	2.2		7.9	4.6	
TPH (mg/kg)						
Total Petroleum Hydrocarbons	<	43	U	<	45.8	U
Water Quality (percent)						
Water	7.1	0.1		13	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1b
Summary of Chemicals Reported for Near-Surface Soil
SWMUs 61-63

LOCATOR	CAN063-0631-0000			CAN063-0631-0008			CAN063-0631-0002			CAN063-0632-0000			CAN063-0632-0000			CAN063-0632-0002		
LAB SAMPLE NUMBER	0312140001SA			0314020007SA			0312140002SA			0312140005SA			0314020013SA			0312140006SA		
COLLECT DATE	09/13/93			09/13/93			09/13/93			09/13/93			09/13/93			09/13/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane				1.5	5.2	J	<	5.5	U				<	5.3	U	<	5.6	U
Toluene				2.7	5.2	J	<	5.5	U				<	5.3	U	<	5.6	U
Xylenes (total)				1.1	5.2	J	<	5.5	U				<	5.3	U	<	5.6	U
Semivolatile Organics (ug/kg)																		
Acenaphthene	58	340	J							120	340	J						
Anthracene	96	340	J							210	340	J						
Benzo(a)anthracene	370	340								1000	340							
Benzo(a)pyrene .621 mg/kg	460	340								900	340							
Benzo(b)fluoranthene	990	340	J							1800	340							
Benzo(g,h,i)perylene	280	340	J							390	340							
Butyl benzyl phthalate	120	340	J							50	340	J						
Carbazole	66	340	J							100	340	J						
Chrysene	720	340	J							1100	340							
Dibenzofuran	51	340	J							53	340	J						
Fluoranthene	900	340	J							1700	340							
Fluorene	59	340	J							100	340	J						
Indeno(1,2,3-cd)pyrene	250	340	J							400	340							
2-Methylnaphthalene	120	340	J							<	340	U						
Naphthalene	80	340	J							<	340	U						
Phenanthrene	670	340	J							1400	340							
Pyrene	1100	340	J							2200	340							

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1b
Summary of Chemicals Reported for Near-Surface Soil
SWMUs 61-63

LOCATOR	CAN063-0631-0000			CAN063-0631-0000			CAN063-0631-0002			CAN063-0632-0000			CAN063-0632-0000			CAN063-0632-0002		
LAB SAMPLE NUMBER	0312140001SA			0314020007SA			0312140002SA			0312140005SA			0314020013SA			0312140006SA		
COLLECT DATE	09/13/93			09/13/93			09/13/93			09/13/93			09/13/93			09/13/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg)																		
Aluminum	3430	10.4					8910	11		3790	10.3					7150	11.1	
Arsenic	2.2	0.52					2.6	0.55		4.1	0.52					2	0.56	
Barium	717	1					96.9	1.1		279	1					74.8	1.1	
Beryllium	0.27	0.21					0.61	0.22		0.28	0.21					0.5	0.22	
Cadmium	0.85	0.52					<	0.55	U	0.81	0.52					<	0.56	U
Calcium	44500	20.8	J				2690	22		65700	20.6					2440	22.2	
Chromium	11.9	1	J				9.7	1.1		16.1	1					8.3	1.1	
Cobalt	2.4	1					4	1.1		2.2	1					3.6	1.1	
Copper	11.6	2.1					7.4	2.2		10.2	2.1					5.5	2.2	
Iron	5120	10.4					8920	11		4580	10.3					7250	11.1	
Lead	84.4	5.2	J				12	1.1		82.6	5.2					6.2	1.1	
Magnesium	1970	20.8					1770	22		1940	20.6					1300	22.2	
Manganese	383	1	J				177	1.1		156	1					144	1.1	
Mercury	0.25	0.1					<	0.11	U	0.18	0.1					<	0.11	U
Nickel	8.2	4.2					8.3	4.4		5.6	4.1					7.6	4.4	
Potassium	898	519					1640	549		1150	516					1260	555	
Sodium	<	519	U				<	549	U	<	516	U				375	555	J
Vanadium	14.2	1					19.2	1.1		11.5	1					15.1	1.1	
Zinc	54.9	2.1					20.7	2.2		54.2	2.1					15.2	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	649	41.6					<	43.9	U	610	41.2					<	44.4	U
Water Quality (percent)																		
Water	3.8	0.1		4.2	0.1		8.9	0.1		3	0.1		4.9	0.1		10	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 20-1c
Comparison of Maximum Concentrations with RBCs (1)
SWMUs 61-63

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN061-0612-0008	Barium	727	600	Y
CAN061-0611-0008	Cadmium	3	8	N
CAN061-0611-0008	Copper	7.2	300	N
CAN061-0612-0008	Silver	1.7	20	N
CAN061-0612-0000	Toluene	0.005	2000	N
CAN061-0612-0000	Xylenes (total)	0.0028	20000	N

(1) All units in mg/kg
(2) Risk based concentration
Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 20-1d
Comparison of Maximum Concentrations with RBCs (1)
SWMUs 61-63

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN062-0622-0000	1,1,2,2-Tetrachloroethane	0.0014	0.4	N
CAN062-0622-0000	2-Hexanone	0.0096	NTF	N
CAN062-0622-0000	4-Methyl-2-pentanone (MIBK)	0.0055	400	N
CAN062-0622-0000	Bromoform	0.0012	200	N
CAN062-0621-0008	Cadmium	1.3	8	N
CAN062-0621-0000	Copper	6.9	300	N
CAN062-0622-0000	Silver	0.59	20	N
CAN062-0621-0002	Toluene	0.0034	2000	N

NTF = No Established EPA Toxicity Factor
(1) All units in mg/kg
(2) Risk based concentration
Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 20-1e
Comparison of Maximum Concentrations with RBCs (1)
SWMUs 61-63

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN063-0631-0000	1,2-Dichloroethane	0.0015	0.8	N
CAN063-0631-0000	2-Methylnaphthalene	0.12	NTF	N
CAN063-0632-0000	Acenaphthene	0.12	500	N
CAN063-0632-0000	Anthracene	0.21	2000	N
CAN063-0632-0008	Barium	751	600	Y
CAN063-0632-0000	Benzo(a)anthracene	1	0.07	Y
CAN063-0632-0000	Benzo(a)pyrene	0.9	0.01	Y
CAN063-0632-0000	Benzo(b)fluoranthene	1.8	0.07	Y
CAN063-0632-0000	Benzo(g,h,i)perylene	0.39	NTF	N
CAN063-0631-0000	Butyl benzyl phthalate	0.12	2000	N
CAN063-0631-0000	Cadmium	0.85	8	N
CAN063-0632-0000	Carbazole	0.1	4	N
CAN063-0632-0000	Chromium	16.1	40	N
CAN063-0632-0000	Chrysene	1.1	2	N
CAN063-0631-0000	Copper	11.6	300	N
CAN063-0632-0000	Dibenzofuran	0.053	NTF	N
CAN063-0632-0000	Fluoranthene	1.7	300	N
CAN063-0632-0000	Fluorene	0.1	300	N
CAN063-0632-0000	Indeno(1,2,3-cd)pyrene	0.4	0.04	Y
CAN063-0631-0000	Lead (3)	84.4	500	N
CAN063-0631-0000	Mercury	0.25	2	N
CAN063-0631-0000	Naphthalene	0.08	300	N
CAN063-0632-0000	Phenanthrene	1.4	NTF	N
CAN063-0632-0000	Pyrene	2.2	200	N
CAN063-0631-0000	Toluene	0.0027	2000	N
CAN063-0631-0000	Total Petroleum Hydrocarbons (4)	649	1000	N
CAN063-0631-0000	Xylenes (total)	0.0011	20000	N
CAN063-0631-0000	Zinc	54.9	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) EPA suggests 500-1,000 mg/kg as allowable concentration for residential soils based on EPA's IUBK Lead Model (EPA 1990)

(4) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 20-2a
Concentrations of COCs in Surface Soils
SWMUs 61-63

Field ID	1,2-Dichloroethane (µg/kg)			Toluene (µg/kg)			Xylenes (total) (µg/kg)			Acenaphthene (µg/kg)			Anthracene (µg/kg)		
	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
CAN063-0631-0000	1.5	J	5.2	2.7	J	5.2	1.1	J	5.2	58	J	340	96	J	340
CAN063-0632-0000		U	5.3		U	5.3		U	5.3	120	J	340	210	J	340
Number	1			1			1			2			2		
Minimum detected	1.50			2.70			1.10			58.0			96.0		
Maximum detected	1.50			2.70			1.10			120			210		
Average	1.50			2.70			1.10			89.0			153		
RME	1.50			2.70			1.10			120			210		

RL = Laboratory reporting limit
RME = Maximum detected
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected.. Value shown is one-half RL

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Source: Woodward-Clyde, 1994

Table 20-2a
Concentrations of COCs in Surface Soils
SWMUs 61-63

Field ID	Benzo(a)anthracene (µg/kg)			Benzo(a)pyrene (µg/kg)			Benzo(b)fluoranthene (µg/kg)			Butyl benzyl phthalate (µg/kg)		
	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
CAN063-0631-0000	370		340	460		340	990		340	120	J	340
CAN063-0632-0000	1000		340	900		340	1800		340	50	J	340
Number	2			2			2			2		
Minimum detected	370			460			990			50.0		
Maximum detected	1000			900			1800			120		
Average	685			680			1395			85.0		
RME	1000			900			1800			120		

RL = Laboratory reporting limit
RME = Maximum detected
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected.. Value shown is one-half RL

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Source: Woodward-Clyde, 1994

Table 20-2a
Concentrations of COCs in Surface Soils
SWMUs 61-63

Field ID	Carbazole (µg/kg)			Chrysene (µg/kg)			Fluoranthene (µg/kg)			Fluorene (µg/kg)			Indeno(1,2,3-cd)pyrene (µg/kg)			Naphthalene (µg/kg)		
	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
CAN063-0631-0000	66	J	340	720		340	900		340	59	J	340	250	J	340	80	J	340
CAN063-0632-0000	100	J	340	1100		340	1700		340	100	J	340	400		340		U	340
Number	2			2			2			2			2			1		
Minimum detected	66.0			720			900			59			250			80		
Maximum detected	100			1100			1700			100			400			80		
Average	83.0			910			1300			80			325			80		
RME	100			1100			1700			100			400			80		

RL = Laboratory reporting limit
RME = Maximum detected
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected.. Value shown is one-half RL

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Source: Woodward-Clyde, 1994

Table 20-2a
Concentrations of COCs in Surface Soils
SWMUs 61-63

Field ID	Pyrene (µg/kg)			TPH (µg/kg)			Barium (mg/kg)			Cadmium (mg/kg)			Lead (mg/kg)			Mercury (mg/kg)			Zinc (mg/kg)		
	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL
CAN063-0631-0000	1100		340	649		42	717		1	0.85		0.5	84.4	J	5.2	0.25		0.1	54.9		2.1
CAN063-0632-0000	2200		340	610		41	279		1	0.81		0.5	82.6		5.2	0.18		0.1	54.2		2.1
Number	2			2			2			2			2			2			2		
Minimum detected	1100			610			279			0.81			82.6			0.18			54.2		
Maximum detected	2200			649			717			0.85			84.4			0.25			54.9		
Average	1650			630			498			0.83			83.5			0.22			54.6		
RME	2200			649			717			0.85			84.4			0.25			54.9		

RL = Laboratory reporting limit
RME = Maximum detected
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected.. Value shown is one-half RL

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

	1,2-Dichloroethane (µg/kg)			Toluene (µg/kg)			Xylenes (total) (µg/kg)			Acenaphthene (µg/kg)			Anthracene (µg/kg)			
Field ID	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	Qual	RL	Result	log Result	Qual	RL
CAN063-0631-0000	1.5	J	5.2	2.7	J	5.2	1.1	J	5.2	58	J	340	96	4.564	J	340
CAN063-0631-0002		U	5.5		U	5.5		U	5.5							
CAN063-0631-0004		U	5.6		U	5.6		U	5.6							
CAN063-0631-0008		U	5.6		U	5.6		U	5.6		U	370	185	5.220	U	370
CAN063-0632-0000		U	5.3	2.65	U	5.3		U	5.3	120	J	340	210	5.347	J	340
CAN063-0632-0002		U	5.6		U	5.6		U	5.6							
CAN063-0632-0004		U	5.6		U	5.6		U	5.6							
CAN063-0632-0008		U	5.6		U	5.6		U	5.6		U	370	185	5.220	U	370
Number	1			2			1			2			4	4		
Minimum detected	1.50			2.70			1.10			58.0			96.0			
Maximum detected	1.50			2.70			1.10			120			210			
Average	1.50			2.68			1.10			89.0			169	5.09		
H Statistic														2.99		
Standard Deviation													50.07	0.35		
95% UCL													318	318		
RME	1.5			2.70			1.10			120			210			

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

Field ID	Benzo(a)anthracene (µg/kg) Result	log Result	Qual	RL	Benzo(a)pyrene (µg/kg) Result	log Result	Qual	RL	Benzo(b)fluoranthene (µg/kg) Result	log Result	Qual	RL	Butyl benzyl phthalate (µg/kg) Result	Qual	RL
CAN063-0631-0000	370	5.914		340	460	6.131		340	990	6.898		340	120	J	340
CAN063-0631-0002															
CAN063-0631-0004															
CAN063-0631-0008	185	5.220	U	370	185	5.220	U	370	185	5.220	U	370		U	370
CAN063-0632-0000	1000	6.908		340	900	6.802		340	1800	7.496		340	50	J	340
CAN063-0632-0002															
CAN063-0632-0004															
CAN063-0632-0008	185	5.220	U	370	185	5.220	U	370	185	5.220	U	370		U	370
Number	4	4			4	4			4	4			2		
Minimum detected	370				460				990				50.0		
Maximum detected	1000				900				1800				120		
Average	435	5.82			433	5.84			790	6.21			85.0		
H Statistic		5.40				5.40				8.32					
Standard Deviation	386.6	0.80			337.6	0.77			772.9	1.17					
95% UCL	5554	5554			5119	5119			2.67E+05	2.67E+05					
RME	1000				900				1800				120		

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

	Carbazole (µg/kg)			Chrysene (µg/kg)				Fluoranthene (µg/kg)				Fluorene (µg/kg)		
Field ID	Result	Qual	RL	Result	log Result	Qual	RL	Result	log Result	Qual	RL	Result	Qual	RL
CAN063-0631-0000	66	J	340	720	6.579		340	900	6.802		340	59	J	340
CAN063-0631-0002														
CAN063-0631-0004														
CAN063-0631-0008		U	370	185	5.220	U	370	185	5.220	U	370		U	370
CAN063-0632-0000	100	J	340	1100	7.003		340	1700	7.438		340	100	J	340
CAN063-0632-0002														
CAN063-0632-0004														
CAN063-0632-0008		U	370	185	5.220	U	370	185	5.220	U	370		U	370
Number	2			4	4			4	4			2		
Minimum detected	66.0			720				900				59.0		
Maximum detected	100			1100				1700				100		
Average	83.0			548	6.01			743	6.17			79.5		
H Statistic					6.244				7.443					
Standard Deviation				446.4	0.92			721.9	1.13					
95% UCL				17332	17332			1.15E+05	1.15E+05					
RME	100			1100				1700				100		

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

	Ideno(1,2,3-cd)pyrene (µg/kg)				Naphthalene (µg/kg)			Pyrene (µg/kg)				TPH (mg/kg)			
Field ID	Result	Log Result	Qual	RL	Result	Qual	RL	Result	log Result	Qual	RL	Result	log Result	Qual	RL
CAN063-0631-0000	250	5.521	J	340	80	J	340	1100	7.003		340	649	6.475		41.6
CAN063-0631-0002												21.95	3.089	U	43.9
CAN063-0631-0004												140	4.942		44.9
CAN063-0631-0008	185	5.220	U	370		U	370	185	5.220	U	370	22.5	3.114	U	45
CAN063-0632-0000	400	5.991		340		U	340	2200	7.696		340	610	6.413		41.2
CAN063-0632-0002												22.2	3.100	U	44.4
CAN063-0632-0004												11.45	2.438	U	44.9
CAN063-0632-0008	185	5.220	U	370		U	370	185	5.220	U	370	22.45	3.111	U	44.9
Number	4	4			1			4	4			8	8		
Minimum detected	250				80.0			1100				140			
Maximum detected	400				80.0			2200				649			
Average	255	5.49			80.0			918	6.28			187	4.09		
H Statistic		3.184							9.124				5.117		
Standard Deviation	101.4	0.36						957.6	1.26			276.2	1.62		
95% UCL	505	505						9.14E+05	9.14E+05			5120	5120		
RME	400				80.0			2200				649			

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

Field ID	Barium (mg/kg) Result	Barium log Result	Barium Qual	Barium RL	Cadmium (mg/kg) Result	Cadmium log Result	Cadmium Qual	Cadmium RL	Lead (mg/kg) Result	Lead log Result	Lead Qual	Lead RL
CAN063-0631-0000	717	6.575		1	0.85	-0.163		0.52	84.4	4.436	J	5.2
CAN063-0631-0002	96.9	4.574		1.1	0.275	-1.291	U	0.55	12	2.485		1.1
CAN063-0631-0004	45.3	3.813		1.1	0.28	-1.273	U	0.56	15	2.708		1.1
CAN063-0631-0008	612	6.417		2.2	0.55	-0.598	U	1.1	3.9	1.361		0.56
CAN063-0632-0000	279	5.631		1	0.81	-0.211		0.52	82.6	4.414		5.2
CAN063-0632-0002	74.8	4.315		1.1	0.28	-1.273	U	0.56	6.2	1.825		1.1
CAN063-0632-0004	61	4.111		1.1	0.28	-1.273	U	0.56	4	1.386		0.56
CAN063-0632-0008	751	6.621		1.1	0.28	-1.273	U	0.56	3.9	1.361		1.1
Number	8	8			8	8			8	8		
Minimum detected	45.3				0.81				3.90			
Maximum detected	751				0.85				84.4			
Average	330	5.26			0.45	-0.92			26.5	2.50		
H Statistic		4.091				2.45				4.428		
Standard Deviation	312.1	1.19			0.25	0.51			35.42	1.30		
95% UCL	2423	2423			0.73	0.73			246	246		
RME	751				0.73				84.4			

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2b
Concentrations of COCs in Total Soils
SWMUs 61-63

	Mercury (mg/kg)				Zinc (mg/kg)			
Field ID	Result	log Result	Qual	RL	Result	log Result	Qual	RL
CAN063-0631-0000	0.25	-1.386		0.1	54.9	4.006		2.1
CAN063-0631-0002	0.055	-2.900	U	0.11	20.7	3.030		2.2
CAN063-0631-0004	0.055	-2.900	U	0.11	14.5	2.674		2.2
CAN063-0631-0008	0.055	-2.900	U	0.11	10.7	2.370		4.5
CAN063-0632-0000	0.18	-1.715		0.1	54.2	3.993		2.1
CAN063-0632-0002	0.055	-2.900	U	0.11	15.2	2.721		2.2
CAN063-0632-0004	0.055	-2.900	U	0.11	14.8	2.695		2.2
CAN063-0632-0008	0.055	-2.900	U	0.11	11	2.398		2.2
Number	8	8			8	8		
Minimum detected	0.18				10.7			
Maximum detected	0.25				54.9			
Average	0.10	-2.56			24.5	2.99		
H Statistic		2.642				2.745		
Standard Deviation	0.08	0.63			18.8	0.66		
95% UCL	0.18	0.18			48.7	48.7		
RME	0.18				48.7			

RL = Laboratory reporting limit
RME = Lower of 95% UCL or maximum detected.
95% UCL concentrations have not been calculated for sample sets with N <3
J = Estimated value below reporting limit or estimated based on data quality criteria
U = Not detected. Value shown is one-half RL
Where no RL is shown, no analysis was performed

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Source: Woodward-Clyde, 1994

Table 20-2c
Summary of Human Health Risks
SWMUs 61-63

Receptor/Pathway	Average Exposure			Reasonable Maximum Exposure		
	Cancer Risk	Subchronic H.I.	Chronic H.I.	Cancer Risk	Subchronic H.I.	Chronic H.I.
Occupational Worker (Surface Soil)						
– Dermal Contact	1×10^{-11}		3×10^{-6}	2×10^{-9}		2×10^{-4}
– Ingestion	5×10^{-9}		5×10^{-5}	2×10^{-6}		6×10^{-3}
– Inhalation of VOCs	9×10^{-11}		4×10^{-8}	4×10^{-9}		8×10^{-7}
– Inhalation of Particulates	2×10^{-12}		1×10^{-5}	1×10^{-10}		2×10^{-4}
	5×10^{-9}		7×10^{-5}	2×10^{-6}		6×10^{-3}
Construction Worker (Total Soil)						
– Dermal Contact	7×10^{-13}	1×10^{-6}		1×10^{-11}	3×10^{-5}	
– Ingestion	1×10^{-9}	1×10^{-4}		2×10^{-8}	2×10^{-3}	
– Inhalation of VOCs	6×10^{-12}	3×10^{-8}		3×10^{-11}	1×10^{-7}	
– Inhalation of Particulates	2×10^{-13}	8×10^{-7}		7×10^{-13}	4×10^{-6}	
	1×10^{-9}	1×10^{-4}		2×10^{-8}	2×10^{-3}	
Trespasser (Surface Soil)						
– Dermal Contact	2×10^{-12}	1×10^{-6}		3×10^{-10}	1×10^{-4}	
– Ingestion	1×10^{-9}	1×10^{-5}		1×10^{-7}	2×10^{-3}	
– Inhalation of VOCs	2×10^{-11}	1×10^{-8}		3×10^{-10}	2×10^{-7}	
– Inhalation of Particulates	4×10^{-13}	4×10^{-7}		8×10^{-12}	6×10^{-6}	
	1×10^{-9}	2×10^{-5}		1×10^{-7}	2×10^{-3}	

Note: Apparent inconsistencies in summation of risks are due to rounding of risk values.

Source: Woodward-Clyde, 1994

Table 21-1a
Results for Metals and Other Detected Chemical Compounds
SWMU 74

Chemical	Sample Interval (ft bgs)									Estimated Background Range[1]
	4-6			8-10			12-14			
	Result[2]	Qual[3]	DL	Result[2]	Qual[3]	DL	Result[2]	Qual[3]	DL	
Aluminum	9520		21.2	5410		52.8	5080		52.8	596 - 10,796
Antimony		U	12.7		U	31.7		U	31.7	0 - 29.6
Arsenic X	2.3		0.53	2.3		0.53	1.7		0.53	0 - 10.5
Barium X	125	J	2.1	**796**	J	5.3	307	J	5.3	0 - 548
Beryllium	**0.67**		0.42		U	1.1		U	1.1	0 - 0.6
Cadmium		U	1.1		U	2.6		U	2.6	0 - 2.1
Calcium	121000		42.4	**274000**		106	**269000**		106	0 - 166,119
Chromium X	7.7	J	2.1		UJ	5.3		UJ	5.3	0.8 - 12.0
Cobalt	**4.4**		2.1	2.8	J	5.3	2.7	J	5.3	0 - 4.0
Copper	4.6		4.2	2.1	J	10.6		U	10.6	0 - 10.1
Iron	8420		21.2	3690		52.8	3660		52.8	0 - 8,564
Lead X	4.9	J	10.6	2.3		1.1	1.8		0.53	0 - 18.4
Magnesium	2710		42.4	4400		106	5060		106	0 - 9,912
Manganese	**188**		2.1	37.3		5.3	32.7		5.3	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	7.1	J	8.5	7.2	J	21.1	6.8	J	21.1	0 - 9.7
Potassium	1710		1060	1150	J	2640	1010	J	2640	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	2.1		U	5.3		U	5.3	0 - 1.8
Sodium		U	1060		U	2640		U	2640	0 - 834
Thallium		UJ	1.1		UJ	1.1		UJ	1.1	0 - 6.2
Vanadium	24.4		2.1	12.3		5.3	11.2		5.3	1.7 - 25.0
Zinc	18.8		4.2	9.8	J	10.6	8.4	J	10.6	0 - 20.7
SVOC-TIC - Hexanedioic acid, bis(2-ethylhexyl)ester				670	NJ					

(1) Background mean plus or minus two standard deviations. Table 2-6 in Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico (W-C 1994).
(2) Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)
(3) U = Not Detected J = Estimated Value UJ = Not Detected, Estimated Reporting Limit
Results that are shaded and in bold are concentrations above the estimated background range.
SVOC = semivolatile organic compound TIC = tentatively identified compound

Source: Woodward-Clyde, 1997

Table 21-1b
Summary of Organic Compounds
SWMU 74

Chemical Group	Chemical	74-07	74-08			74-09			74-10		
		18 ft	6 ft	10 ft	14 ft	10 ft	14 ft	44 ft	10 ft	16 ft	20 ft
VOC	Toluene	9.2									
SVOC	Pentachlorophenol										42 J
SVOC	Phenanthrene									42 J	
SVOC	Pyrene								43 J	73 J	
HERBICIDE	MCPP										
PEST/PCB	4,4'-DDT								3.2 J		
TPH	Total Petroleum Hydrocarbons		62.9	48.6	46.9						
VOC-TIC	Ethylenediamine										6.5 NJ
VOC-TIC	Nonanal										
VOC-TIC	Unknown							7.2 NJ			
SVOC-TIC	1,3-Propanediol, 2,2-dimethyl-										
SVOC-TIC	Hexadecanoic acid, butyl ester										
SVOC-TIC	Hexanedioic acid, bis(2-ethylhexyl)ester										
SVOC-TIC	Octadecanoic acid, butyl ester						240 NJ				220 NJ
SVOC-TIC	Saturated Hydrocarbon; C10-C20					200 NJ					

VOC = volatile organic compound
SVOC = semivolatile organic compound
TIC = tentatively identified compound
MCPP = 2-(2-Methy-4-Chlorophenoxy) propionic acid
All results are reported in µg/kg, except for total petroleum hydrocarbons, which are reported in mg/kg.

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Source: Woodward-Clyde, 1997

Table 21-1b
Summary of Organic Compounds
SWMU 74

Chemical Group	Chemical	74-13	74-14			74-15	74-18			74-23
		12 ft	6 ft	10 ft	14 ft	8 ft	5 ft	9 ft	15 ft	8 ft
VOC	Toluene				1.3J	1.9J				
SVOC	Pentachlorophenol									
SVOC	Phenanthrene									
SVOC	Pyrene									
HERBICIDE	MCPP						12000			
PEST/PCB	4,4'-DDT									
TPH	Total Petroleum Hydrocarbons								42.2	
VOC-TIC	Ethylenediamine									
VOC-TIC	Nonanal			6.8 NJ	7.3 NJ					
VOC-TIC	Unknown									
SVOC-TIC	1,3-Propanediol, 2,2-dimethyl-							200 NJ		
SVOC-TIC	Hexadecanoic acid, butyl ester	500 NJ	230 NJ	170 NJ	280 NJ		370 NJ		320 NJ	
SVOC-TIC	Hexanedioic acid, bis(2-ethylhexyl)ester									670 NJ
SVOC-TIC	Octadecanoic acid, butyl ester	330 NJ			150 NJ	200 NJ	200 NJ		190 NJ	
SVOC-TIC	Saturated Hydrocarbon: C10-C20									

VOC = volatile organic compound
SVOC = semivolatile organic compound
TIC = tentatively identified compound
MCPP = 2-(2-Methy-4-Chlorophenoxy) propionic acid
All results are reported in µg/kg, except for total petroleum hydrocarbons, which are reported in mg/kg.

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Source: Woodward-Clyde, 1997

Table 22-1a
Ethyl Benzene and Xylenes Concentrations in Soil Samples
SWMU 76

Boring Number	Sample Depth (Ft-BGS)	Ethyl Benzene (µg/kg)	Xylenes (µg/kg)
0761	4 - 6	29,000 U	29,000 U
	10 - 12	11 U	11 U
	25 - 27	12 U	12 U
0762	0 - 0.5	3 J	11 U
	8 - 10	7,300 U	7,300 U
	14 - 16	12 U	12 U
	31 - 33	11 U	11 U
0763	0 - 0.5	11 U	11 U
	8 - 10	4,000 J	7,900 J
	18 - 20	11 U	11 U
	22 - 24	12 UJ	12 UJ

J = Estimated value
U = Not detected
UJ = Estimated as non-detect at the CRQL
Ft-BGS = Feet below ground surface

Source: Woodward-Clyde, 1992

Table 22-1b
Metal Concentrations(1) in Soil Samples
SWMU 76

Element	Boring 0761 Sample Depth (Ft-BGS) 4	10	25	Boring 0762 Sample Depth (Ft-BGS) 0	8	14	31	Boring 0763 Sample Depth (Ft-BGS) 0	8	18	22	Background[2] ($\bar{x}$ + 2 σ)
Aluminum	8440J	6990J	6190J	8440	3820	5380J	5220J	9310	5770J	3530J	6140J	2571-10447
Antimony	5.4U	5.2U	5.4U	-R	5.3U	5.3U	4.9U	-R	5.5U	5.8U	5.2U	4.88-5.4
Arsenic	1.9U	1.2J	0.92J	1.8J	1.9J	1.1J	0.6J	1.8J	1.6J	0.63J	0.59J	0.43-1.95
Barium	151J	92.6	42.5J	82.6	374	77.5	61.2	86.6	680	1060	78.1	0-903
Beryllium	0.52J	0.51J	0.47U	0.82J	0.47U	0.46U	0.43U	0.72J	0.48U	0.5U	0.45U	0.32-0.68
Cadmium	0.94U	0.91U	0.94U	0.85J	0.93U	0.93U	0.86U	0.88U	0.96U	1U	0.91U	0.81-1.01
Calcium	164000	121000	113000	2600	210000	211000	38000	2850	219000J	160000	111000	0-193062
Chromium	7	6.1	5.5	9.4	3.8	4.5	6	10	4.6	3.6	6.2	2.67-9.31
Cobalt	3J	2.3J	2.1J	4.6J	2.5J	1.7J	1.5J	4.6J	3.5J	1.5J	1.9J	1.38-4.06
Copper	16.2	6.7	11.2	11	8.7	6.7	4.4U	13.7	5.1U	3.4U	3.5U	0.00-15.44
Iron	6140	5520	3770	8740	2990	3300	4150	9300	3830J	2150	3880	2239-8683
Lead	4.9	4.2	2.2	9.6	2.3	2.6	1.6	12.6	2.6	1.6	2.4	1.76-8.64
Lead, organic	1.2UJ	1.1UJ	1.1UJ	1.1UJ	1.2UJ	1.2UJ	1.1UJ	1.1UJ	1.2UJ	1.1UJ	1.2UJ	NA
Magnesium	2560	3540	11800	1570	3800	7880	9590	1660	5470	8940	8400	0-11903
Manganese	80.9	65.4	36.8	226	29.2	41.1	35.9	223	43.2	18	38.2	10.88-167
Mercury	0.13	0.11U	0.85	0.11U	0.12U	0.12U	0.11U	0.11U	0.12U	0.13U	0.11U	-- - --
Nickel	7.8J	6.2J	5.9J	8.4J	7J	5.4J	4.4J	8.4J	8.3J	5.6J	5.3J	3.57-8.49

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Source: Woodward-Clyde, 1992

Table 22-1b
Metal Concentrations(1) in Soil Samples
SWMU 76

Element	Boring 0761 Sample Depth (Ft-BGS) 4	10	25	Boring 0762 Sample Depth (Ft-BGS) 0	8	14	31	Boring 0763 Sample Depth (Ft-BGS) 0	8	18	22	Background[2] ($\bar{x}$ + 2 σ)
Potassium	1510J	1570J	1070J	1810	951J	1030J	1240	1830	1470	592J	1130J	632-2613
Selenium	0.23UJ	0.23UJ	0.24UJ	0.21U	0.23UJ	0.23UJ	0.21UJ	0.22U	2.4UJ	0.25UJ	2.3UJ	0.00-1.35
Silver	1J	0.91U	1.2J	0.85U	1.1J	0.93U	0.86U	0.88U	0.96U	1U	0.91U	0.86-0.94
Sodium	309U	299U	312J	280U	307U	307U	304J	289U	315U	330U	361J	154-540
Thallium	0.23UJ	0.23UJ	0.24UJ	0.21UJ	0.23UJ	0.23UJ	0.21UJ	0.22UJ	0.24UJ	0.25UJ	0.23UJ	0.20-0.24
Vanadium	16.3	14.4	11.2J	20	10	11.8	13.3	19.8	15.5	16.9	16.4	9.26-26.74
Zinc	15	12.6	7.7	22.2J	7.9	9.2	10.9	24.9	15	9.3	10.2	4.58-21.82

UJ = Estimated as non-detect at the instrument detection limit
J = Estimated value
U = Not detected
-R = Rejected
-- - - = No range could be calculated
Ft-BGS = Feet below ground surface
NA = Not analyzed in background samples

[1] All concentrations are in milligrams per kilogram (mg/kg).
[2] Background range calculated from values ...

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Source: Woodward-Clyde, 1992

Table 22-2b
Proposed Corrective Action Levels and RFI Criteria for Noncarcinogens Detected at Cannon AFB – Soil and Groundwater
SWMU 76

	Chemicals	Chronic Oral RfD (mg/kg/day)	Soil RCRA Action Level (mg/kg)	Soil RFI Criterion (mg/kg)	Groundwater RCRA Action Level (mg/L)	Groundwater RFI Criterion (mg/L)
Volatiles:	1,1,1-Trichloroethane	9.0E-02	7200	7200	0.2*	0.2*
	2-Butanone (MEK)	5.0E-02	4000	4000	1.75	1.75
	Acetone	1.0E-01	8000	8000	3.5	3.5
	Bromoform	2.0E-02	1600	1600	0.1*,(1)	0.1*,(1)
	Carbon Disulfide	1.0E-01	8000	8000	3.5	3.5
	Chloroform	1.0E-02	800	800	7	7
	Dibromomethane	1.0E-02	800	800	0.35	0.35
	Ethylbenzene	1.0E-01	8000	8000	0.7*,(2)	0.7*,(2)
	Toluene	2.0E-01	16000	16000	1*	1*
	Xylenes (total)	2.0E+00	160000	160000	10*,(2)	10*,(2)
Semi-Volatiles:	3-Methylphenol	5.0E-02	4000	4000	1.75	1.75
	4-Methylphenol	5.0E-02	4000	4000	1.75	1.75
	2,4,5-Trichlorophenol	1.0E-01	8000	8000	3.5	3.5
	4-Chloroaniline	4.0E-03	320	320	0.14	0.14
	Anthracene	3.0E-01	24000	24000	10.5	10.5
	Butyl benzyl phthalate	2.0E-01	16000	16000	7	7
	Di-n-butylphthalate	1.0E-01	8000	8000	3.5	3.5
	Fluoranthene	4.0E-02	3200	3200	1.4	1.4
	Naphthalene	4.0E-03	320	320	0.14	0.14
	Phenol	6.0E-01	48000	48000	21	21
	Pyrene	3.0E-02	2400	2400	1.05	1.05
Pesticides:	Methoxychlor	5.0E-03	400	400	0.04*	0.04*
Metals:	Antimony	4.0E-04	32	32	0.014	0.014
	Barium	7.0E-02	5600	5600	2*	2*

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Source: Woodward-Clyde, 1992

Table 22-2b
Proposed Corrective Action Levels and RFI Criteria for Noncarcinogens Detected at Cannon AFB – Soil and Groundwater
SWMU 76

Chemicals	Chronic Oral RfD (mg/kg/day)	Soil RCRA Action Level (mg/kg)	Soil RFI Criterion (mg/kg)	Groundwater RCRA Action Level (mg/L)	Groundwater RFI Criterion (mg/L)
Cadmium, food	1.0E-03	80	80		
Cadmium, water	5.0E-04			0.005*,(2)	0.005*,(2)
Chromium III	1.0E+00	80000	80000	35	35
Chromium VI	5.0E-03	400	400	0.175	0.175
Chromium, total				0.1*,(2)	0.1*,(2)
Copper	3.7E-02	2960	2960	1.3**	1.3**
Lead				0.015**	0.015**
Manganese	1.0E-01	8000	8000	3.5	3.5
Mercury	3.0E-04	24	24	0.002*	0.002*
Nickel	2.0E-02	1600	1600	0.7	0.7
Selenium	5.0E-03	400	400	0.05*,(2)	0.05*,(2)
Silver	5.0E-03	400	400	0.175	0.175
Thallium	7.0E-05	5.6	5.6	0.00245	0.00245
Vanadium	7.0E-03	560	560	0.245	0.245
Zinc	2.0E-01	16000	16000	7	7

* = final MCL
** = SDWA action level
(1) = MCL for total trihalomethanes
(2) = effective July 30, 1992

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Source: Woodward-Clyde, 1992

Table 22-2c

Proposed Corrective Action Levels and RFI Criteria for Carcinogens Detected at Cannon AFB – Soil and Groundwater

SWMU 76

	Chemical	EPA Weight of Evidence	Assumed Risk Level	Exposure Duration (years)	Oral Slope Factor (mg/k-d)-1	Soil RCRA Action Level (mg/kg)	Soil RFI Criterion (mg/kg)	Groundwater RCRA Action Level (mg/L)	Groundwater RFI Criterion (mg/L)
Volatiles:	Benzene	A	1.0E-06	70	2.9E-02	24.14	24.14	5.0E-03*	5.0E-03*
	Bromoform	B2	1.0E-06	70	7.9E-03	88.61	88.61	1.0E-01*,(1)	1.0E-01*,(1)
	Chloroform	B2	1.0E-06	70	6.1E-03	114.75	114.75	1.0E-01*,(1)	1.0E-01*,(1)
	Chloromethane	C	1.0E-05	70	1.3E-02	538.46	538.46	2.69E-02	2.69E-02
	Dibromochloromethane	C	1.0E-05	70	8.4E-02	83.33	83.33	4.17E-03	4.17E-03
	Methylene Chloride	B2	1.0E-06	70	7.5E-03	93.33	93.33	4.67E-03	4.67E-03
	Tetrachloroethene	B2	1.0E-06	70	5.1E-02	13.73	13.73	5.0E-03*	5.0E-03*
	Trichloroethene	B2	1.0E-06	70	1.1E-02	63.64	63.64	5.0E-03*	5.0E-03*
	Vinyl Chloride	A	1.0E-06	70	1.9E+00	0.37	0.37	2.0E-03*	2.0E-03*
Semi-volatiles:	bis(2-Ethylhexyl)phthalate	B2	1.0E-06	70	1.4E-02	50.00	50.00	2.50E-03	2.50E-03
	Benzo(a)anthracene	B2	1.0E-06	70	8.4E-01	0.83	0.83	4.17E-05	4.17E-05
	Benzo(a)pyrene	B2	1.0E-06	70	5.8E+00	0.12	0.12	6.03E-06	6.03E-06
	Benzo(b)fluoranthene	B2	1.0E-06	70	8.1E-01	0.86	0.86	4.32E-05	4.32E-05
	Benzo(k)fluoranthene	B2	1.0E-06	70	3.8E-01	1.84	1.84	9.21E-05	9.21E-05
	Carbazole	B2	1.0E-06	70	2.0E-02	35.00	35.00	1.75E-03	1.75E-03
	Chloroform	B2	1.0E-06	70	6.1E-03	114.75	114.75	1.0E-01*,(1)	1.0E-01*,(1)
	Chrysene	B2	1.0E-06	70	3.0E-02	23.33	23.33	1.17E-03	1.17E-03
	Dibenzo(a,h)anthracene	B2	1.0E-06	70	6.4E+00	0.11	0.11	5.47E-06	5.47E-06
	Indeno(1,2,3-c,d)pyrene	B2	1.0E-06	70	1.4E+00	0.50	0.50	2.50E-05	2.50E-05
	Pentachlorophenol	B2	1.0E-06	70	1.2E-01	5.83	5.83	1.0E-03*	1.0E-03*
Pesticides:	4,4-DDD	B2	1.0E-06	70	2.4E-01	2.92	2.92	1.46E-04	1.46E-04
	4,4-DDE	B2	1.0E-06	70	3.4E-01	2.06	2.06	1.03E-04	1.03E-04
	4,4-DDT	B2	1.0E-06	70	3.4E-01	2.06	2.06	1.03E-04	1.03E-04
	alpha-Chlordane	B2	1.0E-06	70	1.3E+00	0.54	0.54	2.0E-03*	2.0E-03*
	gamma-Chlordane	B2	1.0E-06	70	1.3E+00	0.54	0.54	2.0E-03*	2.0E-03*
	Heptachlor epoxide	B2	1.0E-06	70	9.1E+00	0.08	0.08	2.0E-04*	2.0E-04*
Metals:	Arsenic	A	1.0E-06	70	1.8E+00	0.39	0.39	1.94E-05	1.94E-05
	Beryllium	B2	1.0E-06	70	4.3E+00	0.16	0.16	8.14E-06	8.14E-06

* = final MCL
(1) = MCL for total trihalomethanes
(2) = Effective July 30, 1992

Source: Woodward-Clyde, 1992

Table 22-3
Chemicals Detected in the Confirmation Soil Sample Collected from 5.5 - 6 ft Depth on June 9, 2004
SWMU 76

Chemical	Result (mg/kg)	Reporting Limit (mg/kg)	Region 9 PRG (mg/kg)
Ethylbenzene	0.0083J	0.054	8.9
Gasoline Range Organics	0.069	0.54	62
Methyl tert-butyl ether	0.016J	0.054	
Xylenes (total)	0.057	0.054	270
Percent Moisture (%)	6.8	0.1	

J = Estimated concentration below the reporting limit.

Table 23-1a
Concentration (mg/kg) of TRPH
SWMU 83

BOREHOLE NUMBER	CANNON NUMBER	DEPTH (ft.)	CHEMICAL TRPH
1	CAN083-SUM1-041A	0	3400
	CAN083-SUM1-042B	2.5	3800
	CAN083-SUM1-043C	5	47
	CAN083-SUM1-044D	10	<10
2	CAN083-SUM2-041A	0	1600
	CAN083-SUM2-042B	2.5	5000
	CAN083-SUM2-043C	5	40
	CAN083-SUM2-044D	10	<10
3	CAN083-SUM3-041A	0	1200
	CAN083-SUM3-042B	2.5	<10
	CAN083-SUM3-043C	5	<10
	CAN083-SUM3-044D	10	<10

Duplicate samples or laboratory repeat samples are presented only if they are different from the original sample and not rejected.

J = estimate
R = rejected
U = not detected at CRQL
UJ = estimated as non-detect at CRQL

Source: LRL Sciences, Inc., 1993

Table 23-1b
Concentration (mg/kg) of TAL Metals
SWMU 83

Borehole Number	Sample Number (CAN083-SUM)	Sample Depth (feet)	Aluminum	Barium	Beryllium	Cobalt	Chromium	Copper	Iron	Lead
1	1-051A	0	6250	514	0.27	1.6	6 J	10.2 J	4280	5 J
	1-052B	2.5	7210	227	0.4	2.3	6.1 J	8.2 J	5900	10.2 J
	1-053C	5	13600	74	0.7	3.9	9.9	10.5 J	10400	7.4 J
	1-054D	10	7760	2170	0.47	1.3 U	3.3 J	6.9 J	4180	7.1 J
2	2-051A	0	5780	260	0.21	1.5	3.4 J	13.7 J	3690	9.6 J
	2-052B	2.5	15800	95.4	0.81	4.5	12	12.7	11700	10.4 J
	2-053C	5	15100	68.2	0.69	3.5	10.6	10.4 J	10700	7.6 J
(QAD)	2-751C	5	16400	129	0.77	5	13.2	6.2	11900	6.7
(QCD)	2-851C	5	12300	84.6	0.63	3.1	8.9	11 J	9560	7.6 J
	2-054D	10	8470	1140	0.58	1.6	3 J	7.4 J	4540	7.2 J
3	3-051A	0	8180	233	0.46	3.3	11.8	18 J	8550	36.8 J
	3-052B	2.5	7720	133	0.28	1.9	4.9 J	8.3 J	4890	5.6 J
	3-053C	5	15700 U	68.4	0.72	4	11.3	11.5 J	11700	7.3 J
	3-054D	10	11000	45.8	0.51	2.6	8.6 J	8.4 J	7660	5.2 J
Background (95% UCL) (1)			10540.00	642.00	0.73	4.5	12.50	13.00	1970.00	25.80

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

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Source: LRL Sciences, Inc., 1993

Table 23-1b
Concentration (mg/kg) of TAL Metals
SWMU 83

Borehole Number	Sample Number (CAN083-SUM)	Sample Depth (feet)	Manganese		Mercury		Nickel	Potassium		Silver		Zinc	
1	1-051A	0	105	J	0.01	J	8.6	1050		1.1	UJ	*	R
	1-052B	2.5	239	U	0.01	U	8.9	1210	J	3.4	J	*	R
	1-053C	5	111	J	0.01	U	10.3	2370	J	0.86	UJ	*	R
	1-054D	10	56.2	J	0.02	U	6	1210	J	0.95	UJ	22.5	J
2	2-051A	0	93.6	J	0.01	U	6.6	1030		0.84	UJ	13.9	J
	2-052B	2.5	175	J	0.02	U	11.1	2370		0.86	UJ	*	R
	2-053C	5	111	J	0.02	U	9.5	2810		0.85	UJ	82.1	J
(QAD)	2-751C	5	131	J	0.15		11.4	2860		0.41	U	31.6	
(QCD)	2-851C	5	106	J	0.01	U	10.4	2190		0.92	UJ	30.1	J
	2-054D	10	63.2	J	0.02	U	5.6	1320		0.93	UJ	*	R
3	3-051A	0	271	J	0.02	U	7.6	1500		0.92	UJ	231	J
	3-052B	2.5	50	J	0.02	U	6.1	1320		0.91	UJ	*	R
	3-053C	5	149	J	0.02	U	10.4	2320		0.87	UJ	36.5	J
	3-054D	10	99.9		0.1	U	6.9	1850		0.91	UJ	22.8	
Background (95% UCL) (1)			164		0.13		9.00	2572.00		2.20		21.90	

NOTES:

Duplicate samples (QAD) or (QCD) samples are presented only if they are different from the original sample and not rejected.

U indicates that the compound was analyzed for, but not detected at or above the standard limit.
J indicates and estimated value.
UJ indicates the compound was analyzed for but not detected. The sample quantification limit or reported detection limit is an estimated quantity.
*R indicates that the data was rejected because of quality control measures.

Boldface indicates a detection above the 95% UCL background level.

Only data for metals detected above background is presented.

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Source: LRL Sciences, Inc., 1993

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8305-0000			CAN083-8305-0005			CAN083-8305-0010			CAN083-8305-8362[1]			CAN083-8305-0015			CAN083-8305-0020		
LAB SAMPLE NUMBER	0398670001SA			0398670002SA			0398670003SA			0398670008SA			0398670004SA			0398670005SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)																		
Acetone 704000 mg/kg	<	11	U	<	11	U	3.4	11	J	<	11	U	3.1	11	J	<	11	U
2-Butanone (MEK) 573	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methylene chloride 165	2.1	5.4	J	1.9	5.5	J	4.2	5.6	J	<	5.6	U	3.6	5.6	J	4.5	5.7	J
Toluene 248	<	5.4	U	<	5.5	U	<	5.6	U	<	5.6	U	1.4	5.6	J	<	5.7	U
Semivolatile Organics (µg/kg)																		
Benzo(a)anthracene 0.621	64	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(a)pyrene 0.0621	78	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(b)fluoranthene 0.621	120	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Benzo(g,h,i)perylene	58	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Chrysene 0.621	84	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Fluoranthene 2250	160	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Indeno(1,2,3-cd)pyrene 0.621	58	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Phenanthrene 1800	73	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Phenol 18000	<	360	U	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Pyrene 2300	130	360	J	<	370	U	<	370	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)																		
Aluminum	10800	10.8		8450	11.1		7980	22.6		7210	22.6		7570	11.3		5530	57.3	
Arsenic	3.2	0.54		2.4	0.55		2.6	0.56		2.7	0.56		2	1.1		1	0.57	
Barium	92.6	1.1	J	83.8	1.1	J	633	2.3	J	454	2.3	J	90.8	1.1		234	5.7	J
Beryllium	0.44	0.22		0.41	0.22		0.54	0.45		0.37	0.45	J	0.45	0.23		<	1.1	U
Cadmium	<	0.54	U	<	0.55	U	<	1.1	U	<	1.1	U	<	0.56	U	<	2.9	U
Calcium	8660	21.5		95400	22.2		135000	45.2		132000	45.2		80900	22.6		233000	115	
Chromium	11	1.1		7.3	1.1		5.3	2.3		3.7	2.3		6.4	1.1		<	5.7	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8305-0000			CAN083-8305-0005			CAN083-8305-0010			CAN083-8305-8362[1]			CAN083-8305-0015			CAN083-8305-0020		
LAB SAMPLE NUMBER	0398670001SA			0398670002SA			0398670003SA			0398670008SA			0398670004SA			0398670005SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.																		
Cobalt	3.8	1.1		3.1	1.1		2.8	2.3		2.8	2.3		3.4	1.1		3.4	5.7	J
Copper	8.1	2.2		5.2	2.2		4.6	4.5		4.1	4.5	J	4.4	2.3		<	11.5	U
Iron	10200	10.8		7200	11.1		6470	22.6		6000	22.6		6990	11.3		4040	57.3	
Lead	12.9	2.7		4.7	0.55		4.9	0.56		5.5	0.56		5.1	0.56		2.2	0.57	
Magnesium	1790	21.5		2430	22.2		4120	45.2		3860	45.2		4000	22.6		5830	115	
Manganese	157	1.1		85.6	1.1		106	2.3		95.1	2.3		116	1.1		40.3	5.7	
Nickel	9	4.3		8.7	4.4		5.9	9	J	5.5	9	J	7.3	4.5		<	22.9	U
Potassium	1800	539		1430	554		1400	1130		1210	1130		1840	565		852	2860	J
Vanadium	19.8	1.1		15.9	1.1		17.1	2.3		16.4	2.3		19.5	1.1		14.4	5.7	
Zinc	23.3	2.2		17.3	2.2		16	4.5		14.6	4.5		17	2.3		8.9	11.5	J
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	325	43.1		<	44.3	U	<	45.2	U	<	45.2	U	<	45.2	U	<	45.8	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8305-0025			CAN083-8306-0000			CAN083-8306-0005			CAN083-8306-0010			CAN083-8306-8361[1]		
LAB SAMPLE NUMBER	0398670006SA			0398670010SA			0398710016SA			0398710015SA			0398670009SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)															
Acetone	<	12	U	<	11	U	<	11	U	<	11	U	<	11	U
2-Butanone (MEK)	<	12	U	<	11	U	<	11	U	1.5	11	J	<	11	U
Methylene chloride	<	5.8	U	<	5.7	U	<	5.7	U	<	5.7	U	<	5.7	U
Toluene	<	5.8	U	<	5.7	U	<	5.7	U	<	5.7	U	<	5.7	U
Semivolatile Organics (µg/kg)															
Benzo(a)anthracene	<	380	U	85	380	J	<	370	U	<	370	U	<	380	U
Benzo(a)pyrene	<	380	U	120	380	J	<	370	U	<	370	U	<	380	U
Benzo(b)fluoranthene	<	380	U	160	380	J	<	370	U	<	370	U	<	380	U
Benzo(g,h,i)perylene	<	380	U	75	380	J	<	370	U	<	370	U	<	380	U
Chrysene	<	380	U	99	380	J	<	370	U	<	370	U	<	380	U
Fluoranthene	<	380	U	120	380	J	<	370	U	<	370	U	<	380	U
Indeno(1,2,3-cd)pyrene	<	380	U	68	380	J	<	370	U	<	370	U	<	380	U
Phenanthrene	<	380	U	48	380	J	<	370	U	<	370	U	<	380	U
Phenol	<	380	U	<	380	U	1700	370		59	370	J	<	380	U
Pyrene	<	380	U	110	380	J	<	370	U	<	370	U	<	380	U
Metals (mg/kg)															
Aluminum	5290	23.1		8240	11.4		6810	11.4		8790	22.7		7230	22.8	
Arsenic	1.1	0.58		2.6	1.1		2.4	1.1		1.5	0.57		2.2	0.57	
Barium	133	2.3	J	207	1.1	J	102	1.1		538	2.3	J	1360	2.3	J
Beryllium	<	0.46	U	0.45	0.23		0.49	0.23		0.62	0.45		0.57	0.46	
Cadmium	<	1.2	U	<	0.57	U	<	0.57	U	<	1.1	U	<	1.1	U
Calcium	180000	46.2		72000	22.9		75400	22.7		161000	45.4		173000	45.7	
Chromium	5.2	2.3		7.4	1.1		6.2	1.1		3.9	2.3		4.1	2.3	

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8305-0025			CAN083-8306-0000			CAN083-8306-0005			CAN083-8306-0010			CAN083-8306-8361[1]		
LAB SAMPLE NUMBER	0398670006SA			0398670010SA			0398710016SA			0398710015SA			0398670009SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.															
Cobalt	1.2	2.3	J	3.2	1.1		4	1.1		2.7	2.3		2	2.3	J
Copper	3.5	4.6	J	6.6	2.3		5.7	2.3		3.8	4.5	J	4	4.6	J
Iron	3130	23.1		7530	11.4		6640	11.4		5280	22.7		4660	22.8	
Lead	1.5	0.58		7.5	0.57		6	0.57	J	4.9	0.57	J	5.4	0.57	
Magnesium	16400	46.2		2660	22.9		2360	22.7		4970	45.4		4860	45.7	
Manganese	27.2	2.3		123	1.1		86.1	1.1		71.8	2.3		68.1	2.3	
Nickel	7.2	9.2	J	8.1	4.6		8.9	4.5		8.3	9.1	J	5.8	9.1	J
Potassium	883	1160	J	1330	571		1370	568		1440	1140		1240	1140	
Vanadium	17.1	2.3		15.9	1.1		14.7	1.1		12.1	2.3		11.5	2.3	
Zinc	7.4	4.6		18.2	2.3		15.1	2.3		14.3	4.5		11.6	4.6	
TRPH (mg/kg)															
Total Recoverable Petroleum Hydrocarbons	<	46.2	U	127	45.7		<	45.4	U	<	45.4	U	<	45.7	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8306-0015			CAN083-8306-0020			CAN083-8306-0025		
LAB SAMPLE NUMBER	0398710014SA			0398710013SA			0398710012SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)									
Acetone	<	11	U	<	11	U	<	11	U
2-Butanone (MEK)	<	11	U	<	11	U	<	11	U
Methylene chloride	<	5.6	U	4.5	5.5	J	<	5.6	U
Toluene	<	5.6	U	<	5.5	U	<	5.6	U
Semivolatile Organics (µg/kg)									
Benzo(a)anthracene	<	370	U	<	370	U	<	370	U
Benzo(a)pyrene	<	370	U	<	370	U	<	370	U
Benzo(b)fluoranthene	<	370	U	<	370	U	<	370	U
Benzo(g,h,i)perylene	<	370	U	<	370	U	<	370	U
Chrysene	<	370	U	<	370	U	<	370	U
Fluoranthene	<	370	U	<	370	U	<	370	U
Indeno(1,2,3-cd)pyrene	<	370	U	<	370	U	<	370	U
Phenanthrene	<	370	U	<	370	U	<	370	U
Phenol	<	370	U	<	370	U	<	370	U
Pyrene	<	370	U	<	370	U	<	370	U
Metals (mg/kg)									
Aluminum	6480	11.2		4750	11.1		7440	11.1	
Arsenic	0.96	2.2	J	0.67	2.2	J	0.56	2.2	J
Barium	620	1.1	J	75.1	1.1	J	377	1.1	J
Beryllium	0.42	0.22		0.31	0.22		0.4	0.22	
Cadmium	<	0.56	U	<	0.55	U	0.46	0.56	J
Calcium	86400	22.4		85700	22.2		62300	22.3	
Chromium	4.7	1.1		4	1.1		5.3	1.1	

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
(1) Duplicate for preceeding sample number.

Source: Woodward-Clyde, 1997

Table 23-2a
Summary of Compounds Detected in Soil Samples
SWMU 83

LOCATOR	CAN083-8306-0015			CAN083-8306-0020			CAN083-8306-0025		
LAB SAMPLE NUMBER	0398710014SA			0398710013SA			0398710012SA		
COLLECT DATE	12/13/94			12/13/94			12/13/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Metals (mg/kg), cont.									
Cobalt	2.6	1.1		1.8	1.1		2	1.1	
Copper	2.9	2.2		2.1	2.2	J	2.7	2.2	
Iron	5030	11.2		3830	11.1		5540	11.1	
Lead	3.8	1.1		2.8	1.1	J	2.8	1.1	J
Magnesium	2940	22.4		3080	22.2		4520	22.3	
Manganese	67.9	1.1		41.3	1.1		50.9	1.1	
Nickel	6.5	4.5		5	4.4		6	4.5	
Potassium	1670	560		1280	555		1780	556	
Vanadium	11.1	1.1		10	1.1		12.9	1.1	
Zinc	12.6	2.2		8.8	2.2		13.3	2.2	
TRPH (mg/kg)									
Total Recoverable Petroleum Hydrocarbons	<	44.8	U	<	44.4	U	<	44.5	U

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.

R = Rejected value. D = Sample was diluted for analysis.

U = Nondetected value. RL = Reporting Limit.

(1) Duplicate for preceeding sample number.

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Source: Woodward-Clyde, 1997

Table 23-2b
Comparison of Maximum Concentrations to RBCs for Residential Soil
SWMU 83

Chemical	Maximum Detected Concentration (mg/kg)	Residential Soil Risk-Based Concentration(1) (mg/kg)	Exceeds RBC?	Estimated Risk	Risk Type	Industrial Soil Risk-based Concentration(2) (mg/kg)	Exceeds RBC?
Acetone	0.0034	7,800	NO				
2-Butanone (MEK)	0.0015	47,000	NO				
Methylene Chloride	0.0045	85	NO				
Toluene	0.0014	16,000	NO				
Benzo(a)anthracene	0.085	0.88	NO				
Benzo(a)pyrene	0.12	0.088	YES	1.36×10^{-6}	Carcinogenic	0.39	NO
Benzo(b)fluoranthene	0.16	0.88	NO				
Benzo(g,h,i)perene	0.075	0.88	NO				
Chrysene	0.099	88	NO				
Fluoranthene	0.16	3,100	NO				
Indeno(1,2,3-cd)pyrelene	0.068	NA(a)					
Phenanthrene	0.073	NA(a)					
Phenol	1.7	47,000	NO				
Pyrene	0.13	2,300	NO				
Cadmium	0.46	39	NO				

(1) EPA Region III Risk-Based Concentrations for Residential Soil (EPA 1994).
(2) EPA Region III Risk-Based Concentrations for Industrial Soil (EPA 1994).
(a) Not Applicable: EPA has not established a toxicity factor for these chemicals, so RBCs could not be calculated.

Source: Woodward-Clyde, 1997

Table 24-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0000			CAN092-0921-0001			CAN092-0922-0000			CAN092-0922-0000			CAN092-0923-0002			CAN092-0923-0000		
LAB SAMPLE NUMBER	0313810001SA			0313810002SA			0312140010SA			0314020018SA			0312140011SA			0312140014SA		
COLLECT DATE	09/22/93			09/22/93			09/13/93			09/13/93			09/13/93			09/13/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane 0.0714 mg/kg	<	5.3	U	<	5.3	U				<	5.4	U	<	5.6	U			
Ethylbenzene 10600	1.5	5.3	J	<	5.3	U				<	5.4	U	<	5.6	U			
Toluene 248	7.5	5.3		<	5.3	U				<	5.4	U	1.1	5.6	J			
Xylenes (total) 132	7.2	5.3		<	5.3	U				<	5.4	U	1.6	5.6	J			
Semivolatile Organics (ug/kg)																		
Anthracene 23500							<	360	U							<	350	U
Benzo(a)anthracene 6.21							190	360	J							180	350	J
Benzo(a)pyrene 0.621							210	360	J							220	350	J
Benzo(b)fluoranthene 6.21							460	360								490	350	
Benzo(g,h,i)perylene							130	360	J							120	350	J
Butyl benzyl phthalate 240							140	360	J							110	350	J
Carbazole 24							<	360	U							<	350	U
Chrysene 621							300	360	J							280	350	J
Di-n-butyl phthalate 6000							73	360	J							<	350	U
Fluoranthene 2250							490	360								540	350	
Indeno(1,2,3-cd)pyrene 6.21							130	360	J							120	350	J
Phenanthrene 1800							220	360	J							340	350	J
Pyrene 2300							450	360								500	350	
Metals (mg/kg)																		
Aluminum	6080	10.6		5670	10.6		5070	10.8					8100	11.2		6040	10.6	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 24-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0000			CAN092-0921-0002			CAN092-0922-0000			CAN092-0923-0000			CAN092-0922-0002			CAN092-0923-0000		
LAB SAMPLE NUMBER	0313810001SA			0313810002SA			0312140010SA			0314020018SA			0312140011SA			0312140014SA		
COLLECT DATE	09/22/93			09/22/93			09/13/93			09/13/93			09/13/93			09/13/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Antimony	<	6.4	U	<	6.4	U	<	6.5	U				<	6.7	U	<	6.4	U
Arsenic	2.3	0.53		2	0.53		2.2	0.54					2.4	0.56		2.5	0.53	
Barium	<		R	<		R	198	1.1					83.6	1.1		96.6	1.1	
Beryllium	0.46	0.21		0.46	0.21		0.29	0.22					0.63	0.22		0.47	0.21	
Cadmium	1.6	0.53		0.59	0.53		1	0.54					<	0.56	U	<	0.53	U
Calcium	58200	21.2		58300	21.3		72500	21.6					6450	22.5		17000	21.2	
Chromium	12.3	1.1		5.9	1.1		13.8	1.1					8.7	1.1		9.3	1.1	
Cobalt	3.4	1.1		3	1.1		2.9	1.1					4.5	1.1		3.3	1.1	
Copper	14.2	2.1		5.7	2.1		6.9	2.2					6.7	2.2		6.7	2.1	
Iron	6470	10.6		6020	10.6		12000	10.8					8560	11.2		7960	10.6	
Lead	502	53		4.6	0.53		64.3	5.4	J				8.4	0.56		12.5	1.1	
Magnesium	2100	21.2		1890	21.3		2810	21.6					1640	22.5		1470	21.2	
Manganese	216	1.1		122	1.1		135	1.1					210	1.1		199	1.1	
Nickel	7.5	4.2		6.6	4.3		8.2	4.3					8.4	4.5		8.5	4.2	
Potassium	1480	530		1130	531		1490	540					1630	561		1290	531	
Silver	0.76	1.1	J	0.73	1.1	J	<	1.1	U				<	1.1	U	<	1.1	U
Vanadium	18.1	1.1		16	1.1		13.1	1.1					18.5	1.1		17.3	1.1	
Zinc	39.3	2.1		13.6	2.1		72.6	2.2					19.3	2.2		44.9	2.1	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	674	42.4		47.6	42.5		278	43.2					<	44.9	U	58.2	42.5	
Water Quality (percent)																		
Water	5.6	0.1		5.9	0.1		7.4	0.1		7.6	0.1		11	0.1		5.8	0.1	

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Source: Woodward-Clyde, 1994

Table 24-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 92

LOCATOR	CAN092-0923-0000			CAN092-0923-0002			CAN092-0924-0000			CAN092-0924-0002			CAN092-0925-0000			CAN092-0925-0002		
LAB SAMPLE NUMBER	0314020019SA			0312140015SA			0314170001SA			0314170002SA			0313810014SA			0313810015SA		
COLLECT DATE	09/13/93			09/13/93			09/23/93			09/23/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane	<	5.3	U	<	5.4	U	<	5.4	U	<	5.4	U	1.3	5.3	J	<	5.3	U
Ethylbenzene	<	5.3	U	<	5.4	U	<	5.4	U	<	5.4	U	<	5.3	U	<	5.3	U
Toluene	<	5.3	U	<	5.4	U	1.6	5.4	J	<	5.4	U	4.9	5.3	J	1.5	5.3	J
Xylenes (total)	1.4	5.3	J	1.7	5.4	J	2.5	5.4	J	<	5.4	U	5.3	5.3		<	5.3	U
Semivolatile Organics (ug/kg)																		
Anthracene				<	360	U	<	350	U				70	350	J	<	350	U
Benzo(a)anthracene				<	360	U	440	350					800	350		<	350	U
Benzo(a)pyrene				<	360	U	640	350					940	350		<	350	U
Benzo(b)fluoranthene				<	360	U	1400	350					2100	350		<	350	U
Benzo(g,h,i)perylene				<	360	U	330	350	J				450	350		<	350	U
Butyl benzyl phthalate				<	360	U	<	350	U				<	350	U	<	350	U
Carbazole				<	360	U	38	350	J				89	350	J	<	350	U
Chrysene				<	360	U	560	350					940	350		<	350	U
Di-n-butyl phthalate				<	360	U	<	350	U				<	350	U	<	350	U
Fluoranthene				<	360	U	600	350					1100	350		<	350	U
Indeno(1,2,3-cd)pyrene				<	360	U	340	350	J				470	350		<	350	U
Phenanthrene				<	360	U	280	350	J				470	350		<	350	U
Pyrene				<	360	U	1200	350					2000	350		<	350	U
Metals (mg/kg)																		
Aluminum				7610	10.8		5420	10.8		6570	10.8		6100	10.6		6260	10.6	

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U = Nondetected value.
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Source: Woodward-Clyde, 1994

Table 24-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 92

LOCATOR	CAN092-0923-0000			CAN092-0923-0002			CAN092-0924-0000			CAN092-0924-0002			CAN092-0925-0000			CAN092-0925-0002		
LAB SAMPLE NUMBER	0314020019SA			0312140015SA			0314170001SA			0314170002SA			0313810014SA			0313810015SA		
COLLECT DATE	09/13/93			09/13/93			09/23/93			09/23/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Antimony				<	6.5	U	5.7	6.5	J	5.3	6.5	J	<	6.4	U	<	6.4	U
Arsenic				2.6	0.54		2.7	0.54		2.4	0.54		2.1	0.53		2.1	0.53	
Barium				101	1.1		228	1.1		184	1.1		<		R	<		R
Beryllium				0.54	0.22		0.5	0.22		0.51	0.22		0.42	0.21		0.4	0.21	
Cadmium				<	0.54	U	0.44	0.54	J	<	0.54	U	1.9	0.53		0.89	0.53	
Calcium				12700	21.6		78400	21.5		58700	21.7		53000	21.2		56800	21.2	
Chromium				8.1	1.1		9.1	1.1		5.7	1.1		13.9	1.1		5.3	1.1	
Cobalt				4.4	1.1		2.8	1.1		3.3	1.1		3.4	1.1		2.8	1.1	
Copper				6.9	2.2		7.5	2.2		6.2	2.2		9.8	2.1		5.7	2.1	
Iron				7890	10.8		5910	10.8		6650	10.8		6300	10.6		5800	10.6	
Lead				8.3	0.54		20.9	2.7		5.8	0.54		37.5	5.3		5.7	0.53	
Magnesium				1700	21.6		2650	21.5		2050	21.7		2220	21.2		2030	21.2	
Manganese				195	1.1		130	1.1		149	1.1		182	1.1		122	1.1	
Nickel				8	4.3		7.1	4.3		8	4.3		7.5	4.2		6.1	4.2	
Potassium				1520	540		1550	538		1570	542		1740	531		1270	531	
Silver				<	1.1	U	<	1.1	U	<	1.1	U	1	1.1	J	0.92	1.1	J
Vanadium				17.7	1.1		16.9	1.1		17.2	1.1		17	1.1		14.3	1.1	
Zinc				17.5	2.2		48.4	2.2		14.3	2.2		43.6	2.1		15.7	2.1	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons				49	43.2		159	43		61.5	43.3		295	42.5		120	42.5	
Water Quality (percent)																		
Water	5.6	0.1		7.4	0.1		7	0.1		7.7	0.1		5.8	0.1		5.8	0.1	

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U = Nondetected value.
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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0004			CAN092-0921-0008			CAN092-0921-0018			CAN092-0921-0028			CAN092-0921-0038			CAN092-0921-0048		
LAB SAMPLE NUMBER	0313810003SA			0313810004SA			0313810005SA			0313810006SA			0313810007SA			0313810008SA		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	<	5.3	U	1.8	5.5	J	<	5.7	U	3.3	5.7	J	4.1	5.4	J	2.8	5.7	J
Semivolatile Organics (ug/kg)																		
Benzo(g,h,i)perylene																		
Metals (mg/kg)																		
Aluminum	6440	10.6		5160	11.1		4520	11.5		4540	11.4		2140	10.8		2320	22.7	
Antimony	<	6.4	U	<	6.6	U	<	6.9	U	<	6.9	U	<	6.5	U	<	13.6	U
Arsenic	1.9	0.53		2.2	0.55		1.4	0.57		0.56	1.1	J	0.58	0.54		0.53	1.1	J
Barium			R			R			R			R			R			R
Beryllium	0.44	0.21		0.43	0.22		0.36	0.23		0.27	0.23		<	0.22	U	<	0.45	U
Cadmium	1.3	0.53		1.2	0.55		1.6	0.57		0.67	0.57		1.1	0.54		2.3	1.1	
Calcium	79800	21.3		89200	22.1		103000	23		62800	22.9		72900	21.6		162000	45.4	
Chromium	6.8	1.1		5.7	1.1		3.4	1.1		3.5	1.1		1.3	1.1		4.8	2.3	
Cobalt	3.2	1.1		2.5	1.1		3	1.1		1.8	1.1		1	1.1	J	<	2.3	U
Copper	5.7	2.1		4.6	2.2		3.3	2.3		2.3	2.3		1.2	2.2	J	2.6	4.5	J
Iron	5980	10.6		4710	11.1		3540	11.5		3210	11.4		1640	10.8		1280	22.7	
Lead	5.5	0.53		5.4	0.55		4.3	0.57		3	0.57		1.9	0.54		2.4	0.57	
Magnesium	2570	21.3		2270	22.1		3350	23		4020	22.9		3180	21.6		12600	45.4	
Manganese	127	1.1		196	1.1		94.2	1.1		49.7	1.1		26.2	1.1		19.7	2.3	
Nickel	6	4.3		5.9	4.4		4.8	4.6		4.1	4.6	J	2.1	4.3	J	<	9.1	U
Potassium	1180	532		1060	553		1430	575		1080	571		498	540	J	221	1130	J

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0004			CAN092-0921-0008			CAN092-0921-0018			CAN092-0921-0028			CAN092-0921-0038			CAN092-0921-0048		
LAB SAMPLE NUMBER	0313810003SA			0313810004SA			0313810005SA			0313810006SA			0313810007SA			0313810008SA		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Silver	0.63	1.1	J	0.74	1.1	J	0.91	1.1	J	1.1	1.1		0.73	1.1	J	1.5	2.3	J
Sodium	164	532	J	<	553	U	<	575	U	<	571	U	<	540	U	<	1130	U
Vanadium	15.5	1.1		15.5	1.1		13.1	1.1		10.5	1.1		5.3	1.1		11.2	2.3	
Zinc	13.8	2.1		15	2.2		10.4	2.3		8.7	2.3		7.3	2.2		3.3	4.5	J
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	64.2	42.6		<	44.3	U	<	46	U	<	45.7	U	<	43.2	U	<	45.4	U
Water Quality (percent)																		
Water	6	0.1		9.6	0.1		13	0.1		12	0.1		7.5	0.1		12	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0058			CAN092-0923-0004			CAN092-0922-0005			CAN092-0923-0004			CAN092-0923-0005			CAN092-0924-0004		
LAB SAMPLE NUMBER	03138100095A			0312140012SA			0312140013SA			0312140016SA			0312140017SA			0314170003SA		
COLLECT DATE	09/22/93			09/13/93			09/13/93			09/13/93			09/13/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	<	5.7	U	28	5.6		<	5.4	U	<	5.4	U	<	5.6	U	<	5.4	U
Semivolatile Organics (ug/kg)																		
Benzo(g,h,i)perylene							<	360	U							37	360	J
Metals (mg/kg)																		
Aluminum	1890	11.4		8470	11.2		3370	10.8		7020	10.8		3850	22.3		6230	10.8	
Antimony	<	6.9	U	<	6.7	U	<	6.5	U	<	6.5	U	<	13.4	U	9.4	6.5	
Arsenic	0.31	0.57	J	2.3	0.56		1.9	0.54		2.1	0.54		2.2	0.56		2.5	0.54	
Barium			R	120	1.1		115	1.1		90.3	1.1		310	2.2		171	1.1	
Beryllium	<	0.23	U	0.6	0.22		0.3	0.22		0.54	0.22		0.3	0.45	J	0.41	0.22	
Cadmium	0.7	0.57		<	0.56	U	<	0.54	U	<	0.54	U	<	1.1	U	<	0.54	U
Calcium	52400	22.9		21100	22.3		54700	21.5		19400	21.6		131000	44.5		80400	21.6	
Chromium	2.6	1.1		8.5	1.1		2.8	1.1		7.4	1.1		2.1	2.2	J	5	1.1	
Cobalt	0.87	1.1	J	3.9	1.1		1.7	1.1		3.8	1.1		2.9	2.2		2.7	1.1	
Copper	1.2	2.3	J	6.2	2.2		2.2	2.2		6.4	2.2		2.8	4.5	J	5.5	2.2	
Iron	1700	11.4		8270	11.2		3460	10.8		7460	10.8		3800	22.3		6200	10.8	
Lead	2.1	0.57		7.4	1.1		2.5	0.54		6.3	1.1		3.1	0.56		5.5	0.54	
Magnesium	2300	22.9		1750	22.3		1530	21.5		1580	21.6		2550	44.5		2320	21.6	
Manganese	38.4	1.1		185	1.1		49.3	1.1		176	1.1		58.4	2.2		114	1.1	
Nickel	1.6	4.6	J	8.1	4.5		4.4	4.3		7.9	4.3		5.8	8.9	J	7.7	4.3	
Potassium	319	571	J	1610	559		785	538		1380	540		952	1110	J	1420	539	

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J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0921-0058			CAN092-0922-0064			CAN092-0922-0008			CAN092-0923-0004			CAN092-0923-0008			CAN092-0924-0004		
LAB SAMPLE NUMBER	0313810009SA			0312140012SA			0312140013SA			0312140016SA			0312140017SA			0314170003SA		
COLLECT DATE	09/22/93			09/13/93			09/13/93			09/13/93			09/13/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Silver	0.96	1.1	J	<	1.1	U	<	1.1	U	<	1.1	U	<	2.2	U	<	1.1	U
Sodium	<	571	U	<	559	U	<	538	U	<	540	U	<	1110	U	<	539	U
Vanadium	6.3	1.1		16.6	1.1		12.3	1.1		16.6	1.1		14.6	2.2		17.8	1.1	
Zinc	4.4	2.3		18.5	2.2		8.3	2.2		16.3	2.2		9.1	4.5		13.6	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	45.7	U	<	44.7	U	<	43	U	<	43.2	U	<	44.5	U	44.8	43.1	
Water Quality (percent)																		
Water	12	0.1		11	0.1		7	0.1		7.3	0.1		10	0.1		7.2	0.1	

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U = Nondetected value.

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RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0924-0008			CAN092-0924-0018			CAN092-0924-0028			CAN092-0924-0038			CAN092-0924-0048			CAN092-0924-0058		
LAB SAMPLE NUMBER	0314170004SA			0314170006SA			0314170007SA			0314170008SA			0314170009SA			0314170010SA		
COLLECT DATE	09/23/93			09/23/93			09/23/93			09/23/93			09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	<	5.7	U	<	5.6	U	<	5.9	U	<	5.5	U	<	5.6	U	<	5.5	U
Semivolatile Organics (ug/kg)																		
Benzo(g,h,i)perylene																		
Metals (mg/kg)																		
Aluminum	3840	22.8		3930	11.1		4470	23.6		2730	11		3300	22.4		2780	11	
Antimony	12.2	13.7	J	6.2	6.7	J	<	14.1	U	<	6.6	U	<	13.4	U	6.2	6.6	J
Arsenic	1.8	0.57		1.7	0.56		1.1	0.59		0.96	0.55		0.93	0.56		0.59	0.55	
Barium	226	2.3		80.7	1.1		61.2	2.4		39.8	1.1		116	2.2		123	1.1	
Beryllium	0.38	0.46	J	0.23	0.22		<	0.47	U	<	0.22	U	<	0.45	U	<	0.22	U
Cadmium	<	1.1	U	<	0.56	U	<	1.2	U	<	0.55	U	<	1.1	U	<	0.55	U
Calcium	156000	45.5		62000	22.3		150000	47.1		71600	22.1		145000	44.7		77600	22	
Chromium	<	2.3	U	3	1.1		<	2.4	U	<	1.1	U	<	2.2	U	7.2	1.1	
Cobalt	2.4	2.3		1.5	1.1		<	2.4	U	<	1.1	U	1.6	2.2	J	0.78	1.1	J
Copper	3.7	4.6	J	2.5	2.2		2.8	4.7	J	1.8	2.2	J	5	4.5	J	3.1	2.2	
Iron	3740	22.8		3700	11.1		2740	23.6		2110	11		2190	22.4		2190	11	
Lead	4.4	0.57		3.8	0.56		2.1	0.59		1.5	0.55		1.8	0.56		1.3	0.55	
Magnesium	3470	45.5		2540	22.3		10100	47.1		5430	22.1		8960	44.7		6890	22	
Manganese	68.2	2.3		54.3	1.1		23.9	2.4		18.8	1.1		26.2	2.2		27.7	1.1	
Nickel	7.7	9.1	J	5.5	4.5		4.5	9.4	J	3.7	4.4	J	5.1	8.9	J	3.4	4.4	J
Potassium	1190	1140		1360	557		667	1180	J	628	552		611	1120	J	455	550	J

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0924-0008			CAN092-0924-0018			CAN092-0924-0028			CAN092-0924-0038			CAN092-0924-0048			CAN092-0924-0058		
LAB SAMPLE NUMBER	0314170004SA			0314170006SA			0314170007SA			0314170008SA			0314170009SA			0314170010SA		
COLLECT DATE	09/23/93			09/23/93			09/23/93			09/23/93			09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Silver	<	2.3	U	<	1.1	U	<	2.4	U	<	1.1	U	<	2.2	U	<	1.1	U
Sodium	<	1140	U	<	557	U	<	1180	U	<	552	U	<	1120	U	<	550	U
Vanadium	15.9	2.3		14.1	1.1		18.8	2.4		6.9	1.1		11.7	2.2		10.4	1.1	
Zinc	10	4.6		8.1	2.2		6	4.7		6.5	2.2		6.4	4.5		5.7	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	45.5	U	<	44.6	U	<	47.1	U	<	44.2	U	<	44.7	U	<	44	U
Water Quality (percent)																		
Water	12	0.1		10	0.1		15	0.1		9.5	0.1		11	0.1		9.1	0.1	

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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0925-0008			CAN092-0925-0018			CAN092-0925-0028			CAN092-0925-0038			CAN092-0925-0048			CAN092-0925-0058		
LAB SAMPLE NUMBER	03138100175A			03137400155A			03137400165A			03137400175A			03137400185A			03137400195A		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene	<	5.7	U	<	5.7	U	<	5.8	U	<	5.5	U	<	5.6	U	<	5.4	U
Semivolatile Organics (ug/kg)																		
Benzo(g,h,i)perylene																		
Metals (mg/kg)																		
Aluminum	4730	22.9		4540	11.4		3640	11.6		3340	11		3180	11.2		2490	10.7	
Antimony	<	13.8	U	<	6.8	U	<	6.9	U	<	6.6	U	<	6.7	U	<	6.4	U
Arsenic	2.2	0.57		1.1	0.57		0.45	0.58	J	0.69	0.55		0.52	1.1	J	0.41	0.54	J
Barium			R	391	1.1		71	1.2		61.1	1.1		69	1.1	J	28.9	1.1	
Beryllium	0.46	0.46		0.43	0.23		0.19	0.23	J	0.2	0.22	J	0.21	0.22	J	0.14	0.21	J
Cadmium	1.9	1.1		0.98	0.57		1.3	0.58		0.63	0.55		0.97	0.56		<	0.54	U
Calcium	126000	45.9		59900	22.8		93100	23.1		89900	22		87100	22.5		32800	21.4	
Chromium	3.4	2.3		4.7	1.1		3.8	1.2		3.1	1.1		4.3	1.1		2.5	1.1	
Cobalt	2.6	2.3		1.8	1.1		1.4	1.2		0.58	1.1	J	1.1	1.1		0.97	1.1	J
Copper	3.4	4.6	J	3.5	2.3		1.9	2.3	J	1.2	2.2	J	1.7	2.2	J	1.2	2.1	J
Iron	3900	22.9		4450	11.4		2260	11.6		2370	11		2280	11.2		2550	10.7	
Lead	5.4	0.57		4.8	2.8		1.4	0.58		1.4	2.7	J	1.5	0.56		1.6	0.54	
Magnesium	3590	45.9		2880	22.8		9390	23.1		3880	22		8140	22.5		3130	21.4	
Manganese	81.1	2.3		76.3	1.1		22	1.2		21.4	1.1		26.1	1.1		32.5	1.1	
Nickel	5.5	9.2	J	5	4.6		3.5	4.6	J	2.6	4.4	J	2.8	4.5	J	2.3	4.3	J
Potassium	1100	1150	J	1360	569		601	579		669	549		463	562	J	428	536	J

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U = Nondetected value.

QUAL=Qualification
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Source: Woodward-Clyde, 1994

Table 24-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 92

LOCATOR	CAN092-0925-0008			CAN092-0925-0018			CAN092-0925-0028			CAN092-0925-0038			CAN092-0925-0048			CAN092-0925-0058		
LAB SAMPLE NUMBER	03138100175A			03137400155A			03137400165A			03137400175A			03137400185A			03137400195A		
COLLECT DATE	09/22/93			09/22/93			09/22/93			09/22/93			09/22/93			09/22/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Silver	2.3	2.3		0.65	1.1	J	0.64	1.2	J	0.78	1.1	J	0.41	1.1	J	0.75	1.1	J
Sodium	<	1150	U	<	569	U	<	579	U	<	549	U	<	562	U	<	536	U
Vanadium	15.9	2.3		15.1	1.1		10.9	1.2		6.5	1.1		12.4	1.1		8.1	1.1	
Zinc	10.5	4.6		10.6	2.3		5.8	2.3		6	2.2		5.8	2.2		5.1	2.1	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	45.9	U	<	45.6	U	<	46.3	U	<	43.9	U	<	45	U	<	42.8	U
Water Quality (percent)																		
Water	13	0.1		12	0.1		14	0.1		9	0.1		11	0.1		6.6	0.1	

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Source: Woodward-Clyde, 1994

Table 24-2a
Comparison of Maximum Concentrations with RBCs (1)
SWMU 92

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN092-0925-0000	1,2-Dichloroethane	0.0013	0.8	N
CAN092-0925-0000	Anthracene	0.07	2000	N
CAN092-0925-0000	Benzo(a)anthracene	0.8	0.07	Y
CAN092-0925-0000	Benzo(a)pyrene	0.94	0.01	Y
CAN092-0925-0000	Benzo(b)fluoranthene	2.1	0.07	Y
CAN092-0925-0000	Benzo(g,h,i)perylene	0.45	NTF	N
CAN092-0922-0000	bis(2-Ethylhexyl)phthalate	0.42	5	N
CAN092-0922-0000	Butyl benzyl phthalate	0.14	2000	N
CAN092-0921-0048	Cadmium	2.3	8	N
CAN092-0925-0000	Carbazole	0.089	4	N
CAN092-0925-0000	Chromium	13.9	40	N
CAN092-0925-0000	Chrysene	0.94	2	N
CAN092-0921-0000	Copper	14.2	300	N
CAN092-0921-0000	Ethylbenzene	0.0015	800	N
CAN092-0925-0000	Fluoranthene	1.1	300	N
CAN092-0925-0000	Indeno(1,2,3-cd)pyrene	0.47	0.04	Y
CAN092-0921-0000	Lead (3)	502	500	Y
CAN092-0925-0000	Phenanthrene	0.47	NTF	N
CAN092-0925-0000	Pyrene	2	200	N
CAN092-0925-0008	Silver	2.3	20	N
CAN092-0922-0004	Toluene	0.028	2000	N
CAN092-0921-0000	Total Petroleum Hydrocarbons (4)	674	1000	N
CAN092-0921-0000	Xylenes (total)	0.0072	20000	N
CAN092-0922-0000	Zinc	72.6	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) EPA suggests 500-1,000 mg/kg as allowable concentration for residential soils based on EPA's IUBK Lead Model (EPA 1990)

(4) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 24-2b
Summary of Human Health Risks
SWMU 92

Receptor/Pathway	Average Exposure			Reasonable Maximum Exposure		
	Cancer Risk	Subchronic H.I.	Chronic H.I.	Cancer Risk	Subchronic H.I.	Chronic H.I.
Occupational Worker (Surface Soil)						
– Dermal Contact	8×10^{-12}		3×10^{-8}	2×10^{-9}		2×10^{-6}
– Ingestion	4×10^{-9}		6×10^{-5}	2×10^{-6}		7×10^{-3}
– Inhalation of VOCs	7×10^{-11}		1×10^{-7}	4×10^{-9}		2×10^{-6}
– Inhalation of Particulates	6×10^{-12}		0.00	3×10^{-10}		0.00
	4×10^{-9}		6×10^{-5}	2×10^{-6}		7×10^{-3}
Construction Worker (Total Soil)						
– Dermal Contact	6×10^{-13}	2×10^{-9}		1×10^{-11}	5×10^{-7}	
– Ingestion	9×10^{-10}	2×10^{-4}		2×10^{-8}	2×10^{-3}	
– Inhalation of VOCs	6×10^{-12}	4×10^{-8}		2×10^{-11}	2×10^{-7}	
– Inhalation of Particulates	3×10^{-13}	0.00		1×10^{-12}	0.00	
	9×10^{-10}	2×10^{-4}		2×10^{-8}	2×10^{-3}	
Trespasser (Surface Soil)						
– Dermal Contact	2×10^{-12}	9×10^{-10}		2×10^{-10}	1×10^{-7}	
– Ingestion	8×10^{-10}	2×10^{-5}		1×10^{-7}	2×10^{-3}	
– Inhalation of VOCs	1×10^{-11}	4×10^{-8}		3×10^{-10}	6×10^{-7}	
– Inhalation of Particulates	1×10^{-12}	0.00		2×10^{-11}	0.00	
	8×10^{-10}	2×10^{-5}		1×10^{-7}	2×10^{-3}	

Note: Apparent inconsistencies in summation of risks are due to rounding of risk values.

Source: Woodward-Clyde, 1994

Table 24-2c
Risk Characterization Summary
SWMU 92

Chemical	Sample Number CAN092-0921-0000	CAN092-0921-0002	CAN092-0922-0000	CAN092-0922-0002	CAN092-0923-0000	CAN092-0923-0002	CAN092-0924-0000	CAN092-0924-0002	CAN092-0925-0000	CAN092-0925-0002
Volatile Organics										
1,2-Dichloroethane	0.0027 U	0.0027 U	0.0027 U	0.0028 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0013 J	0.0027 U
Ethylbenzene	0.0015 J	0.0027 U	0.0027 U	0.0028 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U
Toluene	0.0075	0.0027 U	0.0027 U	0.0011 J	0.0027 U	0.0027 U	0.0016 J	0.0027 U	0.0049 J	0.0015 J
Xylenes (total)	0.0072	0.0027 U	0.0027 U	0.0016 J	0.0014 J	0.0017 J	0.0025 J	0.0027 U	0.0053	0.0027 U
Semivolatile Organics										
Anthracene			0.18 U		0.175 U	0.18 U	0.175 U		0.07 J	0.175 U
Benzo(a)anthracene			0.19 J		0.18 J	0.18 U	0.44		0.8	0.175 U
Benzo(a)pyrene			0.21 J		0.22 J	0.18 U	0.64		0.94	0.175 U
Benzo(b)fluoranthene			0.46		0.49	0.18 U	1.4		2.1	0.175 U
Benzo(g,h,i)perylene			0.13 J		0.12 J	0.18 U	0.33 J		0.45	0.175 U
Butyl benzyl phthalate			0.14 J		0.11 J	0.18 U	0.175 U		0.175 U	0.175 U
Carbazole			0.18 U		0.175 U	0.18 U	0.038 J		0.089 J	0.175 U
Chrysene			0.3 J		0.28 J	0.18 U	0.56		0.94	0.175 U
Di-n-butyl phthalate			0.073 J		0.175 U	0.18 U	0.175 U		0.175 U	0.175 U
Fluoranthene			0.49		0.54	0.18 U	0.6		1.1	0.175 U
Ideno(1,2,3-cd)pyrene			0.13 J		0.12 J	0.18 U	0.34 J		0.47	0.175 U
Pentachlorophenol										
Phenanthrene			0.22 J		0.34 J	0.18 U	0.28 J		0.47	0.175 U
Pyrene			0.45		0.5	0.18 U	1.2		2	0.175 U
Metals										
Antimony	3.2 U	3.2 U	3.3 U	3.4 U	3.2 U	3.3 U	5.7 J	5.3 J	3.2 U	3.2 U
Cadmium	1.6	0.59	1	0.28 U	0.27 U	0.27 U	0.44 J	0.27 U	1.9	0.89
Chromium	12.3	5.9	13.8	8.7	9.3	8.1	9.1	5.7	13.9	5.3
Copper	14.2	5.7	6.9	6.7	6.7	6.9	7.5	6.2	9.8	5.7
Lead	502	4.6	64.3 J	8.4	12.5	8.3	20.9	5.8	37.5	5.7
Manganese	216	122	135	210	199	195	130	149	182	122
Selenium										
Zinc	39.3	13.6	72.6	19.3	44.9	17.5	48.4	14.3	43.6	15.7
TPH	674	47.6	278	22.5 U	58.2	49	159	61.5	295	120

* Between 0 and 2 feet deep

** Mean soil concentration multiplied by BAF of 4.6 (Cd).

R Rejected

J Estimated value below reporting limit or estimated based on data quality criteria

U Non-detect, value shown i s one-half the reporting limit

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Source: Woodward-Clyde, 1994

Table 24-2c
Risk Characterization Summary
SWMU 92

Chemical	Sample Number CAN093-0931-0000	CAN093-0931-0002	CAN093-0932-0000	CAN093-0932-0002	CAN093-0933-0000	CAN093-0933-0002	N	Arithmetic Mean (mg/kg)	Robin Threshold Dietary Level (mg/kg)	Risk?	Deer Mouse Threshold Dietary Level (mg/kg)	Risk?
Volatile Organics												
1,2-Dichloroethane							10	0.0026	312.5	--	520.8	--
Ethylbenzene							10	0.0026	485.5	--	809.2	--
Toluene	0.0026 J	0.0027 U	0.0027 U	0.008	0.0049 J	0.0029 U	16	0.0034	12500	--	20800	--
Xylenes (total)	0.0018 J	0.0027 U	0.0027 U	0.0028 U	0.0018 J	0.0029 U	16	0.0028	5000	--	8300	--
Semivolatile Organics												
Anthracene							6	0.16	5000	--	8333.3	--
Benzo(a)anthracene	0.21 U		0.074 J	0.185 U	0.077 J		10	0.25	0.4	--	0.67	--
Benzo(a)pyrene	0.21 U		0.062 J	0.185 U	0.084 J		10	0.29	0.002	Possible	0.003	Possible
Benzo(b)fluoranthene	0.21 U		0.073 J	0.185 U	0.14 J		10	0.54	8	--	13.3	--
Benzo(g,h,i)perylene	0.21 U		0.073 J	0.185 U	0.056 J		10	0.19	375	--	625	--
Butyl benzyl phthalate							6	0.16	470	--	780	--
Carbazole							6	0.14	250	--	417	--
Chrysene	0.21 U		0.095 J	0.185 U	0.12 J		10	0.30	12	--	20	--
Di-n-butyl phthalate							6	0.16	10500	--	17500	--
Fluoranthene	0.21 U		0.15 J	0.185 U	0.1 J		10	0.37	625	--	1041.7	--
Ideno(1,2,3-cd)pyrene	0.21 U		0.055 J	0.185 U	0.038 J		10	0.19	14.4	--	24	--
Pentachlorophenol	0.045 J		0.85 U	0.9 U	0.85 U		4	0.66	190	--	83.3	--
Phenanthrene	0.21 U		0.13 J	0.185 U	0.1 J		10	0.23	150	--	250	--
Pyrene	0.21 U		0.19 J	0.185 U	0.12 J		10	0.52	375	--	625	--
Metals												
Antimony							10	3.70	16.5	--	27.5	--
Cadmium	0.32 U	0.27 U	1.9	1.2	1	1	16	3.82**	10.5	--	166.7	--
Chromium	9.5 J	5.3	7.7	8.1	12.9	11.8	16	9.21	87.5 (VI)	--	92 (VI)	--
Copper	8.6	4.5	158	7.4	8.4	8.5	16	16.98	260	--	50	--
Lead	7.3	5.2	32.4	5.8	10	11.8	16	46.41	87.5	--	150	--
Manganese	155 J	102 J	183	161	146	162	16	160.56	1750	--	166	--
Selenium	0.32 U	0.27 U	0.25 J	0.6 U	0.27 U	0.6 UJ	6	4.68**	5	--	0.125	Possible
Zinc	25.4	13.1	77.2	18.1	53.3	38	16	34.64	875	--	625	--
TPH	77.4	21.6 U	255	311	325	294	16	190.55	241	--	401.7	--

* Between 0 and 2 feet deep

** Mean soil concentration multiplied by BAF of 4.6 (Cd).

R Rejected

J Estimated value below reporting limit or estimated based on data quality criteria

U Non-detect, value shown i s one-half the reporting limit

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Source: Woodward-Clyde, 1994

Table 24-3b
Maximum Soil Sample Concentration of Metals
SWMU 92

SWMU 92 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Arsenic	< 3.0	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	680	1.6	430	805	5300 N
	Chromium	5.9	NT	38	13.3	31 C
	Nickel	6.8	NT	16	11.4	1500 N
	Lead	5	NT	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: U.S. Army Corps of Engineers, 1999

Table 24-3a
Summary of Soil Sample Results
SWMU 92

SUMMARY OF SWMU 92 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	9	UST/OWS	ND	<15	<10	NT	NT	NT	NT	NT
2	9	OWS	ND	<15	<50	ND	ND	NT	NT	NT
3	9	OWS	ND	<15	<10	NT	NT	NT	NT	NT
4	9	OWS	ND	<15	<50	NT	NT	NT	NT	NT
5	9	OWS	ND	<15	<50	NT	NT	NT	NT	NT
6	10	UST	ND	<15	<50	ND	ND	NT	NT	NT
7	10	OWS	NT	NT	NT	NT	ND	ND	ND[1]	Ba[3]
8	n/a	excavated soils	ND	<15	<10	NT	NT	NT	NT	NT
9	11	leach well	ND	<15	<10	NT	NT	NT	NT	NT
10	11	leach well	ND	<15	<10	NT	NT	NT	NT	NT
11	11	leach well	ND	<15	<10	NT	NT	NT	NT	NT
12	11	leach well	ND	<15	<10	NT	NT	NT	NT	NT
13	12	leach well	ND	<15	<10	NT	NT	NT	NT	NT
14	n/a	excavated soils	ND	<15	<10	NT	NT	NT	NT	NT
15	10	leach well	NT	NT	NT	NT	ND	ND	ND[2]	< bkgd

1 Contaminants identified: Di-n-butylphthalate at 25 mg/Kg found in sample and laboratory method blank.
2 Contaminants identified: Di-n-butylphthalate at 30 mg/Kg found in sample and laboratory method blank.
3 Barium at 680 mg/Kg.
ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration

Source: U.S. Army Corps of Engineers, 1999

Table 25-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0000			CAN093-0931-0002			CAN093-0932-0000			CAN093-0932-0002			CAN093-0933-0000			CAN093-0933-0002		
LAB SAMPLE NUMBER	0312740001SA			0312740003SA			0312730001SA			0312730002SA			0312730010SA			0312730011SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Toluene 248 mg/kg	2.6	6.4	J	<	5.4	U	<	5.4	U	8	5.6		4.9	5.3	J	<	5.7	U
Xylenes (total) 132	1.8	6.4	J	<	5.4	U	<	5.4	U	<	5.6	U	1.8	5.3	J	<	5.7	U
Semivolatile Organics (ug/kg)																		
Benzo(a)anthracene 6.21	<	420	U				74	360	J	<	370	U	77	350	J			
Benzo(a)pyrene .621	<	420	U				62	360	J	<	370	U	84	350	J			
Benzo(b)fluoranthene 6.21	<	420	U				73	360	J	<	370	U	140	350	J			
Benzo(g,h,i)perylene —	<	420	U				73	360	J	<	370	U	56	350	J			
Chrysene —	<	420	U				95	360	J	<	370	U	120	350	J			
Fluoranthene 2250	<	420	U				150	360	J	<	370	U	100	350	J			
Indeno(1,2,3-cd)pyrene 6.21	<	420	U				55	360	J	<	370	U	38	350	J			
Pentachlorophenol 29.8	45	2000	J				<	1700	U	<	1800	U	<	1700	U			
Phenanthrene 1800	<	420	U				130	360	J	<	370	U	100	350	J			
Pyrene 2300	<	420	U				190	360	J	<	370	U	120	350	J			
Metals (mg/kg)																		
Aluminum	5930	12.8		3950	10.8		7130	10.8		8660	11.1		9380	10.6		10500	11.4	
Arsenic	2.3	0.64		1.6	0.54		2.5	0.54		2	0.56		2.3	0.53		2.5	0.57	
Barium	99.9	1.3	J	51.9	1.1	J	114	1.1	J	126	1.1	J	140	1.1	J	108	1.1	J
Beryllium	0.48	0.26		0.3	0.22		0.44	0.22		0.5	0.22		0.49	0.21		0.54	0.23	
Cadmium	<	0.64	U	<	0.54	U	1.9	0.54		1.2	0.56		1	0.53		1	0.57	
Calcium	14700	25.5		3710	21.6		26600	21.5		54300	22.3		37400	21.1		33400	22.8	
Chromium	9.5	1.3	J	5.3	1.1		7.7	1.1		8.1	1.1		12.9	1.1		11.8	1.1	
Cobalt	3.9	1.3		2.4	1.1		3.6	1.1		3.1	1.1		3.4	1.1		3.9	1.1	
Copper	8.6	2.6		4.5	2.2		158	2.2		7.4	2.2		8.4	2.1		8.5	2.3	
Iron	6980	12.8		4560	10.8		7920	10.8		8220	11.1		8360	10.6		9110	11.4	
Lead	7.3	0.64		5.2	0.54		32.4	2.7		5.8	2.8		10	1.1		11.8	1.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 25-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0000			CAN093-0931-0002			CAN093-0932-0000			CAN093-0932-0002			CAN093-0933-0000			CAN093-0933-0002		
LAB SAMPLE NUMBER	0312740001SA			0312740003SA			0312730001SA			0312730002SA			0312730010SA			0312730011SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Magnesium	1440	25.5		830	21.6		1740	21.5		2560	22.3		2220	21.1		2310	22.8	
Manganese	155	1.3	J	102	1.1	J	183	1.1		161	1.1		146	1.1		162	1.1	
Nickel	7.2	5.1		4.7	4.3		8.2	4.3		7.5	4.5		7.8	4.2		8.4	4.6	
Potassium	1150	638		760	539		1340	539		1420	557		1630	528		1780	569	
Selenium	<	0.64	U	<	0.54	U	0.25	1.1	J	<	1.1	U	<	0.53	U	<	1.1	UJ
Silver	0.69	1.3	J	0.57	1.1	J	0.72	1.1	J	0.62	1.1	J	1	1.1	J	1.2	1.1	
Sodium	<	638	U	170	539	J	<	539	U	<	557	U	424	528	J	<	569	U
Vanadium	17	1.3		11.9	1.1		16.3	1.1		17.9	1.1		18	1.1		18.9	1.1	
Zinc	25.4	2.6		13.1	2.2		77.2	2.2		18.1	2.2		53.3	2.1		38	2.3	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	77.4	51		<	43.1	U	255	43.1		311	44.6		325	42.2		294	45.6	
Water Quality (percent)																		
Water	22	0.1		7.2	0.1		7.2	0.1		10	0.1		5.3	0.1		12	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0004			CAN093-0931-0005			CAN093-0931-0006			CAN093-0931-0007			CAN093-0931-0008			CAN093-0931-0009		
LAB SAMPLE NUMBER	0312740004SA			0312740005SA			0312740006SA			0312740007SA			0312740008SA			0312740009SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Benzene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Bromodichloromethane				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Carbon disulfide				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Chlorobenzene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Chloroform				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,1-Dichloroethane				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,1-Dichloroethene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,2-Dichloroethene (total)				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,2-Dichloropropane				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Ethylbenzene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
4-Methyl-2-pentanone (MIBK)				<	12	U	<	11	U	<	12	U	<	11	U	<	11	U
Styrene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Tetrachloroethene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Toluene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,1,1-Trichloroethane				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
1,1,2-Trichloroethane				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Trichloroethene				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Xylenes (total)				<	6.2	U	<	5.6	U	<	6.1	U	<	5.4	U	<	5.5	U
Metals (mg/kg)																		
Aluminum	3740	11.5		4300	12.3		4240	11.3		4550	24.5		2250	10.8		2040	11	
Antimony	<	6.9	U	<	7.4	U	2.3	6.8	J	<	14.7	U	<	6.5	U	<	6.6	U
Arsenic	2.4	0.58		2.1	0.62		1	0.56		1.5	0.61		0.77	0.54		0.44	1.1	JJ
Barium	115	1.2	J	243	1.2	J	76.9	1.1	J	1110	2.5	J	66.3	1.1	J	29.2	1.1	J
Beryllium	0.31	0.23		0.35	0.25		0.45	0.23		<	0.49	U	0.19	0.22	J	0.14	0.22	J
Cadmium	1.9	0.58		1.7	0.62		0.98	0.56		2.8	1.2		0.85	0.54		1.1	0.55	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.
QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0004			CAN093-0931-0008			CAN093-0931-0018			CAN093-0931-0028			CAN093-0931-0038			CAN093-0931-0048		
LAB SAMPLE NUMBER	0312740004SA			0312740005SA			0312740006SA			0312740007SA			0312740008SA			0312740009SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Calcium	107,000	23.1		94000	24.6		76800	22.6		188000	49.1		69700	21.7		90000	22	
Chromium	4.1	1.2		3.8	1.2		3.3	1.1		5.2	2.5		1.8	1.1		2.1	1.1	
Cobalt	2.3	1.2		3.2	1.2		2.6	1.1		2.5	2.5		1.2	1.1		0.58	1.1	J
Copper	4.3	2.3		3.5	2.5		3.3	2.3		6.9	4.9		1.6	2.2	J	1.3	2.2	J
Iron	3,690	11.5		3850	12.3		3390	11.3		2200	24.5		1600	10.8		1230	11	
Lead	3.5	0.58		3.8	0.62		5.1	0.56		0.92	0.61		1.3	0.54		1.1	0.55	
Magnesium	1750	23.1		2650	24.6		3160	22.6		33700	49.1		4520	21.7		4970	22	
Manganese	59.8	1.2	J	78.1	1.2	J	95.2	1.1	J	26.7	2.5	J	29.1	1.1	J	20.4	1.1	J
Nickel	5.3	4.6		6.2	4.9		4.9	4.5		<	9.8	U	3.1	4.3	J	2	4.4	J
Potassium	823	577		1030	616		1340	565		<	1230	U	653	542		384	549	J
Selenium	<	1.2	UJ	<	0.62	U	<	0.56	U	<	1.2	UJ	<	0.54	U	<	1.1	UJ
Silver	0.52	1.2		0.51	1.2	J	0.67	1.1	J	0.75	2.5	J	<	1.1	U	<	1.1	U
Sodium	<	577	U	259	616	J	229	565	J	472	1230	J	286	542	J	219	549	J
Vanadium	12.2	1.2		16.4	1.2		13.8	1.1		21.9	2.5		6.7	1.1		7	1.1	
Zinc	10	2.3		9.7	2.5		10	2.3		7.5	4.9		5.1	2.2		3.8	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	ND	46.1	U	<	49.3	U	<	45.2	U	<	49.1	U	<	43.4	U	<	43.9	U
Water Quality (percent)																		
Water				19	0.1		12	0.1		18	0.1		7.8	0.1		8.9	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.
J = Estimated value.
R = Rejected value. QUAL=Qualification
U = Nondetected value. RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0058			CAN093-0932-0004			CAN093-0932-0008			CAN093-0932-0018			CAN093-0932-0028		
LAB SAMPLE NUMBER	0312740010SA			0312730003SA			0312730004SA			0312730005SA			0312730006SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)															
Benzene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Bromodichloromethane	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Carbon disulfide	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Chlorobenzene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Chloroform	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
1,1-Dichloroethane	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
1,1-Dichloroethene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
1,2-Dichloroethene (total)	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
1,2-Dichloropropane	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Ethylbenzene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
4-Methyl-2-pentanone (MIBK)	<	11	U	<	11	U	<	12	U	<	12	U	<	12	U
Styrene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Tetrachloroethene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Toluene	<	5.4	U	1.4	5.6	J	<	6.2	U	<	5.8	U	<	6.1	U
1,1,1-Trichloroethane	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
1,1,2-Trichloroethane	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Trichloroethene	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Xylenes (total)	<	5.4	U	<	5.6	U	<	6.2	U	<	5.8	U	<	6.1	U
Metals (mg/kg)															
Aluminum	2220	10.8		6410	11.2		5190	12.4		3710	57.6		5350	24.5	
Antimony	<	6.5	U	<	6.7	U	<	7.4	U	<	34.6	U	<	14.7	U
Arsenic	0.37	0.54	JJ	2	0.56		2	0.62		0.78	0.58		0.93	0.61	
Barium	33.6	1.1	J	66.5	1.1	J	200	1.2	J	320	5.8	J	438	2.5	J
Beryllium	0.11	0.22	J	0.44	0.22		0.48	0.25		<	1.2	U	<	0.49	U
Cadmium	0.79	0.54		<	0.56	U	1.1	0.62		3	2.9		1.2	1.2	

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U = Nondetected value.

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0931-0058			CAN093-0932-0004			CAN093-0932-0008			CAN093-0932-0018			CAN093-0932-0028		
LAB SAMPLE NUMBER	0312740010SA			0312730003SA			0312730004SA			0312730005SA			0312730006SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Calcium	55400	21.7		19300	22.4		107000	24.8		241000	115		137000	49.1	
Chromium	2.4	1.1		7	1.1		5	1.2		<	5.8	U	4.8	2.5	
Cobalt	0.85	1.1	J	2.8	1.1		2.9	1.2		<	5.8	U	1.4	2.5	J
Copper	0.97	2.2	J	5.9	2.2		5.8	2.5		1.7	11.5	J	8.2	4.9	
Iron	2070	10.8		6830	11.2		4640	12.4		2050	57.6		5300	24.5	
Lead	1.2	0.54		5.5	0.56		2.9	1.2		1.4	2.9	J	1.5	0.61	
Magnesium	2990	21.7		1530	22.4		2890	24.8		7460	115		24800	49.1	
Manganese	27.4	1.1	J	91	1.1		77.1	1.2		21.1	5.8		51.4	2.5	
Nickel	2	4.3	J	7.2	4.5		6.2	5		<	23	U	7.3	9.8	J
Potassium	429	542	J	1240	561		1150	620		426	2880	J	748	1230	J
Selenium	0.31	0.54	J	<	0.56	UJ	<	1.2	UJ	<	1.2	UJ	<	1.2	UJ
Silver	0.73	1.1	J	0.77	1.1	J	0.71	1.2	J	4.8	5.8	J	1.3	2.5	J
Sodium	270	542	J	<	561	U	<	620	J	<	2880	U	379	1230	J
Vanadium	8.9	1.1		14.8	1.1		17.3	1.2		10.8	5.8		17.7	2.5	
Zinc	4.7	2.2		13.7	2.2		13.6	2.5		5.2	11.5	J	14.7	4.9	
TPH (mg/kg)															
Total Petroleum Hydrocarbons	<	43.3	U	<	44.8	U	<	49.6	U	<	46.1	U	<	49.1	U
Water Quality (percent)															
Water	7.7	0.1		11	0.1		19	0.1		13	0.1		18	0.1	

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0932-0036			CAN093-0932-0048			CAN093-0932-0058			CAN093-0933-0064			CAN093-0933-0008			CAN093-0933-0018		
LAB SAMPLE NUMBER	0312730007SA			0312730008SA			0312730009SA			0312730012SA			0312730013SA			0312730014SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
Benzene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Bromodichloromethane	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Carbon disulfide	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Chlorobenzene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Chloroform	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
1,1-Dichloroethane	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
1,1-Dichloroethene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
1,2-Dichloroethene (total)	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
1,2-Dichloropropane	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Ethylbenzene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
4-Methyl-2-pentanone (MIBK)	<	11	U	<	12	U	<	11	U	<	12	U	<	12	U	<	12	U
Styrene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Tetrachloroethene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Toluene	16	5.5		8	5.8		1.6	5.5	J	<	5.8	U	<	5.9	U	<	5.9	U
1,1,1-Trichloroethane	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
1,1,2-Trichloroethane	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Trichloroethene	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Xylenes (total)	<	5.5	U	<	5.8	U	<	5.5	U	<	5.8	U	<	5.9	U	<	5.9	U
Metals (mg/kg)																		
Aluminum	7820	11.1		3380	11.5		3040	11		7490	11.7		3910	58.6		3660	23.4	
Antimony	<	6.6	U	<	6.9	U	<	6.6	U	<	7	U	<	35.2	U	<	14.1	U
Arsenic	0.85	0.55		0.55	1.2	J	0.63	0.55		2.6	0.58		1.3	0.59		1.4	0.59	
Barium	35.9	1.1	J	40.5	1.2	J	17.2	1.1	J	172	1.2	J	697	5.9	J	221	2.3	J
Beryllium	0.32	0.22		0.12	0.23	J	<	0.22	U	0.43	0.23		<	1.2	U	<	0.47	U
Cadmium	<	0.55	U	<	0.58	U	<	0.55	U	1.2	0.58		3	2.9		1.6	1.2	

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U = Nondetected value.

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0932-0038			CAN093-0932-0048			CAN093-0932-0058			CAN093-0933-0004			CAN093-0933-0008			CAN093-0933-0018		
LAB SAMPLE NUMBER	0312730007SA			0312730008SA			0312730009SA			0312730012SA			0312730013SA			0312730014SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Calcium	37200	22.1		48100	23.1		13700	22		80300	23.4		221000	117		142000	46.9	
Chromium	4.9	1.1		2.9	1.2		3.6	1.1		5.8	1.2		<	5.9	U	<	2.3	U
Cobalt	1.5	1.1		0.94	1.2	J	1.2	1.1		2.8	1.2		5	5.9	J	2.4	2.3	
Copper	2.5	2.2		2.4	2.3		1.9	2.2	J	5.1	2.3		3.2	11.7	J	2.3	4.7	J
Iron	5050	11.1		2460	11.5		2490	11		6020	11.7		2800	58.6		2850	23.4	
Lead	4.6	0.55		1.8	1.2		1.9	0.55		4.7	2.9		1.9	2.9	J	3	2.9	
Magnesium	8180	22.1		12500	23.1		7340	22		2060	23.4		3930	117		3150	46.9	
Manganese	38.8	1.1		23.7	1.2		31.7	1.1		75.6	1.2		45.2	5.9	J	31.3	2.3	
Nickel	5.4	4.4		2.6	4.6	J	3	4.4	J	7.1	4.7		<	23.4	U	3.9	9.4	J
Potassium	1750	553		563	577	J	442	551	J	1370	585		723	2930	J	1010	1170	J
Selenium	<	1.1	UJ	<	1.2	UJ	<	0.55	U	<	1.2	UJ	<	1.2	UJ	<	1.2	UJ
Silver	0.76	1.1	J	0.65	1.2	J	0.65	1.1	J	0.95	1.2	J	4.3	5.9	J	1.9	2.3	J
Sodium	304	553	J	210	577	J	<	551	U	<	585	U	<	2930	U	<	1170	U
Vanadium	11.8	1.1		13.6	1.2		12.3	1.1		14.1	1.2		10.5	5.9		11.9	2.3	
Zinc	9.4	2.2		4.9	2.3		4.6	2.2		13.6	2.3		9.9	11.7	J	7.4	4.7	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	44.2	U	<	46.1	U	<	44	U	<	46.8	U	<	46.9	U	<	46.9	U
Water Quality (percent)																		
Water	9.6	0.1		13	0.1		9.2	0.1		14	0.1		15	0.1		15	0.1	

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0933-0028			CAN093-0933-0038			CAN093-0933-0048			CAN093-0933-0058		
LAB SAMPLE NUMBER	0312730015SA			0312730016SA			0312730017SA			0312730018SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)												
Benzene	<	5.8	U	<	5.4	U	<	5.5	U	<	5.4	U
Bromodichloromethane	1.3	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
Carbon disulfide	1.3	5.8	J	<	5.4	U	1.6	5.5	J	<	5.4	U
Chlorobenzene	<	5.8	U	<	5.4	U	<	5.5	U	<	5.4	U
Chloroform	1.8	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
1,1-Dichloroethane	1.6	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
1,1-Dichloroethene	1.4	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
1,2-Dichloroethene (total)	3.1	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
1,2-Dichloropropane	1.6	5.8	J	<	5.4	U	1.5	5.5	J	2.8	5.4	J
Ethylbenzene	1.5	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
4-Methyl-2-pentanone (MIBK)	2.1	12	J	<	11	U	<	11	U	<	11	U
Styrene	1.5	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
Tetrachloroethene	1.3	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
Toluene	<	5.8	U	<	5.4	U	<	5.5	U	1.4	5.4	J
1,1,1-Trichloroethane	1.5	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
1,1,2-Trichloroethane	1.7	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
Trichloroethene	<	5.8	U	<	5.4	U	<	5.5	U	<	5.4	U
Xylenes (total)	3.5	5.8	J	<	5.4	U	<	5.5	U	<	5.4	U
Metals (mg/kg)												
Aluminum	4070	23.4		3440	21.8		3760	11		3730	10.8	
Antimony	<	14	U	<	13.1	U	<	6.6	U	<	6.5	U
Arsenic	1.1	0.58		0.88	0.54		0.54	1.1	J	0.57	0.54	
Barium	113	2.3	J	76.7	2.2	J	27.6	1.1	J	43.1	1.1	J
Beryllium	<	0.47	U	<	0.44	U	0.14	0.22	J	0.15	0.22	J
Cadmium	2.8	1.2		2.2	1.1		<	0.55	U	0.61	0.54	

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Source: Woodward-Clyde, 1994

Table 25-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 93

LOCATOR	CAN093-0933-0028			CAN093-0933-0038			CAN093-0933-0048			CAN093-0933-0058		
LAB SAMPLE NUMBER	0312730015SA			0312730016SA			0312730017SA			0312730018SA		
COLLECT DATE	09/15/93			09/15/93			09/15/93			09/15/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Calcium	153000	46.7		130000	43.6		24500	22.1		41600	21.6	
Chromium	2.8	2.3		2	2.2	J	3.9	1.1		3.2	1.1	
Cobalt	2	2.3	J	1.8	2.2	J	1.2	1.1		1.3	1.1	
Copper	2.5	4.7	J	5.5	4.4		2	2.2	J	2	2.2	J
Iron	2380	23.4		2350	21.8		2890	11		3110	10.8	
Lead	1.1	1.2	J	1.2	1.1		1.3	0.55		1.4	0.54	
Magnesium	12600	46.7		4910	43.6		6800	22.1		5240	21.6	
Manganese	28.8	2.3		32.4	2.2		30.7	1.1		38.1	1.1	
Nickel	4.8	9.3	J	2.6	8.7	J	3.3	4.4	J	3.2	4.3	J
Potassium	590	1170	J	725	1090	J	736	552		670	539	
Selenium	<	1.2	UJ	<	1.1	UJ	<	1.1	UJ	<	1.1	UJ
Silver	2	2.3	J	1.1	2.2	J	0.58	1.1	J	0.5	1.1	J
Sodium	390	1170	J	<	1090	U	299	552	J	219	539	J
Vanadium	15.7	2.3		6.4	2.2		10.4	1.1		11.1	1.1	
Zinc	5.3	4.7		5.9	4.4		6	2.2		6.4	2.2	
TPH (mg/kg)												
Total Petroleum Hydrocarbons	<	46.7	U	<	43.6	U	<	44.2	U	<	43.1	U
Water Quality (percent)												
Water	14	0.1		8.2	0.1		9.5	0.1		7.2	0.1	

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Source: Woodward-Clyde, 1994

Table 25-2a
Comparison of Detected Concentrations with RBCs
SWMU 93

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN093-0933-0058	1,2-Dichloropropane 10 mg/kg	0.0028	30	N
CAN093-0933-0028	4-Methyl-2-pentanone (MIBK) —	0.0021	400	N
CAN093-0931-0018	Antimony —	2.3	3	N
CAN093-0931-0028	**Barium** 5450 mg/kg	**1110**	**600**	**Y**
CAN093-0933-0028	Benzene 27	0.0017	2	N
CAN093-0933-0000	**Benzo(a)anthracene** 6.21	**0.077**	**0.07**	**Y**
CAN093-0933-0000	**Benzo(a)pyrene** 0.621	**0.084**	**0.01**	**Y**
CAN093-0933-0000	**Benzo(b)fluoranthene** 6.21	**0.14**	**0.07**	**Y**
CAN093-0932-0000	Benzo(g,h,i)perylene 103	0.073	NTF	N
CAN093-0933-0028	Bromodichloromethane 103	0.0013	0.5	N
CAN093-0933-0008	Cadmium 74	3	8	N
CAN093-0933-0048	Carbon disulfide 3760	0.0016	800	N
CAN093-0933-0028	Chlorobenzene 176	0.0017	200	N
CAN093-0933-0028	Chloroform 3.56	0.0018	10	N
CAN093-0933-0000	Chromium 230	12.9	40	N
CAN093-0933-0000	Chrysene —	0.12	2	N
CAN093-0933-0008	Cobalt —	5	NTF	N
CAN093-0932-0000	Copper —	158	300	N
CAN093-0932-0000	**Indeno(1,2,3-cd)pyrene** 6.21	**0.055**	**0.04**	**Y**
CAN093-0932-0000	Lead (3) 400	32.4	500	N
CAN093-0931-0000	Pentachlorophenol 29.8	0.045	0.6	N
CAN093-0932-0000	Phenanthrene 1800	0.13	NTF	N
CAN093-0932-0000	Pyrene 2300	0.19	200	N
CAN093-0931-0058	Selenium 391	0.31	40	N
CAN093-0932-0058	Silver 391	0.65	20	N
CAN093-0933-0028	Styrene 419	0.0015	2000	N
CAN093-0933-0028	Tetrachloroethene 1.03	0.0013	1	N
CAN093-0932-0038	Toluene 2.03	0.016	2000	N
CAN093-0933-0000	Total Petroleum Hydrocarbons (4)	325	1000	N
CAN093-0933-0028	Trichloroethene 0.6418	0.0024	6	N
CAN093-0933-0028	Xylenes (total) 132	0.0035	20000	N
CAN093-0932-0000	Zinc 23500	77.2	2000	N

NTF = No EPA Established Toxicity Factor

(1) All units in mg/kg

(2) Risk-based concentration

(3) EPA suggests 500-1,000 mg/kg as allowable concentration for residential soils based on EPA's IUBK Lead Model (EPA 1990)

(4) New Mexico recommended soil cleanup level for fuel contaminated soil.

Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 25-2b
Summary of Human Health Risks
SWMU 93

Receptor/Pathway	Average Exposure			Reasonable Maximum Exposure		
	Cancer Risk	Subchronic H.I.	Chronic H.I.	Cancer Risk	Subchronic H.I.	Chronic H.I.
Occupational Worker (Surface Soil)						
-- Dermal Contact	3×10^{-11}		7×10^{-8}	5×10^{-9}		4×10^{-6}
-- Ingestion	5×10^{-10}		2×10^{-5}	1×10^{-7}		3×10^{-3}
-- Inhalation of VOCs*	0.00		8×10^{-8}	0.00		1×10^{-6}
-- Inhalation of Particulates	4×10^{-12}		0.00	2×10^{-10}		0.00
	6×10^{-10}		2×10^{-5}	2×10^{-7}		3×10^{-3}
Construction Worker (Total Soil)						
-- Dermal Contact	2×10^{-12}	5×10^{-8}		4×10^{-11}	7×10^{-7}	
-- Ingestion	2×10^{-10}	8×10^{-5}		2×10^{-9}	1×10^{-3}	
-- Inhalation of VOCs*	0.00	4×10^{-8}		0.00	2×10^{-7}	
-- Inhalation of Particulates	3×10^{-13}	3×10^{-7}		1×10^{-12}	1×10^{-6}	
	2×10^{-10}	8×10^{-5}		2×10^{-9}	1×10^{-3}	
Future Trespasser						
-- Dermal Contact	6×10^{-12}	2×10^{-8}		7×10^{-10}	2×10^{-6}	
-- Ingestion	1×10^{-10}	3×10^{-6}		1×10^{-8}	7×10^{-4}	
-- Inhalation of VOCs*	0.00	2×10^{-8}		0.00	4×10^{-7}	
-- Inhalation of Particulates	7×10^{-13}	0.00		1×10^{-11}	0.00	
	1×10^{-10}	3×10^{-6}		1×10^{-8}	7×10^{-4}	

Note: Apparent inconsistencies in summation of risks are due to rounding of risk values.

* No carcinogenic volatile organic compounds were detected at SWMU 93.

Source: Woodward-Clyde, 1994

Table 25-3a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 93

LOCATOR	CAN093-9304-0000			CAN093-9304-0005			CAN093-9304-9361[1]			CAN093-9304-0010			CAN093-9305-0000			CAN093-9305-0005		
LAB SAMPLE NUMBER	0397140002SA			0397140003SA			0397140001SA			0397140004SA			0397140005SA			0397140006SA		
COLLECT DATE	12/08/94			12/08/94			12/08/94			12/08/94			12/08/94			12/08/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg//kg)																		
Toluene	<	5.5	U	<	5.7	U	<	5.7	U	4.9	5.8	J	<	5.5	U	<	5.5	U
Semivolatile Organics (µg//kg)																		
Benzo(a)anthracene	45	360	J	<	380	U	<	380	U	<	380	U	49	360	J	<	360	U
Benzo(a)pyrene	52	360	J	<	380	U	<	380	U	<	380	U	69	360	J	<	360	U
Benzo(b)fluoranthene	50	360	J	<	380	U	<	380	U	<	380	U	<	360	U	<	360	U
Benzo(k)fluoranthene	71	360	J	<	380	U	<	380	U	<	380	U	160	360	J	<	360	U
bis(2-Ethylhexyl)phthalate	<	360	U	<	380	U	<	380	U	<	380	U	<	360	U	120	360	J
Chrysene	70	360	J	<	380	U	<	380	U	<	380	U	78	360	J	<	360	U
Fluoranthene	110	360	J	<	380	U	<	380	U	<	380	U	130	360	J	<	360	U
Phenanthrene	<	360	U	<	380	U	<	380	U	<	380	U	38	360	J	<	360	U
Pyrene	73	360	J	<	380	U	<	380	U	<	380	U	90	360	J	<	360	U
Metals (mg/kg)																		
Aluminum	14800	10.9		13300	11.4		10700	11.4		8620	23		12400	11.1		13300	11.1	
Arsenic	2.8	0.55		2.6	0.57		2.9	0.57		2.3	0.58		2.5	1.1		2	0.55	
Barium	153	1.1		94.1	1.1		80.8	1.1		647	2.3		326	1.1		126	1.1	
Beryllium	0.61	0.22		0.55	0.23		0.58	0.23		0.41	0.46	J	0.51	0.22		0.52	0.22	
Cadmium	0.68	0.55		<	0.57	U	<	0.57	U	<	1.2	U	<	0.55	U	<	0.55	U
Calcium	48600	21.9		20800	22.7		15400	22.8		158000	46.1		65300	22.1		15300	22.1	
Chromium	12.1	1.1		11.8	1.1		9.3	1.1		5.4	2.3		11	1.1		11.9	1.1	
Cobalt	3.4	1.1		4.5	1.1		3.9	1.1		1.8	2.3	J	3.2	1.1		4	1.1	
Copper	13.6	2.2		8.1	2.3		7.2	2.3		3.8	4.6	J	7.9	2.2		7.9	2.2	
Iron	11200	10.9		11200	11.4		9560	11.4		5890	23		10100	11.1		10700	11.1	
Lead	11.9	2.7	J	8.6	0.57	J	8.3	0.57	J	5.1	0.58	J	11.7	1.1	J	7.5	0.55	J

Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value. D = Sample was diluted for analysis.
U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceding sample number.
[2] MS/MSD for preceding sample number.

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Source: Woodward-Clyde, 1997

Table 25-3a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 93

LOCATOR	CAN093-9304-0000			CAN093-9304-0005			CAN093-9304-9361[1]			CAN093-9304-0010			CAN093-9305-0000			CAN093-9305-0005		
LAB SAMPLE NUMBER	0397140002SA			0397140003SA			0397140001SA			0397140004SA			0397140005SA			0397140006SA		
COLLECT DATE	12/08/94			12/08/94			12/08/94			12/08/94			12/08/94			12/08/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Magnesium	2790	21.9		2570	22.7		2190	22.8		3610	46.1		2590	22.1		2340	22.1	
Manganese	168	1.1	J	206	1.1	J	205	1.1	J	73	2.3	J	193	1.1	J	181	1.1	J
Nickel	10.3	4.4		10.1	4.5		10.2	4.6		9.1	9.2	J	9.6	4.4		10.6	4.4	
Potassium	2370	547		2270	568		1830	571		1330	1150		2050	553		2350	553	
Thallium	<	1.1	UJ	<	1.1	UJ	<	1.1	UJ	<	1.2	UJ	<	1.1	U	0.14	0.55	J
Vanadium	22.1	1.1		19.3	1.1		12.8	1.1		17.9	2.3		21	1.1		18.7	1.1	
Zinc	46.7	2.2		28.4	2.3		24.6	2.3		15.2	4.6		45.8	2.2		28.4	2.2	
TRPH (mg/kg)																		
Total Recoverable Petroleum Hydrocarbons	213	43.8		<	45.5	U	51.2	45.6		<	46.1	U	547	44.2		<	44.2	U

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U = Nondetected value. RL = Reporting Limit.
[1] Duplicate for preceding sample number.
[2] MS/MSD for preceding sample number.

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Source: Woodward-Clyde, 1997

Table 25-3a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 93

LOCATOR	CAN093-9305-0010			CAN093-9306-0000			CAN093-9306-0005			CAN093-9306-6005[2]			CAN093-9306-0010		
LAB SAMPLE NUMBER	0397140007SA			0397140008SA			0397140009SA			0397140010SA			0397140011SA		
COLLECT DATE	12/08/94			12/08/94			12/08/94			12/08/94			12/08/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (µg/kg)															
Toluene	<	5.5	U	3.1	5.4	J	<	5.6	U	<	5.6	U	<	5.7	U
Semivolatile Organics (µg/kg)															
Benzo(a)anthracene	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Benzo(a)pyrene	<	360	U	<	360	UJ	<	370	U	<	370	U	<	380	U
Benzo(b)fluoranthene	<	360	U	<	360	UJ	<	370	U	<	370	U	<	380	U
Benzo(k)fluoranthene	<	360	U	<	360	UJ	<	370	U	<	370	U	<	380	U
bis(2-Ethylhexyl)phthalate	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Chrysene	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Fluoranthene	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Phenanthrene	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Pyrene	<	360	U	<	360	U	<	370	U	<	370	U	<	380	U
Metals (mg/kg)															
Aluminum	8540	11		15400	10.8		14700	11.1		12500	11.2		11500	11.4	
Arsenic	1.9	0.55		2.7	1.1		2.6	0.56		2.9	0.56		2.7	0.57	
Barium	90.8	1.1		122	1.1		97.5	1.1		109	1.1		1890	1.1	
Beryllium	0.42	0.22		0.62	0.22		0.59	0.22		0.52	0.22		0.73	0.23	
Cadmium	<	0.55	U	0.48	0.54	J	<	0.56	U	<	0.56	U	<	0.57	U
Calcium	28700	22		21300	21.5		51300	22.3		80500	22.4		101000	22.9	
Chromium	8	1.1		12.5	1.1		10.6	1.1		9	1.1		7.2	1.1	
Cobalt	3.3	1.1		4	1.1		2.4	1.1		2.5	1.1		1.7	1.1	
Copper	6.5	2.2		17.8	2.2		6.6	2.2		6.1	2.2		4.6	2.3	
Iron	8170	11		12000	10.8		10100	11.1		8570	11.2		7370	11.4	
Lead	7.4	0.55	J	10.2	1.1	J	6.1	0.56	J	6.5	0.56	J	7.4	0.57	J

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(1) Duplicate for preceding sample number.
(2) MS/MSD for preceding sample number.

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Source: Woodward-Clyde, 1997

Table 25-3a
Summary of Compounds Detected in Phase II Soil Samples
SWMU 93

LOCATOR	CAN093-9305-0010			CAN093-9306-0000			CAN093-9306-0005			CAN093-9306-6005[2]			CAN093-9306-0010		
LAB SAMPLE NUMBER	0397140007SA			0397140008SA			0397140009SA			0397140010SA			0397140011SA		
COLLECT DATE	12/08/94			12/08/94			12/08/94			12/08/94			12/08/94		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Magnesium	2050	22		2490	21.5		2540	22.3		2600	22.4		4070	22.9	
Manganese	209	1.1		168	1.1		112	1.1	J	98.2	1.1		86.6	1.1	J
Nickel	8.3	4.4		11.5	4.3		10.2	4.5		9.3	4.5		8.2	4.6	
Potassium	1730	550		2460	538		2190	557		1910	559		1970	572	
Thallium	0.15	1.1	J	0.12	1.1	J	<	1.1	UJ	0.13	0.56	J	<	1.1	UJ
Vanadium	14.4	1.1	J	22.3	1.1		19.7	1.1		16.5	1.1		18.5	1.1	
Zinc	21.5	2.2		38.4	2.2		23.7	2.2		21.2	2.2		19.5	2.3	
TRPH (mg/kg)															
Total Recoverable Petroleum Hydrocarbons	<	44	U	1760	215		<	44.6	U	<	44.7	U	<	45.8	U

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(1) Duplicate for preceding sample number.
(2) MS/MSD for preceding sample number.

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Source: Woodward-Clyde, 1997

Table 25-3b
Comparison of Phase II Soil Concentrations to Phase I Concentrations and RBCs
SWMU 93

Chemical	Phase I Maximum Detected Concentration (mg/kg)	Phase II Maximum Detected Concentration (mg/kg)	Phase II Concentration Treater than Phase I Concentration	Residential Soil Risk-Based Concentration[1] (mg/kg)	Phase II Concentration Exceeds RBC?
Toluene	0.016	0.0049	NO	16,000	NA
Xylenes	0.0035	ND	NO	160,000	NA
Benzo(a)anthracene	0.077	0.049	NO	0.88	NA
Benzo(a)pyrene	0.084	0.069	NO	0.088	NA
Benzo(b)fluoranthene	0.14	0.05	NO	0.88	NA
Benzo(k)fluoranthene	ND	0.16	YES	8.80	NO
Benzo(g,h,i)perylene	0.073	ND	NA	NA(a)	NA
Bis(2-ethylhexyl)phthalate	ND	0.12	YES	46	NO
Chrysene	0.12	0.078	NO	88	NA
Fluoranthene	0.15	0.13	NO	3,100	NA
Indeno(1,2,3-cd)pyrelene	0.055	ND	NO	0.88	NA
Pentachlorophenol	0.045	ND	NO	5	NA
Phenanthrene	0.13	0.038	NO	NA(a)	NA
Pyrene	0.19	0.073	NO	2,300	NA
TPH	325	1760	YES	NA(a)	NA
Antimony	2.3	ND	NO	31	NA
Barium	1110	1890	YES	5,500	NO
Cadmium	3	0.68	NO	39	NA
Copper	158	17.8	NO	2900	NA
Lead*	32.4	11.9	NO	400	NO
Nickel	8.2	11.5	YES	1600	NO
Silver	4.8	ND	NO	390	NA
Zinc	77.2	46.7	NO	23000	NA

[1] EPA Region III Risk-Based Concentrations for residential soil (EPA 1994).

(a) EPA has not established a toxicity factor for these chemicals, so RBCs could not be calculated.

*No RBC has been calculated for lead; however, EPA recommends an interim residential soil lead concentration of 400 mg/kg (EPA 1994)

ND = Not Detected

NA = Not Applicable

Source: Woodward-Clyde, 1997

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0941-0000			CAN094-0941-0002			CAN094-0942-0000			CAN094-0942-0000			CAN094-0942-0002			CAN094-0943-0000		
LAB SAMPLE NUMBER	0314020002SA			0314020003SA			0312160017SA			0314020006SA			0312160018SA			0314010009SA		
COLLECT DATE	09/24/93			09/24/93			09/24/93			09/24/93			09/13/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane	<	5.1	U	2	5.3	J				<	5.3	U	<	5.6	U	<	5.9	U
Ethylbenzene	<	5.1	U	1.2	5.3	J				<	5.3	UJ	<	5.6	U	<	5.9	U
Tetrachloroethene	<	5.1	U	25	5.3	J				<	5.3	UJ	<	5.6	U	<	5.9	U
Toluene	6.1	5.1	J	49	5.3	J				10	5.3	J	<	5.6	U	1.4	5.9	J
Xylenes (total)	9.4	5.1		4.2	5.3	J				4.7	5.3	J	<	5.6	U	<	5.9	U
Semivolatile Organics (ug/kg)																		
Anthracene	<	340	U				37	360	J							<	390	U
Benzo(a)anthracene	110	340	J				230	360	J							<	390	U
Benzo(a)pyrene	170	340	J				340	360	J							<	390	U
Benzo(b)fluoranthene	230	340	J				550	360								<	390	U
Benzo(g,h,i)perylene	160	340	J				160	360	J							<	390	U
Butyl benzyl phthalate	48	340	J				<	360	U							<	390	U
Chrysene	180	340	J				350	360	J							<	390	U
Dibenzofuran	<	340	U				<	360	U							<	390	U
Fluoranthene	200	340	J				440	360								<	390	U
Fluorene	<	340	U				<	360	U							<	390	U
Indeno(1,2,3-cd)pyrene	110	340	J				140	360	J							<	390	U
2-Methylnaphthalene	<	340	U				<	360	U							<	390	U
Pentachlorophenol	<	1600	U				<	1800	U							74	1900	J
Naphthalene	<	340	U				<	360	U							<	390	U

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0941-0000			CAN094-0941-0002			CAN094-0943-0000			CAN094-0942-0000			CAN094-0942-0002			CAN094-0943-0000		
LAB SAMPLE NUMBER	0314020002SA			0314020003SA			0312160017SA			0314020006SA			0312160018SA			0314010009SA		
COLLECT DATE	09/24/93			09/24/93			09/24/93			09/24/93			09/13/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Phenanthrene	150	340	J				240	360	J							<	390	U
Pyrene	410	340	J				360	360								<	390	U
Metals (mg/kg)																		
Aluminum	3630	10.3		3060	21.1		3830	11					8990	11.3		8670	11.8	
Arsenic	2.7	0.51		3.3	0.53		2.4	0.55					1.9	0.56		2.6	0.59	
Barium	246	1	J	511	2.1		166	1.1					131	1.1		104	1.2	
Beryllium	0.32	0.21		0.23	0.42	J	<	0.22	U				0.44	0.23		0.58	0.24	
Cadmium	1.8	0.51		2	1.1		0.91	0.55					<	0.56	U	<	0.59	U
Calcium	59100	20.5		106000	42.2		61000	22					70200	22.5		26400	23.5	
Chromium	11.5	1	J	3.7	2.1		5.9	1.1					6	1.1		7.9	1.2	
Cobalt	2.3	1		2.1	2.1		2.6	1.1					3.5	1.1		4.4	1.2	
Copper	11.2	2.1		7.7	4.2		10.1	2.2					6.6	2.3		8	2.4	
Iron	5200	10.3		3280	21.1		4510	11					6480	11.3		8290	11.8	
Lead	61.5	5.1		14.6	2.6		99.2	11					5.6	1.1		6.7	0.59	
Magnesium	2000	20.5		3290	42.2		1780	22					2540	22.5		1960	23.5	
Manganese	189	1	J	184	2.1		142	1.1					134	1.1		165	1.2	
Mercury	0.48	0.1		0.26	0.11		0.3	0.11					0.12	0.11		<	0.12	U
Nickel	5.6	4.1		6.3	8.4	J	5.8	4.4					7.9	4.5		8.9	4.7	
Potassium	1430	513	J	997	1060	J	1360	550					1790	564		1660	588	
Selenium	<	0.51	U	<	1.1	UJ	<	0.55	U				<	1.1	UJ	<	0.59	U
Silver	0.54	1	J	<	2.1	U	<	1.1	U				<	1.1	U	<	1.2	U
Sodium	210	513	J	332	1060	J	<	550	U				<	564	U	<	588	U
Thallium	<	0.51	U	<	1.1	UJ	<	0.55	U				<	1.1	UJ	<	0.59	U

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U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0941-0000			CAN094-0941-0001			CAN094-0943-0000			CAN094-0942-0000			CAN094-0942-0002			CAN094-0943-0000		
LAB SAMPLE NUMBER	0314020002SA			0314020003SA			0312160017SA			0314020006SA			0312160018SA			0314010009SA		
COLLECT DATE	09/24/93			09/24/93			09/24/93			09/24/93			09/13/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Vanadium	13.5	1		12.8	2.1		11.1	1.1					13.4	1.1		23.9	1.2	
Zinc	56.3	2.1	J	21.5	4.2		84.8	2.2					18.9	2.3		19	2.4	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	862	82.1		3250	422		247	44					<	45.1	U	<	47	U
Water Quality (percent)																		
Water	2.6	0.1		5.2	0.1		9.1	0.1		5.2	0.1		11	0.1		15	0.1	

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review.

J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0943-0002			CAN094-0944-0000			CAN094-0944-0002			CAN094-0945-0000			CAN094-0945-0002			CAN094-0946-0000		
LAB SAMPLE NUMBER	0314010010SA			0314040007SA			0314040008SA			0311810017SA			0311810018SA			0311810013SA		
COLLECT DATE	09/23/93			09/23/93			09/23/93			09/11/93			09/11/93			09/11/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloroethane	<	5.8	U	<	5.9	U	<	5.9	U	<	6	U	<	5.8	U	<	6	U
Ethylbenzene	<	5.8	U	2.7	5.9	J	<	5.9	U	<	6	U	<	5.8	U	<	6	U
Tetrachloroethene	<	5.8	U	<	5.9	U	<	5.9	U	<	6	U	<	5.8	U	<	6	U
Toluene	<	5.8	U	<	5.9	U	1.2	5.9	J	<	6	U	<	5.8	U	1.4	6	J
Xylenes (total)	<	5.8	U	6.4	5.9		<	5.9	U	4	6	J	<	5.8	U	<	6	U
Semivolatile Organics (ug/kg)																		
Anthracene										<	400	U						
Benzo(a)anthracene										<	400	U						
Benzo(a)pyrene										<	400	U						
Benzo(b)fluoranthene										<	400	U						
Benzo(g,h,i)perylene										<	400	UJ						
Butyl benzyl phthalate										<	400	U						
Chrysene										<	400	UJ						
Dibenzofuran										160	400	J						
Fluoranthene										<	400	U						
Fluorene										320	400	J						
Indeno(1,2,3-cd)pyrene										<	400	UJ						
2-Methylnaphthalene										3800	400							
Pentachlorophenol										<	1900	U						
Naphthalene										430	400							

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R = Rejected value.
U = Nondetected value.

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RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0943-0002			CAN094-0944-0000			CAN094-0944-0002			CAN094-0945-0000			CAN094-0945-0002			CAN094-0946-0000		
LAB SAMPLE NUMBER	0314010010SA			0314040007SA			0314040008SA			0311810017SA			0311810018SA			0311810013SA		
COLLECT DATE	09/23/93			09/23/93			09/23/93			09/11/93			09/11/93			09/11/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Phenanthrene										240	400	J						
Pyrene										<	400	U						
Metals (mg/kg)																		
Aluminum	4500	23.1		7820	11.7		3710	58.9		8400	12		10500	11.5		7160	12	
Arsenic	2	0.58		2.6	0.59		1.8	0.59		2.9	0.6		2.3	0.58		2.6	0.6	
Barium	185	2.3		218	1.2	J	146	5.9	J			R			R			R
Beryllium	0.49	0.46		0.45	0.23		<	1.2	U	0.44	0.24		0.74	0.23		0.45	0.24	
Cadmium	<	1.2	U	0.8	0.59		2.9	2.9		<	0.6	U	<	0.58	U	<	0.6	U
Calcium	125000	46.2		38700	23.4		216000	118		12400	24		4840	23		7840	23.9	
Chromium	<	2.3	U	9.2	1.2		<	5.9	U	9.5	1.2		11.3	1.2		7.9	1.2	
Cobalt	3.1	2.3		1.7	1.2		<	5.9	U	3.2	1.2		5.4	1.2		2.5	1.2	
Copper	4.9	4.6		9.9	2.3		2.2	11.8	J	6.7	2.4		8.2	2.3		5.2	2.4	
Iron	4420	23.1		6280	11.7		3500	58.9		8890	12		10800	11.5		6680	12	
Lead	5.3	0.58		15.2	1.2		3.5	0.59		12.5	1.2	J	7.7	0.58	J	7.5	0.6	J
Magnesium	1880	46.2		2640	23.4		2480	118		1510	24		2250	23		1270	23.9	
Manganese	98.6	2.3		106	1.2		39.7	5.9		86.3	1.2	J	233	1.2	J	61.6	1.2	J
Mercury	<	0.12	U	<	0.12	U	<	0.12	U	<	0.12	U	<	0.12	U	<	0.12	U
Nickel	7.1	9.2	J	5.8	4.7		<	23.5	U	7.1	4.8		11.3	4.6		5.4	4.8	
Potassium	1040	1150	J	1750	585		694	2940	J	1350	600		1830	575		1170	598	
Selenium	<	1.2	UJ	<	1.2	UJ	<	1.2	UJ	0.34	0.6	J	0.26	0.58	J	0.27	0.6	J
Silver	<	2.3	U	0.52	1.2	J	3	5.9	J	<	1.2	UJ	<	1.2	UJ	<	1.2	UJ
Sodium	<	1150	U	<	585	U	<	2940	U	<	600	U	<	575	U	<	598	U
Thallium	<	1.2	UJ	<	0.59	U	<	1.2	UJ	<	1.2	UJ	0.13	1.2	J	<	1.2	UJ

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U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0943-0002			CAN094-0944-0000			CAN094-0944-0002			CAN094-0945-0000			CAN094-0945-0002			CAN094-0946-0000		
LAB SAMPLE NUMBER	0314010010SA			0314040007SA			0314040008SA			0311810017SA			0311810018SA			0311810013SA		
COLLECT DATE	09/23/93			09/23/93			09/23/93			09/11/93			09/11/93			09/11/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Vanadium	12.9	2.3		13.4	1.2		11.7	5.9		18.5	1.2		21.4	1.2		15.3	1.2	
Zinc	12.9	4.6		23.6	2.3		11.2	11.8	J	27.2	2.4		23.6	2.3		17.3	2.4	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	61.3	46.2		221	46.8		<	47.1	U	3600	480		<	46	U	251	47.8	
Water Quality (percent)																		
Water	13	0.1		15	0.1		15	0.1		17	0.1		13	0.1		16	0.1	

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U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0946-0002		
LAB SAMPLE NUMBER	0311810014SA		
COLLECT DATE	09/11/93		
	Result	RL	Qual
Volatile Organics (ug/kg)			
1,2-Dichloroethane	<	5.9	UJ
Ethylbenzene	<	5.9	U
Tetrachloroethene	<	5.9	U
Toluene	9	5.9	
Xylenes (total)	<	5.9	U
Semivolatile Organics (ug/kg)			
Anthracene			
Benzo(a)anthracene			
Benzo(a)pyrene			
Benzo(b)fluoranthene			
Benzo(g,h,i)perylene			
Butyl benzyl phthalate			
Chrysene			
Dibenzofuran			
Fluoranthene			
Fluorene			
Indeno(1,2,3-cd)pyrene			
2-Methylnaphthalene			
Pentachlorophenol			
Naphthalene			

(1) Results presented here are only those chemicals which were detected at least once at this SWMU and have passed data review

J = Estimated value.
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U = Nondetected value.

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RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0946-0002		
LAB SAMPLE NUMBER	0311810014SA		
COLLECT DATE	09/11/93		
	Result	RL	Qual
Phenanthrene			
Pyrene			
Metals (mg/kg)			
Aluminum	8090	11.7	
Arsenic	2.6	0.59	
Barium			R
Beryllium	0.63	0.23	
Cadmium	<	0.59	U
Calcium	14800	23.5	
Chromium	9	1.2	
Cobalt	4.6	1.2	
Copper	7.3	2.3	
Iron	8870	11.7	
Lead	8.2	0.59	J
Magnesium	2070	23.5	
Manganese	198	1.2	J
Mercury	<	0.12	U
Nickel	10	4.7	
Potassium	1530	587	
Selenium	<	0.59	U
Silver	<	1.2	UJ
Sodium	<	587	U
Thallium	0.14	1.2	J

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RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1a
Summary of Chemicals Reported for Near-Surface Soil Samples
SWMU 94

LOCATOR	CAN094-0946-0002		
LAB SAMPLE NUMBER	0311810014SA		
COLLECT DATE	09/11/93		
	Result	RL	Qual
Vanadium	18	1.2	
Zinc	20.2	2.3	
TPH (mg/kg)			
Total Petroleum Hydrocarbons	<	46.9	U
Water Quality (percent)			
Water	15	0.1	

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J = Estimated value.
R = Rejected value.

QUAL=Qualification

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Source: Woodward-Clyde, 1994

Table 26-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 94

LOCATOR	CAN094-0941-0004			CAN094-0941-0008			CAN094-0942-0004			CAN094-0942-0008			CAN094-0943-0004			CAN094-0943-0008		
LAB SAMPLE NUMBER	0314020004SA			0314020005SA			0312160019SA			0312160020SA			0314010011SA			0314010012SA		
COLLECT DATE	09/24/93			09/24/93			09/13/93			09/13/93			09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloropropane	<	5.8	U	<	5.6	U	<	6	U	<	6.3	U	<	5.7	U	<	5.6	U
Toluene	11	5.8		1.3	5.6	J	<	6	U	<	6.3	U	<	5.7	U	<	5.6	U
Metals (mg/kg)																		
Aluminum	2900	23.4		3250	22.5		3510	60.4		3400	25.1	J	6120	22.8		3950	11.3	
Antimony	<	14	U	<	13.5	U	<	36.2	U	<	15	U	<	13.7	U	<	6.8	U
Arsenic	1.9	0.58		1.5	0.56		1.4	0.6		1.5	0.63		1.9	0.57		1.6	0.56	
Barium	133	2.3		233	2.2		1640	6		296	2.5	J	117	2.3		472	1.1	
Beryllium	0.31	0.47	J	0.25	0.45	J	0.88	1.2	J	<	0.5	U	0.58	0.46		0.47	0.23	
Cadmium	2.4	1.2		1.4	1.1		<	3	U	<	1.3	U	<	1.1	U	<	0.56	U
Calcium	213000	46.7		118000	44.9		233000	121		178000	50.1	J	102000	45.7		83400	22.5	
Chromium	3.9	2.3		<	2.2	U	<	6	U	<	2.5	UJ	5.6	2.3		2.7	1.1	
Cobalt	2.4	2.3		<	2.2	U	<	6	U	2	2.5	J	3.7	2.3		2.6	1.1	
Copper	4.5	4.7	J	2.3	4.5	J	<	12.1	U	2.8	5	J	5.5	4.6		3.1	2.3	
Iron	2490	23.4		2940	22.5		2790	60.4		2900	25.1	J	6260	22.8		3650	11.3	
Lead	2.8	0.58		3.3	0.56		3.1	3		3	0.63		5.8	0.57		4.8	0.56	
Magnesium	2230	46.7		3160	44.9		3290	121		2780	50.1		2540	45.7		2880	22.5	
Manganese	37.7	2.3		48.5	2.2		31.2	6		38.4	2.5	J	141	2.3		113	1.1	
Nickel	4.3	9.3	J	4.7	9	J	<	24.2	U	4.8	10	J	9.3	9.1		6.4	4.5	
Potassium	533	1170	J	1010	1120	J	499	3020	J	842	1250	J	1310	1140		938	563	
Silver	1.2	2.3	J	<	2.2	U	<	6	U	<	2.5	U	<	2.3	U	<	1.1	U

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J = Estimated value.
R = Rejected value.
U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 94

LOCATOR	CAN094-0941-0004			CAN094-0941-0008			CAN094-0942-0004			CAN094-0942-0008			CAN094-0943-0004			CAN094-0943-0008		
LAB SAMPLE NUMBER	0314020004SA			0314020005SA			0312160019SA			0312160020SA			0314010011SA			0314010012SA		
COLLECT DATE	09/24/93			09/24/93			09/13/93			09/13/93			09/23/93			09/23/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Sodium	<	1170	U	316	1120	J	<	3020	U	<	1250	U	<	1140	U	<	563	U
Vanadium	9.4	2.3		13.8	2.2		10.8	6		9.6	2.5		16.9	2.3		14.3	1.1	
Zinc	8.6	4.7		8.5	4.5		7.4	12.1	J	9	5	J	16.1	4.6		10	2.3	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	46.7	U	<	44.9	U	<	48.3	U	51.4	50.1		86.2	45.7		91.7	45	
Water Quality (percent)																		
Water	14	0.1		11	0.1		17	0.1		20	0.1		12	0.1		11	0.1	

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U = Nondetected value.

QUAL=Qualification
RL = Reporting Limit.

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Source: Woodward-Clyde, 1994

Table 26-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 94

LOCATOR	CAN094-0944-0004			CAN094-0944-0008			CAN094-0945-0004			CAN094-0945-0008			CAN094-0946-0004			CAN094-0946-0008		
LAB SAMPLE NUMBER	0314040009SA			0314040010SA			0311810019SA			0311810020SA			0311810015SA			0311810016SA		
COLLECT DATE	09/23/93			09/23/93			09/11/93			09/11/93			09/11/93			09/11/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Volatile Organics (ug/kg)																		
1,2-Dichloropropane	<	5.9	U	<	5.5	U	<	5.6	U	<	5.7	U	27	5.9		<	5.6	U
Toluene	4.3	5.9	J	<	5.5	U	<	5.6	U	<	5.7	U	1.9	5.9	J	6.2	5.6	
Metals (mg/kg)																		
Aluminum	4390	23.5		6090	10.9		3970	22.6		3930	22.6		3330	59.4		4880	11.2	
Antimony	<	14.1	U	<	6.6	U	<	13.6	U	10.6	13.6	J	<	35.6	U	<	6.7	U
Arsenic	1.9	0.59		1.8	0.55		1.5	0.56		1.3	0.57		1.7	0.59		2.2	0.56	
Barium	325	2.3	J	137	1.1	J			R			R			R			R
Beryllium	0.28	0.47	J	0.41	0.22		<	0.45	U	0.24	0.45	J	<	1.2	U	0.35	0.22	
Cadmium	2.2	1.2		1.4	0.55		<	1.1	U	<	1.1	U	<	3	U	<	0.56	U
Calcium	168000	46.9		65800	21.9		130000	45.2		105000	45.2		207000	119		58200	22.3	
Chromium	3.1	2.3		5.6	1.1		1.9	2.3	J	2.8	2.3		<	5.9	U	3.9	1.1	
Cobalt	1.8	2.3	J	2.4	1.1		1.9	2.3	J	2.5	2.3		<	5.9	U	2.4	1.1	
Copper	2.5	4.7	J	4.2	2.2		2.7	4.5	J	1.8	4.5	J	<	11.9	U	2.4	2.2	
Iron	3770	23.5		5720	10.9		4120	22.6		3990	22.6		3200	59.4		4760	11.2	
Lead	3.5	0.59		3.5	0.55	J	3.3	0.56	J	4.1	1.1	J	2.6	0.59	J	4.8	1.1	J
Magnesium	2690	46.9		3210	21.9		2030	45.2		3000	45.2		2190	119		2490	22.3	
Manganese	43.3	2.3		107	1.1		51	2.3	J	70.2	2.3	J	34	5.9	J	81.1	1.1	J
Nickel	4.7	9.4	J	6.2	4.4		4.2	9	J	5.6	9	J	<	23.8	U	4.9	4.5	
Potassium	813	1170	J	1400	547		700	1130	J	910	1130	J	<	2970	U	885	558	
Silver	0.51	2.3	J	<	1.1	J	<	2.3	UJ	<	2.3	UJ	<	5.9	UJ	<	1.1	UJ

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U = Nondetected value.

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Source: Woodward-Clyde, 1994

Table 26-1b
Summary of Chemicals Reported for Subsurface Soil Samples
SWMU 94

LOCATOR	CAN094-0944-0004			CAN094-0944-0008			CAN094-0945-0004			CAN094-0945-0008			CAN094-0946-0004			CAN094-0946-0008		
LAB SAMPLE NUMBER	0314040009SA			0314040010SA			0311810019SA			0311810020SA			0311810015SA			0311810016SA		
COLLECT DATE	09/23/93			09/23/93			09/11/93			09/11/93			09/11/93			09/11/93		
	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Sodium	<	1170	U	<	547	U	<	1130	U	<	1130	U	<	2970	U	<	558	U
Vanadium	13.5	2.3		19.4	1.1		10.6	2.3		10.7	2.3		8.7	5.9		17.5	1.1	
Zinc	9.3	4.7		14.4	2.2		9.4	4.5		22	4.5		<	11.9	U	10.8	2.2	
TPH (mg/kg)																		
Total Petroleum Hydrocarbons	<	46.9	U	<	43.8	U	<	45.2	U	<	45.2	U	<	47.5	U	<	44.7	U
Water Quality (percent)																		
Water	15	0.1		8.7	0.1		11	0.1		12	0.1		16	0.1		10	0.1	

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Source: Woodward-Clyde, 1994

Table 26-2a
Comparison of Detected Concentrations with RBCs (1)
SWMU 94

Sample ID	Analyte	Maximum Detected	RBC (2)	Maximum Detected Exceed RBC
CAN094-0941-0002	1,2-Dichloroethane	0.002	0.8	N
CAN094-0946-0004	1,2-Dichloropropane	0.027	30	N
CAN094-0945-0000	2-Methylnaphthalene	3.8	NTF	N
CAN094-0942-0000	Anthracene	0.037	2000	N
CAN094-0945-0008	**Antimony**	**10.6**	**3**	**Y**
CAN094-0942-0004	**Barium**	**1640**	**600**	**Y**
CAN094-0942-0000	**Benzo(a)anthracene**	**0.23**	**0.07**	**Y**
CAN094-0942-0000	**Benzo(a)pyrene**	**0.34**	**0.01**	**Y**
CAN094-0942-0000	**Benzo(b)fluoranthene**	**0.55**	**0.07**	**Y**
CAN094-0941-0000	Benzo(g,h,i)perylene	0.16	NTF	N
CAN094-0942-0004	**Beryllium**	**0.88**	**0.02**	**Y**
CAN094-0941-0000	Butyl benzyl phthalate	0.048	2000	N
CAN094-0944-0002	Cadmium	2.9	8	N
CAN094-0942-0000	Chrysene	0.35	2	N
CAN094-0945-0002	Cobalt	5.4	NTF	N
CAN094-9441-0000	Copper	11.2	300	N
CAN094-0945-0000	Dibenzofuran	0.16	NTF	N
CAN094-0944-0000	Ethylbenzene	0.0027	800	N
CAN094-0942-0000	Fluoranthene	0.44	300	N
CAN094-0945-0000	Fluorene	0.32	300	N
CAN094-0942-0000	**Indeno(1,2,3-cd)pyrene**	**0.14**	**0.04**	**Y**
CAN094-0942-0000	Lead (3)	99.2	500	N
CAN094-0941-0000	Mercury	0.48	2	N
CAN094-0945-0000	Naphthalene	0.43	300	N
CAN094-0945-0002	Nickel	11.3	200	N
CAN094-0943-0000	Pentachlorophenol	0.074	0.6	N
CAN094-0942-0000	Phenanthrene	0.24	NTF	N
CAN094-0941-0000	Pyrene	0.41	200	N
CAN094-0944-0002	Silver	3	20	N
CAN094-0941-0002	Tetrachloroethene	0.025	1	N
CAN094-0946-0002	Thallium	0.14	6	N
CAN094-0941-0002	Toluene	0.049	200	N
CAN094-0945-0000	**Total Petroleum Hydrocarbons (4)**	**3600**	**1000**	**Y**
CAN094-0941-0000	Xylenes (total)	0.0094	20000	N
CAN094-0942-0000	Zinc	84.8	2000	N

NTF = No EPA Established Toxicity Factor
(1) All units in mg/kg
(2) Risk-based concentration
(3) EPA suggests 500-1,000 mg/kg as allowable concentration for residential soils based on EPA's IUBK Lead Model (EPA 1990)
(4) New Mexico recommended soil cleanup level for fuel contaminated soil.
Note: Only metals that exceeded background appear in this table.

Source: Woodward-Clyde, 1994

Table 26-2b
Summary of Human Health Risks
SWMU 94

Receptor/Pathway	Average Exposure			Reasonable Maximum Exposure		
	Cancer Risk	Subchronic H.I.	Chronic H.I.	Cancer Risk	Subchronic H.I.	Chronic H.I.
Occupational Worker (Surface Soil)						
-- Dermal Contact	0.00		3×10^{-6}	0.00		4×10^{-4}
-- Ingestion	2×10^{-9}		9×10^{-6}	6×10^{-7}		2×10^{-3}
-- Inhalation of VOCs	0.00		2×10^{-7}	0.00		3×10^{-6}
-- Inhalation of Particulates	4×10^{-12}		1×10^{-8}	2×10^{-10}		2×10^{-7}
	2×10^{-9}		1×10^{-5}	6×10^{-7}		2×10^{-3}
Construction Worker (Total Soil)						
-- Dermal Contact	4×10^{-14}	1×10^{-6}		5×10^{-13}	2×10^{-5}	
-- Ingestion	5×10^{-10}	4×10^{-4}		5×10^{-9}	4×10^{-3}	
-- Inhalation of VOCs	0.00	2×10^{-7}		0.00	9×10^{-6}	
-- Inhalation of Particulates	3×10^{-13}	5×10^{-7}		1×10^{-12}	2×10^{-6}	
	5×10^{-10}	4×10^{-4}		5×10^{-9}	5×10^{-3}	
Trespasser (Surface Soil)						
-- Dermal Contact	0.00	8×10^{-7}		0.00	2×10^{-4}	
-- Ingestion	3×10^{-10}	2×10^{-6}		4×10^{-8}	3×10^{-4}	
-- Inhalation of VOCs	0.00	5×10^{-8}		0.00	8×10^{-7}	
-- Inhalation of Particulates	8×10^{-13}	4×10^{-9}		1×10^{-11}	7×10^{-8}	
	4×10^{-10}	2×10^{-6}		4×10^{-8}	5×10^{-4}	

Note: Apparent inconsistencies in summation of risks are due to rounding of risk values.

Source: Woodward-Clyde, 1994

Table 26-2c
Risk Characterization Summary
SWMU 94

Chemical	Sample Number CAN094-0941-0000	CAN094-0941-0002	CAN094-0942-0000	CAN094-0942-0002	CAN094-0943-0000	CAN094-0944-0000	CAN094-0945 0000	CAN094-0946-0000	N	Arithmetic Mean (mg/kg)	Robin Benchmark Dietary Threshold (mg/kg)	Risk?
Volatile Organics												
1,2-Dichloroethane	0.0026 U	0.002 J	0.0027 U	0.0028 U	0.003 U	0.003 U	0.003 U	0.003 U	8	0.00	312.5	--
Ethylbenzene	0.0026 U	0.001 J	0.0027 UJ	0.0028 U	0.003 U	0.0027 J	0.003 U	0.003 U	8	0.00	485.5	--
Tetrachloroethene	0.0026 U	0.025 J	0.0027 UJ	0.0028 U	0.003 U	0.003 U	0.003 U	0.003 U	8	0.01	5000	--
Toluene	0.0061 J	0.049 J	0.01 J	0.0028 U	0.0014 J	0.003 U	0.003 U	0.0014 J	8	0.01	12500	--
Xylenes (total)	0.0094	0.004 J	0.0047 J	0.0028 U	0.003 U	0.0032	0.004 J	0.003 U	8	0.00	5000	--
Semivolatile Organics												
Anthracene	0.17 U		0.037 J		0.195 U		0.2 U		4	0.15	5000	--
Benzo(a)anthracene	0.11 J		0.23 J		0.195 U		0.2 U		4	0.18	0.4	--
Benzo(a)pyrene	0.17 J		0.34 J		0.195 U		0.2 U		4	0.23	0.002	Possible
Benzo(b)fluoranthene	0.23 J		0.55		0.195 U		0.2 U		4	0.29	8	--
Benzo(g,h,i)perylene	0.16 J		0.16 J		0.195 U		0.2 UJ		4	0.18	375	--
Butyl benzyl phthalate	0.048 J		0.18 U		0.195 U		0.2 U		4	0.16	470	--
Chrysene	0.18 J		0.35 J		0.195 U		0.2 UJ		4	0.23	12	--
Dibenzofuran	0.17 U		0.18 U		0.195 U		0.16 J		4	0.18	3.3	--
Fluoranthene	0.2 J		0.44		0.195 U		0.2 U		4	0.26	625	--
Fluorene	0.17 U		0.18 U		0.195 U		0.32 J		4	0.22	625	--
Indeno(1,2,3-cd)pyrene	0.11 J		0.14 J		0.195 U		0.2 UJ		4	0.16	14.4	--
2-Methylnaphthalene	0.17 U		0.18 U		0.195 U		3.8		4	1.09	815	--
Naphthalene	0.17 U		0.18 U		0.195 U		0.43		4	0.37	267.5	--
Pentachlorophenol	0.8 U		0.9 U		0.074 J		0.95 U		3	0.68	190	--
Phenanthrene	0.15 J		0.24 J		0.195 U		0.24 J		4	0.21	150	--
Pyrene	0.41 J		0.36		0.195 U		0.2 U		4	0.29	375	--
Metals												
Cadmium	1.8	2	0.91	0.28 U	0.3 U	0.8	0.3 U	0.3 U	8	3.87**	10.5	--
Lead	61.5	14.6	99.2	5.6	6.7	15.2	12.5 J	7.5 J	8	27.85	87.5	--
Mercury	0.48	0.26	0.3	0.12	0.06 U	0.06 U	0.06 U	0.06 U	8	0.18	0.3	--
Selenium	0.26 U	0.6 J	0.28 U	0.6 J	0.3 U	0.6 J	0.34 J	0.27 J	8	4.92**	5	--
Silver	0.54 J	1.1 U	0.6 U	0.6 U	0.6 U	0.52 J	0.6 UJ	0.6 UJ	8	0.65	41	--
Thallium	0.26 U	0.6 J	0.28 U	0.6 U	0.3 U	0.3 U	0.6 UJ	0.6 UJ	8	0.44	2.6	--
Zinc	56.3 J	21.5	84.8	18.9	19	23.6	27.2	17.3	8	33.58	875	--
TPH	862	3250	247	22.6 U	24 U	221	3600	251	8	1059.70	241	Possible

* Between 0 and 2 feet deep
** Mean soil concentration multiplied by BAF of 4.6 for Cd and 12 for Se.
J Estimated value below limit or estimated based on data quality criteria.
U Non-detect, value shown i s one-half the reporting limit

Source: Woodward-Clyde, 1994

Table 26-3a
Summary of Soil Sample Results
SWMU 94

SUMMARY OF SWMU 94 SOIL SAMPLE RESULTS										
No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
1	6	Sandtrap	ND	<20	<10	ND	ND	NT	NT	NT
2	6	Sandtrap	ND	<20	<10	ND	ND	NT	NT	NT
3	6	Sandtrap	ND	<20	ND	NT	NT	NT	NT	NT
4	6	Sandtrap	ND	ND	ND	NT	NT	NT	NT	NT
5	6.5	Sandtrap	ND	ND	ND	NT	NT	NT	NT	NT
6	6.5	Sandtrap	ND	ND	ND	NT	NT	NT	NT	NT
7	6.5	Sandtrap	NT	NT	NT	NT	ND	ND[1]	ND	As, Ba[3]
8	n/a	excavated materials	NT	NT	NT	ND	NT	NT	NT	NT
9	8.5	OWS	ND	ND	<10	NT	NT	NT	NT	NT
10	8.5	OWS	ND	<20	<10	ND	ND	NT	NT	NT
11	8.5	OWS	ND	ND	<10	NT	NT	NT	NT	NT
12	8.5	OWS	ND	<20	ND	NT	NT	NT	NT	NT

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Source: U.S. Army Corps of Engineers, 1999

Table 26-3a
Summary of Soil Sample Results
SWMU 94

No.	Depth (ft.)	Location	PID (units) ppm	4030 TPH ppm	4030 BTEX ppm	SWA846 8020A BTEX mg/Kg	SWA846 M8015 DRO mg/Kg	SWA846 8260 mg/Kg	SWA846 8270B SOX mg/Kg	Total Metals > bkgd mg/Kg
13	9	OWS	ND	<20	ND	NT	NT	NT	NT	NT
14	9	OWS	ND	ND	<10	NT	NT	NT	NT	NT
15	9	OWS	NT	NT	NT	NT	ND	ND	ND	As[4]
16	n/a	excavated soils	NT	NT	NT	ND	ND	NT	NT	NT
17	6	OWS	NT	NT	NT	NT	NT	ND	ND	< bkgd
18	6	Sandtrap	ND	<20	<10	NT	NT	NT	NT	NT
19	6	Sandtrap	ND	ND	<10	ND	ND	NT	NT	NT
20	6	Sandtrap	ND	ND	<10	NT	NT	NT	NT	NT
21	6	Sandtrap	ND	ND	<10	NT	NT	NT	NT	NT
22	6.5	Sandtrap	ND	ND	<10	NT	NT	NT	NT	NT
23	6.5	Sandtrap	ND	ND	<10	ND	ND	NT	NT	NT
24	6.5	Sandtrap	NT	NT	NT	NT	ND	ND	ND	< bkgd
25	n/a	excavated materials	NT	NT	NT	ND	NT	NT	NT	NT
26	n/a	excavated materials	NT	NT	NT	0.58[2]	2300	NT	NT	NT

1 Only contaminant identified: Methylene Chloride at 0.06 mg/Kg.
2 Ethylbenzene at 0.070 mg/Kg, O-Xylene at 0.51 mg/Kg.
3 Arsenic at 6.4 mg/Kg, Barium at 812 mg/Kg.
4 Arsenic at 5.6 mg/Kg.
ND indicates non-detect, or below detection limit
NT indicates not tested
* Upper threshold limit of background concentration

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Source: U.S. Army Corps of Engineers, 1999

Table 26-3b
Maximum Soil Sample Concentration of Metals
SWMU 94

SWMU 94 Maximum Soil Sample Concentration of Metals						
Sample No.	Total Metals mg/Kg		TLCP Metals mg/L	Background Conc. Region VI / Cannon AFB [1] Mg/Kg		Region IV Residential RBSL mg/Kg
7	Arsenic	6.4	< 0.40	1.1-16.7	3.6	0.32 C
	Barium	812	1.6	430	805	5300 N
	Cadmium	0.29	< 0.0050	0.01-1.0	1.3	38 N
	Chromium	9.2	NT	38	13.3	31 C
	Nickel	6.9	NT	16	11.4	1500 N
24	Lead	4.4	NT	10-18	7.1	400 N

N - noncarcinogenic
C - carcinogenic
NT - not tested

[1]CAFB Background Investigation, 1997

Source: U.S. Army Corps of Engineers, 1999

Table 27-1
Results of Water Samples
SWMU 113

Parameter	Well A*	Well B	Well C	Well D
Ag	ND	ND	ND	ND
As (0.1) WQCC	0.0060	ND	0.0004	0.0005
Ba (1.0)	0.074	0.320	0.079	0.150
Ca	37.0	55.0	44.0	45.0
Cd (0.01)	ND	0.003	0.002	ND
Cl	53.0	50.0	50.0	51.0
Cr (0.05)	0.001	0.002	ND	0.004
Cu	ND	ND	ND	0.002
Fe	0.020	0.34	0.020	0.047
F	2.6	2.7	2.6	2.4
Hg (0.002)	0.0004	0.0006	0.0004	0.0006
K	3.7	4.7	3.7	4.1
Mg	37.0	38.0	40.0	36.0
Mn	0.021	0.760	0.330	0.520
Na	60.0	62.0	57.0	53.0
Ni	0.032	0.035	0.035	0.030
NO_3	0.81	0.81	0.82	0.88
Pb (0.05)	ND	ND	ND	ND
Phenol (0.005)	ND	0.041	ND	ND
Se (0.05)	ND	ND	ND	ND
SO_4	120.0	130.0	120.0	110.0
TDS	490.0	440.0	450.0	430.0
TOC	ND	2.0	1.0	ND
TOX	ND	ND	ND	ND
TPO_4	0.06	0.05	0.04	0.05
Zn	0.015	0.010	0.010	ND
601**	2.1	ND	ND	ND
602***	ND	ND	ND	ND
Cond.	740/750/750/750*	810	740	720
pH	7.6/7.5/7.4/7.4*	7.6	7.2	8.2

(all units mg/L (equivalent to ug/ml default values in Appendix A) except pH, which is expressed in pH units, and conductivity (Cond.), which is in umhos, and 601/602 results which are reported in ug/L)

*Quadruplicate analyses for up-gradient well only
**601 = purgeable halocarbons (Trichlorofluoromethane)
***602 = purgeable aromatics
ND = not detected, detection limits and analytical techniques are listed in Appendix A.

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Source: Radian, 1986

Table 27-2
Dissolved Metal Concentrations[1] in Groundwater Samples
SWMU 113

Element	Upgradient	Downgradient				MCL[2]
	Well 113A	Well 113B	Well 113C	Well 113D	Well 113I	
Antimony	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.01/0.005[3]
Arsenic	0.005 U	0.005 U	0.005 U	0.0039 J	0.0033 J	0.051
Barium	0.029 J	0.026 J	0.022 J	0.029 J	0.03 J	1.0
Beryllium	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.01[3]
Cadmium	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005[3]
Chromium	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01
Cobalt	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	*
Copper	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	1.0[4]
Lead	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.05
Mercury	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.002
Nickel	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	1.0[3]
Selenium	0.0049 J	0.01 UJ	0.01 UJ	0.0047 UJ	0.0047 UJ	0.05
Silver	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	1.0[4]
Thallium	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.01 UJ	0.022/0.001[3]
Tin	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	*
Vanadium	0.031	0.017	0.026	0.036	0.027	*
Zinc	0.0049 J	0.02 U	0.02 U	0.02 U	0.0059 U	5.0

MCL = Maximum contaminant level
UJ = Estimated as non-detect at the CRQL
J = Estimated value
U = Not detected

[1] All concentrations are in milligrams per liter (mg/L)
[2] Primary MCL in effect as of July 30, 1992
[3] Proposed primary MCL
[4] Secondary MCL in effect as of July 30, 1992
* No primary or secondary MCL or proposed MCL as of March 1992

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Source: Woodward-Clyde, 1992

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-01

Chemical	Sample Interval (ft bgs) 0-.5			28-30			34-36			45-47			55-56.9			63-64.8			Background Range[1]
	Results	ual	R.L.	Results	Qual	R.L.	Results	Qual	R.L.	Results	Qual	R.L.	Results	Qual.	R.L.	Results	Qual.	R.L.	
Aluminum	4430		10.9	2240		21.8	3070		22.1	3220		10.8	2930		10.5	3200		10.8	596 - 10,796
Antimony		R			R			R			R			R			R		0 - 29.6
Arsenic	1.6		0.54	0.99		0.55	1.4		0.55	0.82		0.54	0.44	J	0.53	0.65		0.54	0 - 10.5
Barium	236	J	1.1	74	J	2.2	98.7	J	2.2	**5050**	UJ	1.1	83.2	J	1.1	119	J	1.1	0 - 548
Beryllium	0.34		0.22		U	0.44		U	0.44	0.15	J	0.22	0.12	J	0.21	0.13	J	0.22	0 - 0.6
Cadmium		U	0.54		UJ	1.1		UJ	1.1		U	0.54		U	0.53		U	0.54	0 - 2.1
Calcium	88300		21.7	**167000**		43.6	150000		44.2	71300		21.5	30900		21.1	75000		21.6	0 - 166,119
Chromium	3.3		1.1	2.6		2.2	1.8	J	2.2	2.2		1.1	3.7		1.1	5		1.1	0.8 - 12.0
Cobalt	2.1		1.1		U	2.2		U	2.2	2.7	J	1.1		UJ	1.1	1.3	J	1.1	0 - 4.0
Copper	3.8		2.2	2.2	J	4.4	2.4	J	4.4	1.1	J	2.2	1.5	J	2.1	**63.6**		2.2	0 - 10.1
Iron	3780		10.9	1410		21.8	1830		22.1	1780		10.8	1840		10.5	2150		10.8	0 - 8,564
Lead	6.1		1.1	2		0.55	2.2		0.55	1.6		0.54	1.3		0.53	1.8		0.54	0 - 18.4
Magnesium	2320		21.7	2300		43.6	4150		44.2	4890		21.5	4550		21.1	6280		21.6	0 - 9,912
Manganese	89.6	J	1.1	21.5	J	2.2	29.3	J	2.2	81.3	J	1.1	27.7	J	1.1	37.7	J	1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	5.2		4.3	2.9	J	8.7	4.9	J	8.8	3.3	J	4.3	3.5	J	4.2	3.7	J	4.3	0 - 9.7
Potassium	1160		543	652	J	1090	686	J	1110	779		538	644		526	580		541	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	1.1		U	2.2		U	2.2		U	1.1		U	1.1	0.41	J	1.1	0 - 1.8
Sodium		U	543		U	1090		U	1110		U	538		U	526		U	541	0 - 834
Thallium	0.14	J	1.1	0.15	J	1.1	0.15	J	1.1	0.23	J	1.1		U	0.53	0.15	J	1.1	0 - 6.2
Tin	NA			NA			NA			NA			NA			10.7	J	10.8	NA
Vanadium	13.4		1.1	7.9		2.2	18.3		2.2	5.7		1.1	5.7		1.1	10.1		1.1	1.7 - 25.0
Zinc	11.2		2.2	6.6		4.4	7.4		4.4	6		2.2	6		2.1	10.1		2.2	0 - 20.7
Acenaphthene		U	360		U	360		U	370		U	350		U	350	39	J	360	
bis(2-		U	360		U	360		U	370		U	350		U	350	57	J	360	
Butyl benzyl phthalate		U	360		U	360	38	J	370		U	350		U	350		U	360	
Fluoranthene		U	360		U	360		U	370		U	350		U	350	67	J	360	
Fluorene		U	360		U	360		U	370		U	350		U	350	41	J	360	
Phenanthrene		U	360		U	360		U	370		U	350		U	350	130	J	360	
Phenol		U	360	360		360		U	370		U	350		U	350		U	360	
Pyrene		U	360		U	360		U	370		U	350		U	350	88	J	360	
Acetone		U	11	5.9	J	11		U	11		U	11		U	11	14		11	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-02

Chemical	Sample Interval (ft bgs) 14-16			20-22			30-31.5			40-41.8			49-51			Background Range
	Results	Qual.	R.L.	Results	Qual.	R.L.	Results	Qual.	R.L.	Results	Qual.	R.L.	Results	Qual.	R.L.	
Aluminum	4630		22.9	11100		11.2	5560		22.2	4480		10.8	2480		10.5	596 - 10,796
Antimony		R			R			R			R			R		0 - 29.6
Arsenic	1.4		0.57	1.1		0.56	1		0.55	0.88		0.54	0.48	J	1	0 - 10.5
Barium	180	J	2.3	106	J	1.1	88.2	J	2.2	68.9	J	1.1	22.4	J	1	0 - 548
Beryllium	0.33	J	0.46	0.41		0.22		U	0.44	0.18	J	0.22		U	0.21	0 - 0.6
Cadmium		UJ	1.1		U	0.56		UJ	1.1		U	0.54		U	0.52	0 - 2.1
Calcium	172000		45.8	65200		22.3	121000		44.3	50600		21.6	22100		21	0 - 166,119
Chromium	2.8		2.3	7.2		1.1	3.9		2.2	4.9		1.1	1.5		1	0.8 - 12.0
Cobalt		U	2.3	2.3	J	1.1		U	2.2	1.3	J	1.1		UJ	1	0 - 4.0
Copper	3.3	J	4.6	3.7		2.2	2.1	J	4.4	1.8	J	2.2	0.98	J	2.1	0 - 10.1
Iron	3530		22.9	7060		11.2	3430		22.2	2950		10.8	1600		10.5	0 - 8,564
Lead	4.3		0.57	3.5		0.56	1.9		0.55	1.9		0.54	1.5		0.52	0 - 18.4
Magnesium	4970		45.8	4150		22.3	4480		44.3	3980		21.6	2950		21	0 - 9,912
Manganese	46.3	J	2.3	53.8	J	1.1	35.8	J	2.2	34.8	J	1.1	28.8	J	1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.1	0 - 0.2
Nickel	6	J	9.2	8.5		4.5	6.4	J	8.9	4.8		4.3	2.3	J	4.2	0 - 9.7
Potassium	1530		1140	2550		558	977	J	1110	912		539	689		524	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1	0 - 36.8
Silver		U	2.3		U	1.1		U	2.2		U	1.1		U	1	0 - 1.8
Sodium		U	1140		U	558		U	1110		U	539		U	524	0 - 834
Thallium	0.19	J	1.1	0.17	J	1.1	0.12	J	1.1	0.16	J	1.1	0.18	J	0.52	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.5	NA
Vanadium	14.3		2.3	13.9		1.1	12		2.2	14.8		1.1	4.8		1	1.7 - 25.0
Zinc	10.4		4.6	18		2.2	10.8		4.4	8.9		2.2	5.6		2.1	0 - 20.7
Acetone		U	11	5.1	J	11		U	11		U	11		U	10	

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-03

Chemical	Sample Interval (ft bgs)															Background Range[1]
	23-25			28-30			40-42			50-51.4			58-59.9			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	6910		52.5	5430		21.2	3970		10.7	2040		10.3	2340		10.4	596 - 10,796
Antimony		U	31.5		U	12.7		U	6.4		U	6.2		U	6.2	0 - 29.6
Arsenic	1.4		0.52	1.1		0.53	0.9		0.53	0.58		0.52	0.27	J	0.52	0 - 10.5
Barium	167		5.2	104		2.1	45.4		1.1	130		1	25.3		1	0 - 548
Beryllium		U	1		U	0.42		U	0.21		U	0.21		U	0.21	0 - 0.6
Cadmium		U	2.6		U	1.1		U	0.53		U	0.52		U	0.52	0 - 2.1
Calcium	**222000**	J	105	**177000**	J	42.5	63200	J	21.4	68900	J	20.7	31300	J	20.8	0 - 166,119
Chromium	5.5		5.2	2.6		2.1	3.1		1.1	1.7		1	1.8		1	0.8 - 12.0
Cobalt		U	5.2		U	2.1	1.1		1.1	0.73	J	1	0.7	J	1	0 - 4.0
Copper	3.9	J	10.5	2.2	J	4.2	1.1	J	2.1	0.84	J	2.1	0.56	J	2.1	0 - 10.1
Iron	4890		52.5	3330		21.2	2360		10.7	1190		10.3	1430		10.4	0 - 8,564
Lead	2.8		0.52	2.4		0.53	2		0.53	1.3		0.52	1.4		0.52	0 - 18.4
Magnesium	5210	J	105	3860	J	42.5	4200	J	21.4	4050	J	20.7	4120	J	20.8	0 - 9,912
Manganese	52.7		5.2	37.4		2.1	25.1		1.1	21.6		1	25.5		1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.11		U	0.1		U	0.1	0 - 0.2
Nickel	**22.4**	J	21	5.2	J	8.5	3.9	J	4.3	3.5	J	4.1	2.7	J	4.2	0 - 9.7
Potassium	1460	J	2620	1160		1060	753		534	526		517	518	J	520	0 - 2,531
Selenium		UJ	1		UJ	1.1		UJ	2.1		UJ	1		UJ	1	0 - 36.8
Silver		UJ	5.2		UJ	2.1		UJ	1.1		UJ	1		UJ	1	0 - 1.8
Sodium		U	2620		U	1060		U	534		U	517		U	520	0 - 834
Thallium	0.15	J	1		UJ	1.1	0.16	J	1.1		UJ	1		UJ	0.52	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.4	NA
Vanadium	11.9		5.2	14.7		2.1	16.3		1.1	5		1	5.7		1	1.7 - 25.0
Zinc	13.9		10.5	9.9		4.2	6.3		2.1	3.6		2.1	4.2		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	350		U	350		U	350		U	340	160	J	340	
Acetone		U	10		U	11	4.7	J	11		U	10		U	10	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-04

Chemical	Sample Interval (ft bgs) 0-.5			20-22			25-27			35-36.3			45-47			55-57			Backgroun Range
	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	
Aluminum	10100		10.7	4960		21.7	4680		21.6	5080		22.9	4460		10.6	3980		10.7	596 - 10,79
Antimony		R		13	J	13	11.8	J	13		UJ	13.7		UJ	6.4		UJ	6.4	0 - 29.6
Arsenic	2.9		1.1	2.1		0.54	1.8		0.54	1.5		0.57	0.78		0.53	0.59		0.54	0 - 10.5
Barium	146	J	1.1	92.4		2.2	134		2.2	258		2.3	175		1.1	48.2		1.1	0 - 548
Beryllium	0.7		0.21	0.27	J	0.43	0.23	J	0.43		U	0.46	0.18	J	0.21	0.17	J	0.21	0 - 0.6
Cadmium		U	0.53		U	1.1		U	1.1		U	1.1		U	0.53		U	0.54	0 - 2.1
Calcium	30200		21.4	129000	J	43.4	135000	J	43.3	2E+05	J	45.8	50100	J	21.3	54700		21.5	0 - 166,119
Chromium	9.8		1.1	6.2		2.2	3.8		2.2	4.9		2.3	2.7		1.1	3		1.1	0.8 - 12.0
Cobalt	5		1.1		U	2.2		U	2.2		U	2.3	1.3		1.1		U	1.1	0 - 4.0
Copper	10		2.1	2.8	J	4.3	2.2	J	4.3	3.4	J	4.6	1.7	J	2.1	1.7	J	2.1	0 - 10.1
Iron	9610		10.7	4340		21.7	3580		21.6	2830		22.9	2930		10.6	2520		10.7	0 - 8,564
Lead	10		1.1	3	J	0.54	2.9	J	0.54	2.2	J	0.57	2	J	0.53	1.9		0.54	0 - 18.4
Magnesium	2870		21.4	3060	J	43.4	3380	J	43.3	13800	J	45.8	5580	J	21.3	7430		21.5	0 - 9,912
Manganese	275	J	1.1	34		2.2	45.3		2.2	32.5		2.3	33.5		1.1	29		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	9.3		4.3	104		8.7	7.2	J	8.7	7.8	J	9.2	2.6	J	4.3	3.5	J	4.3	0 - 9.7
Potassium	2970		535	1330		1080	970	J	1080	770	J	1140	1030		531	744		537	0 - 2,531
Selenium		UJ	5.3		UJ	2.2		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	1.1		U	2.2		U	2.2		U	2.3		U	1.1		U	1.1	0 - 1.8
Sodium		U	535		U	1080	244	J	1080		U	1140		U	531		U	537	0 - 834
Thallium		U	0.53	0.12	J	1.1		U	2.2		U	5.7		U	1.1	0.12	J	1.1	0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.7	NA
Vanadium	24		1.1	16.4		2.2	16		2.2	17		2.3	6.6		1.1	9.3		1.1	1.7 - 25.0
Zinc	28.2		2.1	9.5		4.3	9.3		4.3	7.7		4.6	7.6		2.1	6.9		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	350		U	360	86	J	360	52	J	380		U	350		U	350	
Diethyl phthalate	45	J	350		U	360		U	360		U	380		U	350		U	350	
Acetone	3.7	J	11	6.3	J	11	6.2	J	11		U	11	5.6	J	11	8.3	J	11	
Methylene chloride		U	5.3		U	5.4	1.2	J	5.4	3.3	J	5.7	1.1	J	5.3		U	5.4	
Toluene	1.3	J	5.3		U	5.4		U	5.4		U	5.7		U	5.3		U	5.4	

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-05

Chemical	Sample Interval (ft bgs)															Background Range
	24.5-26.5			29.5-31.5			39.5-40.3			49.5-51			59.5-60.8			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual.	R.L.	
Aluminum	3400		21.8	3280		21.8	5640		21.6	3530		10.4	3420		10.4	596 - 10,796
Antimony		UJ	13.1		UJ	13.1	11.2	J	12.9		UJ	6.2		UJ	6.2	0 - 29.6
Arsenic	1.6		0.55	1		0.55	1.2		0.54	0.59		0.52	0.67		0.52	0 - 10.5
Barium	194		2.2	501		2.2	520		2.2	47.5		1	103		1	0 - 548
Beryllium	0.22	J	0.44		U	0.44		U	0.43	0.13	J	0.21	0.14	J	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	1.1		U	0.52		U	0.52	0 - 2.1
Calcium	146000	J	43.6	204000	J	43.6	144000	J	43.1	42300	J	20.7	51700		20.8	0 - 166,119
Chromium	9.9		2.2	4.8		2.2	29.4		2.2	5.1		1	10.7		1	0.8 - 12.0
Cobalt	1.9	J	2.2	1.9	J	2.2	1.8	J	2.2	1.3		1	1.4		1	0 - 4.0
Copper	5.3		4.4	2.7	J	4.4	2.8	J	4.3	1.9	J	2.1	3		2.1	0 - 10.1
Iron	4800		21.8	1930	J	21.8	3650		21.6	2630		10.4	2870		10.4	0 - 8,564
Lead	3.5	J	0.55	1.4	J	0.55	1.8	J	0.54	1.9	J	0.52	2.5		0.52	0 - 18.4
Magnesium	3170	J	43.6	5930	J	43.6	8000	J	43.1	4240	J	20.7	5050		20.8	0 - 9,912
Manganese	57		2.2	18.6		2.2	40.9		2.2	35.4		1	42.9		1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.1	0 - 0.2
Nickel	392		8.7	7.2	J	8.7	5.9	J	8.6	4.1		4.1	4.7		4.2	0 - 9.7
Potassium	824	J	1090	428	J	1090	1030	J	1080	868		518	705		520	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	2.2		UJ	1		UJ	2.1	0 - 36.8
Silver		U	2.2		U	2.2		U	2.2		U	1	1.1		1	0 - 1.8
Sodium		U	1090		U	1090		U	1080		U	518		U	520	0 - 834
Thallium		U	1.1		U	1.1		U	1.1		U	1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.4	NA
Vanadium	13		2.2	16.5		2.2	10.9		2.2	6.6		1	9.2		1	1.7 - 25.0
Zinc	46.7		4.4	6.5		4.4	9.4		4.3	6.7		2.1	7.4		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate	260	J	360	76	J	360	78	J	360		U	340		U	340	
Butyl benzyl phthalate	170	J	360		U	360	36	J	360		U	340		U	340	
Di-n-octyl phthalate	160	J	360		U	360		U	360		U	340		U	340	
2-Butanone (MEK)		U	11	21		11		U	11		U	10		U	10	
2-Hexanone		U	11	1.9	J	11		U	11		U	10		U	10	
Acetone	12		11	98		11	34		11	8.1	J	10	18		10	
Acetonitrile													16	J	210	
Total Petroleum Hydrocarbons	79.1		43.6		U	43.6		U	43.1		U	41.5		U	41.6	

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-06

Chemical	Sample Interval (ft bgs) 2-21.9 Result	Qual.	R.L.	25-27 Result	Qual.	R.L.	35-37 Result	Qual	R.L.	45-47 Result	Qual	R.L.	55-57.5 Result	Qual.	R.L.	Background Range[1]
Aluminum	5310	J	56.6	6210	J	10.9	5190	J	10.8	3640	J	10.5	2310	J	10.5	596 - 10,796
Antimony		UJ	33.9		UJ	6.5		UJ	638		UJ	6.3		UJ	6.3	0 - 29.6
Arsenic	2.8		0.57	2.4		0.54	2.2		0.54	1.8		0.53	0.82		0.53	0 - 10.5
Barium	177	J	5.7	141	J	1.1	15.8	J	1.1	58.4	J	1.1	58.8	J	1.1	0 - 548
Beryllium		U	1.1	0.37		0.22	0.25		0.22	0.14	J	0.21	0.12	J	0.21	0 - 0.6
Cadmium		U	2.8		U	0.54		U	0.54		U	0.53		U	0.53	0 - 2.1
Calcium	**251000**	J	113	33500	J	21.7	37100	J	21.5	53900	J	21.1	47900	J	21	0 - 166,119
Chromium		U	5.7	4.7		1.1	3.6		1.1	6.4		1.1	11.4		1.1	0.8 - 12.0
Cobalt		U	5.7	1.5		1.1	1.1		1.1	0.88	J	1.1		U	1.1	0 - 4.0
Copper	**27.5**		11.3	4.5		2.2	2.3		2.2	2.5		2.1	2.4		2.1	0 - 10.1
Iron	4420	J	56.6	4650	J	10.9	3270	J	10.8	2420	J	10.5	1680	J	10.5	0 - 8,564
Lead	4.8		1.1	3.7		0.54	2.7		0.54	1.8		0.53	1.5		0.53	0 - 18.4
Magnesium	5940	J	113	3070	J	21.7	2710	J	21.5	2540	J	21.1	2520	J	21	0 - 9,912
Manganese	29.5	J	5.7	8	J	1.1	42.2	J	1.1	30.8	J	1.1	26.7	J	1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	**10.7**	UJ	22.6	6.3		4.3	4.1	J	4.3	4	J	4.2	3.2	J	4.2	0 - 9.7
Potassium	1860	J	2830	1830		543	1210		538	799		526	564		526	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	5.7	0.35	J	1.1		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium		U	2830		U	543		U	538		U	526		U	526	0 - 834
Thallium	0.17	J	1.1	0.17	J	0.54	0.19	J	0.54	0.12	J	0.53	0.23	J	0.53.	0 - 6.2
Tin														U	10.5	NA
Vanadium	**25.5**		5.7	17.8		1.1	13.9		1.1	10		1.1	7.9		1.1	1.7 - 25.0
Zinc	16.4		11.3	13.9		2.2	9		2.2	7.4		2.1	5.4		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	370		U	360	57	J	350		U	350		U	350	
Di-n-octyl phthalate		U	370		U	360	330	J	350		U	350		U	350	
Acetone		U	11	5.1	J	11		U	11		U	11	7.9	J	11	
Carbon disulfide		U	5.7	2.9	J	5.4		U	5.4		U	5.3		U	5.3	
Methylene chloride		U	5.7		U	5.4	2.1	J	5.4		U	5.3		U	5.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-07

Chemical	Sample Interval (ft bgs) 0-.5 Result	Qual	R.L.	24-26 Result	ual	R.L.	29-30.8 Result	ual	R.L.	39-41 Result	ual	R.L.	49-51 Result	ual	R.L.	59-60.9 Result	ual	R.L.	Backgro Range
Aluminum	7240		10.3	5110		10.8	4610		22	5440		10.9	3010		10.5	2820		10.6	596 - 10,
Antimony		R			U	6.5		U	13.2		U	6.5		U	6.3		UJ	6.3	0 - 29.
Arsenic	2.4		0.51	1.6		0.54	0.41	J	0.55	1.4		0.54	1		0.53	0.49	J	0.53	0 - 10.
Barium	138	J	1	42.1	J	1.1	134	J	2.2	75.2	J	1.1	75.1	J	1.1	82.9		1.1	0 - 54
Beryllium	0.44		0.21	0.33		0.22	0.24	J	0.44	0.25		0.22	0.16	J	0.21		U	0.21	0 - 0.6
Cadmium		U	0.51		U	0.54		U	1.1		U	0.54		U	0.53		U	0.53	0 - 2.1
Calcium	73200		20.6	22900		21.7	158000		44	83800		21.8	59900		21.1	46000		21.2	0 - 166,
Chromium	6.4		1	6		1.1	4.7		2.2	7.8		1.1	5.7		1.1	11.7		1.1	0.8 - 12
Cobalt	3.5		1	2.3		1.1		U	2.2	1.9		1.1		U	1.1	1.2		1.1	0 - 4.0
Copper	5.7		2.1	3.7		2.2	3.2	J	4.4	2.6		2.2	2	J	2.1	2.1		2.1	0 - 10.
Iron	6600		10.3	4610		10.8	3360		22	4190		10.9	2630		10.5	2680		10.6	0 - 8,56
Lead	6.9		1	3.9		0.54	3.3		0.55	3		0.54	2.3		0.53	1.7		0.53	0 - 18.
Magnesium	2070		20.6	2240		21.7	3770		44	4430		21.8	2500		21.1	3510		21.2	0 - 9,91
Manganese	113	J	1	82.3	J	1.1	37.5	J	2.2	53.4	J	1.1	27.6	J	1.1	43.3		1.1	0 - 151
Mercury		U	0.1		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	7.5		4.1	**46.2**		4.3	6.7	J	8.8	4.9		4.4	3	J	4.2	2.2	J	4.2	0 - 9.7
Potassium	1550		515	1420		542	830	J	1100	980		544	799		527	630		529	0 - 2,53
Selenium		UJ	1		UJ	0.54		UJ	1.1		UJ	0.54		UJ	0.53		UJ	0.53	0 - 36.
Silver		U	1		U	1.1		U	2.2		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium		U	515	135	J	542		U	1100		U	544		U	527		U	529	0 - 834
Thallium		U	2.1		UJ	1.1	0.22	J	2.2		UJ	2.2		UJ	2.1	0.11	J	1.1	0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	16		1	12.1		1.1	9.4		2.2	18.8		1.1	6.8		1.1	8.2		1.1	1.7 - 25
Zinc	17.7		2.1	**23.4**		2.2	9.1		4.4	9.6		2.2	5.9		2.1	5.9		2.1	0 - 20.
bis(2-Ethylhexyl)phthalate		U	340	500		360	43	J	360	590		360	430		350		U	350	
Acetone		U	10	4.3	J	11	6.3	J	11		U	11	3.9	J	11		U	11	
Acetonitrile																33	J	210	
Methylene chloride		U	5.1		U	5.4		U	5.5		U	5.4		U	5.3	2.2	J	5.3	
Toluene	3.8	J	5.1		U	5.4		U	5.5		U	5.4		U	5.3		U	5.3	
Sulfide, Total																0.57		0.53	
Total Petroleum Hydrocarbons	66.5		41.2		U	43.3		U	44		U	43.5		U	42.2		U	42.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-08

Chemical	Sample Interval (ft bgs) 20-22			25-27			35-35.9			45-47			55-57			Background Range
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	5070	J	10.9	4630	J	11.7	4520	J	11.1	4250	J	10.8	3070		10.7	596 - 10,796
Antimony	5.8	J	6.5		UJ	7		UJ	6.6		UJ	6.5		UJ	6.4	0 - 29.6
Arsenic	3.7		0.54	3.3		0.59	1.2		0.55	0.83		0.54	0.66		0.53	0 - 10.5
Barium	274	J	1.1	96.3	J	1.2	147	J	1.1	285	J	1.1	38.2		1.1	0 - 548
Beryllium	0.37		0.22	0.28		0.23	0.16	J	0.22	0.13	J	0.22	0.15	J	0.21	0 - 0.6
Cadmium		U	0.54		U	0.59		U	0.55		U	0.54		U	0.53	0 - 2.1
Calcium	71800		21.8	77700		23.4	105000		22.1	43100		21.6	46500		21.3	0 - 166,119
Chromium	5.8		1.1	5.2		1.2	3.6		1.1	4.1		1.1	2.6		1.1	0.8 - 12.0
Cobalt	2.4		1.1	2.2		1.2	1.5		1.1	1.3		1.1	1.5		1.1	0 - 4.0
Copper	3.8		2.2	2.8		2.3	1.8	J	2.2	2.3		2.2	1.3	J	2.1	0 - 10.1
Iron	5050	J	10.9	4070	J	11.7	2770	J	11.1	2530	J	10.8	1940		10.7	0 - 8,564
Lead	4.5		0.54	3.5		0.59	2		1.1	1.6		1.1	2		0.53	0 - 18.4
Magnesium	2810	J	21.8	2710		23.4	7570		22.1	7230		21.6	5510		21.3	0 - 9,912
Manganese	82.3		1.1	54	J	1.2	29.8	J	1.1	30.6	J	1.1	38.2		1.1	0 - 151.8
Mercury		U	0.11		U	0.12		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	7.4		4.4	7.1		4.7	4.3	J	4.4	5.4		4.3	3.5	J	4.3	0 - 9.7
Potassium	1510		545	1310		586	759		553	975		539	680		533	0 - 2,531
Selenium		UJ	1.1		UJ	1.2		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		UJ	1.1		UJ	1.2		UJ	1.1		UJ	1.1		U	1.1	0 - 1.8
Sodium	218	J	545	159	J	586		U	553		U	539		U	533	0 - 834
Thallium	0.22	J	2.2		UJ	2.3		UJ	2.2		UJ	2.2		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.7	NA
Vanadium	33.3		1.1	32.2		1.2	21.4		1.1	8		1.1	6		1.1	1.7 - 25.0
Zinc	10.8		2.2	9		2.3	7.2		2.2	6.6		2.2	5		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate	400		360	410		390	420		370	440		360		U	350	
Acetone	8.5	J	11	8.2	J	12		U	11		U	11	7.4	J	11	
Acetonitrile													67	J	210	

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* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-09

Chemical	Sample Interval (ft bgs) 18-20			25-26.5			35-36.9			45-47			53-54.3			Background Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	4450		21.8	3490		21.5	3440		21.5	2250		10.5	3620		10.7	596 - 10,796
Antimony		U	13.1		U	12.9		U	12.9		U	6.3		U	6.4	0 - 29.6
Arsenic	1.9		0.55	1.4		0.54	1.5		0.54	0.44	J	0.53	0.57		0.53	0 - 10.5
Barium	128		2.2	87.8		2.1	121		2.2	240		1.1	48.2		1.1	0 - 548
Beryllium	0.32	J	0.44		U	0.43		U	0.43		U	0.21		U	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	1.1		U	0.53		U	0.53	0 - 2.1
Calcium	152000	J	43.7	98400	J	42.9	114000	J	43.1	49000	J	21	96200	J	21.3	0 - 166,119
Chromium	3.8		2.2	3.1		2.1	2.9		2.2	1.7		1.1	6.1		1.1	0.8 - 12.0
Cobalt		U	2.2		U	2.1		U	2.2	0.84	J	1.1	1.5		1.1	0 - 4.0
Copper	2.4	J	4.4	2.2	J	4.3		U	4.3	0.89	J	2.1	1.7	J	2.1	0 - 10.1
Iron	3540		21.8	2530		21.5	2190		21.5	1710		10.5	2360		10.7	0 - 8,564
Lead	2.8		0.55	6		0.54	2.5		0.54	1.5		0.53	1.7		0.53	0 - 18.4
Magnesium	3910	J	43.7	2440	J	42.9	3460	J	43.1	2040	J	21	4680	J	21.3	0 - 9,912
Manganese	30.3		2.2	31.4		2.1	29.1		2.2	22.2		1.1	32.8		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	4.7	J	8.7	5.7	J	8.6	2.8	J	8.6	3.5	J	4.2	4.2	J	4.3	0 - 9.7
Potassium	1060	J	1090	701	J	1070	541	J	1080	553		526	678		534	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		UJ	2.2	0.61	J	2.1		UJ	2.2		UJ	1.1		UJ	1.1	0 - 1.8
Sodium		U	1090		U	1070		U	1080		U	526		U	534	0 - 834
Thallium		UJ	1.1	0.17	J	0.54	0.15	J	0.54	0.18	J	1.1	0.16	J	1.1	0 - 6.2
Tin	NA			NA			NA			NA			56		10.7	NA
Vanadium	9.9		2.2	8.1		2.1	11		2.2	6.3		1.1	11.7		1.1	1.7 - 25.0
Zinc	8.4		4.4	6.5		4.3	5.6		4.3	4.8		2.1	6.7		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate	73	J	360	75	J	350	190	J	360		U	350		U	350	
2-Butanone (MEK)		U	11		U	11	3.6	J	11		U	11		U	11	
Acetone		U	11		U	11	5	J	11		U	11		U	11	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-10

Chemical	Sample Interval (ft bgs) 0-.5			29.5-31			34-35.3			44-46			54-55			64-65			Background Range[1]
	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual.	R.L.	
Aluminum	7260		10.4	4650		22	5350		21	4310		10.4	4030		10.2	3620		10.4	596 - 10,796
Antimony		R			UJ	13.2		UJ	12.6		UJ	6.2		UJ	6.1		UJ	6.3	0 - 29.6
Arsenic	1.9		0.52	0.78		0.55	1.3		0.53	0.78		0.52	0.71		0.51	0.84		0.52	0 - 10.5
Barium	169	J	1	110		2.2	**595**		2.1	59.5		1	81		1	70.3		1	0 - 548
Beryllium	0.49		0.21		U	0.44		U	0.42	0.16	J	0.21	0.14	J	0.2	0.14	J	0.21	0 - 0.6
Cadmium		UJ	0.52		UJ	1.1		UJ	1.1		UJ	0.52		UJ	0.51		UJ	0.52	0 - 2.1
Calcium	44600		20.8	130000	J	44.1	149000	J	42	58200	J	20.7	43200	J	20.4	88500		20.9	0 - 166,119
Chromium	6.4		1	8		2.2	**40.7**		2.1	7		1	6.8		1	**30.7**		1	0.8 - 12.0
Cobalt	3.5		1	2	J	2.2	2.5		2.1	1.1		1	0.9	J	1	1.2		1	0 - 4.0
Copper	6.4		2.1	2.2	J	4.4	6.4		4.2	2	J	2.1	1.9	J	2	3.3		2.1	0 - 10.1
Iron	6550		10.4	3090		22	**9580**		21	3140		10.4	2910		10.2	3240		10.4	0 - 8,564
Lead	7.3		0.52	2	J	0.55	2	J	0.53	1.7	J	0.52	1.7	J	0.51	1.8		0.52	0 - 18.4
Magnesium	2080		20.8	4970	J	44.1	7200	J	42	5370	J	20.7	5570	J	20.4	8060		20.9	0 - 9,912
Manganese	142	J	1	33.1		2.2	69.3		2.1	37.4		1	42.1		1	47.6		1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.11		U	0.1		U	0.1		U	0.1	0 - 0.2
Nickel	7.4		4.2	**18.4**		8.8	**30.2**		8.4	4.1		4.1	4.5		4.1	5.2		4.2	0 - 9.7
Potassium	1700		520	687	J	1100	957	J	1050	966		518	832		511	600		521	0 - 2,531
Selenium		UJ	2.1		UJ	1.1		UJ	5.3		UJ	1		UJ	1		UJ	1	0 - 36.8
Silver		U	1		U	2.2		U	2.1		U	1		U	1	0.45	J	1	0 - 1.8
Sodium		U	520		U	1100		U	1050		U	518		U	511		U	521	0 - 834
Thallium		U	1		U	1.1		U	2.1	0.1	J	1		U	1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.4	NA
Vanadium	16.7		1	17.4		2.2	14.2		2.1	8.8		1	9.7		1	12		1	1.7 - 25.0
Zinc	19.2		2.1	10.1		4.4	14.3		4.2	8.7		2.1	8.6		2	8.1		2.1	0 - 20.7
2-Butanone (MEK)	1.4	J	10		U	11		U	11		U	10		U	10		U	10	
2-Hexanone		U	10		U	11	1.6	J	11		U	10		U	10		U	10	
4-Methyl-2-pentanone		U	10		U	11	6.4	J	11		U	10		U	10		U	10	
Acetone	3.7	J	10		U	11	37		11	7.8	J	10	9.2	J	10	41		10	
Methylene chloride		U	5.2		U	5.5		U	5.3		U	5.2		U	5.1	1.3	J	5.2	
Toluene	4.9	J	5.2		U	5.5		U	5.3		U	5.2	1	J	5.1		U	5.2	
Total Petroleum Hydrocarbons	49		41.6		U	44.1		U	42		U	41.4		U	40.9		U	41.7	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-11

Chemical	Sample Interval (ft bgs) 31-33			35-35.8			45-47			55-57			65-66.4			Background Range(1)
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	5940		11	7110		21.8	3520		10.5	3740		10.4	4120		10.6	596 - 10,796
Antimony		UJ	6.6		UJ	13.1		UJ	6.3		UJ	6.2		UJ	6.3	0 - 29.6
Arsenic	1.1		0.55	1.3		0.55	0.88		0.52	0.76		0.52	0.6		0.53	0 - 10.5
Barium	132		1.1	512		2.2	66.4		1	48.1		1	193		1.1	0 - 548
Beryllium	0.25		0.22	0.26	J	0.44	0.12	J	0.21	0.12	J	0.21	0.19	J	0.21	0 - 0.6
Cadmium		UJ	0.55		UJ	1.1		UJ	0.52		UJ	0.52		U	0.53	0 - 2.1
Calcium	81800	J	21.9	120000	J	43.7	55200	J	21	30600	J	20.8	51500		21.1	0 - 166,119
Chromium	5.4		1.1	7.8		2.2	2.8		1	3.1		1	5.1		1.1	0.8 - 12.0
Cobalt	1.2		1.1	2.2		2.2	1.2		1	0.93	J	1	1.4		1.1	0 - 4.0
Copper	2	J	2.2	4.7		4.4	1.4	J	2.1	1.5	J	2.1	2.2		2.1	0 - 10.1
Iron	3600		11	5480		21.8	2460		10.5	2750		10.4	3060		10.6	0 - 8,564
Lead	2.7	J	0.55	2.8	J	0.55	1.8	J	0.52	2.3	J	0.52	1.8		0.53	0 - 18.4
Magnesium	6260	J	21.9	8840	J	43.7	3850	J	21	4730	J	20.8	6370		21.1	0 - 9,912
Manganese	30.9		1.1	56.1		2.2	27.5		1	37		1	43.7		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.1		U	0.1		U	0.11	0 - 0.2
Nickel	4.1	J	4.4	50.7		8.7	3.5	J	4.2	3.2	J	4.2	4.2		4.2	0 - 9.7
Potassium	901		548	1120		1090	877		524	801		520	712		528	0 - 2,531
Selenium		UJ	5.5		UJ	5.5		UJ	1		UJ	1		UJ	0.53	0 - 36.8
Silver		U	1.1		U	2.2		U	1		U	1		U	1.1	0 - 1.8
Sodium		U	548		U	1090		U	524		U	520		U	528	0 - 834
Thallium		U	1.1		U	1.1		U	1		U	1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	24.5		1.1	27.2		2.2	6.9		1	8.3		1	13.2		1.1	1.7 - 25.0
Zinc	10.3		2.2	12.2		4.4	5.9		2.1	6.8		2.1	7.2		2.1	0 - 20.7
2-Butanone (MEK)		U	11	7.9	J	11		U	10		U	10		U	11	
Acetone	12		11	24		11		U	10	3	J	10	11		11	
Methylene chloride		U	5.5		U	5.5		U	5.2		U	5.2	1.2	J	5.3	
Total Petroleum Hydrocarbons		U	43.9	59.1		43.7		U	41.9		U	41.6		U	42.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-12

Chemical	Sample Interval (ft bgs)															Background Range[1]
	27.5-29.5			34-36			45-47			55-57			65-65.6			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	3920		21.5	3940		21.5	3960		10.4	3980		10.4	3530		10.5	596 - 10,796
Antimony		R			R		4.5	J	6.3		R			UJ	6.3	0 - 29.6
Arsenic	0.89		0.54	1.3		0.54	0.71		0.52	0.62		0.52	0.58		0.52	0 - 10.5
Barium	249	J	2.2	**654**	J	2.1	441	J	1	28.4	J	1	56.1		1	0 - 548
Beryllium		U	0.43		U	0.43	0.17	J	0.21	0.2	J	0.21		U	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	0.52		U	0.52		U	0.52	0 - 2.1
Calcium	**190000**		43.1	**179000**		43	65400		20.9	19800		20.9	69500		21	0 - 166,119
Chromium	1.6	J	2.2		U	2.1	2.6		1	4.9		1	7.2		1	0.8 - 12.0
Cobalt		U	2.2		U	2.1	0.8	J	1	1.6		1	1.3		1	0 - 4.0
Copper	1.7	J	4.3	2.1	J	4.3	2.3		2.1	1.2	J	2.1	2.6		2.1	0 - 10.1
Iron	2540		21.5	2560		21.5	2430		10.4	3100		10.4	2960		10.5	0 - 8,564
Lead	2.5		0.54	1.7		0.54	1.8		0.52	2.2		0.52	1.9		0.52	0 - 18.4
Magnesium	4870		43.1	7850		43	5940		20.9	5640		20.9	6170		21	0 - 9,912
Manganese	26.9	J	2.2	29.3	J	2.1	28.6	J	1	46.9	J	1	48.8		1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.1		U	0.1		U	0.1	0 - 0.2
Nickel	3.8	J	8.6	6	J	8.6	4.8		4.2	8.3		4.2	4.9		4.2	0 - 9.7
Potassium	643	J	1080	668	J	1070	952		522	853		521	652		525	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1		UJ	1		UJ	1	0 - 36.8
Silver		U	2.2		U	2.1		U	1		U	1		U	1	0 - 1.8
Sodium		U	1080		U	1070		U	522		U	521		U	525	0 - 834
Thallium		U	1.1		U	1.1	0.13	J	0.52		U	0.52		UJ	0.52	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.5	NA
Vanadium	14.9		2.2	18.8		2.1	8.1		1	9.1		1	12.6		1	1.7 - 25.0
Zinc	7.5		4.3	7.7		4.3	6.8		2.1	7.4		2.1	6.3		2.1	0 - 20.7
Acetone		UJ	11		UJ	11	7	J	10		U	10	8.1	J	10	
Acetonitrile													24	J	210	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.
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* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-13

Chemical	Sample Interval (ft bgs) 0-.5			27-29			32-34			40-42			50-51.5			62-64.5			Background Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	5310		10.3	3520	J	10.9	3690	J	11	6660	J	10.9	5270	J	10.7	3610	J	10.6	596 - 10,796
Antimony		R			UJ	6.6		UJ	6.6		UJ	6.5		UJ	6.4		UJ	6.4	0 - 29.6
Arsenic	1.8		0.51	0.6		0.55	1.6		0.55	0.97		0.54	0.65		0.53	0.92		0.53	0 - 10.5
Barium	280	J	1	72	J	1.1	20.6	J	1.1	93.2	J	1.1	153	J	1.1	309	J	1.1	0 - 548
Beryllium	0.44		0.21		U	0.22	0.26		0.22	0.21	J	0.22	0.16	J	0.21	0.13	J	0.21	0 - 0.6
Cadmium		U	0.51		U	0.55		U	0.55		U	0.54		U	0.53		U	0.53	0 - 2.1
Calcium	71900		20.6	82100	J	21.8	16100	J	21.9	68100	J	21.7	59200	J	21.4	28100	J	21.3	0 - 166,119
Chromium	4.2		1	2.7		1.1	2.9		1.1	5.4		1.1	9.9		1.1	10.8		1.1	0.8 - 12.0
Cobalt	3		1	1.2		1.1	2		1.1	0.89	J	1.1	0.89	J	1.1	1.1		1.1	0 - 4.0
Copper	4.5		2.1	1.3	J	2.2	2.6		2.2	3.2		2.2	2.7		2.1	2.2		2.1	0 - 10.1
Iron	4190		10.3	2030	J	10.9	2900	J	11	4010	J	10.9	3720	J	10.7	3030	J	10.6	0 - 8,564
Lead	5.3		0.51	2.5		0.55	2.8		0.55	2		0.54	1.9		0.53	1		0.53	0 - 18.4
Magnesium	1890		20.6	3570	J	21.8	2880	J	21.9	10600	J	21.7	6970	J	21.4	3460	J	21.3	0 - 9,912
Manganese	112		1	31.8	J	1.1	65.4	J	1.1	39.7	J	1.1	40.6	J	1.1	38.9	J	1.1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	6.2		4.1	3.6	J	4.4	5		4.4	5.2		4.3	6.2		4.3	3	J	4.3	0 - 9.7
Potassium	1220		515	758		546	1240		548	1430		543	1130		534	659		531	0 - 2,531
Selenium		UJ	1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	1		U	1.1		U	1.1		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium	3920		515		U	546		U	548		U	543		U	534		U	531	0 - 834
Thallium	0.12	J	1	0.19	J	1.1	0.2	J	0.55	0.14	J	1.1	0.12	J	1.1		U	0.53	0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	13.7		1	10.3		1.1	18.2		1.1	13.8		1.1	12.3		1.1	11.2		1.1	1.7 - 25.0
Zinc	11.6		2.1	6		2.2	7.2		2.2	10.3		2.2	8.8		2.1	6.8		2.1	0 - 20.7
2-		U	340		U	360		U	360	85	J	360		U	350		U	350	
Acenaphthene		U	340	37	J	360		U	360	82	J	360		U	350		U	350	
Chrysene		U	340		U	360		U	360	38	J	360		U	350		U	350	
Pyrene		U	340		U	360		U	360	74	J	360		U	350		U	350	
1-										76	NJ								
Acetone		U	10	130		110	7.2	J	11	4.9	J	11		U	11		U	11	
Ethylbenzene	1.3	J	5.1	300		55		U	5.5		U	5.4		U	5.3		U	5.3	
Methylene		U	5.1		U	55		U	5.5	1.2	J	5.4	1.8	J	5.3	1.1	J	5.3	
Styrene	8.2		5.1	1400		55		U	5.5		U	5.4		U	5.3		U	5.3	
Toluene	1.9	J	5.1		U	55		U	5.5		U	5.4		U	5.3		U	5.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-14

Chemical	Sample Interval (ft bgs)															Background Range[1]
	32-33.9			38-39.1			45-47			57-60.5			67-68.5			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	4370		22.3	4870		22.4	3270		10.5	3350		10.8	2960		10.6	596 - 10,796
Antimony		R			R			R			R			R		0 - 29.6
Arsenic	0.61		0.56	1.1		0.56	0.82		0.53	0.67		0.54	0.68		0.53	0 - 10.5
Barium	107	J	2.2	121	J	2.2	35.2	J	1.1	55.9	J	1.1	59.4	J	1.1	0 - 548
Beryllium		U	0.45		U	0.45		U	0.21		U	0.22		U	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	0.53		U	0.54		U	0.53	0 - 2.1
Calcium	135000		44.6	124000		44.7	50900		21	95300		21.5	39100		21.2	0 - 166,119
Chromium	6		2.2	4.4		2.2	2.4		1.1	6.9		1.1	4.5		1.1	0.8 - 12.0
Cobalt	1.4	J	2.2	1.4	J	2.2	0.74	J	1.1	1.2		1.1	1.2		1.1	0 - 4.0
Copper	1.6	J	4.5	2.6	J	4.5	0.89	J	2.1	1.8	J	2.2	1.4	J	2.1	0 - 10.1
Iron	2430		22.3	2890		22.4	2370		10.5	2720		10.8	2360		10.6	0 - 8,564
Lead	1.8		1.1	3.1		0.56	2		0.53	2		1.1	1.7		0.53	0 - 18.4
Magnesium	**13200**		44.6	**14500**		44.7	4380		21	8180		21.5	5030		21.2	0 - 9,912
Manganese	25.5	J	2.2	31.6	J	2.2	24.1	J	1.1	34	J	1.1	34.1	J	1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	7.8	J	8.9	8	J	8.9	3.2	J	4.2	5		4.3	4.1	J	4.2	0 - 9.7
Potassium	570	J	1120	745	J	1120	868		525	582		538	529	J	530	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	2.2		U	2.2		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium		U	1120		U	1120		U	525		U	538		U	530	0 - 834
Thallium		U	1.1		U	1.1		U	0.53		U	0.54		U	0.53	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	18.7		2.2	19.3		2.2	7		1.1	15		1.1	14.6		1.1	1.7 - 25.0
Zinc	5.7		4.5	7		4.5	5.5		2.1	5.5		2.2	6.2		2.1	0 - 20.7
2-Butanone (MEK)		U	11	1.8	J	11	2.6	J	11	4.4	J	11		U	11	
Acetone		U	11	5.8	J	11	4.2	J	11		U	11		U	11	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.
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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-15

Chemical	Sample Interval (ft bgs) 20-22			25-27			35-35.8			45-46.8			55-55.8			Background Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	4290		22.2	4490		22.2	5290		22.2	4250		11.2	4340		10.7	596 - 10,796
Antimony		U	13.3		U	13.3		U	13.3		U	6.7		U	6.4	0 - 29.6
Arsenic	0.9		0.55	1.1		0.56	1.6		0.56	0.82		0.56	0.89		0.54	0 - 10.5
Barium	304		2.2	131		2.2	245		2.2	51.3		1.1	43.2		1.1	0 - 548
Beryllium		U	0.44		U	0.44		U	0.44	0.18	J	0.22	0.12	J	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	1.1		U	0.56		U	0.54	0 - 2.1
Calcium	165000	J	44.4	160000	J	44.4	95900	J	44.5	42100	J	22.4	85800	J	21.4	0 - 166,119
Chromium	2.3		2.2	3.2		2.2	4.5		2.2	5.4		1.1	5.2		1.1	0.8 - 12.0
Cobalt	1.7	J	2.2	1.4	J	2.2	1.5	J	2.2	1	J	1.1	1.6		1.1	0 - 4.0
Copper	1.7	J	4.4	1.9	J	4.4	2.3	J	4.4	1.5	J	2.2	1.7	J	2.1	0 - 10.1
Iron	2610		22.2	2960		22.2	3160		22.2	3140		11.2	2930		10.7	0 - 8,564
Lead	2.4		0.55	2.2		0.56	1.9		0.56	4.7		1.1	1.8		0.54	0 - 18.4
Magnesium	4920	J	44.4	6250	J	44.4	**11100**	J	44.5	4690	J	22.4	7950	J	21.4	0 - 9,912
Manganese	29.9		2.2	30.2		2.2	33.9		2.2	38.2		1.1	38.8		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	5.6	J	8.9	5.4	J	8.9	6.6	J	8.9	4.6	J	4.5	3.9	J	4.3	0 - 9.7
Potassium	823	J	1110	726	J	1110	1040	J	1110	1020		561	812		536	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		UJ	2.2		UJ	2.2		UJ	2.2		UJ	1.1		UJ	1.1	0 - 1.8
Sodium		U	1110		U	1110		U	1110	113	J	561		U	536	0 - 834
Thallium		UJ	1.1	0.12	J	1.1	0.11	J	1.1	0.11	J	0.56	0.16	J	0.54	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.7	NA
Vanadium	8.1		2.2	8.2		2.2	14		2.2	10.1		1.1	15		1.1	1.7 - 25.0
Zinc	6.6		4.4	18.9		4.4	7.8		4.4	7.3		2.2	6.7		2.1	0 - 20.7
4-Nitrophenol	49	J	1800	68	J	1800		U	1800		U	1800		U	1700	
bis(2-Ethylhexyl)phthalate	230	J	370	100	J	370	74	J	370	200	J	370		U	350	

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-16

Chemical	Sample Interval (ft bgs) 0-.5			45-46.9			50-50.9			60-60.9			70-70.8			80-81.5			Background Range[1]
	Result	ual	R.L.	Result	Qual.	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	
Aluminum	5830		10.2	4080		10.5	4710		10.5	4500		10.6	3200		10.5	1530		10.4	596 - 10,796
Antimony		R			U	6.3		U	6.3		U	6.4	5.4	J	6.3		UJ	6.2	0 - 29.6
Arsenic	1.8		0.51	0.7		0.52	0.78		0.53	0.66		0.53	0.74		0.53	0.39	J	1	0 - 10.5
Barium	194	J	1	184	J	1	213	J	1.1	125	J	1.1	130	J	1.1	36.9		1	0 - 548
Beryllium	0.38		0.2	0.15	J	0.21	0.19	J	0.21	0.19	J	0.21	0.14	J	0.21		U	0.21	0 - 0.6
Cadmium		U	0.51		U	0.52		U	0.53		U	0.53		U	0.53	0.44	J	0.52	0 - 2.1
Calcium	61200		20.4	46500		21	63000		21.1	46200		21.2	46300		21.1	8830		20.7	0 - 166,119
Chromium	19.2		1	6.2		1	7.5		1.1	6.4		1.1	6.7		1.1	6.4		1	0.8 - 12.0
Cobalt	3.3		1	1.4		1	1.5		1.1	1.6		1.1	2		1.1		U	1	0 - 4.0
Copper	6.6		2	12.6		2.1	11.6		2.1	5.7		2.1	27.5		2.1	2.9		2.1	0 - 10.1
Iron	5650		10.2	3240		10.5	3520		10.5	3790		10.6	3730		10.5	2240		10.4	0 - 8,564
Lead	41.1		5.1	4.6		0.52	2.8		0.53	1.9		1.1	3.3		0.53	1.2		0.52	0 - 18.4
Magnesium	1990		20.4	4940		21	7370		21.1	5980		21.2	3470		21.1	1370		20.7	0 - 9,912
Manganese	138	J	1	33.2	J	1	48	J	1.1	48.6	J	1.1	57.6	J	1.1	26.2		1	0 - 151.8
Mercury		U	0.1		U	0.1		U	0.11		U	0.11		U	0.11		U	0.1	0 - 0.2
Nickel	6.3		4.1	5.1		4.2	5.4		4.2	5.8		4.2	6.2		4.2	3	J	4.1	0 - 9.7
Potassium	1880		510	938		525	1030		527	906		530	708		526	331	J	519	0 - 2,531
Selenium		UJ	1		UJ	1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1	0 - 36.8
Silver		U	1	1.5		1	1.8		1.1	1.2		1.1	0.98	J	1.1		U	1	0 - 1.8
Sodium		U	510		U	525		U	527		U	530		U	526		U	519	0 - 834
Thallium		U	1		UJ	1		UJ	1.1		UJ	1.1		UJ	1.1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.4	NA
Vanadium	13.3		1	8.2		1	10.8		1.1	12.9		1.1	11.6		1.1	5.9		1	1.7 - 25.0
Zinc	25.3		2	10.6		2.1	15.6		2.1	9.8		2.1	9.2		2.1	4.5		2.1	0 - 20.7
Aroclor 1254		U	34	75		35		U	35		U	35		U	35		U	34	
4-Methylphenol		U	340	100	J	350		U	350		U	350		U	350				
bis(2-Ethylhexyl)phthalate		U	340	230	J	350		U	350		U	350		U	350		U	340	
Di-n-butyl phthalate		U	340		U	350		U	350		U	350	57	J	350		U	340	
Phenol		U	340	40	J	350		U	350		U	350		U	350		U	340	
2-Butanone (MEK)		U	10	180		21	180		21	3.3	J	11		U	11	3.2	J	10	
2-Hexanone		U	10	8.3	J	21	11	J	21		U	11		U	11		U	10	
4-Methyl-2-pentanone (MIBK)		U	10	230		21	220		21	2.5	J	11		U	11		U	10	
Acetone		U	10	370		21	390		21		U	11	5.9	J	11	6	J	10	
Methylene chloride		U	5.1	5.1	J	10	6.3	J	11		U	5.3		U	5.3		U	5.2	
Toluene	1.4	J	5.1		U	10		U	11		U	5.3		U	5.3		U	5.2	
Total Petroleum Hydrocarbons	72.5		40.8		U	42		U	42.2		U	42.4		U	42.1		U	41.5	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-17

Chemical	Sample Interval (ft bgs)															Background Range[1]
	19-20.3			25-26.5			35-36.3			45-46.9			53-55			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	6020		21.4	6970		21.4	6070		21.3	3560		10.4	3320		10.4	596 - 10,796
Antimony		R			R		12.8	J	12.8		R			R		0 - 29.6
Arsenic	0.92		0.54	1.3		0.53	1.4		0.53	0.79		0.52	0.55		0.52	0 - 10.5
Barium	**1260**	J	2.1	238	J	2.1	**736**	J	2.1	59.1	J	1	22.9	J	1	0 - 548
Beryllium	0.37	J	0.43	0.29	J	0.43	0.24	J	0.43	0.11	J	0.21	0.14	J	0.21	0 - 0.6
Cadmium		U	1.1		U	1.1		U	1.1		U	0.52		U	0.52	0 - 2.1
Calcium	**168000**		42.8	131000		42.8	117000		42.5	50100		20.8	23600		20.8	0 - 166,119
Chromium	7.1		2.1	5.9		2.1	3.1		2.1	4.8		1	2.8		1	0.8 - 12.0
Cobalt	2	J	2.1	2	J	2.1	2.3		2.1	1.3		1	1.2		1	0 - 4.0
Copper	3.2	J	4.3	3.4	J	4.3	2.4	J	4.3	1.9	J	2.1	1.5	J	2.1	0 - 10.1
Iron	4890		21.4	5630		21.4	3920		21.3	2720		10.4	2700		10.4	0 - 8,564
Lead	3.7		0.54	5.5		1.1	3.1		1.1	1.5		0.52	2.2		0.52	0 - 18.4
Magnesium	5120		42.8	5660		42.8	7880		42.5	4830		20.8	4070		20.8	0 - 9,912
Manganese	50.7	J	2.1	66	J	2.1	41.2	J	2.1	39.6	J	1	37.4	J	1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.1	0 - 0.2
Nickel	**20.5**		8.6	8.6		8.6	2.5	J	8.5	3.9	J	4.2	3.4	J	4.2	0 - 9.7
Potassium	1810		1070	1590		1070	1270		1060	826		519	749		519	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1		UJ	1	0 - 36.8
Silver		U	2.1		U	2.1		U	2.1		U	1		U	1	0 - 1.8
Sodium		U	1070		U	1070		U	1060		U	519		U	519	0 - 834
Thallium		U	1.1		U	1.1		U	1.1		U	1		U	1	0 - 6.2
Tin	NA			NA			NA			NA			8.7	J	10.4	NA
Vanadium	11.9		2.1	20.4		2.1	16.9		2.1	7.6		1	8.6		1	1.7 - 25.0
Zinc	14.9		4.3	**24.3**		4.3	13.6		4.3	8.3		2.1	7.4		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	350	3800		350		U	350		U	340		U	340	
Di-n-butyl phthalate	37	J	350	69	J	350	48	J	350		U	340		U	340	
Di-n-octyl phthalate		U	350		U	350		U	350	39	J	340		U	340	
Phenol		U	350	47	J	350		U	350		U	340		U	340	
2-Butanone (MEK)		U	11		U	11		U	11	1.9	J	10		U	10	
2-Hexanone	1.5	J	11		U	11		U	11		U	10		U	10	
4-Methyl-2-pentanone (MIBK)		U	11	10	J	11		U	11		U	10		U	10	
Acetone	8.7	J	11	100		11		U	11	8.3	J	10	7.3	J	10	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-18

Chemical	Sample Interval (ft bgs)															Background Range[1]
	28-29.9			33-35			45-47			55-56.5			63-63.8			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	4450		21.7	4070		10.8	3120		10.5	3760		10.5	3160		10.6	596 - 10,796
Antimony	14.8	J	13	4.4	J	6.5		R			R			UJ	6.4	0 - 29.6
Arsenic	1.3		0.54	1.6		0.54	0.74		0.53	0.78		0.52	0.71		0.53	0 - 10.5
Barium	104	J	2.2	60.8	J	1.1	106	J	1.1	310	J	1	37.2		1.1	0 - 548
Beryllium	0.25	J	0.43	0.21	J	0.22		U	0.21		U	0.21		U	0.21	0 - 0.6
Cadmium		U	1.1		U	0.54		U	0.53		U	0.52		U	0.53	0 - 2.1
Calcium	144000		43.4	35300		21.6	30700		21.1	32400		21	59700		21.3	0 - 166,119
Chromium	4		2.2	3.2		1.1	2.6		1.1	3.8		1	9.7		1.1	0.8 - 12.0
Cobalt	2.3		2.2	1.8		1.1	1	J	1.1	1.5		1	1.2		1.1	0 - 4.0
Copper	3.2	J	4.3	2.5		2.2	1.2	J	2.1	1.2	J	2.1	1.9	J	2.1	0 - 10.1
Iron	3670		21.7	3460		10.8	2110		10.5	2710		10.5	2990		10.6	0 - 8,564
Lead	3		0.54	3.7		0.54	1.7	J	2.6	2.3		0.52	1.9		0.53	0 - 18.4
Magnesium	3860		43.4	3350		21.6	4170		21.1	4690		21	5830		21.3	0 - 9,912
Manganese	46.3	J	2.2	59.7	J	1.1	26.9	J	1.1	46.1	J	1	37.5		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.11	0 - 0.2
Nickel	6.3	J	8.7	6.5		4.3	3.7	J	4.2	4.1	J	4.2	4.4		4.3	0 - 9.7
Potassium	1160		1080	1170		540	859		527	881		524	553		532	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	0.52		UJ	1.1	0 - 36.8
Silver		U	2.2		U	1.1		U	1.1		U	1		U	1.1	0 - 1.8
Sodium		U	1080		U	540		U	527		U	524		U	532	0 - 834
Thallium		U	1.1		U	1.1		U	0.53		U	0.52	0.19	J	0.53	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	14.2		2.2	17.8		1.1	6.6		1.1	9.5		1	11		1.1	1.7 - 25.0
Zinc	9.4		4.3	8.3		2.2	5.1		2.1	6.5		2.1	5.8		2.1	0 - 20.7
2-Butanone (MEK)		U	11		U	11		U	11	3.5	J	10		U	11	
Acetone		U	11		U	11		U	11		U	10	5.5	J	11	
Toluene	1.4	J	5.4		U	5.4		U	5.3		U	5.2	1.1	J	5.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-19

Chemical	Sample Interval (ft bgs) 0-.5			18-20			25-27			35-35.9			45-47			53-56.5			Backgroun Range(1)
	Result	Qual.	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	Qual.	R.L.	Result	Qual	R.L.	Result	Qual.	R.L.	
Aluminum	5530		10.1	5760		10.8	8250		11.2	3880		10.7	3170		10.5	4220		10.5	596 - 10,79
Antimony		R			UJ	6.5		UJ	6.7		UJ	6.4		UJ	6.3		UJ	6.3	0 - 29.6
Arsenic	2.7		0.5	2.2		0.54	5.8		0.56	1.1		0.54	0.84	J	2.1	0.86	J	2.1	0 - 10.5
Barium	145	J	1	61.3		1.1	54.2		1.1	207		1.1	37.5		1	72.9		1.1	0 - 548
Beryllium		U	0.39		U	0.23	0.59		0.22		U	0.21		U	0.21		U	0.21	0 - 0.6
Cadmium		U	0.5		U	0.54		U	0.56		U	0.54		U	0.52		U	0.53	0 - 2.1
Calcium	33400		20.2	78800		21.6	6740		22.4	85100		21.4	55900		21	54200		21.1	0 - 166,119
Chromium	6.7		1	5.5		1.1	9.3		1.1	4.1		1.1	2.8		1	4.4		1.1	0.8 - 12.0
Cobalt	2.9		1	2.2		1.1	2.1		1.1	1.3		1.1	1.1		1	1.4		1.1	0 - 4.0
Copper	5.2		2	3.4		2.2	5		2.2	1.5	J	2.1	1.1	J	2.1	1.6	J	2.1	0 - 10.1
Iron	5990		10.1	4840		10.8	**8810**		11.2	2710		10.7	2420		10.5	2890		10.5	0 - 8,564
Lead	9.2		1	5.1		0.54	7.3		0.56	2.1		0.54	1		0.52	1.9		0.53	0 - 18.4
Magnesium	1490		20.2	3710		21.6	2730		22.4	3550		21.4	2880		21	5600		21.1	0 - 9,912
Manganese	108	J	1	65.8		1.1	56.2		1.1	35		1.1	28.7		1	40.1		1.1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.11		U	0.11		U	0.1		U	0.11	0 - 0.2
Nickel	7.2		4	7.3		4.3	8.9		4.5	4.5		4.3		U	4.2	4.4		4.2	0 - 9.7
Potassium	1260		505	1720		540	**2550**		560	706		536	803		525	889		527	0 - 2,531
Selenium		UJ	1		R			R			R			R			UJ	1.1	0 - 36.8
Silver		U	1		U	1.1		U	1.1		U	1.1		U	1	0.32	J	1.1	0 - 1.8
Sodium		U	505	157	J	540	253	J	560		U	536		U	525		U	527	0 - 834
Thallium	0.13	J	0.5	0.16	J	1.1	0.21	J	0.56	0.19	J	0.54		U	0.52	0.19	J	0.53	0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.5	NA
Vanadium	15.9		1	15.6		1.1	**35.6**		1.1	12		1.1	6.7		1	8.5		1.1	1.7 - 25.0
Zinc	17		2	10.6		2.2	16.2		2.2	6.9		2.1	5.8		2.1	7.6		2.1	0 - 20.7
Aroclor 1254	25	J	33		U	36		U	37		U	35		U	35		U	35	
2-Butanone (MEK)	2.7	J	10		U	11	1.9	J	11		U	11		U	10		U	11	
Acetone	13		10		U	11		U	11	6.5	J	11	3.3	J	10	3	J	11	
Toluene	4.4	J	5		U	5.4		U	5.6		U	5.4		U	5.2		U	5.3	
Total Petroleum	43.5		40.4		U	43.2		U	44.8		U	42.9		U	42		U	42.2	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-20

Chemical	Sample Interval (ft bgs)															Background Range[1]
	16-17.5			20-22			30-32			40-41.8			52-53			
	Result	Qual.	R.L	Result	Qual.	R.L	Result	Qual.	R.L	Result	Qual.	R.L	Result	Qual.	R.L	
Aluminum	6210		11.2	4140		22.1	3710		11.5	5090		10.8	3740		10.5	596 - 10,796
Antimony		UJ	6.7		UJ	13.2		R			R			UJ	6.3	0 - 29.6
Arsenic	2.3		0.56	1.8		0.55	2		0.58	1.1		0.54	0.5	J	0.52	0 - 10.5
Barium	69.4		1.1	427		2.2	50.7	J	1.2	64.3	J	1.1	88.1		1	0 - 548
Beryllium	0.47		0.22	0.28	J	0.44	0.21	J	0.23	0.14	J	0.22	0.14	J	0.21	0 - 0.6
Cadmium		UJ	0.56		UJ	1.1		UJ	0.58		UJ	0.54		U	0.52	0 - 2.1
Calcium	83400		22.3	**197000**		44.2	44000		23	74600		21.5	31800		20.9	0 - 166,119
Chromium	7.4		1.1	3.8		2.2	4.1		1.2	4		1.1	4.5		1	0.8 - 12.0
Cobalt	2.9		1.1	2	J	2.2	2		1.2	1.2		1.1	1.4		1	0 - 4.0
Copper	**23.5**		2.2	3	J	4.4	2.9		2.3	2.7		2.2	2.6		2.1	0 - 10.1
Iron	6000		11.2	3200		22.1	3120		11.5	3010		10.8	3130		10.5	0 - 8,564
Lead	9.3		1.1	3.9		0.55	3.6		0.58	1.7		0.54	2.1		0.52	0 - 18.4
Magnesium	4080		22.3	5660		44.2	2430		23	9300		21.5	4950		20.9	0 - 9,912
Manganese	40.2		1.1	38.3		2.2	56.7	J	1.2	28.1	J	1.1	42.6		1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.12		U	0.11		U	0.1	0 - 0.2
Nickel	7.4		4.5	5.6	J	8.8	5.4		4.6	4.3		4.3	4.1	J	4.2	0 - 9.7
Potassium	1920		559	1040	J	1100	964		575	973		538	767		523	0 - 2,531
Selenium		R			R			UJ	1.2		UJ	1.1		UJ	1	0 - 36.8
Silver		U	1.1		U	2.2		U	1.2		U	1.1		U	1	0 - 1.8
Sodium	233	J	559		U	1100		U	575		U	538		U	523	0 - 834
Thallium		U	1.1		U	2.2		U	1.2		U	1.1		R		0 - 6.2
Tin	NA			NA			NA			NA			9.8	J	10.5	NA
Vanadium	21.8		1.1	12.4		2.2	13.3		1.2	12.4		1.1	9		1	1.7 - 25.0
Zinc	12.1		2.2	10.3		4.4	8.1		2.3	7.3		2.2	7.4		2.1	0 - 20.7

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-21

Chemical	Sample Interval (ft bgs)														
	22-22.9			27-29			35-35.8			45-46.8			57-58.8		
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.
Aluminum	2730	J	10.7	3220		22.6	3870		21.8	4940		10.4	4340		10.7
Antimony		UJ	6.4		U	13.5		U	13.1		U	6.2		U	6.4
Arsenic	0.97		0.54	0.65		0.56	0.91		0.54	0.39	J	0.52	0.34	J	0.53
Barium	377	J	1.1	180		2.3	293		2.2	91.5		1	277		1.1
Beryllium	0.17	J	0.21		U	0.45		U	0.44		U	0.21	0.13	J	0.21
Cadmium	0.69		0.54		U	1.1		U	1.1		U	0.52		U	0.53
Calcium	254000	J	21.4	173000	J	45.1	164000		43.5	39200	J	20.8	35800	J	21.4
Chromium	3	J	1.1	2.1	J	2.3	5.4		2.2	10.9		1	6.4		1.1
Cobalt	0.9	J	1.1		U	2.3	1.6	J	2.2	1		1	1.3		1.1
Copper	0.91	J	2.1	1.2	J	4.5	6.4		4.4	1.5	J	2.1	1.6	J	2.1
Iron	2220	J	10.7	1660		22.6	2340		21.8	3740		10.4	3040		10.7
Lead	2.7		0.54	2		0.56	2.6		0.54	1.7		0.52	1.4		0.53
Magnesium	3660	J	21.4	5870	J	45.1	8910	J	43.5	3960	J	20.8	5490	J	21.4
Manganese	20.8	J	1.1	20.3		2.3	26.7		2.2	35.9		1	37.7		1.1
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.11
Nickel	2.6	J	4.3	5.2	J	9		UJ	8.7		UJ	4.2		UJ	4.3
Potassium	775		535	504	J	1130	615	J	1090	1140		520	764		534
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1		UJ	1.1
Silver	1.2		1.1		UJ	2.3		UJ	2.2		UJ	1		UJ	1.1
Sodium		U	535		U	1130		U	1090		U	520		U	534
Thallium	0.12	J	1.1	0.14	J	1.1		UJ	1.1	0.17	J	1	0.17	J	0.53
Tin	NA			NA			NA			NA			NA	U	10.7
Vanadium	10.6		1.1	20.2		2.3	15		2.2	9.2		1	12.8		1.1
Zinc	6.5	J	2.1	5.1		4.5	6.8		4.4	7.4		2.1	6.5		2.1
bis(2-Ethylhexyl)phthalate	110	J	350	240	J	370	100	J	360		U	340		U	350
1,1,2,2-Tetrachloroethane	2.3	J	5.4	8.2		5.6		U	5.4	3.5	J	5.2	3.1	J	5.3
Acetone	5.6	J	11		U	11	16		11	7	J	10		U	11
Methylene chloride		U	5.4		U	5.6		U	5.4		U	5.2	2.8	J	5.3

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-22

Chemical	Sample Interval (ft bgs)																		Backgrou Range[1]
	0-.5			18-20			25-25.5			35-36.2			45-45.9			56.5-58.5			
	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	Result	ual	R.L.	Result	ual	R.L.	
Aluminum	6010		10.2	5360		10.3	7190		21.8	5090		21.2	3880		10.4	4380		10.6	596 - 10,79
Antimony	5.2	J	6.1		U	6.2	11	J	13.1		U	12.7		U	6.3		UJ	6.4	0 - 29.6
Arsenic	2.3		0.51	1.1		0.51	0.75		0.55	0.97		0.53	0.68		0.52	0.75		0.53	0 - 10.5
Barium	226	J	1	115	J	1	137	J	2.2	94.3	J	2.1	84.2	J	1	32.7		1.1	0 - 548
Beryllium	0.45		0.2	0.29		0.21	0.33	J	0.44		U	0.42	0.12	J	0.21	0.17	J	0.21	0 - 0.6
Cadmium		U	0.51		U	0.51		U	1.1		U	1.1		U	0.52		U	0.53	0 - 2.1
Calcium	83300		20.5	36900		20.6	**207000**		43.7	150000		42.4	59000		20.9	53300		21.2	0 - 166,11
Chromium	5		1	4.2		1	6.4		2.2	2.2		2.1	2.3		1	3.6		1.1	0.8 - 12.0
Cobalt	3.1		1	2		1	2.4		2.2		U	2.1	0.87	J	1	1.2		1.1	0 - 4.0
Copper	5.5		2	2.3		2.1	3.1	J	4.4	2	J	4.2	1.4	J	2.1	1.5	J	2.1	0 - 10.1
Iron	5510		10.2	4250		10.3	4090		21.8	3180		21.2	2860		10.4	3090		10.6	0 - 8,564
Lead	**78.2**		5.1	3.7		0.51	2.6		0.55	2.3		0.53	1.9		0.52	2.4	J	0.53	0 - 18.4
Magnesium	2270		20.5	3140		20.6	**10200**		43.7	6560		42.4	4430		20.9	6800		21.2	0 - 9,912
Manganese	129	J	1	41.8	J	1	44.1	J	2.2	27.9	J	2.1	31	J	1	39.6		1.1	0 - 151.8
Mercury		U	0.1		U	0.1		U	0.11		U	0.11		U	0.1		U	0.11	0 - 0.2
Nickel	7.1		4.1	8.1		4.1	9		8.7	5.9	J	8.5	3.8	J	4.2	3.7	J	4.2	0 - 9.7
Potassium	1390		512	1540		514	1280		1090	976	J	1060	816		522	760		530	0 - 2,531
Selenium		UJ	1		UJ	1		UJ	1.1		UJ	1.1		UJ	1		UJ	1.1	0 - 36.8
Silver		U	1		U	1		U	2.2		U	2.1		U	1		U	1.1	0 - 1.8
Sodium		U	512		U	514		U	1090		U	1060		U	522		U	530	0 - 834
Thallium		UJ	1	0.13	J	1		UJ	2.2		UJ	2.1		UJ	1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	15.8		1	11.9		1	16.5		2.2	11		2.1	7.4		1	13.9		1.1	1.7 - 25.0
Zinc	**22.1**		2	10.8		2.1	14.4		4.4	9.9		4.2	7.9		2.1	8		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	340		U	340		U	360		U	350		U	340	42	J	350	
2-Butanone (MEK)		U	10		U	10	6.6	J	11		U	11		U	10		U	11	
Acetone		U	10	7	J	10	31	J	11	5.7	J	11	7.1	J	10		U	11	
Toluene		U	5.1		U	5.1		U	5.5		U	5.3	4.8	J	5.2		U	5.3	
Total Petroleum	51		41		U	41.1		U	43.7		U	42.4		U	41.8		U	42.4	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-23

Chemical	Sample Interval (ft bgs)															Background Range[1]
	19-20.5			24-26			35-36.3			45-47			54-55.1			
	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	
Aluminum	5530		55.8	6410		22.3	5380		22	5170		10.5	4990		10.5	596 - 10,796
Antimony		U	33.5		U	13.4		U	13.2		U	6.3		UJ	6.3	0 - 29.6
Arsenic	1.3		0.56	1.2		0.56	1.5		0.55	0.76		0.52	0.75		0.53	0 - 10.5
Barium	194	J	5.6	**608**	J	2.2	113	J	2.2	41.1	J	1	47.1		1.1	0 - 548
Beryllium		U	1.1	0.31	J	0.45	0.24	J	0.44	0.15	J	0.21	0.15	J	0.21	0 - 0.6
Cadmium		U	2.8		U	1.1		U	1.1		U	0.52		U	0.53	0 - 2.1
Calcium	**251000**		112	129000		44.7	**174000**		44	28400		21	32800		21.1	0 - 166,119
Chromium		U	5.6	5.3		2.2	7.5		2.2	4.2		1	7.9		1.1	0.8 - 12.0
Cobalt		U	5.6	1.8	J	2.2	2	J	2.2	1.4		1	1.7		1.1	0 - 4.0
Copper	6.2	J	11.2	7.4		4.5	3.6	J	4.4	1.7	J	2.1	3		2.1	0 - 10.1
Iron	3430		55.8	4160		22.3	3620		22	3870		10.5	4080		10.5	0 - 8,564
Lead	3.1		0.56	3.7		0.56	2.3		0.55	2.2		0.52	2.4		0.53	0 - 18.4
Magnesium	7100		112	7660		44.7	8950		44	4160		21	4630		21.1	0 - 9,912
Manganese	56.1	J	5.6	32.6	J	2.2	39.9	J	2.2	44.2	J	1	47.4		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.11	0 - 0.2
Nickel	6.5	J	22.3	7.2	J	8.9	4	J	8.8	3.6	J	4.2	4.2		4.2	0 - 9.7
Potassium	1410	J	2790	1290		1120	906	J	1100	1100		524	1010		526	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1		UJ	1.1	0 - 36.8
Silver		U	5.6		U	2.2		U	2.2		U	1		U	1.1	0 - 1.8
Sodium		U	2790		U	1120		U	1100		U	524		U	526	0 - 834
Thallium		UJ	2.2		UJ	1.1		UJ	2.2		UJ	0.52		R		0 - 6.2
Tin	NA			NA			NA			NA			8.9	J	10.5	NA
Vanadium	14		5.6	22.3		2.2	20.1		2.2	9.7		1	10.7		1.1	1.7 - 25.0
Zinc	13.3		11.2	13		4.5	9		4.4	8.5		2.1	9.1		2.1	0 - 20.7
Acetone	6.7	J	11		U	11	24		11		U	10		U	11	
Methylene chloride		U	5.6	1.2	J	5.6		U	5.5		U	5.2	1.1	J	5.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-24

Chemical	Sample Interval (ft bgs) 24-26			29-29.8			40-42			50-50.8			59-60			Background Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	3310		22.1	4490		21.7	4230		10.8	3500		10.5	3600		10.8	596 - 10,796
Antimony		UJ	13.3		UJ	13		UJ	6.5		UJ	6.3		UJ	6.5	0 - 29.6
Arsenic	0.7		0.55	0.74		0.54	0.12	J	0.54	0.73		0.52	0.68		0.54	0 - 10.5
Barium	103		2.2	367		2.2	56.2		1.1	147		1	251		1.1	0 - 548
Beryllium		U	0.44		U	0.43	0.13	J	0.22		U	0.21		U	0.22	0 - 0.6
Cadmium		U	1.1		U	1.1		U	0.54		U	0.52		U	0.54	0 - 2.1
Calcium	**185000**		44.2	145000		43.4	49200		21.6	69000		21	71800		21.5	0 - 166,119
Chromium	2.2	J	2.2	3.7	J	2.2	3.5	J	1.1	4.6	J	1	6.7	J	1.1	0.8 - 12.0
Cobalt	2	J	2.2	1.8	J	2.2	1.4		1.1	1.1		1	1.5		1.1	0 - 4.0
Copper	2.3	J	4.4	**41.9**		4.3	2.1	J	2.2	2.1		2.1	7.9		2.2	0 - 10.1
Iron	2000	J	22.1	3040	J	21.7	2880	J	10.8	2330	J	10.5	2370	J	10.8	0 - 8,564
Lead	2.2	UJ	1.1	12.2	J	1.1	1.9	J	1.1	2	J	1	2.2	J	0.54	0 - 18.4
Magnesium	3910	J	44.2	4370	J	43.4	5190	J	21.6	5440	J	21	9230	J	21.5	0 - 9,912
Manganese	30.2	J	2.2	32.3	J	2.2	47.7	J	1.1	29.1	J	1	39.7	J	1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.1		U	0.11	0 - 0.2
Nickel	3.4	J	8.8	6.1	J	8.7	4.9	J	4.3	3.4	J	4.2	4	J	4.3	0 - 9.7
Potassium	547	J	1110	631	J	1090	1090		539	788		524	648		538	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1		UJ	1.1	0 - 36.8
Silver		U	2.2		U	2.2		U	1.1		U	1		U	1.1	0 - 1.8
Sodium		U	1110		U	1090		U	539		U	524		U	538	0 - 834
Thallium		UJ	1.1	0.12	J	1.1		UJ	0.54		UJ	1		UJ	0.54	0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.8	NA
Vanadium	9.1		2.2	12.8		2.2	11.6		1.1	9.3		1	14.1		1.1	1.7 - 25.0
Zinc	6.9	J	4.4	11.9	J	4.3	8.9	J	2.2	5.8	J	2.1	5.8	J	2.2	0 - 20.7
4-Methylphenol		U	370	68	J	360		U	360		U	350				
bis(2-Ethylhexyl)phthalate		U	370	65	J	360		U	360		U	350		U	360	
Butyl benzyl phthalate		U	370	40	J	360		U	360		U	350		U	360	
2-Butanone (MEK)	2.5	J	11	22		11		U	11	4.7	J	10	5.6	J	11	
2-Hexanone		U	11	3.4	J	11		U	11		U	10		U	11	
4-Methyl-2-pentanone		U	11		U	11		U	11		U	10		U	11	
Acetone	4.4	J	11	57		11		U	11	9.3	J	10	9.9	J	11	
Toluene		U	5.5		U	5.4	1.8	J	5.4		U	5.2		U	5.4	
Total Petroleum Hydrocarbons		U	44.2	164		43.4		U	43.1		U	41.9		U	43.1	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-25

Chemical	Sample Interval (ft bgs) 0-.5			24-26			30-30.9			40-42			50-50.5			60-62			Backgroun Range[1]
	Result	Qual	R.L.	Result	Qual.	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	
Aluminum	7950		20.6	7690		11.3	7740		24.2	5570		10.8	4880		11.1	4070		10.7	596 - 10,79
Antimony		UJ	12.4	5.2	J	6.8		UJ	14.5		UJ	6.5		UJ	6.6		UJ	6.4	0 - 29.6
Arsenic	1.7		0.52	0.84		0.56	1.1		0.6	0.82		0.54	0.91		0.55	0.79		0.54	0 - 10.5
Barium	281	J	2.1	103		1.1	386		2.4	56.3		1.1	263		1.1	42.1		1.1	0 - 548
Beryllium	0.45		0.41	0.35		0.23	0.28	J	0.48	0.19	J	0.22	0.18	J	0.22	0.16	J	0.21	0 - 0.6
Cadmium		U	1		U	0.56		U	1.2		U	0.54		U	0.55		U	0.54	0 - 2.1
Calcium	118000		41.3	74700		22.5	143000		48.4	48900		21.7	81200		22.2	52500		21.4	0 - 166,115
Chromium	5.2		2.1	5.1	J	1.1	**14.1**	J	2.4	3.4	J	1.1	5.8	J	1.1	3		1.1	0.8 - 12.0
Cobalt	3.2		2.1	2.3		1.1	2.4		2.4	1.6		1.1	1.5		1.1	1.2		1.1	0 - 4.0
Copper	4.3		4.1	2.2	J	2.3	4.3	J	4.8	1.7	J	2.2	2.3		2.2	1.5	J	2.1	0 - 10.1
Iron	6140		20.6	5650	J	11.3	6290	J	24.2	3310	J	10.8	3310	J	11.1	2600		10.7	0 - 8,564
Lead	5.2		0.52	3.9	J	0.56	4.4	J	0.6	3.3	J	0.54	2.9	J	0.55	2.1		0.54	0 - 18.4
Magnesium	4090		41.3	5290	J	22.5	**13000**	J	48.4	7440	J	21.7	7540	J	22.2	5980		21.4	0 - 9,912
Manganese	81.8	J	2.1	52.2	J	1.1	55.9	J	2.4	33.8	J	1.1	37.4	J	1.1	41		1.1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.12		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	6.6	J	8.3	7.1	J	4.5	**68.6**	J	9.7	5.4	J	4.3	5.5	J	4.4	3.7	J	4.3	0 - 9.7
Potassium	2100		1030	1470		563	1300		1210	1160		542	1030		554	758		535	0 - 2,531
Selenium		UJ	1		UJ	1.1		UJ	1.2		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	2.1		U	1.1		U	2.4		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium		U	1030		U	563		U	1210		U	542		U	554		U	535	0 - 834
Thallium		UJ	1		UJ	1.1		UJ	2.4		UJ	1.1		UJ	1.1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.7	NA
Vanadium	17.1		2.1	15.2		1.1	19.4		2.4	11.8		1.1	11.2		1.1	11.9		1.1	1.7 - 25.0
Zinc	17.6		4.1	14	J	2.3	**59**	J	4.8	9.2	J	2.2	8.9	J	2.2	7.7		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	340		U	370		U	400		U	360		U	370	160	J	350	
Acetone		U	10		UJ	11		UJ	12		UJ	11	4.1	J	11	4.9	J	11	
Toluene		U	5.2		U	5.6		U	6		U	5.4		U	5.5	1.7	J	5.4	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-26

Chemical	Sample Interval (ft bgs)															Background Range[1]
	21.5-23			27-29			37-39			47-47.5			55-56.5			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	7090		21.9	6720		22.1	3520		10.8	4340		11.1	3210		10.6	596 - 10,796
Antimony		UJ	13.1		UJ	13.2		UJ	6.5		UJ	6.7		UJ	6.3	0 - 29.6
Arsenic	0.95		0.55	1.3		0.55	0.73		0.54	0.49	J	1.1	0.43	J	0.53	0 - 10.5
Barium	187		2.2	342		2.2	43.9		1.1	94.6		1.1	93.6		1.1	0 - 548
Beryllium		U	0.44		U	0.44		U	0.22		U	0.22		U	0.21	0 - 0.6
Cadmium		UJ	1.1		UJ	1.1		UJ	0.54		UJ	0.56		UJ	0.53	0 - 2.1
Calcium	163000		43.8	**167000**		44.1	62600		21.5	99300		22.2	32600		21.1	0 - 166,119
Chromium	11.1	J	2.2	11.6	J	2.2	3.4	J	1.1	**15.6**	J	1.1	10.2		1.1	0.8 - 12.0
Cobalt	2.2		2.2	2.2		2.2	1.5		1.1	2.1		1.1	1.4		1.1	0 - 4.0
Copper	2.4	J	4.4	2.7	J	4.4	1.5	J	2.2	4.3		2.2	2.3		2.1	0 - 10.1
Iron	4560	J	21.9	4600	J	22.1	2560	J	10.8	3370	J	11.1	2640		10.6	0 - 8,564
Lead	3	J	0.55	4.2	J	0.55	1.7	J	0.54	1.6	J	0.56	1.3		0.53	0 - 18.4
Magnesium	5700	J	43.8	5390	J	44.1	4180	J	21.5	**16300**	J	22.2	3980		21.1	0 - 9,912
Manganese	48.5	J	2.2	51.9	J	2.2	24.1	J	1.1	52.8	J	1.1	46.6		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	7.1	J	8.8	7	J	8.8	4.3	J	4.3	5	J	4.4	3.2	J	4.2	0 - 9.7
Potassium	1090		1090	1160		1100	735		538	679		555	585		528	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		U	2.2		U	2.2		U	1.1		U	1.1		U	1.1	0 - 1.8
Sodium		U	1090		UJ	1100		U	538		U	555		U	528	0 - 834
Thallium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	2.2		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	16.3		2.2	15.7		2.2	10.6		1.1	18.7		1.1	9.4		1.1	1.7 - 25.0
Zinc	11.8	J	4.4	11.8	J	4.4	5.7	J	2.2	6.6	J	2.2	6.1		2.1	0 - 20.7
bis(2-Ethylhexyl)phthalate		U	360	43	J	360		U	360		U	370		U	350	
2-Butanone (MEK)	17		11		U	11		U	11		U	11		U	11	
Acetone	130	J	11	11	J	11		UJ	11	26	J	11		U	11	
Methylene chloride	1.3	J	5.5		U	5.5		U	5.4		U	5.6		U	5.3	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

U = Not Detected J = Estimated Value UJ = Estimated Reporting Limit NA = Not Analyzed

Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-27

Chemical	Sample Interval (ft bgs)															Background Range[1]
	21-23			24.5-26.5			34.5-36.5			44.5-46			57.5-58.1			
	Result	ual	R.L.	Result	ual	R.L.	Result	Qual	R.L.	Result	Qual	R.L.	Result	Qual.	R.L.	
Aluminum	4410		10.8	5030		10.7	6270		10.9	3460		10.6	3060		10.4	596 - 10,796
Antimony		UJ	6.5		UJ	6.4		UJ	6.5		UJ	6.3		UJ	6.3	0 - 29.6
Arsenic	3.9		0.54	4.4		0.53	1.2		0.54	0.32	J	1.1	0.49	J	1	0 - 10.5
Barium	92		1.1	225		1.1	164		1.1	135		1.1	31		1	0 - 548
Beryllium	0.31		0.22	0.3		0.21	0.25		0.22		U	0.21		U	0.21	0 - 0.6
Cadmium		UJ	0.54		UJ	0.53		UJ	0.54		UJ	0.53		UJ	0.52	0 - 2.1
Calcium	43800		21.6	48200		21.4	57900		21.8	51900		21.1	68700		20.9	0 - 166,119
Chromium	7.1	J	1.1	8.5	J	1.1	5.5	J	1.1	3.5	J	1.1	5.2		1	0.8 - 12.0
Cobalt	1.9		1.1	2.3		1.1	0.98	J	1.1	1.5		1.1	1.3		1	0 - 4.0
Copper	3.4		2.2	4.2		2.1	2.6		2.2	1.9	J	2.1	1.8	J	2.1	0 - 10.1
Iron	5230	J	10.8	5230	J	10.7	4150	J	10.9	2340	J	10.6	2180		10.4	0 - 8,564
Lead	4.2	J	0.54	4	J	0.53	2.1	J	0.54	0.63	J	0.53	1.4		1	0 - 18.4
Magnesium	2240	J	21.6	3200	J	21.4	9100	J	21.8	6340	J	21.1	5060		20.9	0 - 9,912
Manganese	40.7	J	1.1	95.6	J	1.1	38	J	1.1	30.5	J	1.1	36.3		1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.1	0 - 0.2
Nickel	6.3	J	4.3	6.2	J	4.3	4.2	J	4.4	3.6	J	4.2	2.8	J	4.2	0 - 9.7
Potassium	1380		541	1250		534	1100		545	698		528	535		522	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1	0 - 36.8
Silver		U	1.1		U	1.1		U	1.1		U	1.1		U	1	0 - 1.8
Sodium		U	541		U	534		U	545		U	528		U	522	0 - 834
Thallium		UJ	0.54		UJ	1.1		UJ	1.1		UJ	0.53		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.4	NA
Vanadium	**36.7**		1.1	**31.1**		1.1	17.6		1.1	7.4		1.1	8.7		1	1.7 - 25.0
Zinc	12.7	J	2.2	14.3	J	2.1	10.2	J	2.2	6.6	J	2.1	5.3		2.1	0 - 20.7
Acetone	5	J	11		U	11	17		11	4.2	J	11	11		10	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Results that are shaded and in bold are concentrations above the maximum background range.

* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-28

Chemical	Sample Interval (ft bgs) 0-.5			20-21.5			25-27			35-37			45-47			55-57			Backgrour Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	ual	R.L.	
Aluminum	9700		10.4	3720	J	55.5	7070	J	22.4	6250	J	10.9	4600	J	10.4	4340		10.5	596 - 10,79
Antimony		R			UJ	33.3		UJ	13.5		UJ	6.5		UJ	6.2		UJ	6.3	0 - 29.6
Arsenic	1.7		0.52	0.93		0.56	0.81		0.56	0.52	J	1.1	0.43	J	0.52	0.36	J	1	0 - 10.5
Barium	281	J	1	201	J	5.6	170	J	2.2	95	J	1.1	49.7	J	1	30.6		1	0 - 548
Beryllium	0.46		0.21		U	1.1	0.29	J	0.45	0.21	J	0.22	0.13	J	0.21	0.13	J	0.21	0 - 0.6
Cadmium		UJ	0.52		U	2.8		U	1.1		UJ	0.54		UJ	0.52		UJ	0.52	0 - 2.1
Calcium	78500		20.7	**284000**		111	131000		44.8	61100		21.8	27000		20.8	17100		21	0 - 166,11
Chromium	7.4		1		U	5.6	4.4		2.2	4.6		1.1	3.9		1	3.9		1	0.8 - 12.0
Cobalt	3.3		1		U	5.6	3		2.2	1.1		1.1	1.6		1	1.3		1	0 - 4.0
Copper	6.3		2.1	3.3	J	11.1	2.4	J	4.5	1.8	J	2.2	1.5	J	2.1	1.6	J	2.1	0 - 10.1
Iron	7520		10.4	2360	J	55.5	4150	J	22.4	4230	J	10.9	3590	J	10.4	3320		10.5	0 - 8,564
Lead	9.6		1	1.8		0.56	2.7		0.56	2.5		0.54	1.8		0.52	1.8		0.52	0 - 18.4
Magnesium	3050		20.7	4610		111	6380		44.8	5860		21.8	3760		20.8	4060		21	0 - 9,912
Manganese	130	J	1	22.1	J	5.6	39.1	J	2.2	38.1	J	1.1	44.3	J	1	42.6		1	0 - 151.8
Mercury		U	0.1		U	0.11		U	0.11		U	0.11		U	0.1		U	0.1	0 - 0.2
Nickel	7.5		4.1		U	22.2	6.9	J	9	3.5	J	4.4	3.7	J	4.2	2.5	J	4.2	0 - 9.7
Potassium	2210		518	855	J	2780	1100	J	1120	1120		544	963		521	853		524	0 - 2,531
Selenium		UJ	1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1		UJ	0.52	0 - 36.8
Silver		U	1		UJ	5.6		UJ	2.2		UJ	1.1		UJ	1		U	1	0 - 1.8
Sodium		U	518		U	2780		U	1120		U	544		U	521		U	524	0 - 834
Thallium		U	1		UJ	2.2		UJ	1.1		UJ	1.1		UJ	0.52		R		0 - 6.2
Tin	NA			NA			NA			NA			NA			NA	U	10.5	NA
Vanadium	17.3		1	9.4		5.6	13.5		2.2	15.9		1.1	9.1		1	9.7		1	1.7 - 25.0
Zinc	**21.8**		2.1	10.3	J	11.1	10.5		4.5	10		2.2	8		2.1	7.7		2.1	0 - 20.7
Acetone		U	10		U	11	6	J	11	3	J	11	1.9	J	10		U	10	
Total Organic Carbon	0.57		0.2																
Total Petroleum Hydrocarbons	85.6		41.4		U	44.4		U	44.8		U	43.5		U	41.6		U	41.9	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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* Metals concentrations are in milligrams per kilogram (mg/kg), organic concentrations are in micrograms per kilogram (µg/kg)

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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-29

Chemical	Sample Interval (ft bgs) 14-16			20-22			30-32			40-42			50-51.8			Background Range[1]
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	7560	J	11.3	6030	J	22.6	5290	J	10.9	4540	J	22	4080		11	596 - 10,796
Antimony		UJ	6.8		UJ	13.5		UJ	6.5		UJ	13.2		UJ	6.6	0 - 29.6
Arsenic	1.7		0.56	0.89		0.56	0.74		0.54	0.84		0.55	0.56		0.55	0 - 10.5
Barium	**1920 J**		1.1	**922 J**		2.3	130	J	1.1	90.1	J	2.2	50.9		1.1	0 - 548
Beryllium	0.49		0.23	0.31	J	0.45	0.16	J	0.22		U	0.44	0.14	J	0.22	0 - 0.6
Cadmium		U	0.56		U	1.1		UJ	0.54		U	1.1		UJ	0.55	0 - 2.1
Calcium	74700		22.6	**186000**		45.1	78500		21.8	124000		44	62000		21.9	0 - 166,119
Chromium	6.1		1.1	3.6		2.3	4.7		1.1	3.9		2.2	5.3		1.1	0.8 - 12.0
Cobalt	2.2		1.1	1.9	J	2.3	1.4		1.1	2.2		2.2	1	J	1.1	0 - 4.0
Copper	3.8		2.3	2.7	J	4.5	1.7	J	2.2	2.1	J	4.4	1.6	J	2.2	0 - 10.1
Iron	5590	J	11.3	3570	J	22.6	3610	J	10.9	3320	J	22	3440		11	0 - 8,564
Lead	5.8		0.56	2.9		0.56	2.3		0.54	1.8		0.55	2		0.55	0 - 18.4
Magnesium	3650		22.6	5330		45.1	5800		21.8	5150		44	5410		21.9	0 - 9,912
Manganese	74.3	J	1.1	33.7	J	2.3	36.3	J	1.1	41.8	J	2.2	36.7		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	8.3		4.5	5.6	J	9	4.6		4.4	4.5	J	8.8	4.1	J	4.4	0 - 9.7
Potassium	2040		565	1290		1130	886		544	757	J	1100	679		548	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1		UJ	1.1	0 - 36.8
Silver		UJ	1.1		UJ	2.3		UJ	1.1		UJ	2.2		U	1.1	0 - 1.8
Sodium		U	565		U	1130		U	544		U	1100		U	548	0 - 834
Thallium	0.12	J	1.1		UJ	2.3		UJ	1.1	0.13	J	1.1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	11	NA
Vanadium	16.3		1.1	10.9		2.3	13.7		1.1	9		2.2	9.7		1.1	1.7 - 25.0
Zinc	13.4		2.3	10.2		4.5	8		2.2	8.6		4.4	7.8		2.2	0 - 20.7
Acetone	6.3	J	11		UJ	11		U	11		U	11	4.3	J	11	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.
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Source: Woodward-Clyde, 1998

Table 27-3
Metals Results and Detected Concentrations for Other Chemical Compounds
SWMU 113

BORING 113-30

Chemical	Sample Interval (ft bgs)															Background[1] Range
	14.5-16.5			20-21.3			30-32			40-42			50-52			
	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	Result	Qual.	R.L.	
Aluminum	7330	J	11.2	3690	J	54.6	4680	J	11	4240	J	10.7	3450		10.6	596 - 10,796
Antimony		UJ	6.7		UJ	32.8		UJ	6.6		UJ	6.4		UJ	6.3	0 - 29.6
Arsenic	1.6		0.56	0.82		0.55	0.54	J	1.1	0.55		0.54	0.34	J	1.1	0 - 10.5
Barium	279	J	1.1	**3470**	J	5.5	168	J	1.1	125	J	1.1	26.8		1.1	0 - 548
Beryllium	0.48		0.22		U	1.1		U	0.22		U	0.21		U	0.21	0 - 0.6
Cadmium		UJ	0.56		UJ	2.7		UJ	0.55		UJ	0.54		UJ	0.53	0 - 2.1
Calcium	69200		22.3	**229000**		109	100000		22	45100		21.4	14900		21.2	0 - 166,119
Chromium	7.6		1.1		U	5.5	4.9		1.1	4.1		1.1	4.1		1.1	0.8 - 12.0
Cobalt	2.9		1.1		U	5.5	1.4		1.1	1.4		1.1	1.3		1.1	0 - 4.0
Copper	4.3		2.2		U	10.9	1.8	J	2.2	2.3		2.1	1.5	J	2.1	0 - 10.1
Iron	6560	J	11.2	2690	J	54.6	2960	J	11	2830	J	10.7	2710		10.6	0 - 8,564
Lead	5.4		2.8	1.9		0.55	2.1		0.55	1.4		0.54	1.2		0.53	0 - 18.4
Magnesium	4500		22.3	4450		109	7580		22	5720		21.4	4400		21.2	0 - 9,912
Manganese	81	J	1.1	22.6	J	5.5	28.3	J	1.1	34.8	J	1.1	33.4		1.1	0 - 151.8
Mercury		U	0.11		U	0.11		U	0.11		U	0.11		U	0.11	0 - 0.2
Nickel	**23.9**		4.5		U	21.8	3.7	J	4.4	3.8	J	4.3	3.1	J	4.2	0 - 9.7
Potassium	2200		559	683	J	2730	729		550	887		535	707		529	0 - 2,531
Selenium		UJ	1.1		UJ	1.1		UJ	11		UJ	1.1		UJ	1.1	0 - 36.8
Silver		UJ	1.1		UJ	5.5		UJ	1.1		UJ	1.1		U	1.1	0 - 1.8
Sodium		U	559		UJ	2730		U	550		U	535		U	529	0 - 834
Thallium		UJ	1.1		UJ	2.2		UJ	1.1		UJ	1.1		R		0 - 6.2
Tin	NA			NA			NA			NA			NA	U	10.6	NA
Vanadium	18.1		1.1	9.9		5.5	17.1		1.1	7.5		1.1	7.9		1.1	1.7 - 25.0
Zinc	13.7		2.2	8.5	J	10.9	7.1		2.2	7.8		2.1	6.1		2.1	0 - 20.7
Acetone		U	11	55		11		U	11	7.2	J	11	5.2	J	11	

(1) Woodward-Clyde. 1994. Concentrations of Selected Naturally Occurring Chemical Constituents in Soil and Groundwater, Cannon AFB, New Mexico.

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Source: Woodward-Clyde, 1998

Table 28-1a
Organic Analytical Results
AOC D

[illegible]	[illegible]	[illegible]	[illegible]
VOLATILE ORGANICS (mg/kg) (Method 8260)	ND	ND	ND
SEMIVOLATILE ORGANICS (mg/kg) (Method 8270)	ND	ND	ND
TRPH (mg/kg) (Method 9071	ND	ND	ND

Page 1 of 1
Source: IMS, P.C., 1997

Table 28-1b
Analytical Data Summary of Detected Metals
AOC D

ANALYTES	CAN-D-SB08-07			CAN-D-SB08-15			CAN-D-SB08-25		
	Results	RL	Qual	Results	RL	Qual	Results	RL	Qual
METALS (mg/kg)									
Aluminum	2960	20	J	1920	20	J	7710	20	J
Antimony	<	10	UJ	<	10	UJ	<	10	UJ
Arsenic	0.509	0.5	J	1.42	0.5	J	0.679	0.5	J
Barium	43.5	2	J	206	2	J	81.3	2	J
Calcium	84200	50		277000	500		7610	50	
Chromium	3.92	2		<	2		5.97	2	
Cobalt	2.63	2		4.48	2		3.17	2	
Copper	3.14	1		2.52	1		5.86	1	
Iron	2120	10		1590	10		7060	10	
Lead	2.6	1	J	1.2	0.2	J	7.6	1	J
Magnesium	2830	10	J	5830	10	J	2010	10	J
Manganese	70	1		78.5	1		45	1	
Nickel	5.1	2		3.53	2		8.59	2	
Potassium	1010	100	J	404	100	J	2460	100	J
Sodium	127	100		147	100		152	100	
Vanadium	4.96	2		10.8	2		11.5	2	
Zinc	5.51	3		4.05	3		28.4	3	

RL Reporting Limit
< Less than the Reporting Limit
J Estimated
UJ Analyte below RL. The RL is approximate.

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Source: IMS, P.C., 1997

Table 28-1c
Asbestos Analytical Results
AOC D

Description	Color	Asbestos %	Asbestos Type	Non-Asbestos %	Non-Asbestos Type
CAN-D-SB08-AB	Brown	20.0	Chrysotile	60.0 20.0	Gypsum Other Non-fibrous
CAN-D-AB01	Brown	5.0	Chrysotile	55.0 20.0 20.0	Gypsum Quartz Other Non-fibrous

Page 1 of 1
Source: IMS, P.C., 1997

Table 28-1d
Detected Metal Concentrations Compared to USEPA Region 6 Screening Levels
AOC D

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aluminum	2,960 J	1,920 J	7,710 J	77,000 N	SAT
Arsenic	0.509 J	1.42 J	0.679 J	22 N 0.32 C	610 N I 2.0 C
Barium	43.5 J	206 J	81.3 J	5,300 N	SAT
Calcium	84,200	277,000	7,610	-	-
Cobalt	2.63	4.48	3.17	4,700 N I	SAT
Chromium	3.92	< 2.0	5.97	210 N	1,600 N
Copper	3.14	2.52	5.86	2,800 N	63,000 N
Iron	2,120	1,590	7,060	23,000 N I	SAT
Lead	2.6 J	1.2 J	7.6 J	400 N	2,000 N
Magnesium	2,830 J	5,830 J	2,010 J	-	-
Manganese	70	78.5	45	380 N	8,300 N
Nickel	5.10	3.53	8.59	1,500 N	34,000 N
Potassium	1,010 J	404 J	2,460 J	-	-
Sodium	127	147	152	-	-
Vanadium	4.96	10.8	11.5	540 N	12,000 N
Zinc	5.51	4.05	28.4	23,000 N	SAT

C Carcinogenic effects
I Ingestion route only
J Estimated
N Non-carcinogenic effects
SAT Risk based value above expected saturation point
1 . USEPA Region 6, Human Health Media-Specific Screening Levels, October 30, 1996.

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Source: IMS, P.C., 1997

Table 29-1a
Detected Compounds in Surface Soils
AOC E

FIELD ID			CAE-HA01-001			CAE-HA04-002			CAE-SB01-002			CAE-SB02-002		
COLLECT DATE			12/04/98			12/04/98			04/30/98			04/30/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
Toluene 238	10	1/8	<	34	U	<	34	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)														
Phenol 18000	120	1/8	<	380	U	<	370	U	<	370	U	<	380	U
PESTICIDES/PCB (µg/kg)														
DDE 17.2	3.4	1/8	3.4	3.8	J	<	3.7	U	<	7.4	U	<	7.5	U
DDT 17.2	3.9	2/8	3.7	3.8	J	<	3.7	U	<	7.4	U	<	7.5	U
METALS (mg/kg)														
Aluminum	19900	8/8	12400	21		12900	20		19900	21		17900	22	
Antimony	3.2	3/8	2.6	6.2	J	3.2	6	J	<	6.3	U	<	6.5	U
Arsenic	4.6	8/8	4.6	4.9	J	4.5	0.98		2.6	2		3.5	2.1	
Barium	163	8/8	97	21		163	20		104	21	J	100	22	J
Beryllium	0.87	8/8	0.71	0.51		0.73	0.5		0.87	0.53		0.87	0.55	
Cadmium	0.46	3/8	<	0.51	U	<	0.5	U	0.22	0.53	J	0.32	0.55	J
Calcium	9450	8/8	2540	510		6580	500		5570	530		2710	550	
Chromium	14.3	8/8	10.7	1		10.2	1		14.3	1.1		13.4	1.1	
Cobalt	5.6	8/8	4.6	5.1	J	4.3	5	J	5.2	5.3	J	5.6	5.5	
Copper	9.2	8/8	8.8	2.6		6.8	2.5		8.4	2.6		9.2	2.7	
Iron	14700	8/8	11800	10		10900	10		14400	11		14700	11	
Lead	11.9	8/8	10	1.5		8.1	0.29		8.3	0.3		9	0.32	
Magnesium	2580	8/8	1800	510		2280	500		2540	530		2320	550	
Manganese	284	8/8	222	1.5		122	1.5		198	1.6		205	1.6	
Mercury	0.04	1/8	<	0.043	U	<	0.041	U	<	0.23	U	<	0.2	UJ
Nickel	12.5	8/8	10.1	4.1		10.9	4		12.3	4.2		11.8	4.4	
Potassium	3140	8/8	2290	510		2280	500		3140	530		2590	550	
Sodium	43.7	8/8	23.8	510	J	29.5	500	J	38.6	530	J	35	550	J
Thallium	0.25	4/8	0.16	0.98	J	0.25	0.98	J	0.23	0.99	J	<	1.1	U
Vanadium	30.1	8/8	23.8	5.1		21.8	5		29.4	5.3		30.1	5.5	
Zinc	36	8/8	25.7	2.1	J	22.4	2		34.1	2.1		36	2.2	

mg/kg - milligram per killogram
µg/kg - microgram per killogram
J - Estimated
U - Nondetect

Source: URS Greiner Woodward Clyde, 1999

Table 29-1a
Detected Compounds in Surface Soils
AOC E

FIELD ID			CAE-SB03-002			CAE-SB04-002			CAE-SB05-002			CAE-SB06-002		
COLLECT DATE			04/30/98			04/30/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
Toluene	10	1/8	<	11	U	<	12	U	<	11	U	10	11	
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)														
Phenol	120	1/8	120	380		<	390	U	<	370	U	<	370	U
PESTICIDES/PCB (µg/kg)														
DDE	3.4	1/8	<	7.5	U	<	7.7	U	<	7.4	U	<	7.3	U
DDT	3.9	2/8	<	7.5	U	<	7.7	U	<	7.4	U	3.9	7.3	
METALS (mg/kg)														
Aluminum	19900	8/8	15900	21		16200	21		18200	21		16900	21	
Antimony	3.2	3/8	<	6.4	U	<	6.4	U	<	6.3	U	<	6.3	U
Arsenic	4.6	8/8	3	2.2		3.6	2		3.6	2.1		2.9	2.2	
Barium	163	8/8	112	21	J	52	21		109	21		81.7	21	
Beryllium	0.87	8/8	0.66	0.53		0.71	0.53		0.79	0.52		0.7	0.52	
Cadmium	0.46	3/8	0.46	0.53	J	<	0.53	U	<	0.52	U	<	0.52	U
Calcium	9450	8/8	9450	530		4960	530		4720	520		2370	520	
Chromium	14.3	8/8	12.8	1.1		12.1	1.1		12.6	1		12.3	1	
Cobalt	5.6	8/8	5.1	5.3	J	4.9	5.3	J	4.8	5.2	J	4.6	5.2	J
Copper	9.2	8/8	7.6	2.7		9.2	2.6		8.1	2.6		7.7	2.6	
Iron	14700	8/8	12500	11		12600	11		13100	10		12200	10	
Lead	11.9	8/8	11.9	0.33		9.3	0.59		8.4	0.32		7.6	0.32	
Magnesium	2580	8/8	2170	530		2140	530		2580	520		2170	520	
Manganese	284	8/8	284	1.6		205	1.6		156	1.6		161	1.6	
Mercury	0.04	1/8	<	0.22	U	<	0.22	U	0.04	0.22	J	<	0.21	U
Nickel	12.5	8/8	10.2	4.3		10.6	4.2		12.3	4.2		12.5	4.2	
Potassium	3140	8/8	2790	530		2650	530		3010	520		2690	520	
Sodium	43.7	8/8	43.7	530	J	34.4	530	J	35.2	520	J	42.5	520	J
Thallium	0.25	4/8	<	1.1	UJ	0.22	0.99	J	<	1.1	U	<	1.1	U
Vanadium	30.1	8/8	26	5.3		26.3	5.3		25.3	5.2		22.5	5.2	
Zinc	36	8/8	32.9	2.1		29.8	2.1		29.4	2.1		27.6	2.1	

mg/kg - milligram per kilogram
µg/kg - microgram per kilogram
J - Estimated
U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-HA01-005			CAE-HA01-010			CAE-HA02-005			CAE-HA02-008			CAE-HA02-013		
COLLECT DATE			12/04/98			12/04/98			12/04/98			12/04/98			12/04/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	7	1/52	<	34	U	<	32	U	<	33	U	<	32	U	<	32	U
Methyl Ethyl Ketone	46	3/52	<	57	U	<	53	U	<	56	U	<	53	U	<	54	U
Methyl Isobutyl Ketone	72	5/52	<	57	U	<	53	U	<	56	U	<	53	U	<	54	U
Toluene	12	2/52	<	34	U	<	32	U	<	33	U	<	32	U	<	32	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Di-N-Butyl Phthalate	300	1/52	<	380	U	<	350	U	<	370	U	<	350	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	380	U	<	350	U	<	370	U	<	350	U	<	360	U
N-Nitrosodiphenylamine	43	2/52	<	380	U	<	350	U	<	370	U	<	350	U	<	360	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/52	<	3.8	U	<	3.5	U	<	3.7	U	<	3.5	U	<	3.5	U
DDT	4.6	1/52	<	3.8	U	<	3.5	U	<	3.7	U	<	3.5	U	<	3.5	U
METALS (mg/kg)																	
Aluminum	19000	52/52	5240	21		7460	19		13400	19		9790	19		9620	19	
Antimony	2.8	7/52	2.5	6.2	J	<	5.8	U	2.8	5.7	J	<	5.7	U	2.8	5.8	J
Arsenic	4.4	52/52	3.3	0.98		2.3	0.9		4.3	0.96		4.3	0.91		4	0.93	
Barium	1740	52/52	163	21		396	19		95.2	19		441	19		65.7	19	
Beryllium	0.8	52/52	0.31	0.51	J	0.5	0.48		0.74	0.48		0.56	0.48		0.64	0.48	
Cadmium	0.38	16/52	<	0.51	U	<	0.48	U	<	0.48	U	<	0.48	U	<	0.48	U
Calcium	338000	52/52	226000	5100		133000	4800		2270	480		77800	4800		82100	4800	
Chromium, Total	26.7	52/52	18.4	1		11.9	0.96		10.3	0.95		11.2	0.96		11.6	0.97	
Cobalt	4.7	51/52	2.1	5.1	J	1.6	4.8	J	4.6	4.8	J	3.4	4.8	J	3.3	4.8	J
Copper	10.5	52/52	2.9	2.6		2.4	2.4		8.5	2.4		4.8	2.4		4.9	2.4	
Iron	12100	52/52	3750	10		4170	9.6		11400	9.5		7840	9.6		7380	9.7	
Lead	9.1	52/52	3.1	3.1		4.7	0.27		9.1	0.29		7.6	0.27		7.6	0.28	
Magnesium	17600	52/52	2820	510		3880	480		2190	480		3310	480		3810	480	
Manganese	180	52/52	42.4	1.5		50.5	1.4		180	1.4		125	1.4		126	1.5	
Mercury	0.07	8/52	<	0.042	U	<	0.041	U	<	0.043	U	<	0.042	U	<	0.042	U
Nickel	11.9	52/52	5	4.1		4.7	3.9		10.7	3.8		8.5	3.8		7.1	3.9	
Potassium	3020	52/52	952	13		1450	480		2250	480		1800	480		1920	480	
Selenium	0.81	3/52	<	9.8	U	<	4.5	U	<	4.8	U	<	4.5	U	<	4.6	U
Sodium	353	52/52	53.9	510	J	332	480	J	43	480	J	216	480	J	268	480	J
Thallium	0.25	3/52	<	0.98	U	<	0.9	U	<	0.96	U	<	0.91	U	<	0.93	U
Vanadium	32.2	52/52	11.2	5.1		9.3	4.8		21.1	4.8		24.8	4.8		22.5	4.8	
Zinc	29.7	52/52	9.3	2.1		11.5	1.9		27.8	1.9		19.2	1.9		18.2	1.9	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-HA03-003			CAE-HA03-008			CAE-HA03-13			CAE-HA04-006			CAE-HA04-010		
COLLECT DATE			12/04/98			12/04/98			12/04/98			12/04/98			12/05/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	7	1/52	<	34	U	<	33	U	<	32	U	<	32	U	<	33	U
Methyl Ethyl Ketone	46	3/52	<	56	U	<	54	U	<	54	U	<	53	U	<	56	U
Methyl Isobutyl Ketone	72	5/52	<	56	U	<	54	U	<	54	U	<	53	U	<	56	U
Toluene	12	2/52	<	34	U	<	33	U	<	32	U	<	32	U	<	33	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Di-N-Butyl Phthalate	300	1/52	<	370	U	<	360	U	<	360	U	<	350	U	<	370	U
Di-N-Octylphthalate	170	1/52	<	370	U	<	360	U	<	360	U	<	350	U	<	370	U
N-Nitrosodiphenylamine	43	2/52	<	370	U	<	360	U	<	360	U	<	350	U	<	370	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/52	<	3.7	U	<	3.6	U	<	3.5	U	<	3.5	U	<	3.7	U
DDT	4.6	1/52	<	3.7	U	<	3.6	U	<	3.5	U	<	3.5	U	<	3.7	U
METALS (mg/kg)																	
Aluminum	19000	52/52	13600	20		7480	20		7490	18		3660	89		8670	19	
Antimony	2.8	7/52	2.9	6	J	<	6	U	2	5.3	J	<	27	U	2.2	5.8	J
Arsenic	4.4	52/52	4.4	0.94		3.3	0.93		2.9	0.92		2.7	0.92		4.4	0.96	
Barium	1740	52/52	97.6	20		237	20		201	18		1310	89		150	19	
Beryllium	0.8	52/52	0.75	0.5		0.43	0.5	J	0.52	0.44		0.31	2.2	J	0.51	0.48	
Cadmium	0.38	16/52	<	0.5	U	0.19	0.5	J	<	.0.44	U	<	2.2	U	0.2	0.48	J
Calcium	338000	52/52	4850	500		197000	5000		59000	4400		121000	2200		95800	4800	
Chromium, Total	26.7	52/52	10.3	0.99		17.5	0.99		9.1	0.89		9.4	4.4		12.4	0.97	
Cobalt	4.7	51/52	4.7	5	J	2.4	5	J	2.9	4.4	J	<	22	U	3.1	4.8	J
Copper	10.5	52/52	7.8	2.5		3.5	2.5		3.3	2.2		2.2	11	J	4.7	2.4	
Iron	12100	52/52	11400	9.9		5240	9.9		6010	8.9		2340	44		6530	9.7	
Lead	9.1	52/52	8.5	0.28		4.2	0.28		6.4	0.28		3.5	0.27		6.2	0.29	
Magnesium	17600	52/52	2190	500		3160	500		3250	440		2620	2200		3050	480	
Manganese	180	52/52	155	1.5		57.3	1.5		104	1.3		30.2	6.6		77.6	1.4	
Mercury	0.07	8/52	<	0.039	U	<	0.041	U	<	0.038	U	<	0.041	U	<	0.04	U
Nickel	11.9	52/52	11.2	4		6	4		6.7	3.6		3.5	3.5	J	8.1	3.9	
Potassium	3020	52/52	2340	500		1350	500		1760	440		675	2200	J	1680	480	
Selenium	0.81	3/52	<	24		<	9.3	U	<	4.6	U	<	9.2	U	<	24	U
Sodium	353	52/52	42.4	500	J	64.9	500	J	127	440	J	132	2200	J	46.9	480	J
Thallium	0.25	3/52	0.18	0.94	J	<	0.93	U	<	0.92	U	<	0.92	U	<	0.96	U
Vanadium	32.2	52/52	21.5	5		15.5	5		14.6	4.4		4.8	22	J	19.5	4.8	
Zinc	29.7	52/52	24	2		12.6	2		14.9	1.8		5.9	8.9	J	15.3	1.9	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB01-005			CAE-SB01-010			CAE-SB01-020			CAE-SB01-030			CAE-SB01-040			CAE-SB02-005		
COLLECT DATE			04/30/98			04/30/98			04/30/98			04/30/98			04/30/98			04/30/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																				
Carbon Disulfide	7	1/52	<	11	U	<	12	U	<	12	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone	46	3/52	<	19	UJ	<	20	UJ	<	19	UJ	<	18	UJ	<	18	UJ	<	18	UJ
Methyl Isobutyl Ketone	72	5/52	<	19	U	<	20	U	<	19	U	<	18	U	<	18	U	<	18	U
Toluene	12	2/52	<	11	U	<	12	U	<	12	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																				
Di-N-Butyl Phthalate	300	1/52	<	370	U	<	390	U	<	390	U	<	360	U	<	360	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	370	U	<	390	U	<	390	U	<	360	U	<	360	U	<	360	U
N-Nitrosodiphenylamine	43	2/52	<	370	U	<	390	U	<	390	U	<	360	U	<	360	U	<	360	U
PESTICIDES/PCB (µg/kg)																				
DDE	3.6	1/52	<	7.4	U	<	7.8	U	<	7.7	U	<	7.2	U	<	7.1	U	<	7.2	U
DDT	4.6	1/52	<	7.4	U	<	7.8	U	<	7.7	U	<	7.2	U	<	7.1	U	<	7.2	U
METALS (mg/kg)																				
Aluminum	19000	52/52	16700	21		8260	24		4000	22		10700	20	J	5260	19		18500	21	
Antimony	2.8	7/52	<	6.2	UJ	<	7.1	UJ	<	6.7	UJ	<	6	UJ	<	5.8	UJ	<	6.3	UJ
Arsenic	4.4	52/52	1.9	2	J	1.6	2.1	J	1.8	2.1	J	1.1	2.1	J	0.89	1.9	J	2.2	2.1	
Barium	1740	52/52	144	21	J	98.9	24	J	560	22	J	1290	20	J	28.7	19	J	130	21	J
Beryllium	0.8	52/52	0.69	0.52		0.39	0.59	J	0.16	0.56	J	0.38	0.5	J	0.23	0.48	J	0.74	0.53	
Cadmium	0.38	16/52	0.15	0.52	J	<	0.59	U	<	0.56	U	<	0.5	U	<	0.48	U	0.37	0.53	
Calcium	338000	52/52	58000	520		212000	2900		338000	5600		55500	2500	J	29700	480		7280	530	
Chromium, Total	26.7	52/52	14.6	1		18	1.2	J	26.7	1.1		9.1	0.99		6.1	0.96		13.5	1.1	
Cobalt	4.7	51/52	4.3	5.2	J	1.8	5.9	J	1.8	5.6	J	1.2	5	J	1.5	4.8	J	4.2	5.3	
Copper	10.5	52/52	7.9	2.6		2.3	2.9	J	3.1	2.8		1.8	2.5	J	1.2	2.4	J	7.1	2.6	
Iron	12100	52/52	11200	10		5010	12		2260	11		6200	9.9	J	4140	9.6		12100	11	
Lead	9.1	52/52	5.8	0.3		3.4	0.32		0.92	0.32		3	0.31		2.3	0.29		7.5	0.31	
Magnesium	17600	52/52	2730	520		3670	590		6010	560		6330	500		4010	480		2970	530	
Manganese	180	52/52	166	1.5		49.2	1.8		20.4	1.7		42.5	1.5		45	1.4		134	1.6	
Mercury	0.07	8/52	<	0.15	U	<	0.19	UJ	<	0.18	U	<	0.17	UJ	<	0.21	UJ	<	0.19	U
Nickel	11.9	52/52	10.6	4.1		6.2	4.7		4	4.5	J	5.6	4		3.7	3.9	J	11.5	4.2	
Potassium	3020	52/52	2760	520		1560	590		858	560		2220	500		1090	480		2930	530	
Selenium	0.81	3/52	<	2.7	U	<	2.6	U	<	2.2	U	<	2.5	U	<	2.5	U	<	2.5	U
Sodium	353	52/52	47.1	520	J	141	590	J	197	560	J	173	500	J	72.8	480	J	48.1	530	
Thallium	0.25	3/52	<	1	UJ	<	1.1	U	<	1.1	U	<	1	U	<	0.96	U	<	1	U
Vanadium	32.2	52/52	23.3	5.2		13.6	5.9		8.9	5.6		16.6	5		12.4	4.8		24.3	5.3	
Zinc	29.7	52/52	28.5	2.1		13.3	2.4		7.4	2.2		13.9	2	J	9	1.9		28.9	2.1	

mg/kg - milligram per killogram J - Estimated
µg/kg - microgram per killogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB02-010			CAE-SB02-020			CAE-SB02-030			CAE-SB02-040			CAE-SB03-005			CAE-SB03-010		
COLLECT DATE			04/30/98			04/30/98			04/30/98			04/30/98			04/30/98			04/30/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																				
Carbon Disulfide	7	1/52	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U	<	12	U
Methyl Ethyl Ketone	46	3/52	<	18	UJ	<	18	UJ	<	18	UJ	<	18	UJ	<	19	UJ	<	21	UJ
Methyl Isobutyl Ketone	72	5/52	<	18	U	<	18	U	<	18	U	<	18	U	<	19	U	<	21	U
Toluene	12	2/52	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U	<	12	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																				
Di-N-Butyl Phthalate	300	1/52	<	360	U	<	360	U	<	350	U	<	350	U	<	380	U	<	410	U
Di-N-Octylphthalate	170	1/52	<	360	U	<	360	U	<	350	U	<	350	U	<	380	U	<	410	U
N-Nitrosodiphenylamine	43	2/52	<	360	U	<	360	U	<	350	U	<	350	U	<	380	U	43	410	
PESTICIDES/PCB (µg/kg)																				
DDE	3.6	1/52	<	7.1	U	<	7.1	U	<	7	U	<	6.9	U	<	7.4	U	<	8.2	U
DDT	4.6	1/52	<	7.1	U	<	7.1	U	<	7	U	<	6.9	U	<	7.4	U	<	8.2	U
METALS (mg/kg)																				
Aluminum	19000	52/52	17600	21		4210	21		4250	20		4260	19		16600	22		10900	24	
Antimony	2.8	7/52	<	6.2	UJ	<	6.3	UJ	<	6.1	UJ	<	5.8	UJ	<	6.5	UJ	<	7.2	UJ
Arsenic	4.4	52/52	2.9	2		1.9	2	J	1.3	1.9	J	1	2	J	2.6	2.2		3.1	2.4	
Barium	1740	52/52	352	21	J	1650	21	J	355	20	J	32.6	19	J	130	22	J	366	24	J
Beryllium	0.8	52/52	0.72	0.52		0.16	0.52	J	0.16	0.51	J	0.2	0.48	J	0.67	0.54		0.72	0.6	
Cadmium	0.38	16/52	0.15	0.52	J	<	0.52	U	0.22	0.51	J	0.13	0.48	J	0.34	0.54	J	0.17	0.6	J
Calcium	338000	52/52	84500	2600		254000	2600		235000	2500		36800	480		70900	2700		203000	3000	
Chromium, Total	26.7	52/52	16.2	1		19.7	1		18.8	1		5.8	0.96		16.4	1.1		19.3	1.2	
Cobalt	4.7	51/52	4.7	5.2	J	0.66	5.2	J	1.6	5.1	J	1.9	4.8	J	4.3	5.4	J	3.1	6	J
Copper	10.5	52/52	6	2.6		1.7	2.6	J	2.1	2.5	J	1.3	2.4	J	7.4	2.7		4.4	3	
Iron	12100	52/52	11300	10		2170	10		2260	10		3260	9.6		10600	11		6810	12	
Lead	9.1	52/52	5.5	0.3		1.1	0.3		1.2	0.28		2.2	0.29		6.5	0.33		7	0.36	
Magnesium	17600	52/52	5120	520		13700	520		13500	510		3480	480		3010	540		4370	600	
Manganese	180	52/52	180	1.6		16.3	1.6		20.1	1.5		42	1.4		123	1.6		96.4	1.8	
Mercury	0.07	8/52	<	0.2	UJ	<	0.16	UJ	<	0.16	UJ	<	0.2	UJ	<	0.18	U	<	0.24	U
Nickel	11.9	52/52	10.5	4.2		5.7	4.2		4.8	4.1		3.6	3.9	J	10.5	4.3		7	4.8	
Potassium	3020	52/52	2890	520		662	520		608	510		915	480		2840	540		1970	600	
Selenium	0.81	3/52	<	2.4	UJ	<	2.4	U	<	2.4	U	<	2.4	U	<	2.3	U	<	3.1	U
Sodium	353	52/52	353	520	J	251	520	J	180	510	J	73.1	480	J	43.3	540	J	227	600	J
Thallium	0.25	3/52	<	0.99	U	<	1	U	<	0.94	U	<	0.98	U	<	1.1	UJ	<	1.2	UJ
Vanadium	32.2	52/52	32.2	5.2		14	5.2		15.8	5.1		8.5	4.8		24	5.4		20.1	6	
Zinc	29.7	52/52	29.7	2.1		6	2.1		6.6	2		8.4	1.9		29.5	2.2		19.3	2.4	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB03-020			CAE-SB03-030			CAE-SB03-040			CAE-SB04-005			CAE-SB04-010		
COLLECT DATE			04/30/98			04/30/98			04/30/98			04/30/98			04/30/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	7	1/52	<	13	U	<	11	U	<	12	U	<	11	U	<	11	U
Methyl Ethyl Ketone	46	3/52	<	22	UJ	<	19	UJ	<	20	UJ	<	18	U	<	18	U
Methyl Isobutyl Ketone	72	5/52	<	22	U	<	19	U	<	20	U	<	18	U	<	18	U
Toluene	12	2/52	<	13	U	<	11	U	<	12	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Di-N-Butyl Phthalate	300	1/52	<	440	U	<	380	U	<	410	U	<	360	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	440	U	<	380	U	<	410	U	<	360	U	<	360	U
N-Nitrosodiphenylamine	43	2/52	<	440	U	38	380		<	410	U	<	360	U	<	360	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/52	<	8.7	U	<	7.5	U	<	8.1	U	<	7.2	U	<	7.1	U
DDT	4.6	1/52	<	8.7	U	<	7.5	U	<	8.1	U	<	7.2	U	<	7.1	U
METALS (mg/kg)																	
Aluminum	19000	52/52	15000	25		5750	21		5770	24		14800	20		9050	18	
Antimony	2.8	7/52	<	7.6	UJ	<	6.4	UJ	<	7.1	UJ	<	5.9	U	<	5.4	U
Arsenic	4.4	52/52	2.6	2.6		1.2	2.2	J	1.3	2.3	J	2.7	2.1		2.5	1.8	
Barium	1740	52/52	155	25	J	169	21	J	81	24	J	65	20		238	18	
Beryllium	0.8	52/52	0.64	0.63		0.2	0.53	J	0.26	0.59	J	0.6	0.49		0.46	0.45	
Cadmium	0.38	16/52	0.38	0.63	J	<	0.53	U	<	0.59	U	<	0.49	U	0.13	0.45	J
Calcium	338000	52/52	117000	3200		233000	2700		116000	2900		29000	490		118000	4500	
Chromium, Total	26.7	52/52	16.9	1.3		18.8	1.1		12.5	1.2		11.2	0.98		11.9	0.89	
Cobalt	4.7	51/52	3.2	6.3	J	3.1	5.3	J	1.3	5.9	J	3.6	4.9	J	2.1	4.5	J
Copper	10.5	52/52	4.5	3.2		1.5	2.7	J	5.9	2.9		6.2	2.5		3.1	2.2	
Iron	12100	52/52	9320	13		3100	11		4390	12		9530	9.8		5300	8.9	
Lead	9.1	52/52	6.5	0.39		1.7	0.33		2.4	0.35		7.4	0.32		4.7	0.27	
Magnesium	17600	52/52	6210	630		6850	530		5220	590		2710	490		2730	450	
Manganese	180	52/52	110	1.9		83.5	1.6		39.4	1.8		82.8	1.5		57.5	1.3	
Mercury	0.07	8/52	<	0.25	U	<	0.2	U	<	0.22	U	<	0.19	U	<	0.19	U
Nickel	11.9	52/52	9.3	5		4.2	4.3	J	4.2	4.7	J	10.5	3.9		5.8	3.6	
Potassium	3020	52/52	2720	630		972	530		1070	590		2450	490		1530	450	
Selenium	0.81	3/52	<	3.1	U	<	2.7	U	<	2.8	U	<	2.6	U	<	2.2	U
Sodium	353	52/52	277	630	J	147	530	J	104	590	J	37.5	490	J	132	450	J
Thallium	0.25	3/52	<	1.3	UJ	<	1.1	UJ	<	1.2	UJ	<	1.1	U	<	0.88	U
Vanadium	32.2	52/52	24.4	6.3		11.1	5.3		11.1	5.9		19.7	4.9		14.6	4.5	
Zinc	29.7	52/52	25.9	2.5		8.3	2.1		11.5	2.4		22.6	2		14.1	1.8	

mg/kg - milligram per killogram J - Estimated
µg/kg - microgram per killogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB04-020			CAE-SB04-030			CAE-SB04-040			CAE-SB05-005			CAE-SB05-010		
COLLECT DATE			04/30/98			04/30/98			04/30/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	7	1/52	<	11	U	<	11	U	7	11		<	11	U	<	11	U
Methyl Ethyl Ketone	46	3/52	<	19	U	<	18	U	<	18	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	72	5/52	<	19	U	<	18	U	<	18	U	<	18	U	<	18	U
Toluene	12	2/52	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Di-N-Butyl Phthalate	300	1/52	<	370	U	300	360		<	360	U	<	360	U	<	350	U
Di-N-Octylphthalate	170	1/52	<	370	U	<	360	U	<	360	U	<	360	U	<	350	U
N-Nitrosodiphenylamine	43	2/52	<	370	U	<	360	U	<	360	U	<	360	U	<	350	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/52	<	7.4	U	<	7.1	U	<	7.1	U	<	7.1	U	<	7	U
DDT	4.6	1/52	<	7.4	U	<	7.1	U	<	7.1	U	<	7.1	U	<	7	U
METALS (mg/kg)																	
Aluminum	19000	52/52	4350	21		4000	21		4910	21		17600	21		7370	21	
Antimony	2.8	7/52	<	6.4	U	<	6.3	U	<	6.4	U	1.2	6.2	J	<	6.2	U
Arsenic	4.4	52/52	1.4	2.1	J	0.12	1.7	J	1.4	2.1	J	3	2.1		2.6	2.1	
Barium	1740	52/52	166	21		232	21		52.6	21		370	21		356	21	
Beryllium	0.8	52/52	0.19	0.53	J	0.14	0.52	J	0.16	0.54	J	0.66	0.52		0.38	0.51	J
Cadmium	0.38	16/52	<	0.53	U	<	0.52	U	<	0.54	U	<	0.52	U	<	0.51	U
Calcium	338000	52/52	271000	5300		141000	5200		72100	5400		48300	520		223000	5100	
Chromium, Total	26.7	52/52	19.6	1.1		11.8	1		7.9	1.1		14.3	1		18.6	1	
Cobalt	4.7	51/52	1.5	5.3	J	0.53	5.2	J	1	5.4	J	3.9	5.2	J	2.6	5.1	J
Copper	10.5	52/52	1.1	2.7	J	1.6	2.6	J	1.2	2.7	J	6.8	2.6		3	2.6	
Iron	12100	52/52	2100	11		2310	10		3120	11		11000	10		4430	10	
Lead	9.1	52/52	1.5	0.32		0.12	0.25	J	2.1	0.32		8	0.31		4.1	0.31	
Magnesium	17600	52/52	6510	530		4320	520		4410	540		3390	520		3190	510	
Manganese	180	52/52	17.9	1.6		20.9	1.6		31.5	1.6		126	1.6		44.3	1.5	
Mercury	0.07	8/52	<	0.2	U	<	0.19	U	0.04	0.2	UJ	0.07	0.15		0.05	0.17	J
Nickel	11.9	52/52	3.8	4.3	J	2.8	4.2	J	2.8	4.3	J	10.4	4.2		5.8	4.1	
Potassium	3020	52/52	679	530		734	520		1060	540		3020	520		1450	510	
Selenium	0.81	3/52	0.81	0.53	J	<	2.1	U	<	2.7	U	<	2.6	U	<	2.6	U
Sodium	353	52/52	209	530	J	134	520	J	101	540	J	53.6	520	J	170	510	J
Thallium	0.25	3/52	<	1.1	U	<	0.83	U	<	1.1	U	<	1	U	<	1	U
Vanadium	32.2	52/52	10	5.3		7.3	5.2		7.9	5.4		27.3	5.2		11.7	5.1	
Zinc	29.7	52/52	5.8	2.1		6.4	2.1		7.5	2.1		26	2.1		12.9	2.1	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB05-020			CAE-SB05-030			CAE-SB05-040			CAE-SB06-005			CAE-SB06-010			CAE-SB06-020		
COLLECT DATE			05/01/98			05/01/98			05/01/98			05/01/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																				
Carbon Disulfide	7	1/52	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone	46	3/52	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	72	5/52	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U
Toluene	12	2/52	<	11	U	<	11	U	<	11	U	12	11		<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																				
Di-N-Butyl Phthalate	300	1/52	<	360	U	<	370	U	<	350	U	<	370	U	<	360	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	360	U	<	370	U	<	350	U	<	370	U	<	360	U	<	360	U
N-Nitrosodiphenylamine	43	2/52	<	360	U	<	370	U	<	350	U	<	370	U	<	360	U	<	360	U
PESTICIDES/PCB (µg/kg)																				
DDE	3.6	1/52	<	7.1	U	<	7.2	U	<	7	U	3.6	1.9	J	<	7.2	U	<	7.2	U
DDT	4.6	1/52	<	7.1	U	<	7.2	U	<	7	U	4.6	7.3	J	<	7.2	U	<	7.2	U
METALS (mg/kg)																				
Aluminum	19000	52/52	11400	21		5240	21		5580	20		12200	20		9100	21		10500	19	
Antimony	2.8	7/52	<	6.2	U	<	6.4	U	<	6	U	<	6.1	U	<	6.4	U	<	5.6	U
Arsenic	4.4	52/52	3	2.1		1.2	2.1	J	1.4	1.8	J	3.5	1.9		2.8	2.1		2.1	1.8	
Barium	1740	52/52	135	21		118	21		48.1	20		201	20		108	21		338	19	
Beryllium	0.8	52/52	0.58	0.51		0.18	0.54	J	0.2	0.5	J	0.5	0.51	J	0.43	0.54	J	0.45	0.46	J
Cadmium	0.38	16/52	0.17	0.51	J	<	0.54	U	0.16	0.5	J	<	0.51	U	0.31	0.54	J	<	0.46	U
Calcium	338000	52/52	81200	5100		173000	5400		78500	5000		105000	5100		98500	5400		83700	4600	
Chromium, Total	26.7	52/52	12.2	1		15.6	1.1		8.9	1		14.1	1		12.4	1.1		11.5	0.93	
Cobalt	4.7	51/52	3.6	5.1	J	1.3	5.4	J	1	5	J	2.8	5.1	J	2.7	5.4	J	2.5	4.6	J
Copper	10.5	52/52	4.3	2.6		2.6	2.7	J	2.6	2.5		5.1	2.5		3.9	2.7		2.8	2.3	
Iron	12100	52/52	7560	10		2740	11		3770	10		7590	10		6280	11		6550	9.3	
Lead	9.1	52/52	5.9	0.32		2.3	0.31		2.5	0.27		6.6	0.29		4.7	0.31	J	4.2	0.26	
Magnesium	17600	52/52	4500	510		10600	540		5990	500		3010	510		3130	540		3960	460	
Manganese	180	52/52	132	1.5		23.8	1.6		35.4	1.5		77.6	1.5		76.6	1.6		75.6	1.4	
Mercury	0.07	8/52	<	0.21	U	<	0.19	U	<	0.21	U	0.04	0.17	J	<	0.21	U	<	0.19	U
Nickel	11.9	52/52	7.8	4.1		4.6	4.3		3.7	4	J	8.8	4.1		6.9	4.3		6.6	3.7	
Potassium	3020	52/52	2590	510		918	540		1200	500		1980	510		1780	540		2350	460	
Selenium	0.81	3/52	<	2.7	U	<	2.6	U	<	2.3	U	<	2.4	U	<	2.6	U	0.66	2.2	J
Sodium	353	52/52	311	510	J	202	540		127	500	J	36.4	510	J	37.3	540	J	74.6	460	J
Thallium	0.25	3/52	<	1.1	U	<	1	U	<	0.9	U	<	0.97	U	<	1	U	<	0.88	U
Vanadium	32.2	52/52	20.2	5.1		14	5.4		11.3	5		18.8	5.1		15.8	5.4		16.6	4.6	
Zinc	29.7	52/52	21.5	2.1		8.6	2.1		8.7	2		18.5	2		15.6	2.1		15.5	1.9	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB06-030			CAE-SB06-040			CAE-SB07-005			CAE-SB07-010			CAE-SB07-015			CAE-SB07-025		
COLLECT DATE			05/01/98			05/01/98			05/01/98			05/01/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																				
Carbon Disulfide	7	1/52	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone	46	3/52	<	18	U	<	18	U	26	19		32	18		46	18		<	18	U
Methyl Isobutyl Ketone	72	5/52	<	18	U	<	18	U	49	19		55	18		72	18		14	18	
Toluene	12	2/52	<	11	U	<	11	U	<	11	U	5	11		<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																				
Di-N-Butyl Phthalate	300	1/52	<	360	U	<	350	U	<	370	U	<	360	U	<	360	U	<	370	U
Di-N-Octylphthalate	170	1/52	<	360	U	<	350	U	<	370	U	<	360	U	<	360	U	<	370	U
N-Nitrosodiphenylamine	43	2/52	<	360	U	<	350	U	<	370	U	<	360	U	<	360	U	<	370	U
PESTICIDES/PCB (µg/kg)																				
DDE	3.6	1/52	<	7.1	U	<	7	U	<	3.7	U	<	3.5	U	<	3.5	U	<	3.6	U
DDT	4.6	1/52	<	7.1	U	<	7	U	<	3.7	U	<	3.5	U	<	3.5	U	<	3.6	U
METALS (mg/kg)																				
Aluminum	19000	52/52	7860	21		3670	19		19000	21		13200	21		11900	20		5580	21	
Antimony	2.8	7/52	<	6.4	U	<	5.8	U	<	6.2	U	<	6.3	U	<	6	U	<	6.3	U
Arsenic	4.4	52/52	1.3	1.9	J	0.92	0.83	J	2.9	2		3.2	1.9		1.9	2	J	1.4	1.9	J
Barium	1740	52/52	1000	21		20.9	19		145	21		267	21		177	20		129	21	
Beryllium	0.8	52/52	0.28	0.53	J	0.15	0.49	J	0.8	0.52		0.62	0.52		0.57	0.5		0.25	0.52	J
Cadmium	0.38	16/52	<	0.53	U	<	0.49	U	<	0.52	U	<	0.52	U	<	0.5	U	<	0.52	U
Calcium	338000	52/52	86000	5300		31900	490		71300	5200		116000	5200		108000	5000		193000	5200	
Chromium, Total	26.7	52/52	10.2	1.1		4.6	0.97		15.6	1		15.1	1		13.6	1		16.1	1	
Cobalt	4.7	51/52	1.2	5.3	J	0.85	4.9	J	4.1	5.2	J	3.3	5.2	J	3.2	5	J	2.2	5.2	J
Copper	10.5	52/52	2.3	2.7	J	0.95	2.4	J	8.7	2.6		5.1	2.6		3.4	2.5		2.3	2.6	J
Iron	12100	52/52	4330	11		2670	9.7		11600	10		8590	10		6910	10		3000	10	
Lead	9.1	52/52	2.7	0.29		2.1	0.25		6.3	0.3		6.3	0.29		4.7	0.3		2	0.29	
Magnesium	17600	52/52	7370	530		2830	490		3410	520		3360	520		4010	500		8880	520	
Manganese	180	52/52	36.4	1.6		28.8	1.5		94.3	1.6		113	1.6		83.4	1.5		30.7	1.6	
Mercury	0.07	8/52	<	0.19	U	<	0.2	U	0.04	0.19	J	<	0.21	U	0.04	0.16	J	<	0.2	U
Nickel	11.9	52/52	4.9	4.3		2.5	3.9	J	11.9	4.2		8.1	4.2		6.8	4		4.6	4.2	
Potassium	3020	52/52	1650	530		814	490		2930	520		2200	520		2250	500		958	520	
Selenium	0.81	3/52	<	2.4	U	<	2.1	U	<	2.5	U	0.56	2.4	J	<	2.5	U	<	2.4	U
Sodium	353	52/52	181	530	J	85.9	490	J	82.7	520	J	209	820	J	282	500	J	206	520	J
Thallium	0.25	3/52	<	0.95	U	<	0.83	U	<	1	U	0.25	0.97	J	<	0.99	U	<	0.95	U
Vanadium	32.2	52/52	10.3	5.3		6.3	4.9		24.8	5.2		22.4	5.2		16.6	5		15.2	5.2	
Zinc	29.7	52/52	10.3	2.1		6.3	1.9		29.2	2.1		21.7	2.1		18.5	2		8.9	2.1	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB07-035			CAE-SB07-045			CAE-SB08-005			CAE-SB08-010			CAE-SB08-015		
COLLECT DATE			05/01/98			05/01/98			05/01/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	7	1/52	<	11	U	<	11	U	<	12	U	<	12	U	<	12	U
Methyl Ethyl Ketone	46	3/52	<	18	U	<	18	U	<	20	U	<	20	U	<	20	U
Methyl Isobutyl Ketone	72	5/52	37	18		<	18	U	<	20	U	<	20	U	<	20	U
Toluene	12	2/52	<	11	U	<	11	U	<	12	U	<	12	U	<	12	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Di-N-Butyl Phthalate	300	1/52	<	350	U	<	350	U	<	360	U	<	360	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	350	U	<	350	U	<	360	U	<	360	U	<	360	U
N-Nitrosodiphenylamine	43	2/52	<	350	U	<	350	U	<	360	U	<	360	U	<	360	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/52	<	3.5	U	<	3.5	U	<	3.6	U	<	3.5	U	<	3.5	U
DDT	4.6	1/52	<	3.5	U	<	3.5	U	<	3.6	U	<	3.5	U	<	3.5	U
METALS (mg/kg)																	
Aluminum	19000	52/52	6080	20		4310	20		14600	2.4		9230	2.7		11500	2.6	
Antimony	2.8	7/52	<	5.9	U	<	6	U	<	1.1	U	<	1.2	U	<	1.2	U
Arsenic	4.4	52/52	1.3	1.9	J	1.3	1.9	J	2.1	0.22		1.9	0.23	J	1.6	0.22	J
Barium	1740	52/52	59.1	20		45.7	20		70.4	0.072		1740	0.079		286	0.078	
Beryllium	0.8	52/52	0.25	0.49	J	0.2	0.5	J	0.71	0.027		0.43	0.03	J	0.49	0.029	
Cadmium	0.38	16/52	<	0.49	U	<	0.5	U	<	0.13	U	<	0.14	U	0.19	0.14	J
Calcium	338000	52/52	101000	4900		119000	5000		6140	2.5		217000	28		91000	27	
Chromium, Total	26.7	52/52	10.3	0.98		12.7	1		10.3	0.58		19.5	0.63		13.4	0.62	
Cobalt	4.7	51/52	1.9	4.9	J	1.8	5	J	4.4	0.26	J	2.6	0.29	J	3.4	0.28	J
Copper	10.5	52/52	1.7	2.4	J	10.5	2.5		6.7	0.19		3.4	0.21		3.2	0.2	
Iron	12100	52/52	3720	9.8		3360	10		10600	0.48		4850	0.52		7100	0.52	
Lead	9.1	52/52	2.3	0.29		2.3	0.29		6.9	0.18		4	0.19		4.4	0.18	
Magnesium	17600	52/52	3560	490		3870	500		2330	2		3650	2.2		4320	2.1	
Manganese	180	52/52	39.7	1.5		34.8	1.5		152	0.081		72.9	0.089		87.2	0.087	
Mercury	0.07	8/52	<	0.19	U	0.04	0.18	J	<	0.037	U	<	0.039	U	<	0.037	U
Nickel	11.9	52/52	3.9	3.9		3.1	4	J	9.8	0.33		5.7	0.35		7.6	0.35	
Potassium	3020	52/52	1220	490		823	500		2420	9.9		1440	11		2280	11	
Selenium	0.81	3/52	<	2.4	U	<	2.4	U	<	0.89	U	<	0.93	U	<	0.88	U
Sodium	353	52/52	134	490	J	93.1	500	J	35.7	2.4	J	183	2.6	J	276	2.5	J
Thallium	0.25	3/52	<	0.97	U	<	0.96	U	0.24	0.2	J	<	0.21	U	<	0.2	U
Vanadium	32.2	52/52	8.5	4.9		8.3	5		20	0.18		14.3	0.2		20	0.19	
Zinc	29.7	52/52	8.5	2		8	2		25.4	0.39		12.7	0.42		18	0.42	

mg/kg - milligram per kilogram J - Estimated
µg/kg - microgram per kilogram U - Nondetect

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1b
Detected Compounds in Subsurface Soils
AOC E

FIELD ID			CAE-SB08-025			CAE-SB08-035			CAE-SB08-045		
COLLECT DATE			05/01/98			05/01/98			05/01/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)											
Carbon Disulfide	7	1/52	<	12	U	<	12	U	<	12	U
Methyl Ethyl Ketone	46	3/52	<	20	U	<	20	U	<	20	U
Methyl Isobutyl Ketone	72	5/52	<	20	U	<	20	U	<	20	U
Toluene	12	2/52	<	12	U	<	12	U	<	12	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)											
Di-N-Butyl Phthalate	300	1/52	<	360	U	<	360	U	<	360	U
Di-N-Octylphthalate	170	1/52	<	360	U	<	360	U	170	360	
N-Nitrosodiphenylamine	43	2/52	<	360	U	<	360	U	<	360	U
PESTICIDES/PCB (µg/kg)											
DDE	3.6	1/52	<	3.6	U	<	3.6	U	<	3.5	U
DDT	4.6	1/52	<	3.6	U	<	3.6	U	<	3.5	U
METALS (mg/kg)											
Aluminum	19000	52/52	4820	2.8		4860	2.8		4410	2.7	
Antimony	2.8	7/52	<	1.2	U	<	1.3	U	<	1.2	U
Arsenic	4.4	52/52	1.6	0.22	J	1.4	0.24	J	0.77	0.22	J
Barium	1740	52/52	194	0.082		139	0.084		43.9	0.081	
Beryllium	0.8	52/52	0.18	0.031	J	0.17	0.032	J	0.18	0.03	J
Cadmium	0.38	16/52	<	0.14	U	0.2	0.15	J	<	0.14	U
Calcium	338000	52/52	240000	29		168000	29		72500	28	
Chromium, Total	26.7	52/52	19.9	0.66		15.3	0.67		8.9	0.65	
Cobalt	4.7	51/52	1.7	0.3	J	1.2	0.3	J	1.5	0.29	J
Copper	10.5	52/52	2.6	0.22		3.7	0.22		1.8	0.21	J
Iron	12100	52/52	2360	0.55		2840	0.56		3290	0.54	
Lead	9.1	52/52	1.5	0.18		1.7	0.2		1.9	0.18	
Magnesium	17600	52/52	17600	2.3		12600	2.3		5000	2.2	
Manganese	180	52/52	22.1	0.093		27.5	0.095		33.8	0.091	
Mercury	0.07	8/52	<	0.039	U	0.04	0.039	J	<	0.041	U
Nickel	11.9	52/52	4.8	0.37		4.2	0.38		2.8	0.37	J
Potassium	3020	52/52	748	11		902	11		854	11	
Selenium	0.81	3/52	<	0.89	U	<	0.99	U	<	0.88	U
Sodium	353	52/52	269	2.7	J	228	2.7	J	119	2.6	J
Thallium	0.25	3/52	<	0.2	U	<	0.22	U	<	0.2	U
Vanadium	32.2	52/52	17.3	0.21		12.9	0.21		11.4	0.2	
Zinc	29.7	52/52	5.4	0.44		8.6	0.45		7.3	0.44	

mg/kg - milligram per killogram J - Estimated
µg/kg - microgram per killogram U - Nondetect

Source: URS Greiner Woodward Clyde, 1999

Table 29-1c
Comparison of Maximum Surface Soil Concentrations to MSSLs
AOC E

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Industrial Soil MSSL Concentration[2] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of Residential MSSL	Frequency of Exceedance of Industrial MSSL	Estimated Risk: Excess Cancer [2]	Estimated Risk: Hazard Quotient [3]
VOLATILE ORGANICS											
Toluene	1/8	CAE-SB06-002	0.010		520	520	NO				**
SEMIVOLATILE ORGANICS											
Phenol	1/8	CAE-SB03-002	0.120		33,000	100,000	NO				***
PESTICIDES											
DDE	1/8	CAE-HA04-002	0.0034		0.2		NO			1.70E-08	
METALS											
Aluminum	8/8	CAE-SB01-002	19900		75,000	100,000	NO				***
Antimony	2/8	CAE-HA01-001	3.2		30		NO				0.1067
Arsenic	8/8	CAE-HA01-001	4.6	J	0.38	3.0	YES	8/8	5/8	1.21E-05	
Beryllium	8/8	CAE-SB01-002	0.87		150	3,400	NO			5.80E-09	
Cadmium	3/8	CAE-SB03-002	0.46	J	37	930	NO				0.0124
Chromium	8/8	CAE-SB01-002	14.3		210	450	NO			6.81E-08	
Iron	8/8	CAE-SB02-002	14,700		22,000		NO				0.67
Nickel	8/8	CAE-SB06-002	12.5		1,500	37,000	NO				0.0083
Vanadium	8/8	CAE-SB02-002	30.1		520	13,000	NO				0.0579
Zinc	8/8	CAE-SB02-002	36		22,000	100,000	NO				***
Total Excess Cancer Risk[4]										1E-05	
Hazard Index[5]											0.85

(1) EPA Region VI Media-Specific Screening Levels for Residential Soil (EPA 1998)
(2) These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*1×10^{-6}.
(3) These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
(4) Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
(5) Hazard Index = Sum of all hazard quotients at the site.
** The MSSL for toluene is based on a soil saturation concentration and is not based on risk. Therefore, a potential risk from toluene could not be estimated using the MSSLs. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of toluene from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
***MSSL is the maximum allowable concentration and not based on risk. Therefore, a potential risk could not be estimated using the MSSL. A MSSL calculated based on risk would be higher than the maximum concentration. Exclusion of this compound from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
mg/kg = Milligrams per Kilogram

Source: URS Greiner Woodward Clyde, 1999

Table 29-1d
Comparison of Maximum Subsurface Soil Concentrations to MSSLs
AOC E

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Industrial Soil MSSL Concentration[(2)] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of Residential MSSL	Frequency of Exceedance of Industrial MSSL	Estimated Risk: Excess Cancer [(2)]	Estimated Risk: Hazard Quotient [(3)]
VOLATILE ORGANICS											
Carbon Disulfide	1/52	CAE-SB04-040	0.007		350	1,200	NO				0.00002
Methyl Ethyl Ketone (2-Butanone	3/52	CAE-SB07-015	0.046		6,900	27,000	NO				0.00001
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	5/52	CAE-SB07-015	0.072		750	2,800	NO				0.0001
Toluene	2/52	CAE-SB06-005	0.012		520	520	NO				**
SEMIVOLATILE ORGANICS											
Di-n-butyl phthalate	1/52	CAE-SB04-030	0.300		5,500	110,000	NO				0.0001
Di-n-octyl phthalate	1/52	CAE-SB08-045	0.170		1,100	10,000	NO				0.0002
N-nitrosodiphenylamine	5/52	CAE-SB03-010	0.043		91	610	NO			5E-10	
PESTICIDES											
DDE	1/52	CAE-SB06-005	0.0036		0.2		NO			2E-08	
DDT	1/52	CAE-SB06-005	0.0046		0.2		NO			2E-08	
METALS											
Arsenic	52/52	CAE-SB06-005	4		0.38	3.0	YES	52/52	10/52	1E-05	
Aluminum	52/52	CAE-SB07-005	19,000		75,000	100,000	NO				***
Barium	52/52	CAE-SB08-010	1,740		5,200	100,000	NO				***
Beryllium	52/52	CAE-SB07-005	0.8		150	3,400	NO				0.0053
Chromium	52/52	CAE-SB01-020	26.7		210	450	NO			1E-07	
Copper	52/52	CAE-SB07-045	10.5		2,800	70,000	NO				0.0038
Lead	52/52	CAE-SB05-005	9.1		400		NO				****

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Source: URS Greiner Woodward Clyde, 1999

Table 29-1d
Comparison of Maximum Subsurface Soil Concentrations to MSSLs
AOC E

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Industrial Soil MSSL Concentration[(2)] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of Residential MSSL	Frequency of Exceedance of Industrial MSSL	Estimated Risk: Excess Cancer [(2)]	Estimated Risk: Hazard Quotient [(3)]
METALS, cont.											
Mercury	8/52	CAE-SB05-005	0.07		22	NA	NO				0.0032
Total Excess Cancer Risk[(4)]										1E-05	
Hazard Index[(5)]											0.01

[(1)] EPA Region Media-Specific Screening Levels for Residential Soil (EPA 1998)
[(2)] These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*$1x10^{-6}$.
[(3)] These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
[(4)] Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
[(5)] Hazard Index = Sum of all hazard quotients at the site.
** The MSSL for toluene is based on a soil saturation concentration and is not based on risk. Therefore, a potential risk from toluene could not be estimated using the MSSLs. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of toluene from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
***The MSSLs for aluminum and barium are the maximum allowable concentrations and not risk-based. Therefore, a potential risk from aluminum and barium could not be estimated using the MSSLs. A MSSL calculated based on risk would be higher than the maximum concentration. Exclusion of these compounds from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
****Lead does not have an EPA-established toxicity factor; therefore, an MSSL has not be calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1a
Detected Compounds in Surface Soils
AOC F

FIELD ID			CAF-HA01-001			CAF-HA01-002			CAF-HA02-001			CAF-HA02-002			CAF-HA03-001			CAF-HA03-002			CAF-HA04-001		
COLLECT DATE			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Antimony	0.19	8/27	<	0.16	UJ	<	0.16	U	<	0.16	U	<	0.14	U	0.19	0.16		<	0.2	U	0.16	0.15	
Arsenic	5	27/27	2.2	0.1		2.1	0.16		2.4	0.11		1.9	0.1		2.4	0.11		2.2	0.1		5	0.1	
Lead	151	27/27	7.8	2.2		2.3	2.1		10	2.1		8	1.9		16.4	2		6.6	2		11.9	2	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
UJ - Value is estimated nondetect
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1a
Detected Compounds in Surface Soils
AOC F

FIELD ID			CAF-HA04-002			CAF-HA05-001			CAF-HA05-002			CAF-HA06-001			CAF-HA06-002			CAF-HA07-001			CAF-HA07-002		
COLLECT DATE			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Antimony	0.19	8/27	<	0.15	U	<	0.15	U	<	0.15	UJ	<	0.15	U	0.16	0.15		<	0.15	U	0.17	0.2	J
Arsenic	5	27/27	2.6	0.1		2.7	0.1		2.9	0.1		2.6	0.1		3.5	0.1		2.6	0.1		2.6	0.1	
Lead	151	27/27	12.7	1.9		10.6	2		151	1.8		7.8	1.9		5.3	1.7		6.6	2.2		6.4	2	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
UJ - Value is estimated nondetect
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1a
Detected Compounds in Surface Soils
AOC F

FIELD ID			CAF-HA08-001			CAF-HA08-002			CAF-HA09-001			CAF-HA09-002			CAF-SS01-002			CAF-SS02-002			CAF-SS03-002		
COLLECT DATE			4/29/98			4/29/98			4/29/98			4/29/98			4/28/98			4/28/98			4/28/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																							
Antimony	0.19	8/27	<	0.15	U	<	0.15	U	<	0.15	U	<	0.15	U	<	0.16	UJ	0.18	0.16	J	<	0.16	U
Arsenic	5	27/27	2.6	0.1		2.5	0.1		2.4	0.1		2.6	0.1		2.9	0.11		2.7	0.11		2.6	0.11	
Lead	151	27/27	5.9	2.1		4.2	2.1		4.4	2		4.5	1.9		23.4	2.2		4.4	2.1		5.4	2.2	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
UJ - Value is estimated nondetect
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1a
Detected Compounds in Surface Soils
AOC F

FIELD ID			CAF-SS04-002			CAF-SS05-002			CAF-SS06-002			CAF-SS07-002			CAF-SS08-002			CAF-SS09-002		
COLLECT DATE			4/28/98			4/28/98			4/28/98			4/28/98			4/28/98			4/28/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																				
Antimony	0.19	8/27	<	0.15	U	<	0.15	U	<	0.14	U	0.18	0.15		0.17	0.16		0.17	0.16	
Arsenic	5	27/27	2.4	0.1		2.2	0.1		2.2	0.1		2.8	0.1		2.8	0.11		2.5	0.11	
Lead	151	27/27	8.9	2		7	2		8.8	1.9		17.1	2		15.4	2.2		6	2.1	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
UJ - Value is estimated nondetect
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1b
Detected Compounds in Subsurface Soils
AOC F

FIELD ID			CAF-HA01-004			CAF-HA02-004			CAF-HA03-004			CAF-HA04-004			CAF-HA05-004		
COLLECT DATE			4/29/98			4/29/98			4/29/98			4/29/98			4/29/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)																	
Antimony	0.27	3/9	0.14	0.16	J	<	0.14	U	<	0.15	U	0.15	0.15		0.27	0.15	
Arsenic	3.1	9/9	2.4	0.11		2	0.09		3.1	0.1		2.6	0.1		2.8	0.1	
Lead	38.9	9/9	7.8	1.9		4.9	1.9		15.1	2		10.8	2		38.9	2.1	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
mg/kg = Milligrams per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 30-1b
Detected Compounds in Subsurface Soils
AOC F

FIELD ID			CAF-HA06-004			CAF-HA07-004			CAF-HA08-004			CAF-HA09-004		
COLLECT DATE			4/29/98			4/29/98			4/29/98			4/29/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
METALS (mg/kg)														
Antimony	0.27	3/9	<	0.15	U	<	0.15	U	<	0.15	U	<	0.15	U
Arsenic	3.1	9/9	2.4	0.1		2.4	0.1		2.4	0.1		2.5	0.1	
Lead	38.9	9/9	4.5	2.1		5.6	2		2.2	1.7		4.4	1.9	

J - Estimated Value
RL - Reporting Limit
Qual - Qualifier
U - Value reported as nondetect
mg/kg = Milligrams per Kilogram

Source: URS Greiner Woodward Clyde, 1999

Table 30-1c
Comparison of Maximum Surface Soil Concentrations to MSSLs
AOC F

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Industrial Soil MSSL Concentration[2] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of MSSL	Estimated Risk: Excess Cancer[3]	Estimated Risk: Hazard Quotient[4]
METALS										
Arsenic	27/27	CAF-HA04-001	5		0.38	3.0	YES	2/27	1.67E-06	
Lead	27/27	CAF-HA05-002	151		400	1,000	NO		NA	NA
Total Excess Cancer Risk[5]									2E-06	
Hazard Index[6]										0.0

[1] EPA Region VI Media-Specific Screening Levels for Residential Soil (EPA 1998)
[2] EPA Region VI Media-Specific Screening Levels for Industrial Soil (EPA 1998)
[3] These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/Industrial MSSL*$1x10^{-6}$.
[4] These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/Industrial MSSL*1.0.
[5] Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
[6] Hazard Index = Sum of all hazard quotients at the site.
NA = Not applicable.
mg/kg = Milligrams per Kilogram
* Lead does not have an EPA-established toxicity factor; therefore, an MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).

Source: URS Greiner Woodward Clyde, 1999

Table 30-1d
Comparison of Maximum Subsurface Soil Concentrations to MSSLs
AOC F

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Industrial Soil MSSL Concentration[2] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of MSSL	Estimated Risk: Excess Cancer[3]	Estimated Risk: Hazard Quotient[4]
METALS										
Lead	9/9	CAF-HA05-002	38.9		400	1,000	NO		NA	NA
Total Excess Cancer Risk[4]									0E+00	
Hazard Index[5]										0.0

[1] EPA Region VI Media-Specific Screening Levels for Residential Soil (EPA 1998)
[2] EPA Region VI Media-Specific Screening Levels for Industrial Soil (EPA 1998)
[3] These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/Industrial MSSL*$1x10^{-6}$.
[4] These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/Industrial MSSL*1.0.
[5] Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
[6] Hazard Index = Sum of all hazard quotients at the site.
mg/kg = Milligrams per Kilogram
NA = Not Applicable.
* Lead does not have an EPA-established toxicity factor; therefore, a MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).

Source: URS Greiner Woodward Clyde, 1999

Table 31-1a
Detected Compounds in Surface Soils
AOC G

FIELD ID			CAG-SB01-002			CAG-SB02-002			CAG-SB03-003			CAG-SB04-003		
COLLECT DATE			5/3/98			5/3/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
Methyl Ethyl Ketone (2-Butanone)	38	1/8	38	19		<	18	U	<	19	U	<	21	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	74	3/8	74	19		<	18	U	6	19		6	21	
Toluene	6	3/8	6	11		4	11		4	11		<	13	U
METALS (mg/kg)														
Aluminum	21300	8/8	11900	21		17000	19		13200	22		15400	23	
Arsenic	3.6	8/8	2.4	2		3.6	2.1		2.4	2.1		2.9	2.4	
Barium	247	8/8	69	21		106	19		133	22		247	23	
Beryllium	0.94	8/8	0.56	0.53		0.79	0.48		0.65	0.55		0.75	0.57	
Cadmium	0.61	2/8	<	0.53	U	0.35	0.48		<	0.55	U	<	0.57	U
Calcium	140000	8/8	2360	530		3090	480		114000	5500		140000	5700	
Chromium, Total	20.6	8/8	8.9	1.1		11.9	0.96		17.1	1.1		20.6	1.1	
Cobalt	6.4	8/8	3.2	5.3		5.3	4.8		4.1	5.5		4	5.7	
Copper	10.9	8/8	5.6	2.7		8.1	2.4		6.9	2.8		8.1	2.9	
Iron	15400	8/8	8640	11	E	13200	9.6		9010	11		10700	11	
Lead	14.9	8/8	6.4	0.29		13	10		6.1	10	J	6.2	10	
Magnesium	4110	8/8	1490	530		2390	480		3350	550		4110	570	
Manganese	278	8/8	135	1.6	E	211	1.4	E	131	1.7	J	131	1.7	
Mercury	0.41	3/8	<	0.19	U	0.04	0.21		0.05	0.21		0.41	0.24	
Nickel	13.8	8/8	7	4.3		10.7	3.8		9.2	4.4		10.4	4.6	
Potassium	3280	8/8	1970	530		2640	480		2110	550		2400	570	
Sodium	336	8/8	43.4	530		41.9	480		63.5	550		138	570	
Thallium	0.45	4/8	<	0.98	U	0.3	1		<	1	U	<	1	U
Vanadium	32.6	8/8	19	5.3	E	27	4.8		19.5	5.5		24.3	5.7	
Zinc	42.6 E	8/8	22.6	2.1		32.5	1.9		24.6	2.2	E	29.8	2.3	E

J = Estimated
Qual = Qualifier
RL = Reporting Limit
U = Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1a
Detected Compounds in Surface Soils
AOC G

FIELD ID			CAG-SB05-002			CAG-SB06-002			CAG-SB07-002			CAG-SB08-002		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/5/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
Methyl Ethyl Ketone (2-Butanone)	38	1/8	<	18	U	<	18	U	<	19	U	<	18	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	74	3/8	<	18	U	<	18	U	<	19	U	<	18	U
Toluene	6	3/8	<	11	U	<	11	U	<	11	U	<	11	U
METALS (mg/kg)														
Aluminum	21300	8/8	21300	21		20900	20		14300	21		16100	21	
Arsenic	3.6	8/8	2.9	1.7		2.5	0.97		3.4	2		3.3	1.5	
Barium	247	8/8	112	21		144	20		159	21		133	21	
Beryllium	0.94	8/8	0.94	0.51		0.94	0.49		0.84	0.53		0.92	0.53	
Cadmium	0.61	2/8	0.61	0.51		<	0.49	U	<	0.53	U	<	0.53	U
Calcium	140000	8/8	4300	510		5430	490		11800	530		2880	530	
Chromium, Total	20.6	8/8	15.4	1		14.2	0.98		12	1.1		12.4	1.1	
Cobalt	6.4	8/8	6.3	5.1		6.4	4.9		6.1	5.3		6.1	5.3	
Copper	10.9	8/8	10.3	2.6		10.3	2.5		9.6	2.6		10.9	2.7	
Iron	15400	8/8	15400	10		15400	9.8		12300	11		14100	11	
Lead	14.9	8/8	12.2	19		5.1	19		14.9	20		4.6	15	
Magnesium	4110	8/8	3120	510		3350	490		2630	530		2600	530	
Manganese	278	8/8	250	1.5		268	1.5		247	1.6		278	1.6	
Mercury	0.41	3/8	<	0.22	U	<.	0.17	U	<	0.22	U	<	0.2	U
Nickel	13.8	8/8	13.4	4.1		13.8	3.9		12.5	4.2		12.1	4.3	
Potassium	3280	8/8	3240	510		3280	490		2500	530		2590	530	
Sodium	336	8/8	331	510		189	490		336	530		49.9	530	
Thallium	0.45	4/8	<	0.95	U	0.43	0.97		0.41	0.99		0.45	0.75	
Vanadium	32.6	8/8	32.6	5.1		29.4	4.9		24.6	5.3		29.2	5.3	
Zinc	42.6 E	8/8	42.6	2.1	E	36.5	2		29.7	2.1		32.9	2.1	

J = Estimated
Qual = Qualifier
RL = Reporting Limit
U = Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB01-005			CAG-SB01-010			CAG-SB01-020			CAG-SB01-030			CAG-SB01-040		
COLLECT DATE			5/3/98			5/3/98			5/3/98			5/3/98			5/3/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	12	U	<	12	U
Chloromethane	10	1/40	<	11	U	10	11		<	11	U	<	12	U	<	12	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	15	18		36	18		<	19	U	<	19	U	<	19	U
Methyl Isobutyl Ketone	52	9/40	36	18		49	18		48	19		45	19		52	19	
Toluene	6	2/40	4	11		<	11	U	<	11	U	<	12	U	<	12	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Benzo(a)pyrene	52	2/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Benzo(b)fluoranthene	55	2/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Benzo(k)fluoranthene	46	1/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Chrysene	51	2/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Di-N-Butyl Phthalate	560	4/40	<	360	U	<	360	U	<	380	U	560	390		<	390	U
Di-N-Octylphthalate	150	2/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Fluoranthene	69	3/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
Pyrene	53	3/40	<	360	U	<	360	U	<	380	U	<	390	U	<	390	U
METALS (mg/kg)																	
Aluminum	16700	40/40	10400	18		9710	21		8270	21		5440	22		4150	22	
Antimony	1.1	1/40	<	5.4	U	<	6.3	U	<	6.2	U	<	6.5	U	<	6.6	U
Arsenic	3.1	40/40	2.1	1.9		1.7	1.9		1.6	2.1		1.9	2.2		1.5	2.2	
Barium	1280	40/40	64	18		106	21		102	21		650	22		115	22	
Beryllium	0.7	40/40	0.52	0.45		0.41	0.53		0.45	0.52		0.21	0.54		0.13	0.55	
Cadmium	0.29	12/39	<	0.45	U	<	0.53	U	<	0.52	U	<	0.54	U	<	0.55	U
Calcium	265000	40/40	3150	450		120000	5300		252000	5200		200000	5400		129000	5500	
Chromium, Total	22.6	40/40	8.8	0.89		13.1	1.1		20.9	1		16.2	1.1		11.2	1.1	
Cobalt	4.3	40/40	3.2	4.5		3	5.3		2	5.2		1.1	5.4		1.2	5.5	
Copper	12.8	38/40	5.8	2.2		2.5	2.6		2.8	2.6		4.5	2.7		<	2.7	U
Iron	9620	40/40	8170	8.9	E	6080	11	E	4160	10	E	2670	11	E	2640	11	E
Lead	9.2	40/40	5.9	0.29		4.2	0.29		2.8	0.32		1.5	0.33		1.6	0.33	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	1430	450		3270	530		7890	520		24000	540		13600	550	

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB01-005			CAG-SB01-010			CAG-SB01-020			CAG-SB01-030			CAG-SB01-040		
COLLECT DATE			5/3/98			5/3/98			5/3/98			5/3/98			5/3/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	142	1.3	E	73.8	1.6	E	40.1	1.5	E	26.4	1.6	E	31.7	1.6	E
Mercury	0.14	8/40	0.04	0.18		<	0.21	U	<	0.19	U	<	0.21	U	<	0.21	U
Nickel	9.8	40/40	7.1	3.6		6.8	4.2		3.9	4.1		4.1	4.3		2.4	4.4	
Potassium	3930	40/40	1770	450		2100	530		1610	520		1010	540		739	550	
Selenium	0.74	1/40	<	2.4	U	<	2.4	U	0.74	2.7		<	2.8	U	<	2.7	U
Sodium	575	40/40	37.3	450		178	530		240	520		290	540		150	550	
Thallium	0.41	13/40	<	0.96	U	<	0.96	U	<	1.1	U	0.22	1.1		<	1.1	U
Vanadium	28.4	40/40	17.4	4.5	E	16.1	5.3	E	16.3	5.2	E	20	5.4	E	15	5.5	E
Zinc	22.1	40/40	20.7	1.8		16	2.1		12.3	2.1		7.9	2.2		6.1	2.2	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB02-005			CAG-SB02-010			CAG-SB02-020			CAG-SB02-030			CAG-SB02-040		
COLLECT DATE			5/3/98			5/3/98			5/3/98			5/3/98			5/3/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	18	U	<	18	U	<	18	U	<	19	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	18	U	<	18	U	<	18	U	<	19	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Benzo(a)pyrene	52	2/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Benzo(b)fluoranthene	55	2/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Benzo(k)fluoranthene	46	1/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Chrysene	51	2/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Di-N-Butyl Phthalate	560	4/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Di-N-Octylphthalate	150	2/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Fluoranthene	69	3/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
Pyrene	53	3/40	<	350	U	<	360	U	<	360	U	<	380	U	<	370	U
METALS (mg/kg)																	
Aluminum	16700	40/40	9510	20		7720	21		6170	21		4640	21		4720	21	
Antimony	1.1	1/40	<	5.9	U	<	6.2	U	<	6.2	U	<	6.3	U	<	6.3	U
Arsenic	3.1	40/40	2.8	1.8		2.1	1		1.6	2		1.8	2		1.4	2.1	
Barium	1280	40/40	224	20		295	21		227	21		117	21		79.6	21	
Beryllium	0.7	40/40	0.44	0.5		0.39	0.52		0.29	0.52		0.17	0.52		0.17	0.53	
Cadmium	0.29	12/39	0.18	5		0.26	5.2		0.28	5.2		<	5.2	U	<	5.3	U
Calcium	265000	40/40	140000	500		163000	520		265000	520		171000	520		99300	530	
Chromium, Total	22.6	40/40	15.1	0.99		15.2	1		22.6	1		14.3	1		13.1	1.1	
Cobalt	4.3	40/40	3	5		2.4	5.2		1.5	5.2		2.6	5.2		1.5	5.3	
Copper	12.8	38/40	3.8	2.5		2.3	2.6		3.3	2.6		2.4	2.6		12.8	2.6	
Iron	9620	40/40	6370	9.9		4960	10		3180	10		2540	10		3100	11	
Lead	9.2	40/40	5.5	9.2		4.7	10	J	3.2	9.9		1.6	9.8		2.5	10	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	3170	500		3340	520		9980	520		18600	520		13000	530	

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB02-005			CAG-SB02-010			CAG-SB02-020			CAG-SB02-030			CAG-SB02-040		
COLLECT DATE			5/3/98			5/3/98			5/3/98			5/3/98			5/3/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	74.4	1.5	E	56.3	1.5	E	29.9	1.6	E	75.4	1.6	E	40.8	1.6	E
Mercury	0.14	8/40	0.06	0.2		<	0.17	U	<	0.2	U	<	0.18	U	<	0.21	U
Nickel	9.8	40/40	6.3	4		5.3	4.1		4.3	4.2		4.1	4.2		3.6	4.2	
Potassium	3930	40/40	1590	500		1520	520		1270	520		910	520		909	530	
Selenium	0.74	1/40	<	9.2	U	<	10	U	<	9.9	U	<	9.8	U	<	10	U
Sodium	575	40/40	64.8	500		262	520		346	520		247	520		164	530	
Thallium	0.41	13/40	<	0.92	U	<	1	U	<	0.99	U	<	0.98	U	<	1	U
Vanadium	28.4	40/40	16.6	5		13.8	5.2		12.1	5.2		14.9	5.2		14.2	5.3	
Zinc	22.1	40/40	16.4	2		12.8	2.1		10.1	2.1		6	2.1		8	2.1	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB03-006			CAG-SB03-011			CAG-SB03-021			CAG-SB03-031			CAG-SB03-041		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	13	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	13	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	18	U	<	18	U	<	18	U	<	21	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	18	U	4	18		5	18		9	21		<	18	U
Toluene	6	2/40	6	11		<	11	U	<	11	U	<	13	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Benzo(a)pyrene	52	2/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Benzo(b)fluoranthene	55	2/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Benzo(k)fluoranthene	46	1/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Chrysene	51	2/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Di-N-Butyl Phthalate	560	4/40	<	370	U	<	360	U	<	370	U	<	420	U	<	370	U
Di-N-Octylphthalate	150	2/40	<	370	U	100	360		<	370	U	<	420	U	<	370	U
Fluoranthene	69	3/40	46	370		<	360	U	<	370	U	<	420	U	<	370	U
Pyrene	53	3/40	48	370		<	360	U	<	370	U	<	420	U	<	370	U
METALS (mg/kg)																	
Aluminum	16700	40/40	10300	20		9040	20		5890	18		8560	25		5280	20	
Antimony	1.1	1/40	<	6	U	<	6	U	<	5.3	U	<	7.5	U	<	6.1	U
Arsenic	3.1	40/40	3.1	2		1.7	1.9		2.1	2.1		1.9	2.4		0.72	0.98	
Barium	1280	40/40	490	20		62.1	20		338	18		163	25		62.8	20	
Beryllium	0.7	40/40	0.57	0.5		0.41	0.5		0.28	0.44		0.35	0.62		0.22	0.5	
Cadmium	0.29	12/39	<	0.5	U	<	0.5	U	<	0.44	U	<	0.62	U	<	0.5	U
Calcium	265000	40/40	63900	5000		60300	5000		179000	4400		86500	6200		22100	500	
Chromium, Total	22.6	40/40	11.9	0.99		10.3	0.99		17.2	0.89		11	1.2		6.1	1	
Cobalt	4.3	40/40	3.7	5		2.6	5		2.5	4.4		1.7	6.2		1.8	5	
Copper	12.8	38/40	5.2	2.5		2.6	2.5		2.7	2.2		2.6	3.1		2.3	2.5	
Iron	9620	40/40	8310	9.9		6260	9.9		3570	8.9		5040	12		3880	10	
Lead	9.2	40/40	5.6	9.2		3.9	11		2	9.5		2.4	12		2.1	9.8	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	3330	500		3080	500		5420	440		8530	620		7750	500	

Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB03-006			CAG-SB03-011			CAG-SB03-021			CAG-SB03-031			CAG-SB03-041		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	120	1.5		75.5	1.5		51.6	1.3		41.6	1.9		47.5	1.5	
Mercury	0.14	8/40	<	0.22	U	<	0.2	U	0.07	0.21		0.14	0.25		<	0.2	U
Nickel	9.8	40/40	8.1	4		5.4	4		4.9	3.6		5.1	5		3.4	4	
Potassium	3930	40/40	1690	500		2050	500		1140	440		1740	620		1030	500	
Selenium	0.74	1/40	<	5	U	<	4.8	U	<	5.3	U	<	5.9	U	<	2.5	U
Sodium	575	40/40	60.6	500		167	500		134	440		182	620		137	500	
Thallium	0.41	13/40	<	0.92	U	<	1.1	U	<	0.95	U	<	1.2	U	<	0.98	U
Vanadium	28.4	40/40	23.8	5		15.8	5		11.2	4.4		13.4	6.2		13.8	5	
Zinc	22.1	40/40	21.3	2	E	17	2	E	11.1	1.8	E	12	2.5	E	8.1	2	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB04-006			CAG-SB04-011			CAG-SB04-021			CAG-SB04-031			CAG-SB04-041		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	19	U	<	19	U	<	19	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	19	U	6	19		<	19	U	<	18	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	39	380		<	370	U	<	370	U	<	360	U	<	360	U
Benzo(a)pyrene	52	2/40	52	380		47	370		<	370	U	<	360	U	<	360	U
Benzo(b)fluoranthene	55	2/40	55	380		46	370		<	370	U	<	360	U	<	360	U
Benzo(k)fluoranthene	46	1/40	46	380		<	370	U	<	370	U	<	360	U	<	360	U
Chrysene	51	2/40	51	380		43	370		<	370	U	<	360	U	<	360	U
Di-N-Butyl Phthalate	560	4/40	<	380	U	<	370	U	<	370	U	<	360	U	<	360	U
Di-N-Octylphthalate	150	2/40	<	380	U	150	370		<	370	U	<	360	U	<	360	U
Fluoranthene	69	3/40	69	380		67	370		<	370	U	<	360	U	<	360	U
Pyrene	53	3/40	49	380		53	370		<	370	U	<	360	U	<	360	U
METALS (mg/kg)																	
Aluminum	16700	40/40	11300	20		9270	20		5840	21		3570	20		4170	21	
Antimony	1.1	1/40	<	6	U	<	6.1	U	<	6.3	U	<	6	U	<	6.2	U
Arsenic	3.1	40/40	2	2.3		1.9	2.1		1.6	2.1		1.2	2		1.3	1.9	
Barium	1280	40/40	1250	20		257	20		296	21		835	20		120	21	
Beryllium	0.7	40/40	0.62	0.5		0.42	0.51		0.24	0.53		0.18	0.5		0.19	0.51	
Cadmium	0.29	12/39	<	0.5	U	<	0.51	U	<	0.53	U	<	0.5	U	<	0.51	U
Calcium	265000	40/40	174000	5000		156000	5100		225000	5300		65500	5000		108000	5100	
Chromium, Total	22.6	40/40	17.9	1		16.5	1		19	1.1		7	1		14.5	1	
Cobalt	4.3	40/40	3.1	5		2.9	5.1		2	5.3		1	5		1.3	5.1	
Copper	12.8	38/40	4.3	2.5		2.7	2.5		1.8	2.6		<	2.5	U	2	2.6	
Iron	9620	40/40	6510	10		5490	10		3060	11		2970	10		2950	10	
Lead	9.2	40/40	4.2	10		3.4	10		1.6	11		1.6	10		1.8	9.5	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	5110	500		3650	510		8090	530		2750	500		4660	510	

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB04-006			CAG-SB04-011			CAG-SB04-021			CAG-SB04-031			CAG-SB04-041		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	72	1.5		64.4	1.5		31.5	1.6		34.8	1.5		32	1.5	
Mercury	0.14	8/40	0.07	0.2		0.04	0.2		<	0.22	U	0.04	0.15		<	0.16	U
Nickel	9.8	40/40	7	4		5.6	4		4.2	4.2		2.7	4		3.5	4.1	
Potassium	3930	40/40	1760	500		1750	510		954	530		748	500		795	510	
Selenium	0.74	1/40	<	5.7	U	<	5.2	U	<	5.3	U	<	4.9	U	<	4.7	U
Sodium	575	40/40	221	500		210	510		217	530		131	500		149	510	
Thallium	0.41	13/40	<	1	U	<	1	U	<	1.1	U	<	1	U	<	0.95	U
Vanadium	28.4	40/40	18.8	5		16.4	5.1		14.5	5.3		7	5		8.5	5.1	
Zinc	22.1	40/40	19.4	2	E	16	2	E	9.3	2.1	E	6.7	2	E	9.1	2.1	E

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB05-005			CAG-SB05-010			CAG-SB05-020			CAG-SB05-030			CAG-SB05-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	19	U	<	18	U	<	19	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	19	U	<	18	U	<	19	U	<	18	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Benzo(a)pyrene	52	2/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Benzo(b)fluoranthene	55	2/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Benzo(k)fluoranthene	46	1/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Chrysene	51	2/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Di-N-Butyl Phthalate	560	4/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Di-N-Octylphthalate	150	2/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Fluoranthene	69	3/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
Pyrene	53	3/40	<	380	U	<	360	U	<	370	U	<	370	U	<	360	U
METALS (mg/kg)																	
Aluminum	16700	40/40	8590	20		10400	21		5970	20		6610	21		5110	21	
Antimony	1.1	1/40	<	6.1	U	<	6.2	U	<	6.1	U	<	6.2	U	<	6.3	U
Arsenic	3.1	40/40	2.2	2.1		2.3	0.97		1.5	0.98		1.2	0.99		1.1	0.97	
Barium	1280	40/40	162	20		177	21		762	20		151	21		96.8	21	
Beryllium	0.7	40/40	0.43	0.51		0.65	0.52		0.22	0.51		0.27	0.52		0.22	0.52	
Cadmium	0.29	12/39				0.22	0.52		0.14	0.51		<	0.52	U	0.15	0.52	
Calcium	265000	40/40	216000	5100		87400	5200		195000	5100		138000	5200		75300	5200	
Chromium, Total	22.6	40/40	20.1	1		12.1	1		18	1		14.5	1		10.8	1	
Cobalt	4.3	40/40	2.8	5.1		4	5.2		2.3	5.1		2	5.2		1.5	5.2	
Copper	12.8	38/40	4.2	2.5		4.5	2.6		3.5	2.6		2.2	2.6		2.8	2.6	
Iron	9620	40/40	5130	10		7070	10		3030	10		3660	10		3520	10	
Lead	9.2	40/40	2.7	11		6.3	9.7	J	1.6	9.8		2.7	9.9		1.9	9.7	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	3810	510		4000	520		16900	510		8790	520		7240	520	

Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB05-005			CAG-SB05-010			CAG-SB05-020			CAG-SB05-030			CAG-SB05-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	51.9	1.5		113	1.6		31.9	1.5		31.9	1.6		38	1.6	
Mercury	0.14	8/40	0.1	0.18		<	0.19	U	<	0.31	U	<	0.2	U	<	0.2	U
Nickel	9.8	40/40	5.6	4.1		8.2	4.2		6.7	4.1		4.8	4.1		4.2	4.2	
Potassium	3930	40/40	1250	510		1940	520		1090	510		1200	520		1020	520	
Selenium	0.74	1/40	<	5.2	U	<	2.4	U	<	2.5	U	<	2.5	U	<	2.4	U
Sodium	575	40/40	273	510		351	520		289	510		240	520		168	520	
Thallium	0.41	13/40	<	1.1	U	0.28	0.97		0.22	0.98		0.39	0.99		0.27	0.97	
Vanadium	28.4	40/40	15.3	5.1		22.8	5.2		15	5.1		12.9	5.2		12.7	5.2	
Zinc	22.1	40/40	14.7	2	E	19.4	2.1		7.7	2		8	2.1		8.6	2.1	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB06-005			CAG-SB06-010			CAG-SB06-020			CAG-SB06-030			CAG-SB06-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	18	U	<	19	U	<	18	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	18	U	<	19	U	<	18	U	<	18	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Benzo(a)pyrene	52	2/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Benzo(b)fluoranthene	55	2/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Benzo(k)fluoranthene	46	1/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Chrysene	51	2/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Di-N-Butyl Phthalate	560	4/40	<	360	U	39	370		<	360	U	<	360	U	<	360	U
Di-N-Octylphthalate	150	2/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Fluoranthene	69	3/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
Pyrene	53	3/40	<	360	U	<	370	U	<	360	U	<	360	U	<	360	U
METALS (mg/kg)																	
Aluminum	16700	40/40	10100	21		16700	21		8280	21		11700	20		5540	19	
Antimony	1.1	1/40	<	6.2	U	<	6.2	U	<	6.3	U	<	6	U	<	5.7	U
Arsenic	3.1	40/40	2.3	0.96		2.5	0.98		2.4	0.97		1.2	0.98		0.78	0.95	
Barium	1280	40/40	329	21		322	21		70.1	21		271	20		30.1	19	
Beryllium	0.7	40/40	0.51	0.52		0.69	0.52		0.41	0.52		0.4	0.5		0.25	0.48	
Cadmium	0.29	12/39	0.25	0.52		0.24	0.52		<	0.52	U	<	0.5	U	<	0.48	U
Calcium	265000	40/40	158000	5200		80000	5200		43300	520		18200	500		17700	480	
Chromium, Total	22.6	40/40	16.9	1		14.6	1		7.5	1		9.2	1		5.2	0.95	
Cobalt	4.3	40/40	3.8	5.2		2.5	5.2		2.3	5.2		1.9	5		1.9	4.8	
Copper	12.8	38/40	4.6	2.6		3.2	2.6		2.2	2.6		3	2.5		1.7	2.4	
Iron	9620	40/40	6560	10		9620	10		6110	10		7220	10		4050	9.5	
Lead	9.2	40/40	6	9.6		6.1	9.8		6.6	9.7		3.3	9.8		2.4	9.5	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	3600	520		9470	520		4570	520		10400	500		6190	480	

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB06-005			CAG-SB06-010			CAG-SB06-020			CAG-SB06-030			CAG-SB06-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	72.1	1.5		66.2	1.6		77.7	1.6		48.2	1.5		52.7	1.4	
Mercury	0.14	8/40	<	0.16	U	<	0.2	U	<	0.21	U	<	0.19	U	<	0.3	U
Nickel	9.8	40/40	6.5	4.1		9.8	4.1		6	4.2		5.9	4		4.2	3.8	
Potassium	3930	40/40	1650	520		3930	520		2120	520		2360	500		1220	480	
Selenium	0.74	1/40	<	2.4	U	<	2.4	U	<	2.4	U	<	2.4	U	<	2.4	U
Sodium	575	40/40	202	520		575	520		303	520		245	500		102	480	
Thallium	0.41	13/40	0.31	0.96		0.41	0.98		<	0.97	U	0.26	0.98		<	0.95	U
Vanadium	28.4	40/40	18.7	5.2		28.4	5.2		23.7	5.2		18.4	5		13.3	4.8	
Zinc	22.1	40/40	16.7	2.1		21.4	2.1		13.8	2.1		13.4	2		8.9	1.9	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB07-005			CAG-SB07-010			CAG-SB07-020			CAG-SB07-030			CAG-SB07-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	19	U	<	19	U	<	19	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	19	U	<	19	U	<	19	U	<	18	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Benzo(a)pyrene	52	2/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Benzo(b)fluoranthene	55	2/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Benzo(k)fluoranthene	46	1/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Chrysene	51	2/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Di-N-Butyl Phthalate	560	4/40	19	370		<	370	U	<	370	U	<	360	U	<	360	U
Di-N-Octylphthalate	150	2/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Fluoranthene	69	3/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
Pyrene	53	3/40	<	370	U	<	370	U	<	370	U	<	360	U	<	360	U
METALS (mg/kg)																	
Aluminum	16700	40/40	10900	19		9230	21		8450	21		5010	19		4040	21	
Antimony	1.1	1/40	<	5.8	U	<	6.2	U	<	6.2	U	<	5.7	U	<	6.4	U
Arsenic	3.1	40/40	2.6	0.99		1.9	0.82		1.2	0.98		0.94	0.94		0.54	0.97	
Barium	1280	40/40	1280	19		219	21		557	21		52.3	19		26.2	21	
Beryllium	0.7	40/40	0.51	0.49		0.44	0.52		0.33	0.51		0.18	0.47		0.2	0.53	
Cadmium	0.29	12/39	0.2	0.49		0.16	0.52		<	0.51	U	<	0.47	U	<	0.53	U
Calcium	265000	40/40	133000	4900		175000	5200		107000	5100		89100	4700		29500	530	
Chromium, Total	22.6	40/40	15.2	0.97		17.3	1		14.8	1		8.7	0.94		5.2	1.1	
Cobalt	4.3	40/40	2.8	4.9		3.5	5.2		2	5.1		1.2	4.7		1.2	5.3	
Copper	12.8	38/40	4.5	2.4		4	2.6		2.2	2.6		1.2	2.4		1.3	2.7	
Iron	9620	40/40	7170	9.7		6040	10		4610	10		3200	9.4		2950	11	
Lead	9.2	40/40	9.2	9.9		4.9	8.2		3	9.8		2	9.4		1.7	9.7	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	3550	490		3590	520		10500	510		4710	470		6210	530	

Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB07-005			CAG-SB07-010			CAG-SB07-020			CAG-SB07-030			CAG-SB07-040		
COLLECT DATE			5/4/98			5/4/98			5/4/98			5/4/98			5/4/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	79.4	1.5		64.2	1.5		38.8	1.5		27.7	1.4		35.1	1.6	
Mercury	0.14	8/40	<	0.2	U	<	0.16	U	<	0.2	U	<	0.21	U	<	0.19	U
Nickel	9.8	40/40	7.4	3.9		6.8	4.1		5.7	4.1		2.6	3.8		3.5	4.2	
Potassium	3930	40/40	1730	490		1500	520		1460	510		1000	470		761	530	
Selenium	0.74	1/40	<	2.5	U	<	2	U	<	2.5	U	<	2.4	U	<	2.4	U
Sodium	575	40/40	281	490		270	520		356	510		183	470		88.4	530	
Thallium	0.41	13/40	0.32	0.99		<	0.82	U	0.41	0.98		<	0.94	U	<	0.97	U
Vanadium	28.4	40/40	21	4.9		17.4	5.2		18.4	5.1		9.5	4.7		10.8	5.3	
Zinc	22.1	40/40	17.9	1.9		15.3	2.1		10	2.1		6.7	1.9		6.2	2.1	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB08-005			CAG-SB08-010			CAG-SB08-020			CAG-SB08-030			CAG-SB08-040		
COLLECT DATE			5/5/98			5/5/98			5/5/98			5/5/98			5/5/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
Carbon Disulfide	22	2/40	<	11	U	<	11	U	<	11	U	22	11		11	11	
Chloromethane	10	1/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	36	2/40	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U
Methyl Isobutyl Ketone	52	9/40	<	18	U	<	18	U	<	18	U	<	18	U	<	18	U
Toluene	6	2/40	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzo(a)anthracene	39	1/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Benzo(a)pyrene	52	2/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Benzo(b)fluoranthene	55	2/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Benzo(k)fluoranthene	46	1/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Chrysene	51	2/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Di-N-Butyl Phthalate	560	4/40	<	350	U	<	350	U	<	360	U	<	370	U	270	350	
Di-N-Octylphthalate	150	2/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Fluoranthene	69	3/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
Pyrene	53	3/40	<	350	U	<	350	U	<	360	U	<	370	U	<	350	U
METALS (mg/kg)																	
Aluminum	16700	40/40	10400	18		8500	18		11700	19		13300	19		5200	18	
Antimony	1.1	1/40	<	5.3	U	<	5.4	U	<	5.6	U	1.1	5.6		<	5.4	U
Arsenic	3.1	40/40	1.7	0.95		1	0.92		1.5	0.94		0.87	0.96		0.81	0.93	
Barium	1280	40/40	108	18		493	18		221	19	J	125	19		43.6	18	
Beryllium	0.7	40/40	0.61	0.44		0.43	0.45		0.7	0.47		0.46	0.47		0.22	0.45	
Cadmium	0.29	12/39	0.22	0.44		0.29	0.45		<	0.47	U	<	0.47	U	<	0.45	U
Calcium	265000	40/40	56000	4400		100000	450		63700	470		48700	470		38900	450	
Chromium, Total	22.6	40/40	11.6	0.88		13.6	0.91		10.9	0.94		12.1	0.94		6.4	0.9	
Cobalt	4.3	40/40	4.3	4.4		3.4	4.5		3.7	4.7		2.7	4.7		1.2	4.5	
Copper	12.8	38/40	7.3	2.2		4.1	2.3		4.3	2.3		3.5	2.3		2	2.3	
Iron	9620	40/40	8460	8.8		6450	9.1		7820	9.4		6980	9.4		3420	9	
Lead	9.2	40/40	8	9.5		3.5	9.2		5.6	9.4		3.6	9.6		2.1	9.3	
METALS (mg/kg) (continued)																	
Magnesium	24000	40/40	2810	440		3140	450		4880	470		15300	470		7300	450	

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1b
Detected Compounds in Subsurface Soils
AOC G

FIELD ID			CAG-SB08-005			CAG-SB08-010			CAG-SB08-020			CAG-SB08-030			CAG-SB08-040		
COLLECT DATE			5/5/98			5/5/98			5/5/98			5/5/98			5/5/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
Manganese	156	40/40	156	1.3		91	1.4		115	1.4		54.4	1.4		34.9	1.4	
Mercury	0.14	8/40	<	0.19	U	<	0.2	U	<	0.21	U	<	0.21	U	<	0.21	U
Nickel	9.8	40/40	9.4	3.5		6.7	3.6		6.7	3.7		5.9	3.8		3.7	3.6	
Potassium	3930	40/40	1930	440		1960	450	E	2790	470	E	2780	470	E	1080	450	E
Selenium	0.74	1/40	<	2.4	U	<	0.46	U	<	0.47	U	<	0.48	U	<	0.46	U
Sodium	575	40/40	76.3	440		202	450	E	358	470	E	302	470	E	142	450	E
Thallium	0.41	13/40	<	0.95	U	0.18	0.92		0.31	0.94		0.25	0.96		<	0.93	U
Vanadium	28.4	40/40	18	4.4		16.9	4.5		18.4	4.7		18.5	4.7		10.8	4.5	
Zinc	22.1	40/40	22.1	1.8		16.3	1.8		20.8	1.9		14.8	1.9		7.6	1.8	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E - Estimated since result exceeded the calibration curve.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 31-1c
Comparison of Maximum Surface Soil Concentrations to MSSLs
AOC G

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of MSSL	Estimated Risk: Excess Cancer[2]	Estimated Risk: Hazard Quotient[3]
VOLATILE ORGANICS									
Methyl Ethyl Ketone (2-Butanone)	1/8	CAG-SB01-002	0.038		6,900	NO			0.000006
Methyl Isobutyl Ketone	3/8	CAG-SB01-002	0.074		750	NO			0.000099
Toluene	3/8	CAG-SB01-002	0.006		520	NO			**
METALS									
Aluminum	8/8	CAG-SB05-002	21300		75,000	NO			0.28
Beryllium	8/8	CAG-SB06-002	0.94		150	NO		6.27E-09	
Chromium	8/8	CAG-SB04-003	20.6		210	NO		9.81E-08	
Iron	8/8	CAG-SB05-002	15,400		22,000	NO			0.70
Lead	8/8	CAG-SB07-002	14.9		400	NO			*
Mercury	3/8	CAG-SB04-003	0.41		22	NO			0.02
Nickel	8/8	CAG-SB06-002	13.8		1,500	NO			0.009
Vanadium	8/8	CAG-SB05-002	32.6		520	NO			0.06
Zinc	8/8	CAG-SB05-002	42.6	E	22,000	NO			0.002
Total Excess Cancer Risk[4]								1E-07	
Hazard Index[5]									1.08

[1] EPA Region Media-Specific Screening Levels for Residential Soil (EPA 1998)
[2] These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*$1x10^{-6}$.
[3] These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
[4] Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
[5] Hazard Index = Sum of all hazard quotients at the site.
* Lead does not have an EPA-established toxicity factor; therefore, a MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).
mg/kg = milligrams per kilogram
** The MSSL for toluene is based on a soil saturation concentration and not based on risk.
Therefore, a potential risk from these chemicals could not be estimated using the MSSLs. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of these chemicals from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.

Source: URS Greiner Woodward Clyde, 1999

Table 31-1d
Comparison of Maximum Subsurface Soil Concentrations to MSSLs
AOC G

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Exceeds MSSL?	Estimated Risk: Excess Cancer[3]	Estimated Risk: Hazard Quotient[4]
VOLATILE ORGANICS								
Carbon Disulfide	2/40	CAG-SB08-030	0.022		350	NO		0.00006
Chloromethane	1/40	CAG-SB01-010	0.01		1.2	NO	8.33E-09	
Methyl Ethyl Ketone (2-Butanone)	2/40	CAG-SB01-010	0.036		6900	NO		0.00001
Methyl Isobutyl Ketone	9/40	CAG-SB01-040	0.052		750	NO		0.00007
Toluene	2/40	CAG-SB03-006	0.006		520	NO		**
SEMIVOLATILE ORGANICS								
Benzo(a)anthracene	1/40	CAG-SB04-006	0.039		0.56	NO	6.96E-08	
Benzo(a)pyrene	2/40	CAG-SB04-006	0.052		0.056	NO	9.29E-07	
Benzo(b)fluoranthene	2/40	CAG-SB04-006	0.055		0.56	NO	9.82E-08	
Benzo(k)fluoranthene	1/40	CAG-SB04-006	0.046		5.6	NO	8.21E-09	
Chrysene	2/40	CAG-SB04-006	0.051		56	NO	9.11E-10	
Di-n-butylphthalate	4/40	CAG-SB01-030	0.56		5500	NO		0.0001
Di-n-octylphthalate	2/40	CAG-SB04-011	0.15		1100	NO		**
Fluoranthene	3/40	CAG-SB04-006	0.069		2000	NO		0.00003
Pyrene	3/40	CAG-SB04-011	0.053		1500	NO		0.00004
METALS								
Aluminum	40/40	CAG-SB06-010	16700		75000	NO		***
Barium	40/40	CAG-SB07-005	1280		5200	NO		***
Chromium	40/40	CAG-SB02-020	22.6		210	NO	1.08E-07	
Copper	38/40	CAG-SB02-040	12.8		2800	NO		0.005
Lead	40/40	CAG-SB07-005	9.2		400	NO		*
Mercury	8/40	CAG-SB03-031	0.14		22	NO		0.006
Total Excess Cancer Risk[5]							1E-06	
Hazard Index[6]								0.01

(1) EPA Region Media-Specific Screening Levels for Residential Soil (EPA 1998)
(2) EPA Region Media-Specific Screening Levels for Industrial Soil (EPA 1998)
(3) These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*1x10-6.
(4) These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
(5) Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
(6) Hazard Index = Sum of all hazard quotients at the site.
** The MSSL for toluene is based on a soil saturation concentration and not based on risk.
Therefore, a potential risk from these chemicals could not be estimated using the MSSLs. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of these chemicals from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
mg/kg = milligrams per kilogram
*** The MSSL is a maximum allowable concentration and not based on risk. Therefore, a potential risk from these chemicals could not be estimated using the MSSLs. A MSSL calculated based on risk would be greater than the MSSL. The exclusion of these chemicals from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
* Lead does not have an EPA-established toxicity factor; therefore, a MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).

Source: URS Greiner Woodward Clyde, 1999

Table 32-1a
Detected Compounds in Surface Soils
AOC H

LOCATION			CAH-SB01-002			CAH-SB02-002			CAH-SB03-002			CAH-SB04-002		
FIELD ID														
COLLECT DATE			5/1/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	17	1/6	<	20	U	17	19	J	<	18	U	<	20	U
Toluene	4	1/6	<	12	U	<	12	U	<	11	U	4	12	J
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)														
Di-N-Octylphthalate	40	1/6	40	370		<	380	U	<	360	U	<	390	U
PESTICIDES/PCB (µg/kg)														
DDE (1,1-bis(Chlorophenyl)-2,2-Dichloroethene)	10.7 J	2/6	<	7.4	U	4.1	3.8		10.7	1.9		<	7.7	U
DDT (1,1-bis(Chlorophenyl)-2,2,2-Trichloroethane)	2.1 J	1/6	<	7.4	U	<	3.8	U	2.1	7.2	J	<	7.7	U
METALS (mg/kg)														
Aluminum	17400	6/6	11800	2.7		17200	22		11500	21		9060	21	
Antimony	3.8	1/6	<	1.2	U	<	6.6	U	<	6.4	U	<	6.2	U
Arsenic	3.9 J	6/6	2.2	0.22		2.5	1.9		2.4	1.6		2.8	2.2	
Barium	97.1	6/6	74.2	0.079		92.8	22		72.7	21		63.8	21	
Beryllium	0.77	6/6	0.48	0.03		0.76	0.55		0.52	0.53	J	0.45	0.51	J
Cadmium	0.28	3/6	0.25	0.14		<	0.55	U	0.15	0.53	J	0.28	0.51	J
Calcium	4870	6/6	4870	2.8		3090	550		2830	530		2330	510	
Chromium, Total	12.9	6/6	9.9	0.63		12.4	1.1		9.2	1.1		8.1	1	
Cobalt	5.2	6/6	3.1	0.29		5.2	5.5	J	3.7	5.3	J	3.3	5.1	J
Copper	8.7	6/6	6.2	0.21		8.2	2.8		6.2	2.7		5.1	2.6	
Iron	12900	6/6	9190	0.53		12500	11	E	9450	11		8600	10	
Lead	20.3	6/6	20.3	0.45		8	0.28		9.7	16	J	7.3	11	J
Magnesium	2540	6/6	1570	2.2		2210	550		1590	530		1280	510	
Manganese	210 E	6/6	152	0.089		210	1.7	E	160	1.6	E	147	1.5	E
Mercury	0.07	2/6	<	0.041	U	<	0.19	U	<	0.21	U	<	0.2	U
Nickel	10.6	6/6	7.1	0.36		10.6	4.4		7.5	4.2		6.5	4.1	
Potassium	2910	6/6	2080	11		2670	550		1980	530		1720	510	
Sodium	188	6/6	24.1	2.6		32.6	550	J	37.1	530	J	22.2	510	J
Thallium	0.36	3/6	0.21	0.2		<	0.94	U	<	0.82	U	<	1.1	U
Vanadium	27.9	6/6	19.2	0.2		26.4	5.5	E	19.3	5.3		18.3	5.1	
Zinc	31.9 E	6/6	27.2	0.43	E	31.2	2.2		23.8	2.1		19.6	2.1	

J = Estimated
Qual = Qualifier
RL = Reporting Limit
U = Not detected at specified reporting limit
E = Estimated since result exceeded calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1a
Detected Compounds in Surface Soils
AOC H

LOCATION FIELD ID COLLECT DATE	Maximum	Frequency	CAH-SB05-002 5/2/98 Result	RL	Qual	CAH-SB06-002 5/2/98 Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)								
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	17	1/6	<	18	U	<	22	U
Toluene	4	1/6	<	11	U	<	13	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)								
Di-N-Octylphthalate	40	1/6	<	360	U	<	440	U
PESTICIDES/PCB (µg/kg)								
DDE (1,1-bis(Chlorophenyl)-2,2-Dichloroethene)	10.7 J	2/6	<	7.2	U	<	8.7	U
DDT (1,1-bis(Chlorophenyl)-2,2,2-Trichloroethane)	2.1 J	1/6	<	7.2	U	<	8.7	U
METALS (mg/kg)								
Aluminum	17400	6/6	16300	20		17400	25	
Antimony	3.8	1/6	<	5.9	U	3.8	7.5	J
Arsenic	3.9 J	6/6	3.9	1	J	2.9	1.2	
Barium	97.1	6/6	91	20		97.1	25	
Beryllium	0.77	6/6	0.73	0.49		0.77	0.62	
Cadmium	0.28	3/6	<	0.49	U	<	0.62	U
Calcium	4870	6/6	3430	490		2430	620	
Chromium, Total	12.9	6/6	12	0.98		12.9	1.2	
Cobalt	5.2	6/6	5.1	4.9		4.8	6.2	J
Copper	8.7	6/6	7.8	2.5		8.7	3.1	
Iron	12900	6/6	12500	9.8		12900	12	
Lead	20.3	6/6	8.7	10	J	9.7	12	J
Magnesium	2540	6/6	2170	490		2540	620	
Manganese	210 E	6/6	200	1.5		204	1.9	
Mercury	0.07	2/6	0.04	0.17	J	0.07	0.25	J
Nickel	10.6	6/6	10	3.9		10.5	5	
Potassium	2910	6/6	2470	490		2910	620	
Sodium	188	6/6	188	490	J	126	620	J
Thallium	0.36	3/6	0.27	1	J	0.36	1.2	J
Vanadium	27.9	6/6	25.6	4.9		27.9	6.2	
Zinc	31.9 E	6/6	28.9	2	E	31.9	2.5	E

J = Estimated
Qual = Qualifier
RL = Reporting Limit
U = Not detected at specified reporting limit
E = Estimated since result exceeded calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB01-005			CAH-SB01-010			CAH-SB01-020			CAH-SB01-030			CAH-SB01-040			CAH-SB02-005		
COLLECT DATE			5/1/98			5/1/98			5/1/98			5/1/98			5/1/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																				
2-Hexanone	7	1/30	<	21	U	7	24	J	<	20	U	<	18	U	<	18	U	<	19	U
Benzene	4	1/30	<	13	U	<	14	U	<	12	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	21	U	23	24		<	20	U	<	18	U	<	18	U	37	19	
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	<	21	U	41	24		<	20	U	<	18	U	<	18	U	59	19	
Toluene	22	5/30	<	13	U	<	14	U	<	12	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																				
Benzyl Butyl Phthalate	16	1/30	<	420	U	<	470	U	<	400	U	<	370	U	<	350	U	<	370	U
Di-N-Butyl Phthalate	15	1/30	<	420	U	<	470	U	<	400	U	<	370	U	<	350	U	<	370	U
PESTICIDES/PCB (µg/kg)																				
DDE	3.6	1/30	3.6	0.83		<	0.94	U	<	0.8	U	<	0.73	U	<	0.7	U	<	3.7	U
METALS (mg/kg)																				
Aluminum	17500	30/30	14600	24		13000	25		7350	24		5790	19		6000	19		16000	21	
Antimony	1.8	1/30	<	7.1	U	<	7.5	U	<	7.2	U	<	5.8	U	<	5.8	U	<	6.2	UJ
Arsenic	3.1	30/30	2.5	2.4		2.8	2.8		1.6	2.3	J	1.3	2.1	J	1.2	1.9	J	2.5	2	
Barium	2240	30/30	81.6	24		736	25		133	24		90.6	19		31.4	19		89.2	21	
Beryllium	0.75	30/30	0.67	0.59		0.65	0.62		0.37	0.6	J	0.23	0.49	J	0.24	0.48	J	0.74	0.52	
Cadmium	0.4	7/30	<	0.59	U	<	0.62	U	<	0.6	U	<	0.49	U	<	0.48	U	<	0.52	U
Calcium	312000	30/30	9430	590		153000	6200		81500	6000		111000	4900		57500	480		28900	520	
Chromium, Total	24.1	30/30	11.4	1.2		20	1.2		10.8	1.2		12.8	0.97		8	0.97		13.1	1	
Cobalt	5.3	30/30	4.3	5.9	J	3.5	6.2	J	2.4	6	J	1.2	4.9	J	1.6	4.8	J	5.3	5.2	
Copper	9	27/30	9	2.9		4.9	3.1		2.6	3	J	2.3	2.4	J	<	2.4	U	8	2.6	
Iron	12700	30/30	10700	12		7790	12		5060	12		3520	9.7		3860	9.7		11200	10	E
Lead	11.3	30/30	10.2	12	J	4.5	12	J	3.2	11	J	2	10	J	2.9	9.2	J	8.3	0.31	
Magnesium	11500	30/30	2170	590		5110	620		3170	600		9250	490		5300	480		2960	520	
Manganese	190	30/30	158	1.8		92.8	1.9		58	1.8		28.2	1.5		37.6	1.5		174	1.6	E
Mercury	0.34	7/30	0.34	0.24		0.16	0.23	J	0.04	0.22	J	<	0.2	U	0.16	0.2	J	<	0.21	U
Nickel	11.6	30/30	9.4	4.7		7.5	5		5.7	4.8		4.1	3.9		3.5	3.9	J	11.1	4.2	
Potassium	2840	30/30	2490	590		2150	620		1570	600		1020	490		1200	480		2660	520	
Sodium	348	30/30	41.2	590	J	192	620	J	120	600	J	166	490	J	111	480	J	40.7	520	J
Thallium	0.35	3/30	<	1.2	U	<	1.2	U	<	1.1	U	<	1	U	<	0.92	U	0.35	1	J
Vanadium	25.9	30/30	20.9	5.9		20.9	6.2		15.2	6		21.2	4.9		15.6	4.8		22.3	5.2	E
Zinc	35.4 E	30/30	35.4	2.4	E	22.3	2.5	E	14.2	2.4	E	8.7	1.9	E	9.3	1.9	E	28.9	2.1	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB02-010			CAH-SB02-020			CAH-SB02-030			CAH-SB02-040			CAH-SB03-005		
COLLECT DATE			5/2/98			5/2/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
2-Hexanone	7	1/30	<	18	U	<	20	U	<	19	U	<	18	U	<	17	U
Benzene	4	1/30	<	11	U	<	12	U	<	11	U	<	11	U	<	10	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	18	U	34	20		<	19	U	<	18	U	<	17	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	8	18	J	66	20		14	19	J	<	18	U	<	17	U
Toluene	22	5/30	6	11	J	22	12		<	11	U	<	11	U	12	10	
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzyl Butyl Phthalate	16	1/30	<	360	U	<	390	U	<	370	U	<	370	U	<	360	U
Di-N-Butyl Phthalate	15	1/30	<	360	U	<	390	U	<	370	U	<	370	U	<	360	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/30	<	3.5	U	<	3.9	U	<	3.7	U	<	3.7	U	<	7.1	U
METALS (mg/kg)																	
Aluminum	17500	30/30	10500	19		9660	20		6720	21		4610	19		9020	19	
Antimony	1.8	1/30	<	5.6	U	<	6.1	U	<	6.3	U	<	5.7	U	<	5.7	U
Arsenic	3.1	30/30	2.4	2		1.4	2.2	J	1.4	2	J	1.2	2	J	2.1	2	
Barium	2240	30/30	159	19		186	20		386	21		43.3	19		74.9	19	
Beryllium	0.75	30/30	0.52	0.47		0.4	0.5	J	0.26	0.53	J	0.17	0.47	J	0.41	0.48	J
Cadmium	0.4	7/30	<	0.47	U	<	0.5	U	<	0.53	U	<	0.47	U	0.29	0.48	J
Calcium	312000	30/30	123000	4700		97500	5000		125000	5300		56700	470		7920	480	
Chromium, Total	24.1	30/30	15.1	0.94		12.4	1		12	1.1		7.1	0.95		7.5	0.95	
Cobalt	5.3	30/30	3.3	4.7	J	1.9	5	J	1	5.3	J	1.1	4.7	J	2.7	4.8	J
Copper	9	27/30	4	2.4		2.7	2.5		<	2.6	U	<	2.4	U	5.1	2.4	
Iron	12700	30/30	6650	9.4	E	5590	10	E	3500	11	E	3110	9.5	E	7630	9.5	
Lead	11.3	30/30	5.6	0.3		4	0.33		2.8	0.3		2.1	0.29		11.3	20	J
Magnesium	11500	30/30	3660	470		5300	500		10000	530		6510	470		1370	480	
Manganese	190	30/30	95.8	1.4	E	55.3	1.5	E	31.1	1.6	E	30.3	1.4	E	126	1.4	E
Mercury	0.34	7/30	<	0.15	U	<	0.23	U	<	0.2	U	<	0.19	U	<	0.21	U
Nickel	11.6	30/30	6.4	3.8		4.6	4		3.4	4.2	J	3.2	3.8	J	5.6	3.8	
Potassium	2840	30/30	1900	470		1840	500		1220	530		1010	470		1880	480	
Sodium	348	30/30	180	470	J	149	500	J	157	530	J	126	470	J	22	480	J
Thallium	0.35	3/30	<	1	U	<	1.1	U	<	1	U	<	0.98	U	<	1	U
Vanadium	25.9	30/30	18.2	4.7	E	18.4	5	E	17.7	5.3	E	11.8	4.7	E	16.4	4.8	
Zinc	35.4 E	30/30	18.3	1.9		15.8	2		9.5	2.1		7.6	1.9		20.3	1.9	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB03-010			CAH-SB03-020			CAH-SB03-030			CAH-SB03-040			CAH-SB04-005		
COLLECT DATE			5/2/98			5/2/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
2-Hexanone	7	1/30	<	20	U	<	20	U	<	19	U	<	18	U	<	18	U
Benzene	4	1/30	<	12	U	<	12	U	<	12	U	4	11	J	<	11	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	20	U	<	20	U	<	19	U	<	18	U	<	18	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	<	20	U	<	20	U	<	19	U	<	18	U	<	18	U
Toluene	22	5/30	<	12	U	<	12	U	<	12	U	13	11		<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzyl Butyl Phthalate	16	1/30	<	400	U	<	410	U	<	390	U	<	360	U	<	370	U
Di-N-Butyl Phthalate	15	1/30	<	400	U	<	410	U	<	390	U	<	360	U	15	370	J
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/30	<	7.9	U	<	8.1	U	<	7.7	U	<	7.1	U	<	7.3	U
METALS (mg/kg)																	
Aluminum	17500	30/30	11700	23		9800	23		10600	22		4700	20		17500	20	
Antimony	1.8	1/30	<	7	U	<	6.9	U	<	6.7	U	<	5.9	U	<	5.9	U
Arsenic	3.1	30/30	2.8	2.1		1.2	2.4	J	1.6	2.2	J	1.2	1.6	J	3.1	2	
Barium	2240	30/30	351	23		412	23		2240	22		72	20		210	20	
Beryllium	0.75	30/30	0.55	0.58	J	0.36	0.58	J	0.31	0.56	J	0.16	0.49	J	0.73	0.49	J
Cadmium	0.4	7/30	0.3	5.8	J	<	5.8	U	0.17	5.6	J	<	4.9	U	0.2	0.49	J
Calcium	312000	30/30	181000	580		126000	580		97700	560		115000	490		22000	490	
Chromium, Total	24.1	30/30	18.5	1.2		15	1.2		13.9	1.1		11	0.98		12.9	0.99	
Cobalt	5.3	30/30	3.2	5.8	J	2.2	5.8	J	2.4	5.6	J	1.3	4.9	J	4.6	4.9	J
Copper	9	27/30	4	2.9		2.1	2.9	J	2	2.8	J	2	2.5	J	7.9	2.5	
Iron	12700	30/30	7670	12		5670	12		5670	11		2860	9.8		12000	9.9	
Lead	11.3	30/30	6.4	10		3.9	12	J	2.8	11	J	1.9	8.1	J	10	9.9	
Magnesium	11500	30/30	4800	580		8830	580		11500	560		9610	490		2700	490	
Manganese	190	30/30	97.1	1.7	E	47	1.7	E	38.7	1.7	E	25.5	1.5	E	155	1.5	E
Mercury	0.34	7/30	<	0.23	U	<	0.22	U	<	0.2	U	<	0.19	U	<	0.2	U
Nickel	11.6	30/30	7.1	4.7		5.4	4.6		5.6	4.4		3.3	3.9	J	10.6	3.9	
Potassium	2840	30/30	2230	580		1890	580		1930	560		915	490		2720	490	
Sodium	348	30/30	272	580	J	265	580	J	216	560	J	91.5	490	J	69.3	490	J
Thallium	0.35	3/30	<	1	U	<	1.2	U	<	1.1	U	<	0.81	U	<	0.99	U
Vanadium	25.9	30/30	22.4	5.8		24	5.8		23	5.6		13.8	4.9		24	4.9	
Zinc	35.4 E	30/30	22.5	2.3		14.7	2.3		12.5	2.2		9	2		29.1	2	

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB04-010			CAH-SB04-020			CAH-SB04-030			CAH-SB04-040			CAH-SB05-005		
COLLECT DATE			5/2/98			5/2/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
2-Hexanone	7	1/30	<	18	U	<	18	U	<	18	U	<	18	U	<	21	U
Benzene	4	1/30	<	11	U	<	11	U	<	11	U	<	11	U	<	13	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	18	U	<	18	U	<	18	U	<	18	U	<	21	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	<	18	U	<	18	U	<	18	U	<	18	U	<	21	U
Toluene	22	5/30	<	11	U	<	11	U	7	11	J	<	11	U	<	13	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzyl Butyl Phthalate	16	1/30	<	350	U	<	360	U	<	360	U	<	360	U	<	430	U
Di-N-Butyl Phthalate	15	1/30	<	350	U	<	360	U	<	360	U	<	360	U	<	430	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/30	<	7	U	<	7.1	U	<	7.1	U	<	7.1	U	<	8.5	U
METALS (mg/kg)																	
Aluminum	17500	30/30	15800	19		7860	20		9530	19		6460	19		16900	24	
Antimony	1.8	1/30	1.8	5.8	J	<	6	U	<	5.8	U	<	5.7	U	<	7.2	U
Arsenic	3.1	30/30	2.6	1.9		1.8	1.9	J	2.1	1.8		1.6	1.9	J	2.7	1.1	
Barium	2240	30/30	686	19		217	20		447	19		372	19		103	24	
Beryllium	0.75	30/30	0.75	0.48		0.4	0.5	J	0.4	0.48	J	0.25	0.47	J	0.74	0.6	
Cadmium	0.4	7/30	0.4	4.8	J	0.21	5	J	<	4.8	U	0.13	0.47	J	<	0.6	U
Calcium	312000	30/30	105000	480		79500	500		118000	480		37400	470		10200	600	
Chromium, Total	24.1	30/30	15.5	0.96		10.6	1		14.7	0.96		6.8	0.95		13.2	1.2	
Cobalt	5.3	30/30	3.5	4.8	J	2.4	5	J	2.6	4.8	J	1.4	4.7	J	4.8	6	J
Copper	9	27/30	4.8	2.4		2.4	2.5	J	3.1	2.4		2.4	2.4		8.6	3	
Iron	12700	30/30	9090	9.6		5870	10		5760	9.6		3780	9.5		12700	12	
Lead	11.3	30/30	5.9	9.4	J	3.9	9.5	J	4.2	9.2	J	2.3	9.6	J	7.8	11	J
Magnesium	11500	30/30	4340	480		3500	500		9530	480		8930	470		2700	600	
Manganese	190	30/30	113	1.4	E	81.8	1.5	E	71.2	1.4	E	33.4	1.4	E	190	1.8	
Mercury	0.34	7/30	<	0.19	U	<	0.19	U	<	0.19	U	<	0.21	U	<	0.24	U
Nickel	11.6	30/30	8.4	3.9		5.5	4		5.7	3.9		4	3.8		11.6	4.8	
Potassium	2840	30/30	2280	480		1960	500		2150	480		1390	470		2840	600	
Sodium	348	30/30	149	480	J	219	500	J	241	480	J	102	470	J	127	600	J
Thallium	0.35	3/30	<	0.94	U	<	0.95	U	<	0.92	U	<	0.96	U	0.3	1.1	J
Vanadium	25.9	30/30	22.9	4.8		14.3	5		18.2	4.8		15.1	4.7		25.9	6	
Zinc	35.4 E	30/30	23.1	1.9		16.3	2		15.6	1.9		9.1	1.9		29.2	2.4	E

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB05-010			CAH-SB05-020			CAH-SB05-030			CAH-SB05-040			CAH-SB06-005		
COLLECT DATE			5/2/98			5/2/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)																	
2-Hexanone	7	1/30	<	18	U	<	19	U	<	18	U	<	18	U	<	19	U
Benzene	4	1/30	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	18	U	<	19	U	<	18	U	<	18	U	<	19	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	<	18	U	<	19	U	<	18	U	<	18	U	<	19	U
Toluene	22	5/30	<	11	U	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)																	
Benzyl Butyl Phthalate	16	1/30	<	360	U	<	370	U	<	360	U	<	360	U	16	370	J
Di-N-Butyl Phthalate	15	1/30	<	360	U	<	370	U	<	360	U	<	360	U	<	370	U
PESTICIDES/PCB (µg/kg)																	
DDE	3.6	1/30	<	7	U	<	7.3	U	<	7.2	U	<	7.2	U	<	7.3	U
METALS (mg/kg)																	
Aluminum	17500	30/30	3780	19		9850	20		6650	21		11800	21		13400	19	
Antimony	1.8	1/30	<	5.8	U	<	6	U	<	6.4	U	<	6.3	U	<	5.6	U
Arsenic	3.1	30/30	1.8	1		1.4	1		1.3	0.92		1.8	0.88		2	1	
Barium	2240	30/30	345	19		134	20		229	21		244	21		79.1	19	
Beryllium	0.75	30/30	0.15	0.49	J	0.39	0.5	J	0.24	0.53	J	0.45	0.52	J	0.6	0.47	
Cadmium	0.4	7/30	<	0.49	U	<	0.5	U	<	0.53	U	<	0.52	U	<	0.47	U
Calcium	312000	30/30	312000	490		107000	500		115000	530		98800	520		13700	470	
Chromium, Total	24.1	30/30	24.1	0.97		13.6	0.99		14	1.1		22.6	1		10.7	0.93	
Cobalt	5.3	30/30	1.4	4.9	J	1.8	5	J	2	5.3	J	2.9	5.2	J	4.1	4.7	J
Copper	9	27/30	2.3	2.4	J	2.2	2.5	J	2.2	2.6	J	3.5	2.6		7.4	2.3	
Iron	12700	30/30	2070	9.7		5530	9.9		3840	11		6830	10		10400	9.3	
Lead	11.3	30/30	1.5	10	J	3.4	10	J	2.1	9.2	J	4	8.8	J	8.8	10	J
Magnesium	11500	30/30	3870	490		6950	500		6210	530		7430	520		2270	470	
Manganese	190	30/30	18.1	1.5		52.1	1.5		43.9	1.6		82.3	1.6		156	1.4	
Mercury	0.34	7/30	0.06	0.2	J	<	0.21	U	<	0.19	U	<	0.22	U	0.04	0.18	J
Nickel	11.6	30/30	4	3.9		5.2	4		4.3	4.2		11.2	4.2		9.3	3.7	
Potassium	2840	30/30	780	490		1960	500		1290	530		2510	520		2300	470	
Sodium	348	30/30	210	490	J	334	500	J	202	530	J	348	520	J	131	470	J
Thallium	0.35	3/30	<	1	U	<	1	U	<	0.92	U	<	0.88	U	0.21	1	J
Vanadium	25.9	30/30	8	4.9		24.4	5		16.7	5.3		24.1	5.2		21.5	4.7	
Zinc	35.4 E	30/30	6.1	1.9	E	13.8	2	E	10.1	2.1	E	21.1	2.1	E	24.9	1.9	E

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

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Source: URS Greiner Woodward Clyde, 1999

Table 32-1b
Detected Compounds in Subsurface Soils
AOC H

FIELD ID			CAH-SB06-010			CAH-SB06-020			CAH-SB06-030			CAH-SB06-040		
COLLECT DATE			5/2/98			5/2/98			5/2/98			5/2/98		
	Maximum	Frequency	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual	Result	RL	Qual
VOLATILE ORGANICS (METHOD 8260) (µg/kg)														
2-Hexanone	7	1/30	<	18	U	<	18	U	<	19	U	<	18	U
Benzene	4	1/30	<	11	U	<	11	U	<	11	U	<	11	U
Methyl Ethyl Ketone (2-Butanone)	37	3/30	<	18	U	<	18	U	<	19	U	<	18	U
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	66	5/30	<	18	U	<	18	U	<	19	U	<	18	U
Toluene	22	5/30	<	11	U	<	11	U	<	11	U	<	11	U
SEMIVOLATILE ORGANICS (METHOD 8270) (µg/kg)														
Benzyl Butyl Phthalate	16	1/30	<	370	U	<	360	U	<	380	U	<	370	U
Di-N-Butyl Phthalate	15	1/30	<	370	U	<	360	U	<	380	U	<	370	U
PESTICIDES/PCB (µg/kg)														
DDE	3.6	1/30	<	7.3	U	<	7.1	U	<	7.5	U	<	7.3	U
METALS (mg/kg)														
Aluminum	17500	30/30	16200	19		3650	19		6140	21		3730	21	
Antimony	1.8	1/30	<	5.6	U	<	5.8	U	<	6.3	U	<	6.2	U
Arsenic	3.1	30/30	2.2	0.97		1.1	1		1.5	1.1		0.9	0.96	J
Barium	2240	30/30	103	19		845	19		177	21		79.9	21	
Beryllium	0.75	30/30	0.66	0.47		0.14	0.48	J	0.19	0.53	J	0.13	0.52	J
Cadmium	0.4	7/30	<	0.47	U	<	0.48	U	<	0.53	U	<	0.52	U
Calcium	312000	30/30	57900	470		188000	480		152000	530		57600	520	
Chromium, Total	24.1	30/30	14.6	0.93		15	0.97		14.1	1.1		7.8	1	
Cobalt	5.3	30/30	4.1	4.7	J	1.2	4.8	J	1.1	5.3	J	1.2	5.2	J
Copper	9	27/30	7.3	2.3		3.4	2.4		1.5	2.6	J	1.2	2.6	J
Iron	12700	30/30	10800	9.3		1900	9.7		3360	11		2520	10	
Lead	11.3	30/30	6.4	9.7	J	1.3	10	J	1.8	11	J	1.9	9.6	J
Magnesium	11500	30/30	3470	470		7660	480		6470	530		5680	520	
Manganese	190	30/30	145	1.4		18.8	1.5		32.5	1.6		29.5	1.5	
Mercury	0.34	7/30	<	0.18	U	0.04	0.18	J	<	0.19	U	<	0.15	U
Nickel	11.6	30/30	10.6	3.7		3.5	3.9	J	4.4	4.2		2.5	4.1	J
Potassium	2840	30/30	2750	470		609	480		1210	530		697	520	
Sodium	348	30/30	202	470	J	138	480	J	164	530	J	67.9	520	J
Thallium	0.35	3/30	<	0.97	U	<	1	U	<	1.1	U	<	0.96	U
Vanadium	25.9	30/30	24	4.7		9	4.8		12.8	5.3		11.9	5.2	
Zinc	35.4 E	30/30	26.4	1.9	E	5.4	1.9	E	9	2.1	E	6.2	2.1	E

J - Estimated
Qual - Qualifier
RL - Reporting Limit
U - Not detected at specified reporting limit
E = Estimated since result exceeded the calibration curve
µg/kg = Microgram per Kilogram
mg/kg = Milligram per Kilogram

Source: URS Greiner Woodward Clyde, 1999

Table 32-1c
Comparison of Maximum Surface Soil Concentrations to MSSLs
AOC H

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of MSSL	Estimated Risk: Excess Cancer[2]	Estimated Risk: Hazard Quotient[3]
VOLATILE ORGANICS									
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	1/6	CAH-SB02-002	0.017	J	750	NO			0.000023
Toluene	1/6	CAH-SB04-002	0.004	J	520	NO			**
SEMIVOLATILE ORGANICS									
Di-n-octylphthalate	1/6	CAH-SB01-002	0.040		1,100	NO			0.00004
PESTICIDES									
DDE	2/6	CAH-SB02-002	0.0107	J	1.7	NO		6.29E-09	0.006
METALS									
Aluminum	6/6	CAH-SB06-002	17400		75,000	NO			0.2
Antimony	1/6	CAH-SB06-002	3.8		30	NO			0.1
Arsenic	6/6	CAH-SB05-002	3.9	J	0.38	YES	6/6	1.03E-05	
Chromium	6/6	CAH-SB06-002	12.9		210	NO		6.14E-08	
Iron	6/6	CAH-SB06-002	12,900		22,000	NO			0.6
Lead	6/6	CAH-SB01-002	20.3		400	NO			*
Mercury	2/6	CAH-SB06-002	0.07		22	NO			0.003
Vanadium	6/6	CAH-SB06-002	27.9		520	NO			0.05
Total Excess Cancer Risk[4]								1E-05	
Hazard Index[5]									1

(1) EPA Region VI Media-Specific Screening Levels for Residential Soil (EPA 1998)
(2) These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*1x10-6.
(3) These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
(4) Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
(5) Hazard Index = Sum of all hazard quotients at the site.
mg/kg = Milligram per Kilogram
J = Estimated
** The MSSL for toluene is based on the soil saturation concentration and are not based on risk.
Therefore, a potential risk from toluene could not be estimated using the MSSL. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of toluene from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
* Lead does not have an EPA-established toxicity factor; therefore, a MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).

Source: URS Greiner Woodward Clyde, 1999

Table 32-1d
Comparison of Maximum Subsurface Soil Concentrations to MSSLs
AOC H

Chemical	Frequency Detected	Field Sample ID for Maximum Hit	Maximum Detected Concentration (mg/kg)	Qual	Residential Soil MSSL Concentration[1] (mg/kg)	Exceeds MSSL?	Frequency of Exceedance of MSSL	Estimated Risk: Excess Cancer[2]	Estimated Risk: Hazard Quotient[3]
VOLATILE ORGANICS									
2-Hexanone	1/30	CAH-SB01-010	0.007		NA	NA			
Benzene	1/30	CAH-SB03-040	0.004		0.62	NO		6.45E-09	
Methyl Ethyl Ketone (2-Butanone)	3/30	CAH-SB02-005	0.037		6900	NO			0.000005
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	5/30	CAH-SB02-020	0.066		750	NO			0.00009
Toluene	5/30	CAH-SB02-020	0.022		520	NO			**
SEMIVOLATILE ORGANICS									
Butylbenzylphthalate	1/30	CAH-SB06-005	0.016		930	NO			**
Di-n-butylphthalate	1/30	CAH-SB04-005	0.015		5500	NO			0.000003
PESTICIDES									
DDE	1/30	CAH-SB01-005	0.0036		1.7	NO		2.12E-09	
METALS									
Aluminum	30/30	CAH-SB04-005	17500		75000	NO			***
Barium	30/30	CAH-SB03-030	2240		5200	NO			***
Beryllium	30/30	CAH-SB04-010	0.75		150	NO			0.005
Chromium	30/30	CAH-SB05-010	24.1		210	NO		1.15E-07	
Cobalt	30/30	CAH-SB02-005	5.3		3300	NO			0.002
Copper	27/30	CAH-SB01-005	9		2800	NO			0.003
Lead	30/30	CAH-SB03-005	11.3		400	NO			*
Mercury	7/30	CAH-SB01-005	0.34		22	NO			0.02
Zinc	30/30	CAH-SB01-005	35.4	E	22000	NO			***
Total Excess Cancer Risk[4]								1E-07	
Hazard Index[5]									0.03

(1) EPA Region VI Media-Specific Screening Levels for Residential Soil (EPA 1998).
(2) These chemicals are known carcinogens. Excess Cancer Risk = Maximum Detected Concentration/MSSL*1x10-6.
(3) These chemicals are noncarcinogens. Hazard Quotient = Maximum Detected Concentration/MSSL*1.0.
(4) Total Excess Cancer Risk = Sum of all excess cancer risks at the site.
(5) Hazard Index = Sum of all hazard quotients at the site.
NA = Not Available (see Section 9.9.4)
mg/kg = Milligrams per Kilogram
* Lead does not have an EPA-established toxicity factor; therefore, a MSSL has not been calculated for it. The concentration presented as the MSSL for lead is based on an EPA exposure model (EPA 1994).
** The MSSL for toluene is based on the soil saturation concentration and are not based on risk. Therefore, a potential risk from toluene could not be estimated using the MSSL. A MSSL calculated based on risk would be higher than the saturation concentration; therefore, the exclusion of toluene from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.
*** The MSSL is a maximum allowable concentration and not based on risk. Therefore, a potential risk from these chemicals could not be estimated using the MSSLs. A MSSL calculated based on risk would be greater than the MSSL. The exclusion of these chemicals from the cumulative risk estimate is not likely to significantly affect the conclusions of the risk screening evaluation.

Source: URS Greiner Woodward Clyde, 1999

Table 33-1a
Confirmation and Backfill Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION											
	CAFB1	CAFB2	CAFB3	CAFB4	CAFB5	CAFB6	CAFB7	CAFB8	CAFB9	CAFB10	CAFB13	CAFB14
Volatile Organic Compounds (EPA Method 8240) (ug/kg)												
Chloromethane	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Bromomethane	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Vinyl Chloride	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Chloroethane	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Methylene Chloride	14 B	17 B	10 B	13 B	15 B	22 B	13 B	12 B	16 B	21 B	15 B	16 B
Acetone	9 BJ	43 B	9 BJ	18 B	25 B	12 B	25 B	10 BJ	13 B	11 U	11 U	2 BJ
Carbon Disulfide	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,1-Dichloroethene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,1-Dichloroethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,2-Dichloroethene (total)	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Chloroform	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,2-Dichloroethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
2-Butanone	11 U	10 J	11 U	1 J	1 J	11 U	11 U	11 U	12 U	1 J	11 U	11 U
1,1,1-Trichloroethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Carbon Tetrachloride	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Vinyl Acetate	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	11 U	11 U
Bromodichloromethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,2-Dichloropropane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
cis-1,3-Dichloropropene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Trichloroethene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Dibromochloromethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,1,2-Trichloroethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Benzene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
trans-1,3-Dichloropropene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Bromoform	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
4-Methyl-2-Pentanone	11 U	10 U	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	1 J	11 U
2-Hexanone	11 U	3 BJ	11 U	11 U	11 U	11 U	11 U	11 U	12 U	11 U	2 BJ	11 U
Tetrachloroethene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Toluene	1 J	3 J	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Chlorobenzene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Ethylbenzene	2 J	4 J	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Styrene	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 U	5 U
Xylene (total)	3 J	12 +	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	2 J	5 U

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Source: IT Corp., 1995

Table 33-1a
Confirmation and Backfill Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION											
	CAFB1	CAFB2	CAFB3	CAFB4	CAFB5	CAFB6	CAFB7	CAFB8	CAFB9	CAFB10	CAFB13	CAFB14
Semivolatile Organic Compounds (EPA Method 8270) (ug/kg)												
Phenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
bis (2-Chloroethyl) Ether	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2-Chlorophenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
1,3-Dichlorobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
1,4-Dichlorobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Benzyl Alcohol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
1,2-Dichlorobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2-Methylphenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,2'-oxybis (1-Chloropropane)	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Methylphenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
N-Nitroso-Di-n-Propylamine	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Hexachloroethane	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Nitrobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Isophorone	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2-Nitrophenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,4-Dimethylphenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Benzoic Acid	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
bis (2-Chloroethoxy) Methane	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,4-Dichlorophenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
1,2,4-Trichlorobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Naphthalene	350 U	45 J	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Chloroaniline	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Hexachlorobutadiene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Chloro-3-Methylphenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2-Methylnaphthalene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Hexachlorocyclopentadiene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,4,6-Trichlorophenol	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,4,5-Trichlorophenol	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
2-Chloronaphthalene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2-Nitroaniline	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
Dimethylphthalate	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Acenaphthylene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U

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Source: IT Corp., 1995

Table 33-1a
Confirmation and Backfill Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION											
	CAFB1	CAFB2	CAFB3	CAFB4	CAFB5	CAFB6	CAFB7	CAFB8	CAFB9	CAFB10	CAFB13	CAFB14
2,6-Dinitrotoluene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
3-Nitroaniline	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
Acenaphthene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	88 J	1700 U	1700 U
2,4-Dinitrophenol	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
4-Nitrophenol	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
Dibenzofuran	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
2,4-Dinitrotoluene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Diethylphthalate	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Chlorophenyl-phenylether	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Fluorene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Nitroaniline	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
4,6-Dinitro-2-Methylphenol	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
N-Nitrosodiphenylamine (1)	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
4-Bromophenyl-phenylether	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Hexachlorobenzene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Pentachlorophenol	1700 U	1700 U	1800 U	1700 U	1800 U	1800 U	1800 U	1800 U	1900 U	3600 U	8500 U	8400 U
Phenanthrene	350 U	340 U	370 U	360 U	120 J	370 U	360 U	360 U	380 U	760	1700 U	1700 U
Anthracene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	230 J	1700 U	1700 U
Di-n-Butylphthalate	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Fluoranthene	350 U	340 U	370 U	360 U	140 J	370 U	360 U	360 U	380 U	1100	1700 U	1700 U
Pyrene	350 U	340 U	370 U	360 U	120 J	370 U	360 U	360 U	380 U	1400	250 J	1700 U
Butylbenzylphthalate	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
3,3'-Dichlorobenzidine	710 U	690 U	740 U	720 U	730 U	730 U	730 U	730 U	770 U	1500 U	3500 U	3500 U
Benzo(a)Anthracene	350 U	340 U	370 U	360 U	60 J	370 U	360 U	360 U	380 U	740	1700 U	1700 U
Chrysene	350 U	340 U	370 U	360 U	61 J	370 U	360 U	360 U	380 U	640 J	1700 U	1700 U
bis(2-Ethylhexyl)Phthalate	38 U	340 U	45 J	49 J	370 U	52 J	42 J	70 J	380 U	730 U	1700 U	1700 U
Di-n-Octyl Phthalate	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	41 J	730 U	1700 U	1700 U
Benzo(b)Fluoranthene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	440 J	1700 U	1700 U
Benzo(k)Fluoranthene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	470 J	220 J	1700 U
Benzo(a)Pyrene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Indeno(1,2,3-cd)Pyrene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	230 J	1700 U	1700 U
Dibenz(a,h)Anthracene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U
Benzo(g,h,i)Perylene	350 U	340 U	370 U	360 U	370 U	370 U	360 U	360 U	380 U	730 U	1700 U	1700 U

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Source: IT Corp., 1995

Table 33-1a
Confirmation and Backfill Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION CAFB1	CAFB2	CAFB3	CAFB4	CAFB5	CAFB6	CAFB7	CAFB8	CAFB9	CAFB10	CAFB13	CAFB14
Pesticides/PCBs (EPA Method 8080) (ug/kg)												
alpha-BHC	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
gamma-BHC (lindane)	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	15 U*	1 U	1 U
beta-BHC	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	35 U*	2 U	2 U
heptachlor	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U*	1 U	1 U
delta-BHC	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
aldrin	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4 U*	1 U	1 U
heptachlor epoxide	32 U	31 U	33 U	32 U	33 U	33 U	33 U	33 U	35 U	33 U	32 U	32 U
endosulfan I	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	6 U	5 C	5 U
DDE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	3.7 C	2.3 U	1 U
dieldrin	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
endrin	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	4 U*	2 U	2 U
DDD	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	5 U	4 U	4 U	4 U
endosulfan II	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2 U*	1 U	1 U
DDT	4 U	5.2 C	4 U	4 U	4 U	4 U	4 U	4.2 U	5 U	4 U	8.8 C	4 U
endrin aldehyde	8 U	8 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	8 U	8 U
endosulfan sulfate	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
methoxychlor	64 U	62 U	67 U	65 U	66 U	66 U	65 U	65 U	69 U	67 U	64 U	63 U
chlordane (technical)	5 U	5 U	6 U	5 U	6 U	6 U	5 U	5 U	6 U	33 U*	14 +	5 U
toxaphene	85 U	82 U	89 U	86 U	88 U	88 U	87 U	87 U	92 U	89 U	85 U	84 U
PCB-(Aroclor)-1221	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
PCB-(Aroclor)-1016	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
PCB-(Aroclor)-1232	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
PCB-(Aroclor)-1242	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
PCB-(Aroclor)-1248	21 U	21 U	22 U	22 U	22 U	22 U	22 U	22 U	23 U	22 U	21 U	21 U
PCB-(Aroclor)-1254	42 U	41 U	44 U	43 U	44 U	44 U	44 U	44 U	46 U	44 U	42 U	42 U
PCB-(Aroclor)-1260	42 U	41 U	44 U	43 U	44 U	44 U	44 U	44 U	46 U	44 U	42 U	42 U

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Source: IT Corp., 1995

Table 33-1a
Confirmation and Backfill Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION											
	CAFB1	CAFB2	CAFB3	CAFB4	CAFB5	CAFB6	CAFB7	CAFB8	CAFB9	CAFB10	CAFB13	CAFB14
Metals (EPA Methods 6010 & 7471) (mg/kg)												
Antimony	8 +	7 +	6 U	6 +	6 U	8 +	6 +	5 U	6 U	6 U	5 U	26 U
Arsenic	9 U	8 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	9 U	42 U
Barium	98.5 +	164 +	179 +	73.8 +	74.6 +	60.7 +	122 +	83.7 +	524 +	136 +	388 +	225 +
Beryllium	0.9 +	0.8 +	0.7 +	0.7 +	0.8 +	0.8 +	0.8 +	0.8 +	0.4 +	0.7 +	0.6 +	0.7 +
Cadmium	0.5 U	0.5 U	0.6 U	0.5 U	0.6 U	0.6 U	0.6 U	0.6 +	0.6 U	0.7 +	0.5 +	2.6 +
Chromium	17 +	14 +	11 +	13 +	13 +	14 +	21 +	15 +	8 +	13 +	12 +	13 +
Copper	16 +	10 +	8 +	13 +	10 +	9 +	10 +	9 +	4 +	12 +	9 +	5 U
Iron	15500 +	13500 +	11000 +	12400 +	12300 +	13400 +	12800 +	13400 +	4700 +	11200 +	10200 +	10600 +
Manganese	177 +	226 +	200 +	177 +	194 +	217 +	194 +	196 +	54.8 +	185 +	198 +	174 +
Nickel	11 +	11 +	10 +	17 +	12 +	11 +	12 +	12 +	6 +	10 +	8 +	11 +
Potassium	2540 +	2340 +	1940 +	2410 +	2380 +	2400 +	2700 +	2700 +	1150 +	2180 +	1900 +	2160 +
Selenium	9 U	9 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	48 U
Silver	0.5 U	0.5 U	0.8 +	0.5 U	0.6 +	0.6 +	0.8 +	0.5 U	3.2 +	1.1 +	1 U	2.6 U
Sodium	134 +	99 +	116 +	143 +	107 +	92 +	124 +	175 +	109 +	75 +	131 +	118 +
Thallium	24 +	32 +	19 +	17 +	22 +	16 +	21 +	21 +	14 U	13 U	20 +	63 U
Vanadium	30 +	25 +	21 +	21 +	21 +	23 +	26 +	24 +	15 +	23 +	21 +	25 +
Zinc	76.6 +	50.9 +	20.9 +	111 +	22.7 +	24.2 +	91.9 +	30.2 +	11.6 +	47.6 +	31.5 +	27.4 +
Molybdenum	1 U	1 +	1 U	1 U	1 U	1 U	1 U	1 U	6 U	1 U	1 U	5 U
Mercury	0.14 +	0.1 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U	0.1 U
Lead	22 +	25 +	21 +	12 +	13 +	15 +	35 +	14 +	29 U*	52 +	21 +	26 U*
Total Petroleum Hydrocarbons (EPA Methods 8015 Modified & 418.1) (mg/kg)												
TPH (diesel fuel)	5 U	11 +	5 U	5 U	5 U	5 U	5 U	5 U	5 U	12 +	5 U	5 U
TPH (JP-4)	5 U	16 +	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
TRPH	408 +	181 +	295 +	162 +	50 U	495 +	332 +	311 +	1380 +	162 +	577 +	177 +

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Source: IT Corp., 1995

Table 33-1b
Profile Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION CAFB11	CAFB12
TCLP Volatile Organic Compounds (EPA Method 8240) (mg/L)		
Benzene	0.025 U	0.025 U
Carbon Tetrachloride	0.025 U	0.025 U
Chlorobenzene	0.025 U	0.025 U
Chloroform	0.025 U	0.025 U
1,2–dichloroethane	0.025 U	0.025 U
1,1–dichloroethene	0.025 U	0.025 U
Methyl ethyl ketone	0.050 U	0.050 U
Tetrachloroethene	0.025 U	0.025 U
Trichloroethene	0.025 U	0.025 U
Vinyl chloride	0.025 U	0.025 U
TCLP Semivolatile Organic Compounds (EPA Method 8270) (mg/L)		
Total Cresols	0.04 U	0.04 U
1,4–dichlorobenzene	0.04 U	0.04 U
2,4–dinitrotoluene	0.04 U	0.04 U
hexachlorobenzene	0.04 U	0.04 U
hexachloro–1,3–butadiene	0.04 U	0.04 U
hexachloroethane	0.04 U	0.04 U
nitrobenzene	0.04 U	0.04 U
pentachlorophenol	0.20 U	0.20 U
pyridine	0.40 U	0.40 U
2,4,5–trichlorophenol	0.20 U	0.20 U
2,4,6–trichlorophenol	0.04 U	0.04 U
TCLP Pesticides (EPA Method 8080) (mg/L)		
Lindane	0.008 U	0.008 U
Heptachlor	0.001 U	0.001 U
Heptachlor epoxide	0.001 U	0.001 U
Endrin	0.004 U	0.004 U
Methoxychlor	0.08 U	0.08 U
Chlordane	0.006 U	0.006 U
Toxaphene	0.1 U	0.1 U

U – Not detected (conc. is detection limit) * – Elevated detection limit + – positive result

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Source: IT Corp., 1995

Table 33-1b
Profile Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION CAFB11	CAFB12
TCLP Metals (EPA Method 6010) (mg/L)		
Antimony	0.25 U	0.25 U
Arsenic	0.08 U	0.08 U
Barium	1.3 +	1.2 +
Beryllium	0.002 +	0.003 +
Cadmium	0.005 U	0.006 +
Chromium	0.03 +	0.03 +
Copper	0.02 +	0.02 +
Iron	0.26 +	0.32 +
Manganese	1.7 +	2 +
Nickel	0.1 U	0.1 U
Potassium	4 +	4 +
Selenium	0.45 U	0.45 U
Silver	0.034 +	0.028 +
Sodium	115 +	207 +
Thallium	0.6 U	0.6 U
Vanadium	0.01 U	0.05 U
Zinc	0.29 +	0.24 +
Molybdenum	0.05 U	0.05 U
Mercury	0.0002 U	0.0002 U
TCLP Total Petroleum Hydrocarbons (EPA Methods 8015 Mod. & 418.1)		
TPH (diesel fuel) (ug/L)	125 U	125 U
TPH (JP-4) (ug/L)	125 U	125 U
TRPH (mg/L)	3 +	2 +

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Source: IT Corp., 1995

Table 33-1c
Confirmation and Profile Samples
DP-33

COMPOUND	SAMPLE CONCENTRATION CAFB15	CAFB16	CAFB17
Total Petroleum Hydrocarbons (EPA Method 418.1)			
TRPH (mg/L)	54 U	893 +	54110 +

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Source: IT Corp., 1995

Table 33-1d
Backfill Sample
DP-33

Volatile Organic Compounds (EPA Method 8240) (ug/kg)	
Chloromethane	10 U
Bromomethane	10 U
Vinyl Chloride	10 U
Chloroethane	10 U
Methylene Chloride	5 U
Acetone	6 BJ
Carbon Disulfide	5 U
1,1-Dichloroethene	5 U
1,1-Dichloroethane	5 U
1,2-Dichloroethene (total)	5 U
Chloroform	5 U
1,2-Dichloroethane	5 U
2-Butanone	10 U
1,1,1-Trichloroethane	5 U
Carbon Tetrachloride	5 U
Vinyl Acetate	10 U
Bromodichloromethane	5 U
1,2-Dichloropropane	5 U
cis-1,3-Dichloropropene	5 U
Trichloroethene	5 U
Dibromochloromethane	5 U
1,1,2-Trichloroethane	5 U
Benzene	5 U
trans-1,3-Dichloropropene	5 U
Bromoform	5 U
4-Methyl-2-Pentanone	10 U
2-Hexanone	10 U
Tetrachloroethene	5 U
1,1,2,2-Tetrachloroethane	5 U
Toluene	5 U
Chlorobenzene	5 U
Ethylbenzene	5 U
Styrene	5 U
Xylene (total)	5 U

Semivolatile Organic Compounds (EPA Method 8270) (ug/kg)	
Phenol	340 U
bis (2-Chloroethyl) Ether	340 U
2-Chlorophenol	340 U
1,3-Dichlorobenzene	340 U
1,4-Dichlorobenzene	340 U
Benzyl Alcohol	340 U
1,2-Dichlorobenzene	340 U
2-Methylphenol	340 U
2,2'-oxybis (1-Chloropropane)	340 U
4-Methylphenol	340 U
N-Nitroso-Di-n-Propylamine	340 U
Hexachloroethane	340 U
Nitrobenzene	340 U
Isophorone	340 U
2-Nitrophenol	340 U
2,4-Dimethylphenol	340 U
Benzoic Acid	1600 U
bis (2-Chloroethoxy) Methane	340 U
2,4-Dichlorophenol	340 U
1,2,4-Trichlorobenzene	340 U
Naphthalene	340 U
4-Chloroaniline	340 U
Hexachlorobutadiene	340 U
4-Chloro-3-Methylphenol	340 U
2-Methylnaphthalene	340 U
Hexachlorocyclopentadiene	340 U
2,4,6-Trichlorophenol	340 U
2,4,5-Trichlorophenol	1600 U
2-Chloronaphthalene	340 U
2-Nitroaniline	1600 U
Dimethylpthalate	340 U
Acenaphthylene	340 U

2,6-Dinitrotoluene	340 U
3-Nitroaniline	1600 U
Acenaphthene	340 U
2,4-Dinitrophenol	1600 U
4-Nitrophenol	1600 U
Dibenzofuran	340 U
2,4-Dinitrotoluene	340 U
Diethylphthalate	340 U
4-Chlorophenyl-phenylether	340 U
Fluorene	340 U
4-Nitroaniline	1600 U
4,6-Dinitro-2-Methylphenol	1600 U
N-Nitrosodiphenylamine (1)	340 U
4-Bromophenyl-phenylether	340 U
Hexachlorobenzene	340 U
Pentachlorophenol	1600 U
Phenanthrene	340 U
Anthracene	340 U
Di-n-Butylphthalate	100 J
Fluoranthene	340 U
Pyrene	340 U
Butylbenzylphthalate	340 U
3,3'-Dichlorobenzidine	340 U
Benzo(a)Anthracene	340 U
Chrysene	340 U
bis(2-Ethylhexyl)Phthalate	340 U
Di-n-Octyl Phthalate	340 U
Benzo(b)Fluoranthene	340 U
Benzo(k)Fluoranthene	340 U
Benzo(a)Pyrene	340 U
Indeno(1,2,3-cd)Pyrene	340 U
Dibenz(a,h)Anthracene	340 U
Benzo(g,h,i)Perylene	340 U

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Source: IT Corp., 1995

Table 33-1d
Backfill Sample
DP-33

Pesticides/PCBs (EPA Method 8080) (ug/kg)	
alpha-BHC	1 U
gamma-BHC (lindane)	1 U
beta-BHC	2 U
heptachlor	1 U
delta-BHC	3 U
aldrin	1 U
heptachlor epoxide	30 U
endosulfan I	5 U
DDE	1 U
dieldrin	1 U
endrin	2 U
DDD	4 U
endosulfan II	1 U
DDT	4 U
endrin aldehyde	8 U
endosulfan sulfate	20 U
methoxychlor	60 U
chlordane (technical)	5 U
toxaphene	80 U
PCB-(Aroclor)-1221	20 U
PCB-(Aroclor)-1016	20 U
PCB-(Aroclor)-1232	20 U
PCB-(Aroclor)-1242	20 U
PCB-(Aroclor)-1248	20 U
PCB-(Aroclor)-1254	40 U
PCB-(Aroclor)-1260	40 U

Metals (EPA Methods 6010 & 7471) (mg/kg)	
Antimony	25 U
Arsenic	40 U
Barium	450 +
Beryllium	0.6 +
Cadmium	2.5 U
Chromium	14 +
Copper	5 U
Iron	6760 +
Manganese	86.2 +
Nickel	13 +
Potassium	1990 +
Selenium	45 U
Silver	2.5 U
Sodium	156 +
Thallium	60 U
Vanadium	16 +
Zinc	21.6 +
Molybdenum	5 U
Mercury	0.1 U
Lead	27 U

Total Petroleum Hydrocarbons (EPA Methods 8015 Mod. & 418.1) (mg/kg)	
TPH (diesel fuel)	5 U
TPH (JP-4)	5 U
TRPH	54 U

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Source: IT Corp., 1995