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Management Action Plan

Cannon Air Force Base
Clovis, New Mexico



10-1-1996

October 1996

MANAGEMENT ACTION PLAN

**CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO**

OCTOBER 1996

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ACRONYMS

ACC	Air Combat Command
ACP	Accelerated Cleanup Program
AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
AGE	Aerospace Ground Equipment
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
BCP	Base Comprehensive Plan
BRA	Baseline Risk Assessment
CAMP	Corrective Action Management Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEVR	Civil Engineering Environmental Restoration Branch
CLP	Contract Laboratory Program
COPC	Contaminant of Potential Concern
CRP	Community Relations Plan
CSM	Conceptual Site Model
DCE	Dichloroethylene
DD	Decision Document
DERA	Defense Environmental Restoration Account
DOD	U.S. Department of Defense
ECP	Environmental Compliance Program
EDMDS	Environmental Data Management and Decision Support
ELC	Environmental Leadership Council
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
GIS	Geographic Information System
GWEN	Ground Wave Emergency Network
HQ	Headquarters
HSWA	Hazardous and Solid Waste Amendment of 1984
IPMS	Independent Performance Measure System
IRP	Installation Restoration Program
IRPIMS	IRP Information Management System
MAP	Management Action Plan

ACRONYMS (Continued)

MCL	Maximum Contaminant Level
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NMED	New Mexico Environmental Department
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PCB	Polychlorinated Biphenyl
POL	Petroleum, Oils, and Lubricants
PP	Proposed Plan
PPE	Pathways, Parameters, and Equations
ppm	parts per million
RA	Remedial Action
RAB	Restoration Advisory Board
RCAP	RCRA Corrective Action Program
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RNSI	Rational National Standards Initiative
ROD	Record of Decision
RPM	Remedial Project Manager
RRSE	Relative Risk Site Evaluation
SOW	Statement of Work
SVOC	Semivolatile Organic Contaminants
SWMU	Solid Waste Management Unit
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbon
USAF	U.S. Air Force
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Cannon Air Force Base has contaminated areas due to past practices in management of waste, hazardous wastes and compounds, and resource handling. Various Environmental efforts are now in place at Cannon Air Force Base (AFB) (hereafter referred to as the Base) as a response to identify and remediate the contamination. Applicable laws and regulations are being complied with by the Base and are reflected in current waste and resource management practices as practiced by the Air Force, tenant units and as a requirement of future property lessees. Management practices governed by regulation compliance will continue to protect human health and the environment during daily operations at the Base.

This Management Action Plan (MAP) has a two-fold purpose. First, it summarizes the current status of the Base environmental program including restoration and associated environmental compliance projects. Second, it presents a comprehensive strategy for implementing the proper actions necessary to protect human health and the environment. This strategy integrates activities under the Installation Restoration Program (IRP) and the associated environmental compliance programs that support full restoration of the base. The MAP is a dynamic document that will be updated regularly with new information and reflect the completion or change in status of remedial actions (RAs). This MAP was prepared with information available as of April 1996.

In light of the ever changing nature of environmental projects this MAP is intended as a planning document only. Information, schedules, and remedial actions presented in this MAP do not necessarily represent those that have been or will be approved by the Air Force or federal and state

regulatory agencies. It was necessary to make certain assumptions and interpretations to develop the estimates. As additional data become available, implementation programs and cost estimates could be dramatically altered. Such changes will be reflected in future updates to the MAP.

1.1 Management Action Plan - Contents

Chapter 1 summarizes the objectives of the environmental restoration program; introduces the MAP and Project Team; and provides an operations history that led to the contamination.

Chapter 2 summarizes the environmental condition of the installation's property with emphasis on the adequacy of previous efforts for source discovery and assessment of existing conditions. It also identifies any off-base property associated with operations at the installation.

Chapter 3 summarizes the present status of the installation's environmental restoration program, including restoration projects related to environmental compliance issues, and community involvement efforts. Summarizes information on all IRP sites, areas of concern (AOC's), zones and/or operable units.

Chapter 4 presents strategies and plans for completing the environmental restoration program. Describes management strategies and projects for investigating and remediating contamination, and summarizes remedy selection and community involvement strategies. Presents plans for specific problem areas and their sources by complying with specific

programs such as the underground storage tank (UST) program for example.

Chapter 5 presents a schedule for restoration and restoration-related projects and identifies dates and issues for upcoming Project Team meetings.

Chapter 6 identifies key program issues to be addressed by the Project Team for implementation. Each program issue has an action item presented and its status is summarized.

The six main chapters of the MAP are followed by these appendices;

Appendix A presents historical program costs and future year program costs to meet fiscal year guidance.

Appendix B summarizes contractor deliverables by site and project for the environmental restoration program.

Appendix C summarizes remedy selection decisions for sites or projects.

Appendix D summarizes no further response action planned decisions for sites or projects.

Appendix E provides conceptual model data summaries for key sites, zones, or operable units.

1.2 Environmental Response Objectives

The objectives of the Cannon AFB environmental restoration program are as follows:

- protect human health and the environment;
- comply with existing statutes and regulations;
- meet Cannon AFB's RCRA Hazardous Waste Storage Permit deadlines and/or commitments in other agreements;
- complete Remedial Investigations (RIs) and/or RFIs as soon as practicable for each IRP/Solid Waste Management Unit (SWMU) site, in order of priority as specified in the Hazardous and Solid Waste Amendments of 1984 (HSWA) Permit Appendices;
- continue efforts to identify all potential source areas;
- provide an accurate inventory of the environmental condition of base property (which identifies all potential sites and establishes areas of no suspected contamination, assisted by a restoration Geographic Information System);
- initiate removal actions where necessary to control, eliminate, or reduce risks to manageable levels;
- characterize risks associated with releases of hazardous substances, pollutants, contaminants, or hazardous wastes;
- develop, screen, and select RAs that reduce risks in a manner consistent with statutory requirements;
- commence RAs as soon as practicable;
- conduct long-term groundwater monitoring and RAs; and
- conduct appropriate modifications of the RCRA HSWA permit to have all IRP/SWMUs delisted from the permit.

1.3 MAP Purpose, Updates, and Distribution

This MAP summarizes the status of Cannon AFB's environmental restoration program and presents a comprehensive long-range strategy, plans, and schedules to implement program objectives. It also defines the status of the current effort to resolve scientific and technical issues so that continued progress and implementation of scheduled activities can occur.

The Cannon AFB Project Team will use this MAP to direct and monitor environmental response actions and to schedule activities needed to resolve technical, administrative, and operational issues. This MAP is updated informally on an ongoing basis at the base level and formally twice a year at the headquarters level. Copies of the Cannon AFB MAP will be distributed to the Project Team after every update. The annual update of the Cannon AFB MAP will be distributed to the ELC, RAB, and Headquarters (HQ) USAF.

1.4 Project Team, ELC, and RAB

The USAF maintains primary responsibility for conducting restoration and restoration-related compliance investigations and cleanups at Cannon AFB. The U.S. Environmental Protection Agency (EPA) Region VI (Dallas, Texas) and the New Mexico Environmental Department (NMED) provide oversight to the USAF in restoration decision-making processes. For most IRP sites, these actions are being conducted in a manner consistent with RCRA. Funding is provided by the U.S. Department of Defense (DOD) through the DERA and the ECP account.

The Environmental Flight Chief manages the environmental program at Cannon AFB. The 27 CE is part of the 27 Support Group (27 SPTG), under the 27 Fighter Wing (27 FW). Currently, 27 CEV has 30 full-time employees, including 22 civilian and 8 military personnel. It has the primary responsibility to maintain environmental compliance with federal, state, local, DOD, and USAF laws and regulations. 27 CEV has formed a project team to accomplish the goals of Cannon AFB's environmental restoration programs.

The Cannon AFB Project Team is comprised of a core group and associate members. The Project Team is led by the base Remedial Project Manager (RPM) from 27 CEV. In addition to the base RPM, other core team members include representatives from HQ Air Combat Command (ACC), EPA Region VI, and the NMED. The core Project Team meets on an as-needed basis to address and resolve base restoration issues. Table 1-1 lists the current Project Team members and specifies their roles and responsibilities.

Topics of discussion and procedures for team members can include the following:

- Maintaining communication among all team members on an as-needed basis for review and discussion of the progress of work being performed at the Base. Communication may include correspondence, telephone conferences, and, if necessary, formal meetings.
- Preparing periodic summaries from the RPM of the status of the environmental restoration work at the Base and distributing them to other team members.
- Communicating through telephone conferences among team members the status of the work being conducted.

Table 1-1

Current Cannon AFB Project Team Members

CORE TEAM MEMBERS			
Name	Title	Phone	Role/Responsibility
Cannon AFB and HQ ACC Members			
Mr. John Constantine	CEVR Chief	505-784-2739	Lead USAF Project Manager
Mr. John Pike	Base RPM	505-784-4348	Remedial Project Manager
Mr. Sanford Hutsel	Base RPM	505-784-4348	Remedial Project Manager
Ms. Margaret Calvert	ACC CES/ESV	804-764-4613	USAF Program Manager
Lt. Col. Kenneth Singel	BCE	505-784-2008	Cannon AFB - BCE
Mr. Richard Chandler	UST Project Manager	505-784-4348	Cannon AFB - UST Project Manager
Captain Philip Preen	BEE	505-784-4063	Cannon AFB - BEE
Captain Lisa Spencer	JAG	505-784-2211	Cannon AFB - JAG
Captain Claudia Foss	Public Affairs	505-784-4131	Cannon AFB - Public Affairs
EPA and State Regulatory Members			
Mr. Rich Mayer	EPA RPM (Melrose AFR)	214-655-7442	EPA Region VI Project Manager
Mr. Bob Sturdivant	EPA RPM (Cannon AFB)	214-665-7440	EPA Region VI Project Manager
Vacant	State RCRA Permit Manager	505-827-4358	NMED-HRMB
Vacant	RPM	505-827-2771	NMED Project Manager
Mr. Jerry Bober	RCRA Technical Manager	505-827-4313	NMED Technical Manager

**Table 1-1
Current Cannon AFB Project Team Members
(Continued)**

DSMOA			
Mr. Steve Pullen	State DSMOA	505-827-1558	NMED
Ms. Julie Jacobs	State DSMOA	505-827-2776	NMED
Mr. Paul Lancer	USACE DSMOA Contact	202-272-1176	USACE Contact for DSMOA
Contract Management			
Mr. Steven Peterson	USACE Project Manager	402-221-7183	USACE Contract Management and Oversight
Mr. Jeff Enrenzeller	Project Manager Woodward-Clyde Consultants (Denver)	303-694-2770	USACE Contractor Project Manager
Mr. Steve Cox	Project Manager Woodward-Clyde Consultants (Omaha)	402-334-8181	USACE Contractor Project Manager
Mr. Bob Kewer	Project Manager Harza Environmental (Chicago)	312-831-3812	USACE Contractor Project Manager

ACC = Air Combat Command
 AFB = Air Force Base
 AFR = Air Force Range
 BCE = Base Civil Engineer
 BEE = Bioenvironmental Engineer
 DSMOA = Defense and State Memorandum of Agreement
 EPA = U.S. Environmental Protection Agency
 HQ ACC/CEVR = Headquarters, Air Combat Command Environmental
 JAG = Judge Advocate General
 NMED = New Mexico Environment Department
 RCRA = Resource Conservation and Recovery Act
 RPM = Remedial Project Manager
 USACE = U.S. Army Corps of Engineers
 USAF = U.S. Air Force
 UST = Underground Storage Tank

- Discussing issues related to the progress of the work being performed.
- Providing approval of minor modifications to the work being performed.
- Documenting teleconferences and, when necessary, following up in writing to all team members.

Associate members include representatives from four Cannon AFB offices: (1) the CEV office, (2) the Judge Advocate office, (3) the Bioenvironmental Engineering office, and (4) the Public Affairs office. Other associate members include the RFI contractor, Defense and State Memorandum of Agreement contacts, and the ELC and RAB members. Associate Project Team members are consulted when their areas of expertise are required.

The Cannon AFB ELC was established to keep the Major Command updated on the entire environmental program at the Base. The ELC meets to discuss all environmental programs, including the IRP. Table 1-2 provides a list of the primary ELC members. The Cannon AFB RAB was established in August 1995 to provide a forum for the exchange of information between the Base and the community. It is composed of USAF and community members that meet regularly to review and comment on technical documents and proposed RAs. Table 1-3 provides a list of the primary RAB members.

Table 1-2
Cannon AFB Environmental Leadership
Committee Primary Members

Name	Organization
Col. Gale W. Larsen	27 FW/CV
Col. W. P. Ard	27 SPTG/CC
Col. John A. Grossi	27 MDG/CC
Col. Loyd S. Utterback	27 OG/CC
Col. Wayne A. Recknor	27 LG/CC
Lt. Col. Harry L. Drutok	27 EMS/CC
Maj. Michael S. Woolley	27 SUP/CC
Lt. Col. Kenneth R. Singel	27 CE/CC
Lt. Col. Susan N. Houston	27 SV/CC
Maj. Sally Whitener	27 CRS/CC
Capt. Lisa Spencer	27 FW/JA
Capt. Philip J. Preen	27 AMDS/SGPB
Ms. Suzanne W. Bilbrey	27 CE/CEV
Mr. Cecil Huff	27 FW/SE
Mr. Gary Kimbill	DECA
Mr. Fermin Montoya	DRMO
Mr. Chris Redmond	OSI

Table 1-3

Cannon AFB Restoration Advisory Board Members

Name	Phone Number
Col. W. P. Ard*	784-2761
Ms. Mona Lee Norman-Armstrong	762-0846
Mr. Tommy Bonner	763-4481
Ms. Millie Boyle	356-5429
Mr. Forrest Carper	784-4195
Mr. Donald W. Davis Portales Mayor	359-1205
Mr. Charles R. Ferguson	762-3728
Maj. Christopher Harrell, Retired	359-6892
Mr. Ray Hester Melrose Mayor	253-4336
Mayor David Lansford Clovis Mayor	253-4274
Rev. Anthony Martinez	762-6746
Mr. Dennis Mills	356-4241
Mr. Lawerance Palmer	762-4417
	359-0778
	356-6662
Mr. Jimmie N. Richards	356-4830
Mr. R. Dallon Sanders Community Co-Chair	356-5966
Dr. Marvin E. Towne	762-6081
	769-3626
Mr. Eldred Noble	762-0474

*Installation Co-chair
HCommunity Co-chair

1.5 Brief History of Cannon AFB

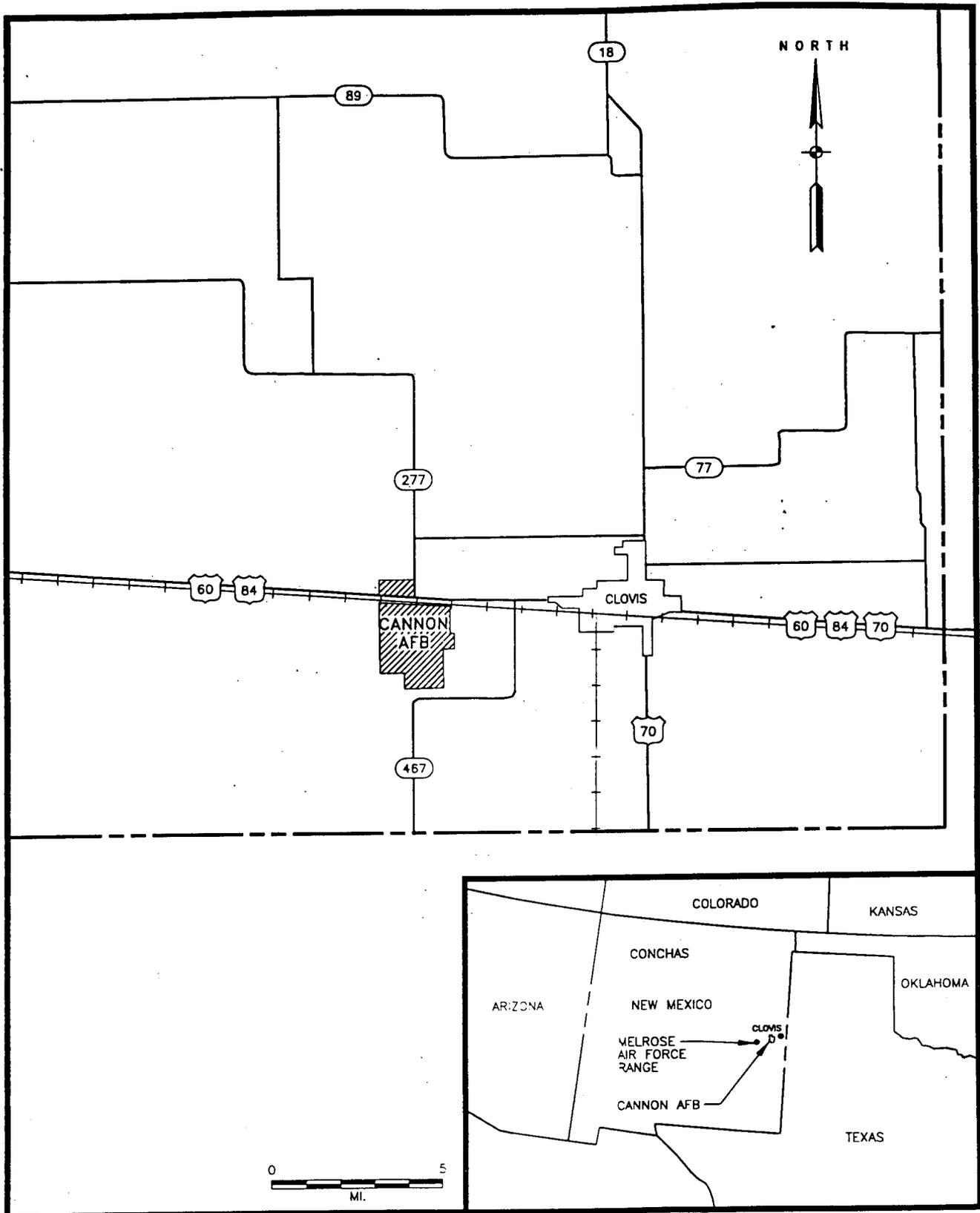
Figure 1-1 shows the location of Cannon AFB in Clovis, New Mexico, and Table 1-4 outlines the Base's operational history. Figure 1-2 provides the approximate locations of past hazardous substance and petroleum activities as presented in Table 1-4.

The land the Base currently occupies was originally farmland. In 1929 Partair Field was established as a trancontinental flight civilian air terminal. The DOD took control of Portair Field in 1942 and renamed it Clovis Army Air Base. In its early years as an Army Air Base it provided training facilities for B-17, B-24, and B-29 air crews during World War II. The Base was deactivated in 1947.

In 1951, the Air Base was reassigned to the Tactical Air Command and reactivated as Clovis AFB, operating P-51s and F-86s. The Base was renamed Cannon AFB in 1957 and operated F-100s. Since 1971, the primary mission of the Base has been to develop and maintain tactical fighter wings composed of various models of the F/EF-111 aircraft. Cannon AFB was reassigned to the ACC on 1 June 1992. In 1995, Cannon AFB began transitioning from F/EF-111 aircraft to F-16 aircraft.

The mission of Cannon AFB is to maintain a combat-ready force capable of day, night, and all-weather operations and to provide replacement training of combat aircrews for tactical organizations worldwide. To support this mission, quantities of petroleum, oils, and lubricants (POL) as well as solvents and protective coatings are used, resulting in waste generation.

The main Base covers approximately 3782 acres (Figure 1-3). Open farmland borders the Base in every direction. Most of the Base is bounded to the north by U.S. Highway 60/84, with the exception of the Chaves Manor Housing Area located north of 60/84. Residences are scattered along the highway in the vicinity of the Base.



N:\61200141\02\CANNLDC

Figure 1-1. Location of Cannon AFB, Clovis, New Mexico

Table 1-4
History of Base Operations at Cannon AFB

Period	Type of Operation	Weapon System	Hazardous Substance Activities	Figure 1-2 Reference
Pre-1929	Farmland	None	None	C
1929 to 1942	Portair Field Civilian Air Terminal	None	None	C
1942 to 1947	Clovis Army Air Base Bomber Training	B-17 B-24 B-29	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, discharge areas	A
1947 to 1951	Inactive	None	None	C
1951 to 1957	Clovis AFB Fighter/Bomber Training	P-51 F-86	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, discharge areas	B
1957 to 1971	Cannon AFB Fighter Training	F-100	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, discharge areas	C
1971 to 1992	Cannon AFB Fighter/Bomber Training TAC	F/EF-111	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, wastewater lagoons, discharge areas	D
1992 to present	Cannon AFB Fighter/Bomber Training ACC; Currently 15 F-16 aircraft on station	F/EF-111, F-16	Landfills, aircraft and auto fuel storage, hangars, machine shops (paints, solvents, metals), POL, oil/water separator, weapons storage, fire training areas, fuel pumphouses, wastewater lagoons, discharge areas	E, F

ACC = Air Combat Command
 AFB = Air Force Base
 POL = petroleum, oils, and lubricants
 TAC = Tactical Air Command

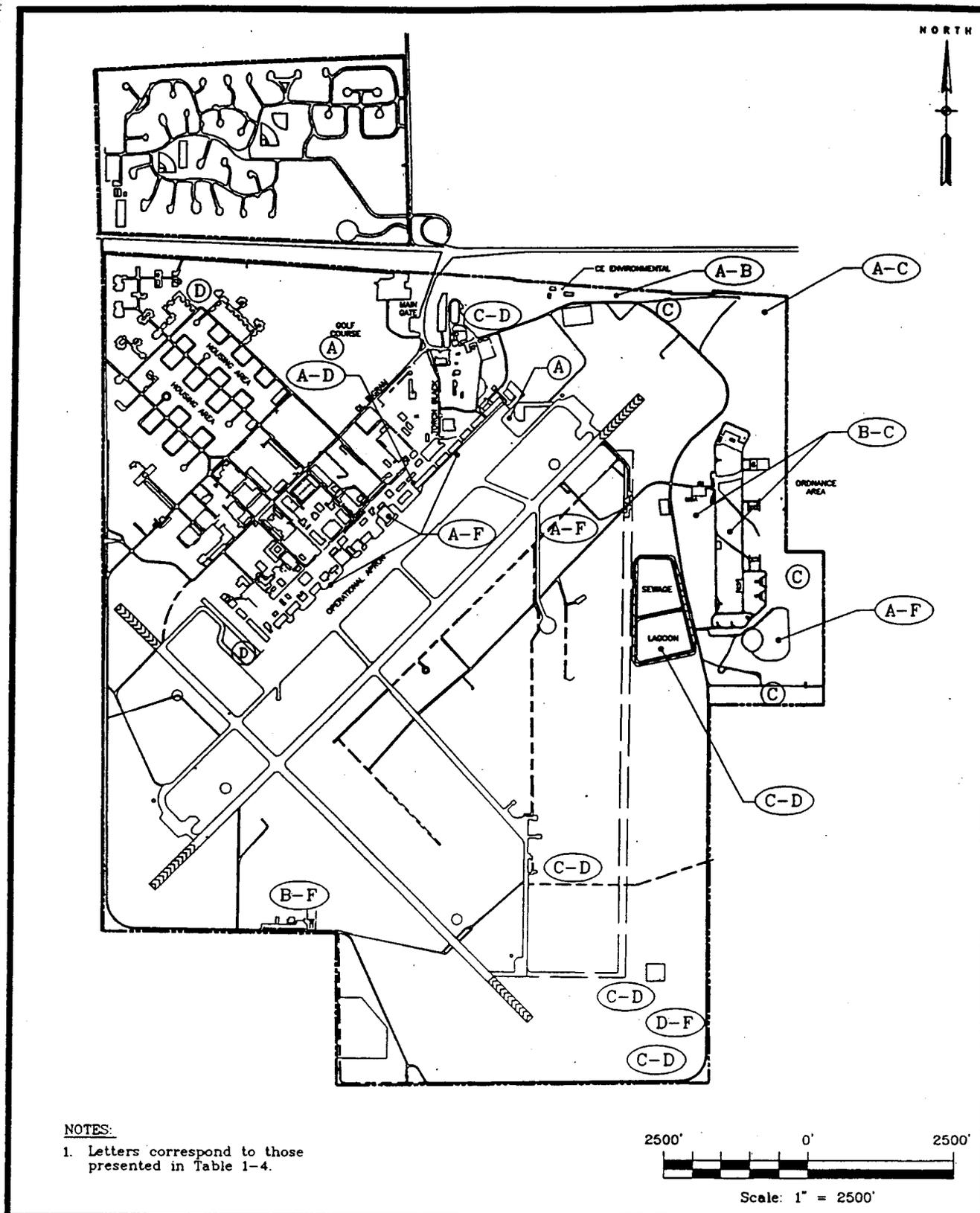


Figure 1-2. Location of Past Hazardous Substances and Petroleum Activities at Cannon AFB

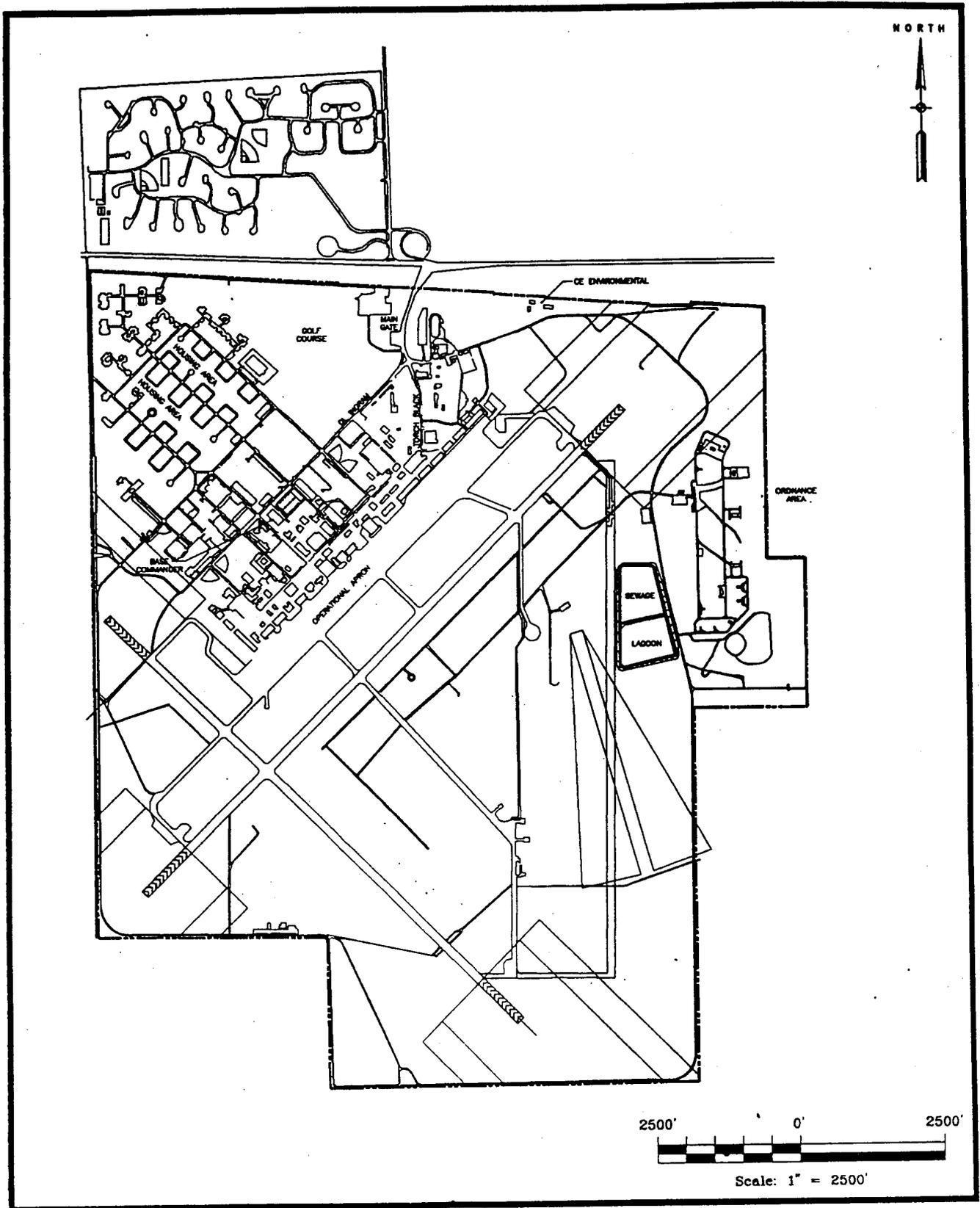


Figure 1-3. Cannon AFB, Clovis, New Mexico

2.0 ENVIRONMENTAL CONDITION OF PROPERTY

This chapter summarizes the status of the ongoing basewide discovery and assessment activities at Cannon AFB and all properties owned by the Base. These activities are the basis for determining whether environmental restoration is required. As areas of the Base are evaluated, an overall understanding of the environmental condition of property at the Base is developed. This chapter provides the most current map of the environmental condition of property at Cannon AFB. Additionally, off-base property, current and future land use plans, and adjacent property land use are presented in this chapter.

2.1 Basewide Source Discovery and Assessment Status

Cannon AFB is conducting environmental restoration under the Installation Restoration Program (IRP). The USAF initiated the program at the Base in 1983 with the Records Search, which was part of the IRP Phase I approach. Chapter 3 presents a chronology of these activities. The purpose of the program is to identify, confirm, and correct problems associated with past (generally prior to 1980) releases of hazardous substances or petroleum products into the environment. The program is usually divided into two phases: assessment (study) and remediation (cleanup). The phases are explained in more detail in Chapter 3.

Source discovery and assessment data gathering activities have been included in every step of the program to date. These steps include the following activities:

- Reviews of past and current hazardous substance and petroleum product activities, including historical records and historical aerial photographs.

- Interviews with current and former base employees and other individuals with personal knowledge of the Base, particularly CEV personnel, and outside agency contacts.
- A Phase I Records Search conducted during 1983. An IRP Phase II Confirmation/Quantification study was conducted in 1986. Subsequent RFIs followed the RCRA Facility Assessment (RFA) conducted in July 1987 and RCRA Corrective Action Program (RCAP) procedures.

These discovery, assessment, and investigation activities have resulted in the identification of numerous potential sources of contamination at the Base. These sites and the status of investigations and cleanups at these sites are further addressed in Chapter 3. Generally, the sources include landfills, sludge disposal pits, fire training areas, fuel spills and fuels leaks from tanks and pipelines, drainage areas, oil/water separators, wastewater discharge areas, and other disposal areas.

The main contaminants found at these sites include the following:

- petroleum hydrocarbons (from sources such as jet fuel, motor gasoline, and diesel) and fuel contaminants such as benzene, toluene, ethylbenzene, and xylenes;
- polynuclear aromatic hydrocarbons;
- chlorinated solvents such as trichloroethene and tetrachloroethane;
- pesticides and herbicides; and
- heavy metals such as lead, chromium, and zinc.

2.2 Environmental Condition of Property

According to the USAF and EPA, the environmental condition of property is defined as one of the following seven area types.

Areas where no storage, release, or disposal (including migration) has occurred. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where results of investigations show no hazardous substances or petroleum products were stored, released into the environment or site structures, or disposed of on the site property (USAF, June 1995)."

Areas where only storage has occurred. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where results of investigations show only that storage of hazardous substances or petroleum products has occurred (USAF, June 1995)."

Areas of contamination below action levels. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where environmental evidence demonstrates that hazardous substance or petroleum products have been stored, released, or disposed of, but are present in quantities that require no response action to protect human health and the environment. Such quantities of hazardous substances or petroleum products can be below defensible detection limits, or can be above detection limits but below action levels. Below action levels means, in the absence of installation-specific risk-based criteria, that the concentration of any hazardous substance or petroleum constituent in any medium does not exceed chemical-specific applicable or relevant and appropriate requirements (ARARs). Designation of this area type also means that risk assessment estimates completed for contamination do not do the following:

- exceed 10^{-6} for any carcinogenic hazardous substance or petroleum constituent detected in any medium;
- result in a hazard quotient above 1 for any noncarcinogenic hazardous substance or petroleum constituent detected in any medium;
- exceed 10^{-6} for all carcinogenic hazardous substances and petroleum constituents, taken together, in any exposure pathway;
- result in a hazard index above 1 for all noncarcinogenic hazardous substances or petroleum constituents, taken together, in any exposure pathway;
- exceed 10^{-4} for all carcinogenic hazardous substances and petroleum constituents accumulated across all pathways; or
- result in a hazard index above 1 for all noncarcinogenic hazardous substances and petroleum constituents accumulated across all pathways (USAF, June 1995)."

Areas where RA has been taken. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where all RAs necessary to protect human health and the environment have been taken (USAF, June 1995)." This means that the construction and installation of the approved remedial design has been completed and demonstrated to be operating properly and successfully remediating the site.

Areas of known contamination with removal and/or RA underway. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is confirmed based on the results of sampling and analysis...this area type contains contamination above action levels (USAF, June 1995)." RAs are partially or entirely in place, but they have not been demonstrated.

Areas of known contamination where required response actions have not yet been implemented. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is confirmed based on the results of sampling and analysis...this area type contains contamination above action levels (USAF, June 1995)." RAs have not been selected or implemented.

Areas that are unevaluated or that require further evaluation. This area type is defined by the USAF and EPA as a "geographically contiguous and mappable area where the presence of sources or releases of hazardous substances or petroleum products (including derivatives) is suspected...(USAF, June 1995)."

In order to define the environmental condition of property in terms of the seven area types discussed above, the following data must be collected, examined, interpreted, and consolidated: records searches of base and adjacent properties, base chain of title documents, aerial photographs, visual inspections of base and adjacent properties, interviews with current and former base employees, and site investigations. As discussed earlier, Cannon AFB has been actively collecting these data since 1983 and has recently completed the development of an Environmental Data Management and Decision Support (EDMDS) application (Radian, 1995). The purpose of the EDMDS application is to assemble relevant environmental data from all existing sources into one reporting product. Among other things, this application allows Cannon AFB to easily and accurately identify and report the current environmental condition of on-base property.

The following data sources were used to develop the EDMDS application and subsequently used to develop the current Environmental Condition of Property Map shown in Figure 2-1 (Radian EDMDS, 1995):

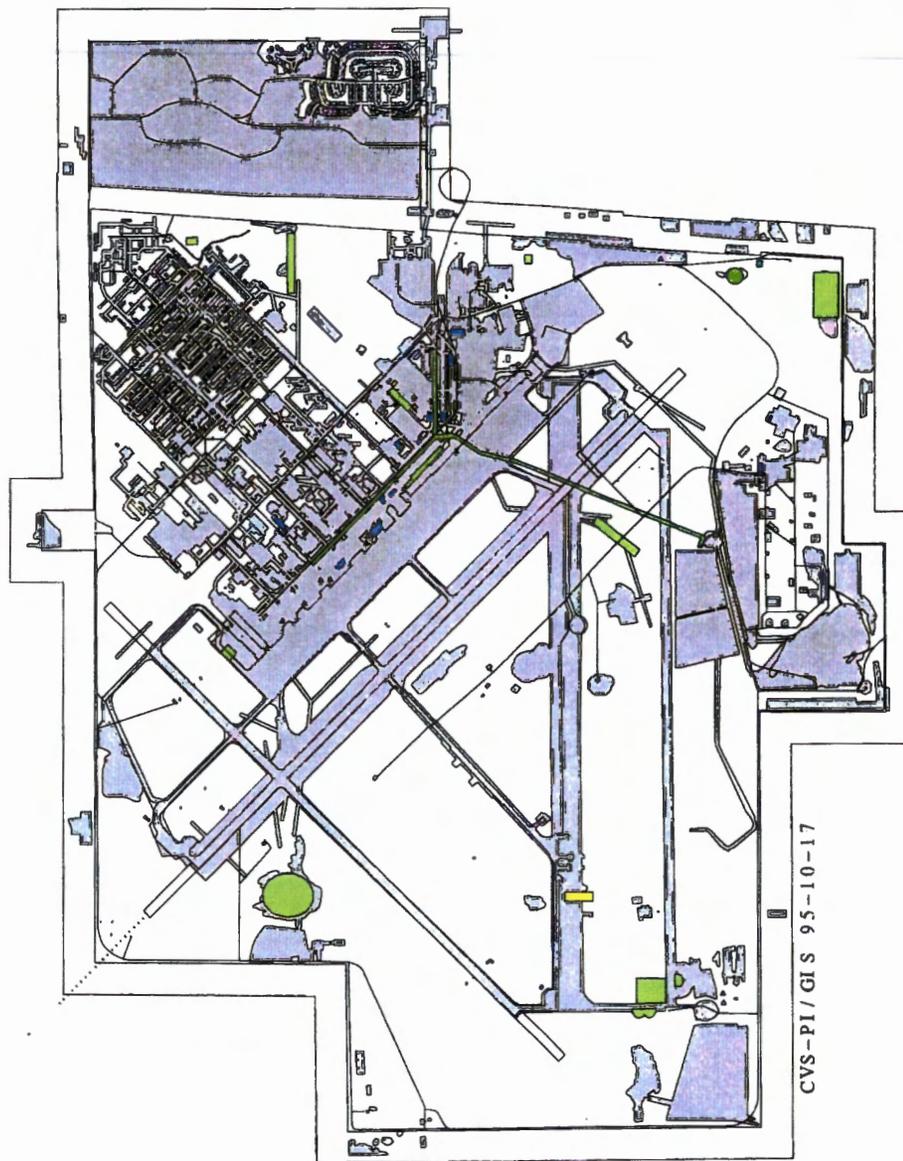
- Digital Line Graph and Digital Elevation Model files and the 1:24,000 topographic quadrangles from the U.S. Geological Survey;
- Electronic format CAD drawings and the C-1, D-1, G-1, G-6, and G-8 Tabs from the Base Comprehensive Plan (BCP);
- Hard copy drawings of the C-1, C-1.4, D-1, D-6, G-1, G-2, G-3, G-5, G-8, M-3, and the "Master Plan Location Plan, Oil/Water Separator and Lift Stations" also from the BCP;
- The 1993 Cannon MAP prepared by Radian and other source documents referenced in the MAP, including the 1983 IRP Phase I Records Search, the 1986 Phase II study, and RFI reports;
- A comprehensive environmental records search performed in accordance with the American Society for Testing and Materials guidelines; and
- Historical aerial photographs of Cannon AFB from 1951 to 1994 (Radian EDMDS, 1995).

Figure 2-1 presents the current composite results of the integration of the available information listed above. To date, the seven area types have been delineated as shown on the figure and as described below. Chapter 6 addresses the data gaps and uncertainties associated with Cannon AFB's current understanding of the environmental condition of property. The total base area, including a 500-ft buffer area around the perimeter of the base boundary, covers 4526 acres (Radian, 1995). The Base covers 3782 acres and the 500-ft buffer contains 764 acres. The respective areas corresponding to each environmental condition of property category are:

Category 1: 3021 acres or 67% of the base area + buffer.

Environmental Condition of Property

Category	Description
1	Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)
2	Areas where only storage of hazardous substances or petroleum products has occurred (but no release, disposal, or migration from adjacent areas has occurred)
3	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but at concentrations that do not require a removal or remedial action
4	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, and all remedial actions necessary to protect human health and the environment have been taken
5	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, removal and/or remedial actions are under way, but all required remedial actions have not been taken
6	Areas where storage, release, disposal, and/or migration of hazardous substances or petroleum products has occurred, but required response actions have not yet been implemented
7	Areas that are unevaluated or require additional evaluation.



**Figure 2-1. Composite Environmental Condition of Property
Cannon Air Force Base**

Category 2: 3 acres or less than 1% of the base area + buffer.

Category 3: 41 acres or 1% of the base area + buffer.

Category 4: 1/2 acre or less than 1% of the base area + buffer.

Category 5: 5 acres or less than 1% of the base area + buffer.

Category 6: No areas are designated Category 6.

Category 7: 1455 acres or 32% of the base area + buffer.

2.2.1 Areas Where No Storage, Release, or Disposal Has Occurred

This area type encompasses approximately 3021 acres at Cannon AFB. No hazardous substances or petroleum products have been stored, released, or disposed of on approximately 67% of the Base and the base buffer (Radian EDMDS, 1995).

2.2.2 Areas Where Only Storage Has Occurred

This area type encompasses approximately 3 acres at Cannon AFB. Hazardous substances or petroleum products have been stored on approximately less than 1% of the Base and the base buffer. No release or disposal is suspected to have occurred at these areas (Radian EDMDS, 1995).

2.2.3 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred But Require No Remedial Action

This area type encompasses approximately 41 acres at Cannon AFB. Hazardous substances or petroleum products have resulted in less than 1% of the Base and the base buffer where no remedial action was required (Radian, 1995).

2.2.4 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred and All Remedial Actions Have Been Taken

This area type encompasses approximately 1/2 acre at Cannon AFB. All RAs necessary to protect human health and the environment have been taken at less than 1% of the Base and the base buffer in areas where contamination by hazardous substances or petroleum products has been confirmed above action levels (Radian, 1995).

2.2.5 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred

This area type encompasses approximately 5 acres at Cannon AFB. RAs necessary to protect human health and the environment are underway at less than 1% of the Base and the base buffer in areas where contamination by hazardous substances or petroleum products have been confirmed above action levels (Radian, 1995).

2.2.6 Areas Where Storage, Release, Disposal, and/or Migration Has Occurred But Required Response Actions Have Not Been Taken

To date, no areas at Cannon AFB have been designated as this area type (Radian, 1995).

2.2.7 Unevaluated Areas or Areas Requiring Additional Evaluation

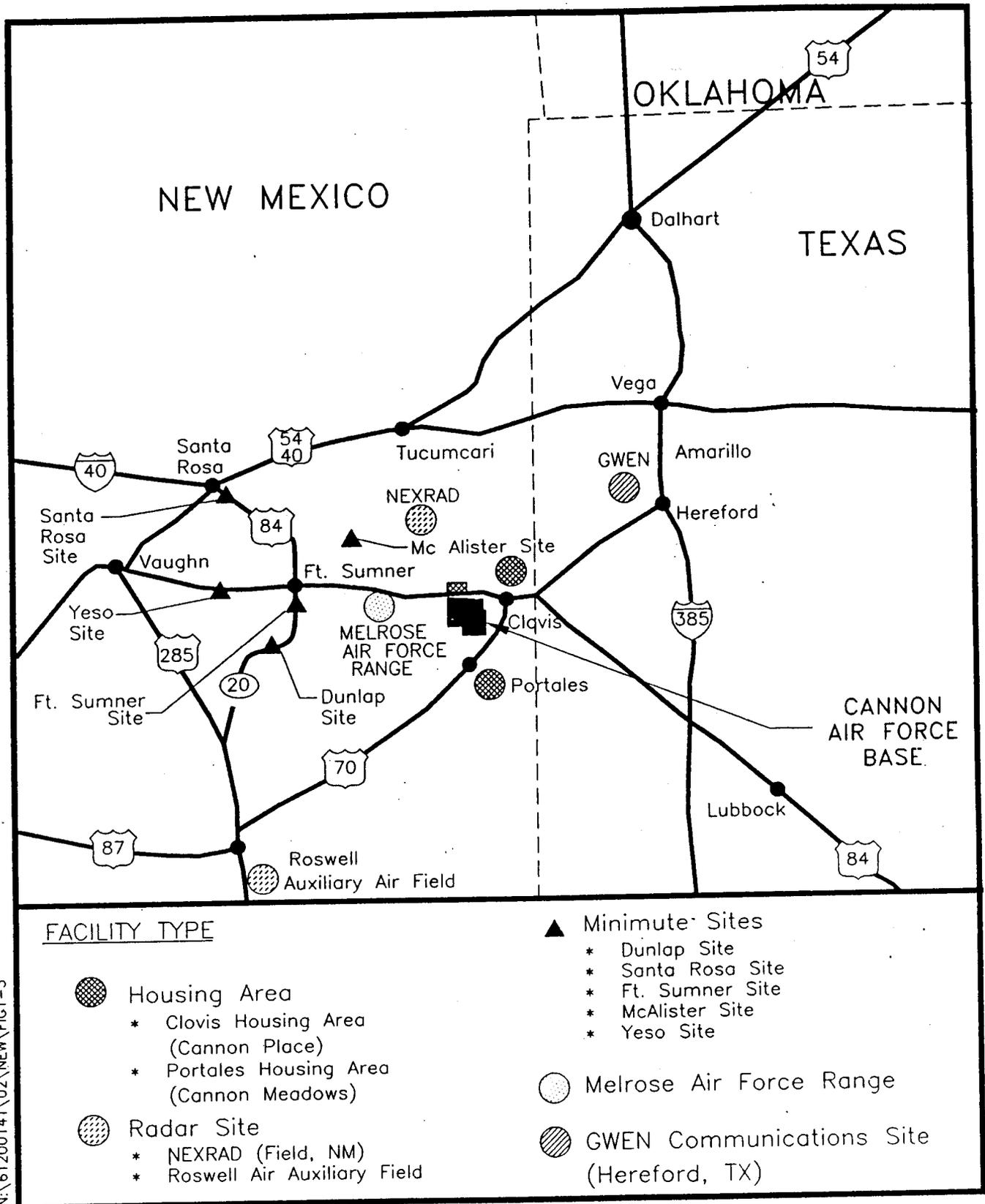
This area type encompasses approximately 1455 acres at Cannon AFB. Approximately 32% of the Base and the base buffer have not been evaluated, but storage, release, disposal, and/or migration of hazardous substances or petroleum products is suspected in these areas (Radian, 1995).

Those areas categorized as Category 7 require further evaluation because they were determined from aerial photography to have been locations of past commercial or industrial activities, including excavation operations of unknown origins, or because collateral information indicates activities of probable environmental impact but lacks further information concerning such impact.

2.3 Off-Base Property

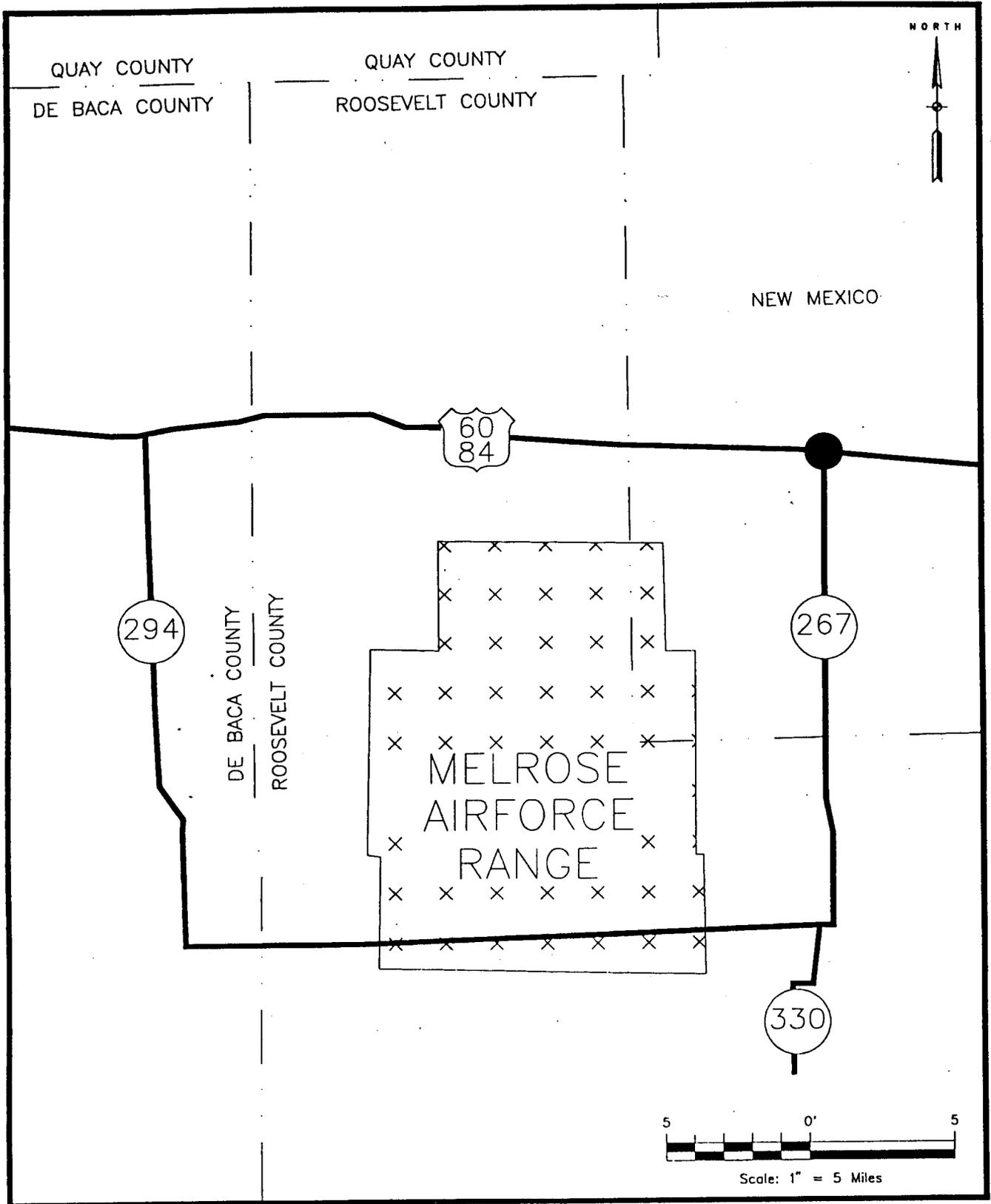
The following describe the off-base property currently under the control of Cannon AFB. The locations of these properties are shown on Figures 2-2 and 2-3 and summarized in Table 2-1. The Base maintains the following satellite facilities (Figure 2-2):

Melrose Bombing Range (87,925 acres of base-owned, public domain and restricted easement property), approximately 25 miles west of the Base (Figure 2-3).



N:\61200141\02\NEW\FIG1-3

Figure 2-2. Cannon AFB Satellite Facilities



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Figure 2-3. Melrose Air Force Range

Table 2-1

Cannon AFB Real Property Records

Name	Acres	Location	Date Acquired	Dates of Operation	Comments
Melrose Bombing Range	87,925	25 miles west of the main base	1952	1952 to Present	OB/OD operations conducted under RCRA Subpart X permit
Clovis Housing Area (Cannon Place)	40	Clovis, New Mexico	Leased 1992	1992 to Present	Housing
Portales Housing Area (Cannon Meadows)	30	Portales, New Mexico	Leased 1993	1992 to Present	Housing
NEXRAD Clovis Weather Site	0.5	Field, New Mexico	1992	1992 to Present	
Roswell Air Field, Roswell, New Mexico	12	Roswell Industrial Air Center, Roswell, New Mexico	Leased 1 August 1992 from city of Roswell	1992 to Present	Includes four buildings
Hereford Communications Site - GWEN	10	West of Hereford, Texas, on Texas Highway 1058	1991	1991 to Present	Active transmitter
Dunlap Mini Mute Site	5.7	49 miles north of Roswell, New Mexico, on NM Highway 20	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Yeso Mini Mute Site	5.7	1 mile east of Yeso, New Mexico, on U.S. Highway 60	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Ft. Sumner Mini Mute Site	5.7	6 miles south of Ft. Sumner, New Mexico, on NM Highway 20	1 January 1995	1995 to Present	Mini Mute Threat Emitter
Santa Rosa Mini Mute Site	5.7	13 miles southeast of Santa Rosa, New Mexico, on U.S. Highway 84	24 March 1995	1995 to Present	Mini Mute Threat Emitter
McAlister Mini Mute Site	5.7	3 miles west of McAlister, New Mexico, on County Road	24 March 1995	1995 to Present	Mini Mute Threat Emitter

OB/OD = Open Burn/Open Detonation

RCRA = Resource Conservation and Recovery Act

Used since 1952 as a bombing and air-to-ground gunnery range, the range consists of a composite day-and-night simulated special and conventional weapon delivery range and day-only tactical range. Live ordnance use was discontinued in 1969. Cannon AFB was issued a RCRA Subpart X permit by NMED and EPA Region VI for treatment of unserviceable munitions by open burn/open detonation.

Clovis Housing Area (Cannon Place) (40 acres). This area includes 200 units, a community center, and maintenance facility in Clovis, New Mexico.

Portales Housing Area (Cannon Meadows) (30 acres). This includes approximately 150 units in Portales, New Mexico.

NEXRAD Clovis Weather Site (0.5 acres), near Field, New Mexico. The site contains radar equipment.

Roswell Auxiliary Air Field (12 acres). The site contains four facilities and five unimproved acres used as support facilities.

Ground Wave Emergency Network (GWEN) Hereford Communication Site (10 acres). This site is used for the GWEN transmitter.

Minimute Sites at Dunlap, Yeso, Ft. Sumner, Santa Rosa, and McAlister (5.7 acres each).

2.4 Current and Future Land Use

Land uses at Cannon AFB are categorized into 11 functional classes and are described in the most recent Cannon AFB *Commander's Long Range Facility Improvement Plan* (Cannon AFB, 1993).

Community: Land use areas designated for commercial activities, club facilities, indoor recreation, and community services.

Administrative: Land use areas reserved for administrative functions.

Housing: Accompanied and unaccompanied temporary and permanent housing areas.

Dormitory: Unaccompanied housing for unmarried enlisted personnel

Industrial: Land use areas for maintenance, storage, and supply functions not directly related to aircraft.

Mission: Land use areas directly related to the operation, maintenance, and training of aircraft and their crews.

Medical: Land use areas occupied by hospitals, dental clinics, and veterinarian facilities.

Outdoor Recreation: Land use areas designated for outdoor recreation.

Open Space: Conservation areas, wetlands, undeveloped land, and required buffer space (i.e., safety clearances, security areas, utility easements, and environmentally sensitive areas).

Airfield: Active and inactive runways, taxiways, and parking aprons.

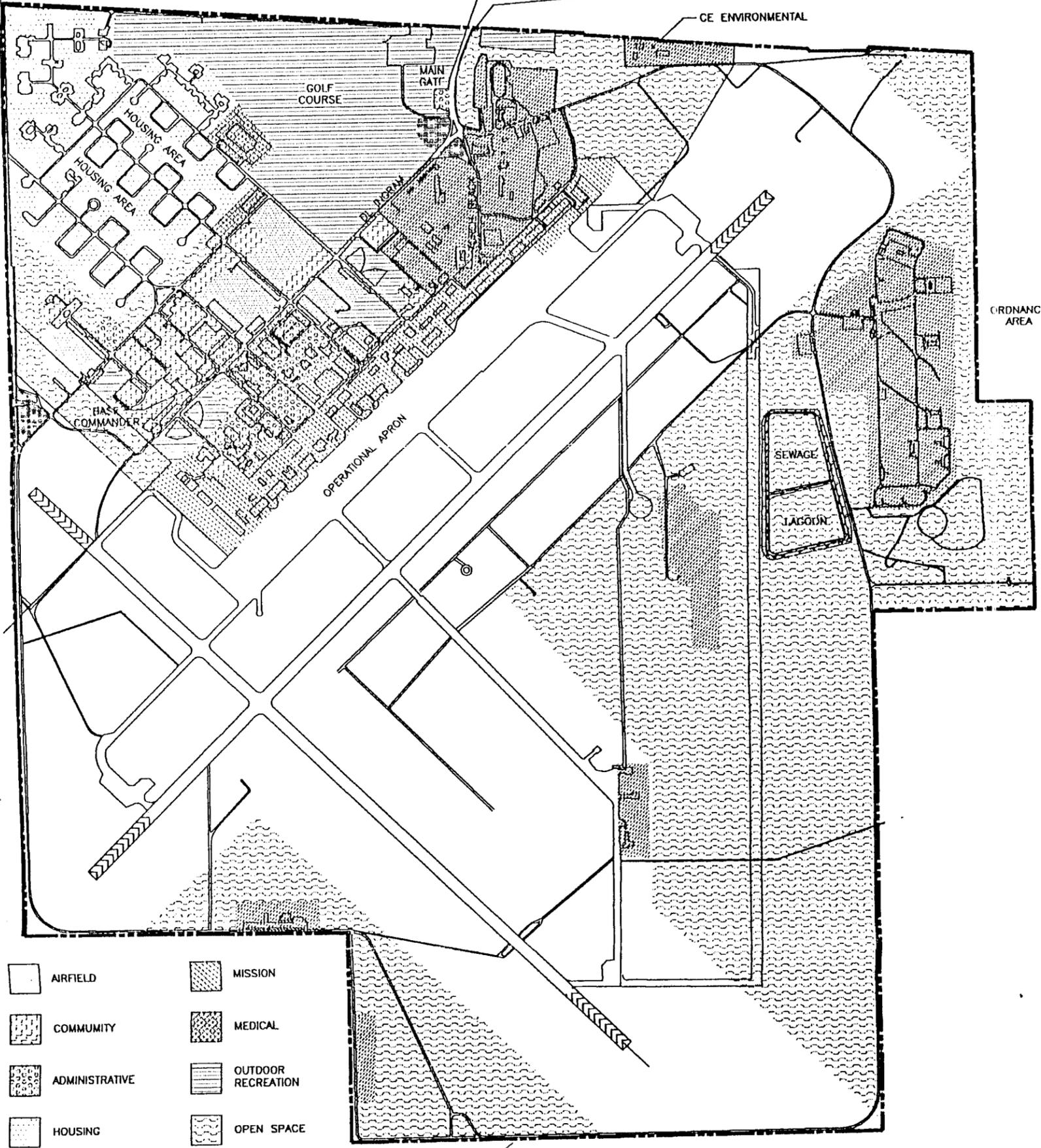
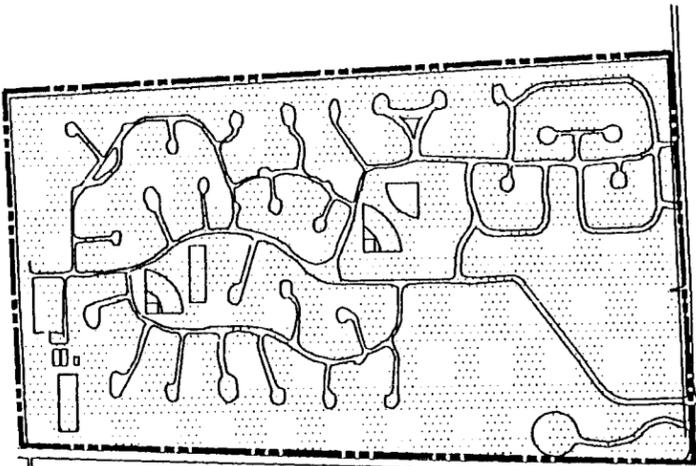
Special Interest: Areas which receive enhanced architectural and/or landscaping treatment such as entrance gates.

Current land use at Cannon AFB is shown on Figure 2-4. Currently, open space, airfields, and air field pavements comprise the greatest percentage of total land area at the Base. Other minor land uses at the Base include housing, outdoor recreation, aircraft operation and maintenance, commercial, administrative, community services, and medical facilities. Planned future land uses at the Base are summarized in Figure 2-5 and discussed in detail in the current Cannon AFB BCP. Figure 2-6 presents the current land use of off-base property surrounding the Cannon AFB boundary. All of this land is shown to be utilized for agricultural purposes, primarily for cattle and crops grown for cattle feed.

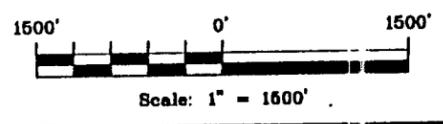
2.5 Current Associate Groups and Contractors at Cannon AFB

As summarized in Table 2-2, Cannon AFB is currently host to 16 associate groups. Table 2-3 lists current on-base contractors. These lists were developed with information available from Real Property at the Civil Engineer Squadron. It is not believed that these associate groups or contractors are involved in any restoration or restoration-related activities at Cannon AFB.

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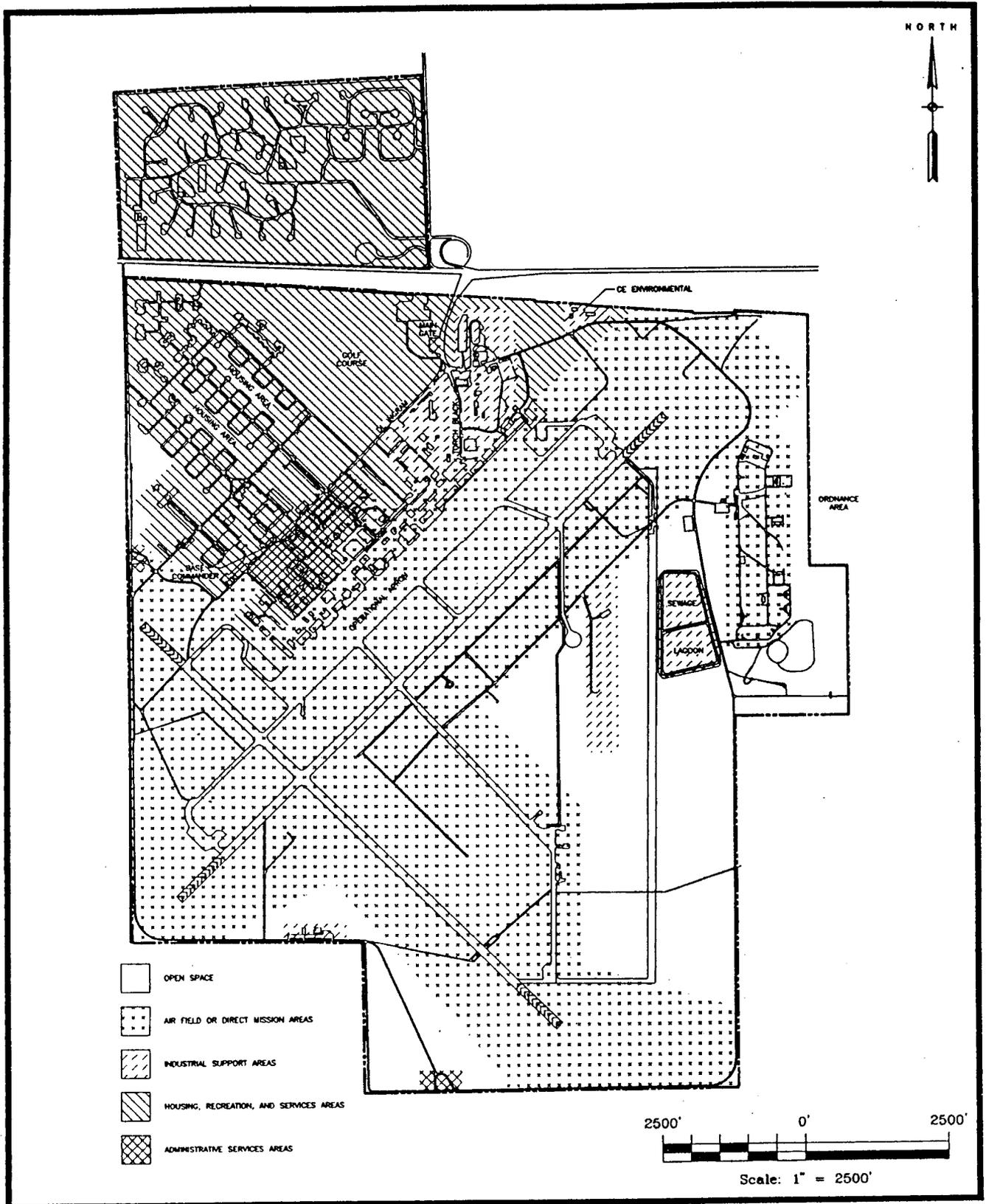


- | | | | |
|---|----------------|---|--------------------|
|  | AIRFIELD |  | MISSION |
|  | COMMUNITY |  | MEDICAL |
|  | ADMINISTRATIVE |  | OUTDOOR RECREATION |
|  | HOUSING |  | OPEN SPACE |
|  | DORMITORY |  | SPECIAL INTEREST |
|  | INDUSTRIAL | | |



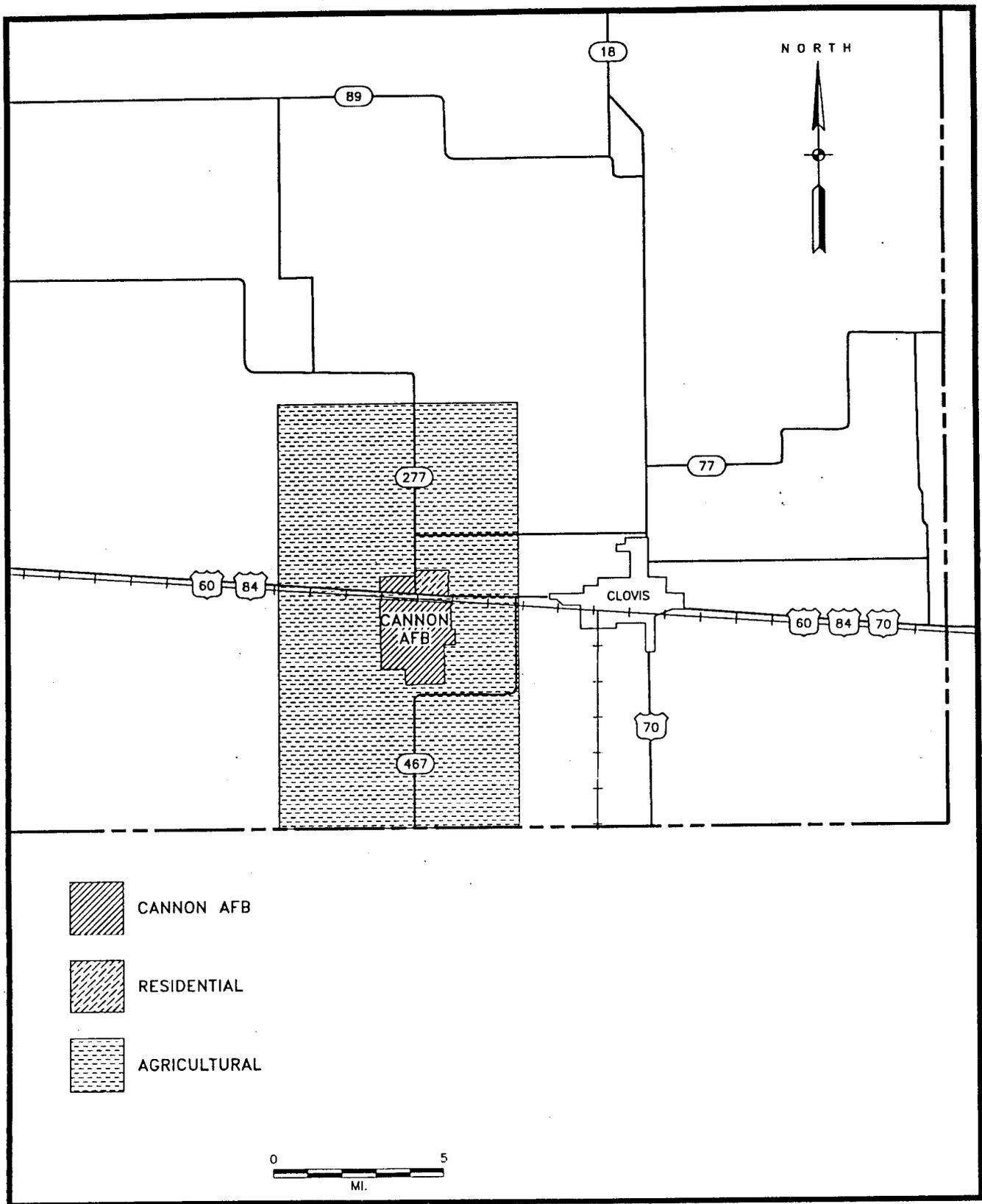
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Figure 2-4. Present Land Use, Cannon AFB



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Figure 2-5. Future Land Use, Cannon AFB



N:\61200141\02\FIG2-3

Figure 2-6. Surrounding Off-Base Land Use, Cannon AFB

Table 2-2
On-Base Associate Units at Cannon AFB

Organization	Building Number/Telephone Extension
Army and Air Force Exchange Service	77/2141
AFAA Area Audit Office	327/2991
American Red Cross	1801/2023
Army Corps of Engineers	323/4350
Area Defense Council	327/2915
Air Force Office of Special Investigations	60/2511
DET 2 ACC TRSS (DET 2, 444 Operations Squadron)	181/4202
Defense Commissary Agency	77/4330
Defense Reutilization and Marketing Office	214/2437
Defense Investigative Service	327/4304
DET 7, 79 TEG	125/2528
Sunwest Bank	71/2500
Cannon Federal Credit Union	77/791-3353
USAFAWC/OLAC (TSS 29)	790/2568
HSHM - Vet C (Veterinary Service from William Beaumont)	2378/4098
Defense Finance and Accounting System	600/2497

Source: 27 CES/CERR

Table 2-3
Cannon AFB Contractors

Contractor	Building Number/Telephone Extension
U.S. West	10 and 745/none
SATO Travel	600/2304
National Maintenance Inc. of California (Hospital HAMS contract)	1400/4018
ENMRSH (Dining Hall)	1199/2420
Oak Tree (Grounds Maintenance)	5144/8293
AAI-ESI (Simulators)	790/2568
Carroll Automative (COPAR contract at Transportation)	335/5622
Burger King (through AAFES)	1230/2772
American Federation of Government Employees Local 2308	327/3258
Unisys	772/4338
SIMCO (Janitorial Contract)	181/4166
National General Supply (COCESS contractor with CE)	323/7070
Sanders	679/6571
Litton	679/6571
General Dynamics	622/4813
Reflectone	181/2837
Lockheed	164/2790
Westar (at Melrose AFR)	3121/6647

Source: 27 CES/CERR

3.0 BASEWIDE ENVIRONMENTAL PROGRAM STATUS

This chapter summarizes the past accomplishments and the current status of the IRP and restoration-related compliance programs at Cannon AFB. It also provides a summary of community involvement in these programs.

3.1 Restoration Program Status

3.1.1 Summary of Regulatory Agreements

To ensure compliance with applicable state and federal hazardous substance regulations promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOD developed the IRP. The IRP was intended to be the primary mechanism for response actions at USAF installations under the provisions of CERCLA. The IRP at Cannon AFB began with the Phase I Records Search and was followed by the Phase II Confirmation/Quantification study conducted in 1986. Subsequent to these studies, the approach was changed to ensure consistency with the CERCLA response action process. As a result, terminology and procedures reflect the four-phase strategy outlined in the National Oil and Hazardous Substances Pollution Contingency Plan.

In response to the 1986 submittal of a RCRA Part B permit application for hazardous waste storage at the on-base Defense Reutilization and Marketing Office facility, EPA Region VI conducted an RFA, which listed 128 SWMUs and 52 Areas of Concern (AOCs). From this original list, 74 SWMUs and 3 AOCs warranted further study (the other 55 SWMUs and 48 AOCs were dropped) and were subsequently included in the HSWA of the RCRA Part B permit issued to the Base on 14 November 1989. Because of the corrective action precedent established by HSWA, the procedures of the CERCLA IRP approach, including investigations and/or RAs for all Cannon

AFB IRP sites identified as SWMUs, were changed to meet the applicable requirements of HSWA under the RCAP. Remedial activities for IRP/SWMU sites now follow these provisions, and in fact, all sites are now being closed out under RCRA. IRP data collected prior to issuance of the permit were used for site screening purposes only. These data were replaced by the RFA/RFI data; in some cases, this meant resubmitting data gathered during a CERCLA RI using RCRA terminology. An exception to this process is the Disposal Pit (DP-33), a recently identified site (1992) that does not meet the criteria of an SWMU because of its pre-HSWA activities. The 1994 interim removal action at DP-33 followed the provisions set forth by CERCLA.

The HSWA permit originally listed 74 SWMUs and 3 AOCs. Currently, there are a total of 81 SWMUs and AOCs at Cannon AFB, with another 8 SWMUs and AOCs at the Melrose Air Force Range. Of these, 31 SWMUs and AOCs were also identified as IRP sites. Due to the differences in programming funds used to address these sites, only the RFIs and corrective actions on IRP sites/SWMUs and AOCs that are being funded by DERA are included in this MAP. Funding for RFI activities at the remaining IRP sites and SWMUs/AOCs has been identified under the ECP account and will be addressed under the Cannon AFB Corrective Action Management Plan (CAMP). The sites that are being addressed in the CAMP are listed in Tables 3-1 and 3-2. Included in this list is a group of IRP sites that were considered ineligible for DERA funding and thus requested by Cannon AFB CEV staff for removal from the IRP. A letter justifying this action was submitted to HQ ACC, a copy of which is provided in Appendix C.

In an effort to prioritize investigations, EPA Region VI divided the 74 SWMUs and 3 AOCs into 3 sections: Appendix I, Appendix II, and Appendix

**Table 3-1
Cannon AFB ECP SWMUs**

Site Identification	Current Status
Appendix I Sites	
SWMU 98	NFA
SWMU 101	Groundwater monitoring ongoing
SWMU 102	Groundwater monitoring ongoing
SWMU 109	RFI in FY 1996
SWMU 111	RFI in FY 1996
Appendix II Sites	
SWMU 1	IRA programmed for FY 1996
SWMU 2	To be removed from RCRA permit
SWMU 3	Awaiting EPA approval of report recommendation
SWMU 4	NFA
SWMU 5	Awaiting EPA approval of report recommendation
SWMU 6	NFA
SWMU 7	IRA programmed for FY 1996
SWMU 8	IRA programmed for FY 1996
SWMU 9	IRA programmed for FY 1996
SWMU 10	NFA by NMED UST Program
SWMU 11	IRA programmed for FY 1996
SWMU 16	Awaiting EPA approval of report recommendation
SWMU 32	IRA programmed for FY 1996
SWMU 33	IRA programmed for FY 1996
SWMU 38	IRA programmed for FY 1996
SWMU 39	IRA programmed for FY 1996
SWMU 49	NFA by NMED UST Program
SWMU 50	NFA by NMED UST Program
SWMU 71	NFA by NMED UST Program
SWMU 79	NFA by NMED UST Program
SWMU 108	Awaiting EPA approval of report recommendation
SWMU 110	RFI in FY 1996
SWMU 124	NFA by NMED UST Program
SWMU 125	NFA by NMED UST Program
SWMU 126	NFA by NMED UST Program

**Table 3-1
Cannon AFB ECP SWMUs
(Continued)**

Appendix III Sites	
SWMU 31	Awaiting EPA approval of report recommendation
SWMU 46	IRA programmed for FY 1996
SWMU 47	IRA programmed for FY 1996
SWMU 51	IRA programmed for FY 1996
SWMU 55	NFA
SWMU 57	IRA programmed for FY 1996
SWMU 61	IRA programmed for FY 1996
SWMU 62	IRA programmed for FY 1996
SWMU 63	IRA programmed for FY 1996
	Bioventing project ongoing
SWMU 72	TBD
SWMU 77	Awaiting EPA approval of report recommendation
SWMU 91	NFA by NMED UST Program
SWMU 92	IRA programmed for FY 1996
SWMU 93	Awaiting EPA approval
SWMU 94	IRA programmed for FY 1996
SWMU 97	Further study expected
SWMU 103	Awaiting EPA approval
SWMU 112	RFI in FY 1996
SWMU 127	Awaiting EPA approval
SWMU 128	TBD

IRA = Investment Recovery Association
LTM = Long-Term Monitoring
NFA = No Further Action
NMED = New Mexico Environmental Department
RFI = RCRA Facility Investigation
SWMU = Solid Waste Management Unit
TBD = To be determined
UST = Underground Storage Tank

**Table 3-2
ECP-Funded SWMUs and AOCs at Melrose AFR**

Melrose AFB SWMUs and AOCs	
Site Identification	Current Status
SWMU 114	Undergoing Phase I RFI study in 1995
SWMU 115	Undergoing Phase I RFI study in 1995
SWMU 117	Undergoing Phase I RFI study in 1995
SWMU 118	Not yet investigated; permitted active RCRA site
Northwest Munitions Disposal Area ^a	Undergoing Phase I RFI study in 1995
WWII Cantonment Disposal Area ^a	Undergoing Phase I RFI study in 1995
Helicopter Pad ^a	Undergoing Phase I RFI study in 1995
Domestic Waste Burial Site ^a	Undergoing Phase I RFI study in 1995

^aThese sites are unnumbered potential AOCs that are undergoing RFI.

NA = Not applicable
RFI = RCRA Facility Investigation
SWMU = Solid Waste Management Unit

III. The RFIs scheduled for each RCRA Permit Appendix were originally referred to as Phase 1 for Appendix I (highest priority), Phase 2 for Appendix II, and Phase 3 for Appendix III (lowest priority).

Studies on the Cannon AFB SWMUs listed in Appendix I were scheduled first, those for Appendix II scheduled second, and the ones for Appendix III scheduled last. In general, these schedules were followed, although priority did not in all cases prove to be true, as there were some exceptions where Military Construction Program projects were programmed. These two sites (both DERA-funded) included Landfill 25 and JP-4 Fuel Spill (AOC B) on the south ramp. Both were listed in Appendix II but were studied under the schedule established for Appendix I SWMUs. A breakdown of DERA-funded SWMUs and AOCs assigned to each appendix is shown in Table 3-3.

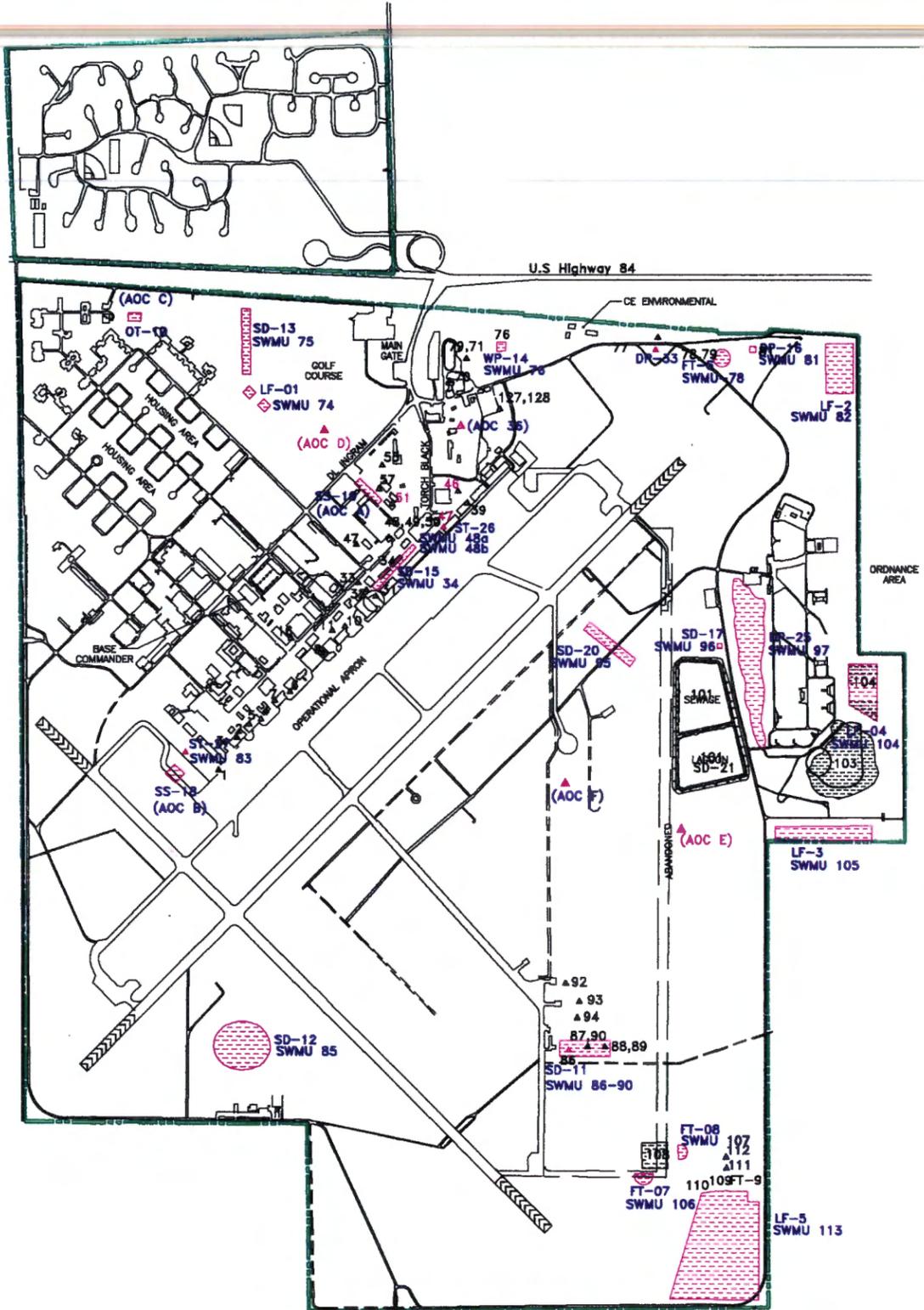
3.1.2 Restoration Sites and Areas of Concern

All DERA-eligible IRP sites are shown in Figure 3-1, and information for these sites, including site number, name, materials disposed of, dates of discovery and operation, status, and relative risk, is summarized in Table 3-4. Detailed descriptions and the current status of each site are provided in Appendix A.

Phase I RFIs have been completed for all SWMUs in Appendix I except for Landfill 5 (LF-05) and the rediscovered burn pits of Landfill 1 (LF-01). A Phase I RFI of Landfill 5 is scheduled for 1995 to 1997. Excess funds from the original Phase I investigation of Landfill 1 are being used to complete a Phase I RFI on the rediscovered burn pits.

**Table 3-3
DERA Funded SWMUs and AOCs at Cannon AFB**

Appendix I	Appendix II	Appendix III
SD-15 (SWMU 34) LF-01 (SWMU 74) SD-13 (SWMU 75) WP-14 (SWMU 76) FT-06 (SWMU 78) DP-16 (SWMU 81) LF-02 (SWMU 82) SD-12 (SWMU 85) SD-11 (SWMUs 86, 87, 88, 89, and 90) SD-20 (SWMU 95) SD-17 (SWMU 96) LF-04 (SWMU 104) LF-03 (SWMU 105) FT-07 (SWMU 106) FT-08 (SWMU 107) FT-09 (SWMU 109) LF-05 (SWMU 113)	ST-26 (SWMUs 48a and 48b) ST-27 (SWMU 83)	SD-11 (SWMU 90) LF-25 (SWMU 97) AOC A AOC B AOC C AOC E AOC F



IRP No.	DESIGNATED AREA
LF-01	Landfill No. 1 (SWMU 74)
LF-02	Landfill No. 2 (SWMU 82)
LF-03	Landfill No. 3 (SWMU 105)
LF-04	Landfill No. 4 (SWMU 104)
LF-05	Landfill No. 5
FT-06	Fire Department Training Area No. 1 (SWMU 78)
FT-07	Fire Department Training Area No. 2 (SWMU 106)
FT-08	Fire Department Training Area No. (SWMU 107)
OT-10	Blown Capacitors Site (AOC C)
SD-11	Engine Test Cell (SWMU 86)
SD-11	Former Overflow Pit (SWMU 87)
SD-11	Former Leaching Field (SWMU 88)
SD-11	Evaporation Pond (SWMU 89)
SD-11	Oil/Water Separator No. 5114 (SWMU 90)
SD-12	Stormwater Collection Point (SWMU 85)
SD-13	Sanitary Sewage Lift Station Overflow Pit (SWMU 75)
WP-14	Sludge Weathering Pit (SWMU 76)
SD-15	AGE Drainage Ditch (SWMU 34)
DP-16	Solvent Disposal Site (SWMU 81)
SD-17	Old Entomology Rinse Area (SWMU 96)
SS-18	JP-4 Fuel Spill (AOC B)
SS-19	MOGAS Spill (AOC A)
SD-20	NE Stormwater Drainage Area (SWMU 95)
LF-25	Concrete Rubble Pile (SWMU 97)
ST-26	Underground Waste Oil Tank (SWMU 48a)
ST-26	Aboveground Overflow Capacity Tank (SWMU 48b)
ST-27	Sump (SWMU 83)
DP-33	Disposal Pit
*	Asbestos Burial Pit on Golf Course (AOC D)
*	Disposal Pit (AOC 36)
*	Rubble Pile (AOC E)
*	(Site Mound (AOC F))

* These sites have not been assigned a WIMS-ES identification number.

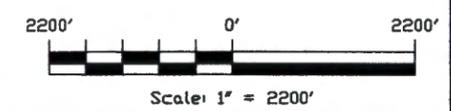
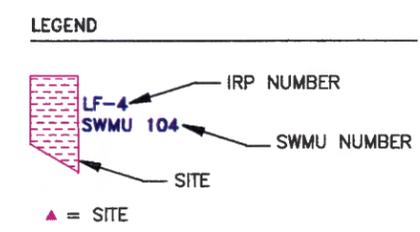


Figure 3-1. IRP/SWMU Site Locations at Cannon AFB

Table 3-4 Site Summary Table

WIMS-ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Date of Discovery	Status	Relative Risk Evaluation	Regulatory Mechanism
LF-01	74	SWMU/IRP	Landfill No. 1	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1943 to 1946	1983	RCRA Facility Investigation Appendix I	low	RCRA
LF-02	82	SWMU/IRP	Landfill No. 2	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, and empty cans/drums	1946 to 1947 1952 to 1959	1983	RCRA Facility Investigation Appendix I (Completed)	low	RCRA
LF-03	105	SWMU/IRP	Landfill No. 3	Solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1959 to 1967	1983	RCRA Facility Investigation Appendix I (Completed)	medium	RCRA
LF-04	104	SWMU/IRP	Landfill No. 4	Domestic solid waste, waste oils and solvents, paint strippers and thinners, pesticide containers, empty cans/drums	1967 to 1968	1983	RCRA Facility Investigation Appendix I (Completed)	medium	RCRA
LF-05	113	SWMU/IRP	Landfill No. 5	Domestic solid waste, waste oils and solvents, paint strippers and thinners; pesticide containers, and empty cans/drums	1968 to 1988	1983	Compliance Order, RCRA Facility Investigation Appendix I	medium	RCRA
FT-06	78	SWMU/IRP	Fire Department Training Area No. 1	Waste oils and solvents, recovered fuels	1959 to 1968	1983	RCRA Facility Investigation Appendix I	low	RCRA
FT-07	106	SWMU/IRP	Fire Department Training Area No. 2	Waste fuels, oils, and solvents burned	1968 to 1974	1983	RCRA Facility Investigation Appendix I	low	RCRA
FT-08	107	SWMU/IRP	Fire Department Training Area No. 3	Waste fuels, oils, and solvents burned	1968 to 1974	1983	RCRA Facility Investigation Appendix I	low	RCRA

Table 3-4 Site Summary Table (Continued)

WIMS-ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Date of Discovery	Status	Relative Risk Evaluation	Regulatory Mechanism
OT-10	AOC C	SWMU/IRP	Blown Capacitors Site	Approximately 6 gal of oil thought to contain PCB	1978	1983	Removal action completed in 1988 RCRA Facility Investigation Appendix III	low	RCRA/TSCA
SD-11	86	SWMU/IRP	Engine Test Cell	Fuel from aircraft engine cleaning operations (Building 5114)	1965 to 1988	1983	RCRA Facility Investigation Appendix I (Completed)	high	RCRA
SD-11	87	SWMU/IRP	Overflow Pit	Overflow from Engine Test Cell, SWMU No. 86	1982 to 1985	1983	RCRA Facility Investigation Appendix I (Completed)	high	RCRA
SD-11	88	SWMU/IRP	Leach Field	Washdown wastewater from Oil/Water Separator SWMU No. 90 (attached to Engine Test Cell, SWMU No. 86)	1965 to 1985	1983	RCRA Facility Investigation Appendix I (Completed)	high	RCRA
SD-11	89	SWMU/IRP	Evaporation Pond	Engine Test Cell wastewater/fuel	1985 to present	1983	RCRA Facility Investigation Appendix I (Completed)	high	RCRA
SD-11	90	SWMU/IRP	Oil/Water Separator No. 5114	Engine Test Cell, SWMU No. 86, wastewater/fuel	1965 to 1988	1983	RCRA Facility Investigation Appendix I (Completed)	high	RCRA
SD-12	85	SWMU/IRP	Stormwater Collection Point	Received stormwater runoff from flightline	1943 to present	1983	RCRA Facility Investigation Appendix I (removed from Part B permit September 1990) (Completed)	low	RCRA

Table 3-4 Site Summary Table (Continued)

WIMS-ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Date of Discovery	Status	Relative Risk Evaluation	Regulatory Mechanism
SD-13	75	SWMU/IRP	Sanitary Sewage Lift Station Overflow Pit	Emergency sewage storage pit. In February 1983, an estimated 100,000 to 150,000 gal of raw sewage were stored in the pit for one week	Unknown to present	1983	RCRA Facility Investigation Appendix I (removed from Part B permit September 1990) (Completed)	low	RCRA
WP-14	76	SWMU	Sludge Weathering Pit	Sludge from JP-4 bulk storage fuel tanks	1960 to 1980	1983	RCRA Facility Investigation Appendix I (Completed)	low	RCRA
SD-15	34	SWMU	AGE Drainage Ditch	Solvents, fuels, greases	Late 1960s to present	1987	RCRA Facility Investigation Appendix I (Completed)	low	RCRA
DP-16	81	SWMU/IRP	Solvent Disposal Site	Trichloroethylene	1983(?)	1983	RCRA Facility Investigation Appendix I (Completed)	low	RCRA
SD-17	96	SWMU/IRP	Old Entomology Rinse Area	Pesticides	1968(?) to 1983	1983	RCRA Facility Investigation Appendix I (Completed)	low	RCRA
SS-18	AOC B	SWMU/IRP	JP-4 Fuel Spill	Approximately 400 gal of JP-4	1980	1983	RCRA Facility Investigation Appendix III (Completed)	low	RCRA
SS-19	AOC A	SWMU/IRP	MOGAS Spill	Approximately 2000 to 3000 gal of leaded gasoline	Early 1960s	1983	RCRA Facility Investigation Appendix III (Completed)	low	RCRA
SD-20	95	SWMU/IRP	NE Stormwater Drainage Area	Stormwater runoff from flightline and effluent from flightline oil/water separators	1943 to present	1987	RCRA Facility Investigation Appendix I (Completed)	low	RCRA

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Table 3-4 Site Summary Table (Continued)

WIMS-ES Site ID	SWMU Site No.	Site Type	Description	Material Disposed of	Date of Operation	Date of Discovery	Status	Relative Risk Evaluation	Regulatory Mechanism
LF-25	97	SWMU/IRP	Concrete Rubble Pile	Building demolition material, asphalt rubble	Late 1950s to early 1960s	1987	RCRA Facility Investigation Appendix III (Completed)	medium	RCRA
SD-26	48a	SWMU/IRP	Underground Waste Oil Tank	Waste oils, solvents, paint thinners, fuels	1965 to 1984 Removed 1988	1987	RCRA Facility Investigation Appendix II (Completed)	low	RCRA
SD-26	48b	SWMU/IRP	Aboveground Overflow Capacity Tank	Waste oils, solvents, paint thinners, fuels	1965 to 1984 Removed 1988	1992	RCRA Facility Investigation Appendix II	low	RCRA
ST-27	83	SWMU/IRP	Sump	Washdown from flight apron	Unknown to present	1987	RCRA Facility Investigation Appendix II (Completed)	low	RCRA
DP-33	C	IRP	Disposal Pit	55-gal drums discovered; 60 to 100 drums	Late 1940s to Early 1950s	1992	IRA: FY 1994 RI/FS: FY 1994	low	IRP
*	AOC D	SWMU/IRP	Nonfriable asbestos burial pit	Asbestos siding material	Unknown	1993	Investigate in 1996/1997		RCRA
*	AOC 36	SWMU/IRP	Rubble pile	Airfield pavement	Late 1930s	1995	Investigate in 1996		RCRA
*	AOC E	SWMU/IRP	Boys site mound	Small caliber munitions	1957-1971	1995	Investigate in 1997		RCRA
*	AOC F	IRP	Disposal pit	Solvents from aircraft maintenance	Early 1950s	C	Investigate in 1997		IRP

*These sites have not been assigned WIMS-ES identification numbers.

The Old Entomology Rinse Area (SD-17) required a Phase II investigation that was completed in 1994. The majority of Appendix I SWMUs have boundary markers installed around them and now require DDs written for site close-out. Monitoring wells for Landfill 3 (LF-03) and Landfill 4 (LF-04) were installed in 1994 and 1995. During a 1994 interim removal project at Engine Test Cell SD-11, contamination warranting further investigation was uncovered.

Phase I RFIs have been completed on all SWMUs listed in Appendices II and III. The Baseline Risk Assessments (BRAs) from the Phase I RFIs for both Appendix II and Appendix III recommend No Further Action (NFA) on these sites. EPA Region VI did not accept all the Phase I NFA recommendations, and follow-up Phase II RFIs for some Appendix II and III sites were conducted during 1994 and 1995.

At the time of the RFA in 1987, 32 SWMUs and AOCs were determined to be IRP sites. Another four AOCs and one IRP site (Disposal Pit, DP-33) have been added since that time. DP-33 did not meet the definition of an SWMU and therefore was not added to the HSWA permit (and thus DERA eligible). AOCs 36, D, E, and F were added between 1993 and 1995. Ten IRP sites were removed from the IRP investigation list (the letter detailing this action is presented in Appendix C) because they were either ineligible for DERA funding, were duplicate sites, did not exist, or had been addressed under other compliance programs [e.g., underground storage tanks (USTs)]. The UST sites were removed from the IRP list because the USTs were physically removed and the excavations were tested following NMED UST regulations. The remaining sites dropped from the DERA arena are either NFA or are being investigated or monitored under the ECP.

As of October 1995, only six DERA IRP sites and three DERA AOCs require additional work. a list of work, excluding corrective action, remaining at the IRP sites is shown in Table 3-5.

Removal actions were performed in 1994 at Cannon AFB to remove known contamination at two sites: the Engine Test Cell (SD-11) and the Disposal Pit (DP-33). A DERA-funded Air Force Center for Environmental Excellence (AFCEE) pilot bioventing system at Oil/Water Separator No. 326 and Leach Field (SWMU 70), which is not an IRP site, began in 1994 and continue to operate. Removal actions for DERA sites are summarized in Table 3-6.

Although a number of DDs, which are currently included in the IRP site folders located in the Administrative Record in Section 17B, have been prepared to close out sites for IRP purposes and remove them from the RCRA HSWA permit, the majority of these need to be modified to incorporate the information indicating where boundary markers have been placed. Cannon AFB considers a majority of its IRP sites to be closed based on the assumption that NMED and EPA Region VI will sign off on the recommendations provided in the RFI reports. However, the total number of NFA recommendations for Cannon AFB SWMUs is dynamic (i.e., subject to change) pending regulatory concurrence. Because IRP sites have been incorporated into the RCRA corrective action process by virtue of the HSWA permit, Cannon AFB cannot attain official closeout of its SWMUs and AOCs listed in the HSWA permit until it has submitted an application to NMED and EPA Region VI for a Class III permit modification to terminate the RFI/Corrective Measures Study process for a specific unit. NMED and EPA may grant the requested modification upon approval and public comment of the information.

**Table 3-5
Remaining Work at IRP Sites**

Site	Activity
Landfill 1 (LF-01)	Limited Phase I RFI on the burn trenches discovered on the golf course (1995-1996); final work plan completed August 1995
Landfill 3 (LF-03)	Groundwater monitoring in downgradient well; draft RFI report completed in March 1995
Landfill 4 (LF-04)	Groundwater monitoring in downgradient well; draft RFI report completed in March 1995
Landfill 5 (LF-05)	Phase 1 RFI to be directed by NMED (1995-1997); final work plan completed July 1995
Engine Test Cell (SD-11)	RFI of contamination discovered during removal of the oil/water separator system (1995-1996)
Old Entomology Rinse Area (SD-17)	Completion of DD
AOC D	PA/SI to be completed in 1996
AOC E	PA/SI to be completed in 1996
AOC F	PA/SI to be completed in 1996

PA/SI = Preliminary Assessment/Site Inspection

**Table 3-6
Completed Removal Actions and Interim Action Status**

Site Number	Action	Objective	Time Frame
AOC C (OT-10)	Excavation of approximately 10 ³ yards of soil contaminated with PCB-containing oil	Remove soil potentially contaminated with PCBs	1988
SD-11 (SWMUs 86-90)	Remove oil/water separator system and surrounding soils contaminated with petroleum hydrocarbons	Remove contaminant source (oil/water separator)	July/August 1994
DP-33 Disposal Pit	Remove 28 buried drums containing POL products or glycol	Remove contaminant source	May 1994

Major investigations completed at Cannon AFB since the beginning of the IRP/RCAP as of October 1995 are included in Appendix B. Table B-1 lists technical documents and their respective IRP Information Management System (IRPIMS) data loading summary status. Table B-2 lists historical IRP deliverables for Cannon AFB. Table B-3 identifies the site deliverables for the Cannon AFB IRP.

3.2 Restoration-Related Compliance Program Status

Pollution prevention, natural/cultural resources, and compliance activities at Cannon AFB are conducted in coordination with environmental restoration activities. Compliance activities address USTs, hazardous materials management, polychlorinated biphenyls (PCBs), water discharges, closure of active hazardous waste management units, air quality management, asbestos, and radon.

3.2.1 Underground Storage Tanks

The Cannon AFB UST program is regulated by the NMED UST regulations. Table 3-7 provides an itemization of USTs at Cannon AFB, including their capacity, type of fuel, removal date (from 1991 to 1995), and current status.

3.2.2 PCBs and Stormwater Discharges

The Base has been PCB-free since 1991, when all known transformers containing PCBs were removed and disposed of off-base. The Base is in the process of obtaining a Clean Water Act National Pollutant Discharge Elimination System (NPDES) permit and a Clean Air Act permit. The NPDES

permit will set discharge standards for the sewage lagoons. A New Mexico discharge plan was granted approval in 1994. It requires monitoring of the Wastewater Playa Lake (SWMU 103) that receives discharge from the Wastewater Treatment System Lagoons and Effluent Discharge (SWMUs 101 and 102) and groundwater monitoring. A management plan was developed in 1995 for maintenance of oil/water separators and sand traps. The plan has been supplied to EPA in response to the needs of Appendix II and Appendix III sites. Table 3-8 summarizes the current ECPs.

3.3 Status of Community Involvement

Community relations activities occurring at Cannon AFB to date are outlined below. Table 3-9 itemizes the status of community involvement activities that are intended to enhance public awareness and participation in restoration efforts at Cannon AFB.

- Publication and release for public comment of the RCRA hazardous waste permit application.
- Establishment of information repositories. Public repositories for environmental information were established at the Clovis Public Library. The repository contains fact sheets, technical summaries, site reports, the Cannon AFB Community Relations Plan (CRP), and other information used to support USAF decision-making.

**Table 3-7
Cannon AFB Tank Status**

Tank	SWMU No.	Removal Date	Capacity	Fuel	Remarks
Building 10	C	9/23/94	500 gal	Diesel	Clean
Building 129	6	1992	2,000 gal	Heating Oil	C
Building 130	C	1/20/95	500 gal	Diesel	Investigation required/Awaiting approval of closure plan
Building 135	C	1/19/95	500 gal	Diesel	Clean
Building 163	126		Unknown	Heating Oil	C
Building 170	10	1992	2,000 gal	Heating Oil	C
Building 182A	C	8/22/95	2,000 gal	Gasoline	Clean
Building 182B	C	8/22/95	2,000 gal	Diesel	Clean
Building 187	C	8/30/94	6,000 gal	Jet Fuel	Clean
Building 216	C	11/17/94	250 gallons	Diesel	Clean
Building 368A	C	1/24/95	10,000 gal	Gasoline	Investigation required
Building 368B	C	1/24/95	10,000 gal	Gasoline	Investigation required
Building 368C	C	1/24/95	10,000 gal	Gasoline	Investigation required
Building 368D	C	1/19/95	150 gal	Used Oil	Clean
Building 390	72	4/91	2,000 gal	Jet Fuel	C
Building 494	C	1/19/95	500 gal	Used Oil	Clean
Building 600	C	10/12/94	500 gal	Diesel	Investigation required
Building 728	C	9/28/94	1,000 gal	Diesel	Investigation required/Awaiting approval
Building 1400A	C	9/1/94	25,000 gal	Diesel	Awaiting approval
Building 1400B	C	7/26/94	1,000 gal	Diesel	Clean
Building 1402	C	8/8/94	200 gal	Diesel	Clean
Building 2105	C	11/17/94	1,000 gal	Diesel	Clean
Building 2110	C	9/22/94	550 gal	Diesel	Clean
Building 2282	C	11/29/94	250 gal	Diesel	Clean
Building 2285	C	1/31/95	500 gal	Diesel	Investigation required

**Table 3-7
 Cannon AFB Tank Status
 (Continued)**

Tank	SWMU No.	Removal Date	Capacity	Fuel	Remarks
Building 2300	C	10/28/94	250 gal	Diesel	Clean
Building 2302	C	10/12/94	250 gal	Diesel	Clean
Building 2306	C	12/1/94	550 gal	Diesel	Clean
Building 2340	C	11/28/94	250 gal	Diesel	Clean
Building 3025	C	12/2/94	250 gal	Diesel	Clean
Building 3050	C	11/3/94	500 gal	Diesel	Clean
Building 3060A	C	12/28/94	500 gal	Diesel	Investigation required/Awaiting approval
Building 3060B	C	12/28/94	500 gal	Diesel	Awaiting approval
Building 3121A	C	1/13/95	1,000 gal	Gasoline	Clean
Building 3122B	C	1/13/95	1,000 gal	Diesel	Clean
Building 3121C	C	12/5/94	550 gal	Diesel	Clean
Building 4048	C	10/12/94	500 gal	Diesel	Clean
Building 5038	C	10/18/94	500 gal	Diesel	Clean
Building 326	C	Active	OWS	C	C
Building 680	C	Active	OWS	C	C
Building 5114	C	Active	OWS	C	C

OWS = Oil/Water Separator

SWMU = Solid Waste Management Unit

**Table 3-8
Environmental Compliance Projects**

Project	Status	Regulatory Program
USTs	See Table 3-5	New Mexico UST Program
Stormwater Discharges (under the Clean Water Act)	NPDES permit is pending	NMED Water Quality Program
Air Emissions (under the Clean Air Act)	Air quality permit is pending	NMED Air Quality Program
Hazardous Materials/Waste Management	Hazardous wastes are stored at 25 satellite and three 90-day accumulation points, transported to the storage facility on-base, and disposed of by a licensed contractor	New Mexico RCRA Program
Active RCRA Units ^a	Active RCRA units include: <ul style="list-style-type: none"> \$ 3 DRMO accumulation points and 25 satellite accumulation points \$ 77 SWMUs and AOCs (HSWA) \$ DRMO hazardous waste storage facility \$ RCRA Subpart X permit for treatment of military ordnance at the open burn/open detonation unit (Melrose AFR) 	New Mexico RCRA Program and EPA Region VI

^aTo date sanitary sewer lagoons have not been determined to contain hazardous waste by either Extraction Procedure Toxicity or Toxicity Characteristic. Therefore, they are not recognized as RCRA units at this time.

AFR = Air Force Range
AOC = Area of Concern
DRMO = Defense Reutilization and Marketing Office
EPA = U.S. Environmental Protection Agency
HSWA = Hazardous and Solid Waste Amendments
NMED = New Mexico Environmental Department
NPDES = National Pollutant Discharge Elimination System
RCRA = Resource Conservation and Recovery Act
SWMU = Solid Waste Management Unit
UST = underground storage tank

**Table 3-9
Overview of Community Involvement Activities at Cannon AFB**

Activity^a	Priority	Status
Community Relations Plan	Required	Revised August 1995
Mailing List	Required	Generated August 1995
Clipping File	Desirable	Established
Contract File	Desirable	Not established
Newsletter	Desirable	Not established/Planned for development
Information Repository	Required	Being updated; to be completed by December 1995
Fact Sheets	Required	Three issued in August 1995
Technical Assistant Grant	Optional	None (not necessary)
Technical Review Committee/RAB	Required	Established August 1995
Media Contacts	Desirable	Public Affairs office maintains
Community Relations Schedule	Desirable	Public Affairs office maintains
Public Forum	Desirable	None performed to date
Administrative Record	Required	Established under contract
Proposed Action Document	Required	SD-11 in draft
Public Notice	Required	Have performed
Comment Period	Required	Have performed
Public Meeting/Hearing	Required	Have performed
Responsiveness Summary	Required	Status undetermined
Site Visits	Optional	None performed to date
Final Document Notice	Required	Status undetermined

^aMany of the elements presented in this table pertain to the CERCLA process only and are therefore not applicable to the RCAP at Cannon AFB.

- Maintenance of a mailing list of all interested parties in the community. The Cannon AFB Environmental Restoration Office has developed an extensive mailing list for RAB activities and distribution of materials to parties interested in Base environmental restoration activities. This list contains names of state and local elected officials, congressional representatives, chambers of commerce, community organizations, other citizens' groups, and various federal and USAF organizations. Fact sheets and other public information documents identify a Cannon AFB contact for parties wanting more information. The mailing list is continually reviewed and updated to add those people requesting information and to reflect changes in elected offices. It also lists local radio stations, local, regional, and national newspapers, and other daily and weekly publications for media release distribution.
- The CRP was updated in 1995. To develop the CRP update, Cannon AFB interviewed community members to solicit perceptions of the Base and its environmental programs, as well as to assess the knowledge of and access to environmental information. Public involvement strategies are based on the interview results.

Cannon AFB established its RAB in 1995. RABs provide expanded opportunities for ongoing community input and participation in IRP activities and are an important mechanism for two-way communication of IRP-related information between base representatives and members of the community. Many stakeholder groups were identified during the community interviews for the CRP. Fact sheets and a RAB membership application have been developed,

and the Base is in the process of advertising the development of its RAB. Following the advertisement and solicitation for members, Cannon AFB will seek volunteers to serve on a panel to select the members of the RAB. The 20 September 1995 RAB meeting was called to establish the charter and guidelines of operation.

4.0 BASELINE STRATEGY FOR ENVIRONMENTAL RESTORATION

This chapter describes the basewide strategies for completing the environmental restoration of IRP sites and SWMUs and maintaining the compliance programs at Cannon AFB. This chapter also discusses the community relations program and presents strategies for community involvement.

4.1 Restoration Program Strategy

4.1.1 RCRA Part B Appendices

The HSWA component of the RCRA hazardous waste permit stipulates that 74 SWMUs and 3 AOCs listed in the RFA are to be investigated by Cannon AFB for environmental releases. EPA Region VI placed these SWMUs into three groups, representing a prioritization of sites, and included them as Appendices I, II, and III to the RCRA permit. A portion of these SWMUs and AOCs are being funded through DERA and are the focus of this MAP. The remaining sites are detailed in the CAMP. New SWMUs and AOCs, when found, are investigated under RCAP, as specified under HSWA, and their funding is provided under ECP.

4.1.2 Ongoing and Planned Removal Actions and Treatability Studies

There have been limited removal actions at Cannon AFB for DERA-funded sites. The oil/water separator at the Engine Test Cell (SD-11) was removed during July/August 1994, and the contaminated soil was disposed of off base. An interim removal action for Disposal Pit DP-33 was

completed in 1994. A DERA-funded pilot bioventing study for Oil/Water Separator No. 326 and the Leachfield (SWMU 70) was begun in 1994 and is still in operation under the management of Cannon AFB. All planned removal actions during 1995 and 1996 include ECP-funded sites only.

4.1.3 Risk-Based Approach To Clean Up Sites Based On

Future Land Use Considerations

In 1994, the Air Force initiated a program to establish screening levels to develop site remediation strategies that will provide a safe environment for future inhabitants of each site. This program, called the Rational National Standards Initiative (RNSI), establishes a consistent risk management paradigm, and the results of the RNSI process can be utilized in various stages during the IRP and corrective action processes. The objectives of the RNSI approach presented in this document are to:

- Identify land reuse options for active IRP/SWMU sites;
- Establish risk-based screening levels appropriate for future land use options; and
- Quantify potential monetary and time saving benefits by applying these screening levels to site remediation strategies.

RNSI screening levels are primarily dependent on the future use of the site and properties adjacent to the site. Future land uses of IRP/ SWMU sites have been categorized as residential, open space, commercial, and industrial. Site screening levels have been developed for each potential future land use and are discussed in Section 6.6. Cost and time estimates to remediate IRP/SWMU sites based on the future use of the property are shown in Appendix A (Section A.4). The Air Force will seek the

community's concurrence of risk-based screening levels for anticipated future land use options.

The RNSI approach focuses on the fact that human exposure to soil and groundwater in a residential setting is more frequent and of greater duration than exposure in an open space, commercial, or industrial setting. Therefore, screening levels for contaminated sites whose future land uses fall into the open space, commercial, or industrial categories are expected to be less restrictive than standards based on residential land use. Sites that are remediated to meet designated land use criteria will be deed restricted, or another similar mechanism will be used to ensure that the land use does not change without prior evaluation of land use criteria. If the land use should be reassigned, then the land use criteria would be reopened and reviewed by the Base and regulatory agencies at that time.

The RNSI approach has been documented in the following reports.

Pathways, Parameters, and Equations Report:

- Current land use/future land use options for each active IRP/SWMU site have been identified in accordance with the BCP land use plan and long-range facilities development plan.
- Risk-based algorithms have been identified that EPA and state agencies have agreed are acceptable for risk evaluation.
- On the basis of future land use considerations, conceptual site models have been developed for each active IRP/SWMU site. These RNSI conceptual site models (CSMs) define on-site and off-site exposure pathways for the probable future land use. The RNSI CSMs are also presented in Appendix E of the MAP.

- Exposure assumptions such as exposure duration and frequency, ingestion rate, etc., that would be expected in a future open space, commercial, and industrial land use setting, have been determined.

Management Action Plan Revisions:

- RNSI screening levels were developed using EPA and state accepted algorithms by applying the exposure assumptions that were developed in the PPE report.
- Constituent concentrations exceeding the calculated risk-based screening levels were retained for remedy selection and cost estimating. Constituents that pose human health risks below the calculated risk-based screening levels or federal/state standards were eliminated from future consideration. Information regarding the development of RNSI screening levels can be found in Section 6.6. Tables displaying the screening levels can be found in Appendix K.
- For all future land use options, potential remedial technologies were selected and costs were estimated to remediate sites where constituent concentrations exceed the risk-based screening levels. Note that these are suggested technologies and they may differ from the technologies that are ultimately implemented for the sites. Information on the remedy selection process and development of cost estimates can be found in Appendix A (Section A.4) of this MAP, and in Attachment C to Appendix A (bound separately).

As part of the RNSI process, the Base environmental project team will meet with regulatory agency representatives and community planners to make decisions regarding future use of land at the Base that meets the needs of both the community and the Air Force. This will serve as a springboard for restoration activities at the Base by restricting the use of the property and initiating only those cleanup actions required to provide a safe environment for inhabitants of the land in the future. By working together, the Air

Force, the regulatory agencies, and the surrounding community will realize the following mutual benefits:

- Accelerated rate of site cleanups;
- Creation of uniform goals and expectations for site cleanup between the Air Force, the regulatory agencies, and the community;
- Reduction of the costs for site investigations and remedial actions;
- The ability to close sites that clearly pose risks below the target risk to human health immediately after the site investigation and assessment of risk is complete; and
- The ability to select remedial technologies and begin remedial design at sites requiring cleanup immediately after the site investigation and assessment of risk is complete, thereby allowing sites to be cleaned up at an accelerated pace.

4.1.4 Community Involvement Strategy

Cannon AFB has taken steps to ensure a proactive community involvement strategy. A CRP was first drafted by the Civil Engineering Environmental Restoration Branch (CEVR) in 1993 and was revised in March 1995. Only one meeting of the Technical Review Committee was held and only one member of the general public attended.

The Technical Review Committee was replaced by the RAB in 1995, and the charter meeting was held in September 1995. The RAB is composed of approximately 16 members from the Base and community. The RAB will continue to meet and provide continuous review and input through the remainder of the IRP; the meetings will serve as a forum for discussion, review, and comment between Cannon AFB and the community.

The USAF also plans to initiate several activities to increase public awareness of environmental cleanup programs at Cannon AFB and encourage public involvement. Fact sheets will be prepared that summarize the current status of investigations and the proposed cleanup options at the IRP/SWMU/AOC sites at Cannon AFB. In addition, Cannon AFB is planning to develop a newsletter that will summarize restoration activities taking place at the Base.

4.1.5 Remedy Selection Approach

Remedies for each IRP site or SWMU will be selected in accordance with statutory and RCAP guidance protocol. The Cannon AFB Project Team will involve all relevant public and private parties in the remedy selection process through the RAB and will provide access to information repositories. Particular attention will be given to the following during the evaluation of alternatives.

- **Land use/risk assessment.** Where future uses are known, risk assessment protocols will incorporate future groundwater, surface water, and land use considerations in developing exposure scenarios. RNSI utilizes future land use in selecting risk-based cleanup levels and prioritizing their implementation. The RNSI concept is fully described in Section 4.1.3.
- **Alternative concentration limits.** During the CSMs, these limits will be considered as groundwater protection standards to be applied in determining points for compliance, if groundwater contamination is detected.
- **Applicable remedies.** Focused CSMs will be developed and innovative technologies will be considered for those sites requiring specific action. Presumptive Remedy Engineering Evaluation/Cost Analysis, an HQ ACC initiative, can help minimize the amount of investigation and design required prior to corrective action selection for some sites.

4.1.6 Remedy Selection Approach for Petroleum-Contaminated Soils

Cannon AFB has numerous sites where soils are contaminated with POLs. Regulations pertaining to POL contamination have been promulgated by the State of New Mexico, including the UST regulations. Basically, petroleum-contaminated soils can be treated as follows:

- **No Further Action.** Total petroleum hydrocarbons (TPH) less than 100 mg/kg or water table greater than 100 ft deep: Leave the contaminated soil in place, as it should pose no risk given the low annual rainfall and local depth to groundwater. The less than 100 mg/kg TPH rule is given in the NMED UST regulations.
- **TPH greater than 100 mg/kg but less than 1000 mg/kg:** Disposal in a permitted landfill. Most municipal landfills would be permitted to receive such waste, but it would depend on the policy of the landfill operators if they would accept it. Clovis Municipal Landfill was permitted to take such waste, but the Clovis Landfill management personnel no longer allow it. Bioventing and/or on-base landfarming in lieu of excavation and off-base disposal will be considered.
- **TPH greater than 1000 mg/kg:** Treatment at a permitted "landfarm" facility; the closest to Cannon AFB is found in Hobbs, New Mexico. Cannon AFB has the room for such a facility but requires a groundwater discharge permit modification to accomplish it.
- **Any TPH levels:** In situ treatment by bioventing or other bioremediation techniques. An ongoing AFCEE pilot project is testing the suitability of this approach at Cannon AFB at Oil/Water Separator No. 326 Leachfield. Because the groundwater is relatively deep at Cannon AFB, the in situ option could be negotiated with NMED on almost any site if the AFCEE project data confirm suitability. Preliminary data gathered from the six-month sampling milestones of the AFCEE bioventing pilot test indicate degradation of contaminants, thus it appears to be a suitable technology.

- Institutional controls to limit exposure (e.g., fencing, deed restrictions) should be considered as part of the remedy selection.

Two other technology options are available. One is low temperature thermal treatment, but it could prove costly and require extensive air permitting. Bioventing is a viable treatment technology that is currently being implemented at the Base. Its advantages include cost-effectiveness and ease of installation and operation, and it has minimal impact to a site. Although bioventing can be limited based on soil conditions and is best applied where contamination is deep, the system at Cannon AFB has proven effective based on first year degradation rates and reduction of contaminant levels in soil vapor. Table 4-1 presents the advantages and disadvantages of the remedy selection approach for petroleum-contaminated soils at Cannon AFB.

Table 4-1
Selection Approach for Remediation of Petroleum-Contaminated Soils

Treatment Technology	Advantages	Disadvantages
On-base landfarming	<ul style="list-style-type: none"> - Cost-effective - Not labor-intensive - Low maintenance 	<ul style="list-style-type: none"> - Permitting is required - Space/capacity constraints - Expansion potential questionable - Requires periodic monitoring
Low temperature thermal desorption	<ul style="list-style-type: none"> - Proven effective technology - More cost effective for small quantities of soil - No additional permitting required for established and licensed unit 	<ul style="list-style-type: none"> - High capital cost - Public awareness/relations - Complex regulatory permits required
Intrinsic remediation	<ul style="list-style-type: none"> - Cost-effective - Not labor-intensive - Minimal site disturbance 	<ul style="list-style-type: none"> - Longer remediation time - May result in the migration of contaminants - Requires long-term monitoring
Bioventing	<ul style="list-style-type: none"> - Cost-effective - Minimal site disturbance - Relatively easy to install and maintain - Effective for sites with deeper contamination 	<ul style="list-style-type: none"> - Generally requires monitoring to evaluate effectiveness - Limited applications/effectiveness - Effectiveness dependent on soil type

4.2 Compliance Strategy

The following are strategies for compliance activities at Cannon AFB.

- **USTS:** All USTs have been removed or are being removed following NMED UST regulations. All USTs are being replaced with state-of-the-art aboveground storage tanks or underground vaults.
- **PCBs:** Cannon AFB was declared PCB-free in 1991.
- **NPDES Permit:** Cannon AFB is in the process of obtaining an NPDES permit. The NPDES permit will include discharge limits for the Base's sewage lagoons.
- **Air Permit:** Cannon AFB is in the process of obtaining a Clean Air Act permit.
- **Petroleum-contaminated Soils:** Petroleum-contaminated soils will be dealt with on a site-by-site basis using the remedy selection process described above and in Table 4-1. Restoration sites will be approved as part of the RCAP. Nonrestoration sites (e.g., plane crashes) require approval on a case-by-case basis.

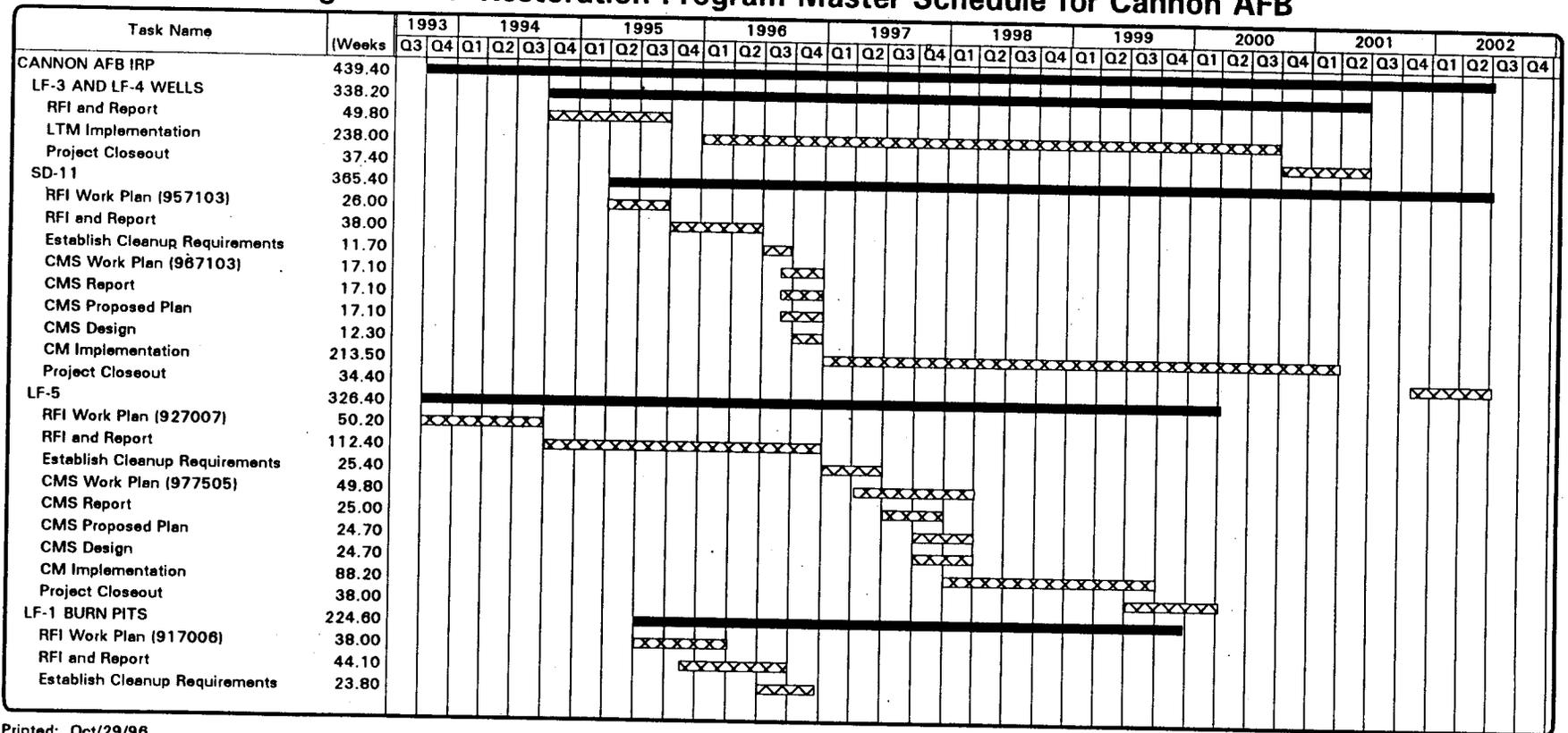
5.0 ENVIRONMENTAL RESTORATION/COMPLIANCE PROGRAM MASTER SCHEDULE

This chapter presents the Cannon AFB master schedules for activities anticipated in the Base environmental restoration and restoration-related compliance program. These master schedules are simplified versions of detailed schedules developed to support site-specific environmental restoration activities. Appendix A provides supporting documentation for these master schedules and presents detailed schedules and cost estimate breakdowns by site. This chapter also provides a proposed schedule for Project Team, ELC, and RAB meetings.

5.1 Environmental Restoration Schedule

Figure 5-1 summarizes the schedule for planned restoration activities and estimated costs. Sites that are classified as NFA are not included, while those falling under ECP funding are addressed in the Cannon AFB CAMP. Table A1-1 (Appendix A) presents an annual cost summary for the Cannon AFB IRP/SWMU sites scheduled for investigation and RA under DERA funding. The Base's ability to meet the milestones shown in the master schedule depends on (1) the availability and timeliness of funding; (2) the successful completion of conceptual models of sources, contaminant migration, and receptors in IRP/SWMU sites under investigation; (3) the timely preparation of draft RFI reports and BRAs; and (4) agreement on appropriate risk-based cleanup levels for each site.

Figure 5.1. Restoration Program Master Schedule for Cannon AFB



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Milestone Δ Summary [Solid Bar]

5.2 Restoration-Related Compliance Schedule

Figure 5-2 summarizes the schedules for planned restoration-related compliance activities and estimated costs. It is based on schedules specified in the base UST Management Plan, RCRA permits and closure plans, the base NPDES permit, and other compliance-related documentation. Continued compliance activities at Cannon AFB include the following:

- UST program,
- Hazardous materials/waste management,
- NPDES requirements (under the Clean Water Act),
- RCRA facility requirements, and
- Air emissions (under the Clean Air Act).

5.3 Project Team, ELC, and RAB Meeting Schedules

The Project Team and the RAB meet on an as-needed basis. The next meeting of the Project Team will be scheduled upon review of the RFI Report by NMED, probably in 1995. The next RAB meeting has not been scheduled. The Cannon AFB ELC meets on a quarterly basis; the next meeting is scheduled for November 1995.

Figure 5.2. Restoration - Related Compliance Program Master Schedule Cannon AFB

Task Name	Duration (Weeks)	Years							
		95	96	97	98	99	0	1	2
COMPLIANCE SCHEDULE PROGRAM	351.60								
Underground Storage Tank Program	351.60								
Aboveground Storage Tank Program	0.00	▲							
Aboveground Storage Tank Program	0.00		▲						
Aboveground Storage Tank Program	0.00			▲					
Aboveground Storage Tank Program	0.00				▲				
Aboveground Storage Tank Program	0.00					▲			
Aboveground Storage Tank Program	0.00						▲		
Aboveground Storage Tank Program	0.00							▲	
Aboveground Storage Tank Program	0.00								▲
Hazardous Materials/Waste Management	351.60								
NPDES Requirements	351.60								
RCRA Restoration Requirements	351.60								
Air Emissions Requirements	351.60								

6.0 TECHNICAL AND OTHER ISSUES TO BE RESOLVED

This chapter summarizes key technical and administrative issues to be resolved by the Cannon AFB Project Team and presents action items and strategies for resolving those issues. Specific issues include data quality; data integration and management; conceptual models/data gaps; natural (background) levels of elements and compounds in soil, groundwater, surface water, and sediments; risk assessment protocols; future land use designation; cleanup standards; relative risk evaluation; and contracting strategies.

6.1 Data Quality

Since 1994, contracts for environmental restoration work awarded by the Omaha Corps have required contractors to supply IRPIMS-formatted data as part of the project deliverable. Although the data generated during the RFI have been collected following standard Data Management Plans and Quality Control Plans, some historical data have not been loaded into the IRPIMS or delivered to Cannon AFB in the required electronic format. Before IRPIMS-formatted data were required, the Cannon AFB IRP office received printed documents, with the data delivered electronically in word processing formats on 3 1/2-in. floppy disks.

6.2 Data Integration and Management

This section summarizes issues to be resolved for managing the information gathered and used in the Cannon AFB environmental restoration and compliance programs.

6.2.1 Project Team Action Items

The following actions will help ensure that an effective information management program is in place for the Base environmental restoration programs.

- Improve access to and management of environmental restoration data generated at Cannon AFB. An example of this improvement is the acquisition of a dedicated computer for managing the Administrative Record.
- Improve data analysis capabilities and ensure that the Base has the tools necessary for information management, such as computer hardware and software, that will expedite the information management process. Cannon AFB has acquired a Geographic Information System, (GIS) with dedicated computer hardware that will assist the restoration program in evaluating and managing base property.
- Cannon's GIS will be used jointly by Real Property, Community Planners, and CEVR in evaluating and managing real property.

6.2.2 Rationale

As the number of agencies and contractors involved with the environmental restoration work at Cannon AFB increases, it is important that all parties involved with remedial projects be able to share data for decision-making. The establishment and maintenance of an electronic data base that contains sampling, analytical, and non-IRP (e.g., topographic and site condition maps) data will provide the ability for all parties to access and share generated data.

6.2.3 Status/Strategy

As discussed in Chapter 2, Cannon AFB has been actively collecting restoration and restoration-related data since 1983 and has recently completed the development of an Environmental Data Management and Decision Support (EDMDS) application (Radian, 1995). The purpose of the EDMDS application is to assemble relevant environmental data from all existing sources into one reporting product. The following data sources were used to develop the EDMDS application:

- Digital Line Graph and Digital Elevation Model files and topographic quadrangles from the U.S. Geological Survey;
- Electronic format CAD drawings and the C-1, D-1, G-1, G-6, and G-8 Tabs from the BCP;
- Hard copy drawings of the C-1, C-1.4, D-1, D-6, G-1, G-2, G-3, G-5, G-8, M-3, and the "Master Plan Location Plan, Oil/Water Separator and Lift Stations" also from the BCP;
- The 1993 Cannon MAP prepared by Radian Corporation and other source documents referenced in the MAP, including the 1983 IRP Phase I Records Search prepared by CH2M Hill;
- A comprehensive environmental records search performed in accordance with American Society for Testing and Materials guidelines; and
- Historical aerial photographs of Cannon AFB from 1951 to 1994 (Radian, 1995).

Data gaps exist in EDMDS, including analytical data from historical and ongoing site investigations and environmental information on natural and cultural resources at Cannon AFB. Because analytical data from historical and ongoing investigations have not been loaded into IRPIMS, they are unavailable to EDMDS. If the manpower exists, Cannon AFB will load all necessary

analytical data into IRPIMS by accomplishing the following:

- Establishing priorities and deadlines for loading historical data and modifying existing contracts to do the actual data preparation and loading.
- Making necessary contract modifications to ensure that data from ongoing efforts are submitted electronically in accordance with the *IRPIMS Data Loading Handbook*.
- Establishing standard procedures for reviewing electronic data submitted by contractors. Preliminary procedures that would be implemented for proper electronic data review include:
 - Review of the IRPIMS data quality reports within two weeks of submission by the Cannon AFB RPM, Technical Project Manager, and contractor.
 - Review of trends in contamination versus time for key contaminants within one month of receipt of the electronic submission.
 - Use of data analysis tools to rapidly create, maintain, and document conceptual models that illustrate target areas, sources, pathways, and receptors within one month of receipt of the electronic submission.

As the IRPIMS data loading tasks are completed, the information will be made available to the EDMDS application. As more is learned about the natural and cultural resources at Cannon AFB, this information will be made available to the EDMDS application as well.

6.3 Conceptual Models/Data Gaps

This section summarizes unresolved issues pertaining to: the development of conceptual models for IRP/SWMU sites requiring additional investigations and/or corrective action; the determination of data needs; and the collection of data needed to complete the Cannon AFB environmental restoration

program. Currently, there are few data gaps because EPA did not accept the historical data. Acceptable data for the evaluation of each site at the Base are being generated, as required by the RCRA Part B permit.

6.3.1 Project Team Action Items

The Cannon AFB Project Team will perform the following actions to develop any additional conceptual models and ensure that data gaps are identified and filled as needed to complete the Cannon AFB environmental restoration program.

- Evaluate data submitted for each IRP/SWMU site at Cannon AFB to identify data gaps;
- Reach a consensus on field sampling or other efforts needed to fill data gaps, if necessary; and
- Review all work plans submitted for approval prior to each phase of the investigation and remediation process so that data gaps resulting from deficiencies in the project scopes of work can be prevented.

6.3.2 Rationale

The effective identification and resolution of data gaps will accelerate the completion of RFI efforts and the development of conceptual site models (CSMs) for risk assessment. These CSMs were developed for the *Rational National Standards Initiative, Air Combat Command, Pathways, Parameters, and Equations Report* (Radian, 1995), and are presented in Appendix E to this MAP. The CSMs contain information pertaining to the waste sources, contaminants, migration pathways, and natural receptors at each site and provide a conceptual understanding of the site so that potential risks to human health and the environment can be evaluated. Risk-based cleanup levels and

potential remedial technologies can be selected and evaluated by identifying the following:

- Known and suspected sources of contamination,
- Types of contaminants,
- Affected media,
- Known and potential routes of migration,
- Known or potential human and environmental receptors,
- Locations where sampling is needed, and
- ARARs.

As data gaps are filled and the objectives of the RFI are met, areas with no suspected contamination and target areas for further investigation and/or remediation can be defined and the CSMs can be updated.

6.3.3 Status/Strategy

The status and strategies for identifying and filling data gaps are as follows:

- The Project Team will review all draft documents, including work plans, RFI documents, and subsequent investigative data documents, to ensure data gaps do not exist. If data gaps are identified, action can be taken to rectify problems before documents become final.
- The Project Team may meet, when necessary, with federal and state regulators to reach a consensus on a Scope of Work (SOW) to fill any data gaps identified during the current IRP/ RCAP investigation process.

6.4 Background Levels

This section summarizes issues regarding the determination of background (natural) concentrations of elements and compounds that occur naturally in the Cannon AFB environment.

6.4.1 Project Team Action Items

IRP work conducted before the issuance of the RCRA Part B permit determined the background concentrations of elements in the Base's environment that will be used in Baseline Risk Assessment computations (as required for Cannon AFB environmental restoration). Some background levels, however, exceed the state and federal maximum contaminant levels (MCLs). The Project Team is negotiating this issue with the state and federal agencies to concur on acceptable background levels.

6.4.2 Rationale

Background concentration values of elements in soil, groundwater, surface water, and sediments must be determined before risk assessments can be conducted. The values must represent what is *naturally* occurring, and EPA and state regulators must concur with the value determinations.

6.4.3 Status/Strategies

The following status and strategies will be used to determine background concentration values.

- Background concentrations have been determined as a result of historical IRP investigations. Cannon AFB has developed a document

titled *Concentrations of Naturally Occurring Chemical Constituents in Soil and Groundwater at Cannon AFB, Clovis, New Mexico* (March 1994). This document should be used when assessing the levels of naturally occurring elements at any given site on Cannon AFB.

- The Project Team is currently negotiating with the regulatory agencies to determine the acceptable levels of elements that exceed MCLs at background level.

6.5 Risk Assessment Protocols, Future Land Use, and Cleanup Standards

This section summarizes issues regarding the completion of risk assessments required to complete the Cannon AFB environmental restoration program and associated compliance programs.

6.5.1 Project Team Action Items

The Cannon AFB Project Team will continue to evaluate the role of anticipated land use, including potential uses of groundwater, surface water, and soils, as a criterion in selecting assumptions in the exposure assessment. BRAs conducted as part of the RFI/Corrective Measures Study process will follow RFI guidance protocol.

In addition to the risk assessments currently being performed at the Base, HQ ACC, in cooperation with the Base and its contractors, is pursuing a parallel approach to develop CSMs and screening levels based on future land use of the IRP sites and SWMUs. The RNSI approach summarized in Section 4.1.3 considers exposure to human health that would be anticipated for each of several future land use scenarios and uses risk assessment as a tool to develop screening levels. The regulators, as part of the Base environment project team, will be included in the RNSI approach as results are formalized to facilitate specific issues. The Project Team, including the regulators, will meet with the

community to discuss the mutual benefits of the RNSI approach, and create uniform expectations for the future use of each IRP site and the corresponding cleanup standards that are necessary to achieve a safe environment for future inhabitants of the property.

6.5.2 Rationale

Currently, risk assessments being performed at Cannon AFB are measured by RCRA and CERCLA standards. These standards are based on risk to human health and the environment. Regulatory cleanup standards, ARARs, and MCLs are often derived from risk calculations based on worst case exposure to contaminants. Where regulatory standards are not available, quantitative risk assessments are used to establish cleanup levels.

The RNSI approach proposes to use EPA-accepted risk assessment methodology using future land use-specific exposure parameters to prepare CSMs and develop screening levels on the basis of human health risks deemed appropriate for the intended future land use. Those screening levels will vary depending on the future land use of the property. As an example, risk-based screening levels for residential reuse of the property should be more stringent than cleanup standards for industrial reuse of the property, as the exposure to workers in an industrial setting is less frequent and shorter in duration than in a residential setting. Details of the methodology and development of screening levels based on future land use considerations are described in Section 6.6. A more detailed explanation is described in the PPE Report, bound separately from the MAP.

6.5.3 Status/Strategy

The RNSI approach establishes a consistent risk management paradigm, and the results of the RNSI process can be utilized in various stages of the IRP and corrective action processes. During the early stages of site investigations, the RNSI process provides a consistent protocol for establishing screening levels. Utilizing the BCP as a baseline, the future land use and potential exposure pathways may be identified. As a screening tool, RNSI screening levels may be used to eliminate chemicals of potential concern (COPCs), and the IRP/SWMU sites may be designated as requiring no further action when all chemical concentrations are below the RNSI screening levels for the chosen land use. As sites become fully characterized, the RNSI process may provide chemical-specific remedial goals and remedial technology options.

CSMs have been developed for each active site at Cannon AFB. These have been developed in conjunction with the most recent and current studies being performed at the Base and in cooperation with base environmental personnel and contractors currently working at Cannon AFB. The CSMs are presented in Appendix E. An explanation for inclusion of pathways for each land use type is presented in the PPE Report. A discussion of the future land uses and development of risk-based cleanup standards for future land reuse options can be found in Section 6.6.

The Base will continue to work with the regulators and community planners to ensure that future land use considerations are incorporated into risk assessments and remedial actions. The strategy for resolving risk assessment issues will be to continue to use traditional and/or RNSI risk assessment protocols that meet regulatory requirements and are approved by the regulators.

6.6 Cleanup Standards

This section summarizes the current regulatory cleanup standards that may apply to IRP/SWMU site cleanups at Cannon AFB (Section 6.6.1). In addition, this section introduces the approach taken in the determination of future land uses and the development of screening levels based on potential future uses of the land at IRP/SWMU sites (Section 6.6.3) and explains the procedures used to determine final contaminants of potential concern (COPCs) for the remedy selection and cost estimating (Section 6.6.4).

6.6.1 Current Regulatory Cleanup Standards

Potential chemical-, action-, and location-specific ARARs for environmental media at Cannon AFB have been identified. These ARARs pertain to drinking water, surface water, groundwater, soils, and USTs. Those ARARs pertaining to drinking water have been promulgated pursuant to the New Mexico Drinking Water Regulations (NMED, 1995) and the Federal Safe Drinking Water Act (EPA 194). Language addressing more specific rules and regulations that pertain to these ARARs are found in 20 NMAC 7.1 and 40 CFR 141.61. Standards for New Mexico drinking water contaminants are listed in Table 6-1.

**Table 6-1
New Mexico Drinking Water Standards**

Contaminant	Maximum Contaminant Level (mg/L)
Inorganic Contaminants	
Antimony	0.006
Asbestos	7 million fibers/liter (longer than 10 Fm)
Arsenic	0.05
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide	0.2
Fluoride	4.0
Mercury	0.002
Nickel	0.1
Nitrate (as N)	10
Nitrite (as N)	1
Total Nitrate and Nitrite (as N)	10
Selenium	0.05
Thallium	0.002
Organic Contaminants	
Apply to community and non-transient, non-community water systems	
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dibromochloropropane	0.0002
2,4-D	0.07
Ethylene dibromide	0.00005
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Polychlorinated biphenyls	0.0005
Pentachlorophenol	0.001
Toxaphene	0.003
2,4,5-TP	0.05

**Table 6-1
New Mexico Drinking Water Standards
(Continued)**

Contaminant	Maximum Contaminant Level (mg/L)
Benzo(a)pyrene	0.0002
Dalapon	0.2
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Glphosate	0.7
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Oxamyl (Vydate)	0.2
Picloram	0.5
Simazine	0.004
1,3,7,8-TCDD (Dioxin)	0.00000003
Vinly Chloride	0.002
Benzene	0.005
Carbon Tetrachloride	0.005
1,2-Dichloroethane	0.005
Trichloroethylene	0.005
para-Dichlorobenzene	0.075
1,1-Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
cis-1,2-Dichloroethylene	0.07
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
o-Dichlorobenzene	0.6
Styrene	0.1
Tetracloroethylene	0.005
Toluene	1
trans-1,2-Dichloroethylene	0.1
Xylenes (total)	10
Dichloromethane	0.005
1,2,4-Trichlorobenzene	0.07

Table 6-1
New Mexico Drinking Water Standards
(Continued)

Contaminant	Maximum Contaminant Level (mg/L)
1,1,2-Trichloroethane	0.005
Apply to water systems which serve 10,000 or more individuals and add a disinfectant to the water	
Total Trihalomethanes	0.10

Source: New Mexico Drinking Water Regulations, New Mexico Environmental Department, Santa Fe, New Mexico, January 1, 1995

ARARs pertaining to surface water have been promulgated pursuant to the State of New Mexico Standards for Interstate and Intrastate Streams (WQCC 1995) and the EPA Quality Criteria for Water (EPA 1987). More specific rules and regulations that pertain to these ARARs are found in 20 NMAC 6.1 and the Federal Clean Water Act. Standards for New Mexico surface water contaminants are listed in Table 6-2. This table includes the New Mexico standards that apply to domestic water supplies, irrigation, fisheries (including coldwater fisheries, high quality coldwater fisheries, limited warmwater fisheries, marginal coldwater fisheries, and warmwater fisheries), and livestock watering. Wildlife habitats are discussed in the text of the State of New Mexico Standards for Interstate and Intrastate Streams (WQCC 1995).

ARARs pertaining to groundwater have been promulgated pursuant to the New Mexico Water Quality Control Commission Regulations (WQCC 1993). The standards are adopted by the commission under the authority of Section 74-6-4, NMSA 1978 (The New Mexico Water Quality Act, Chapter 326, Laws of 1973, as amended). Regulations are adopted by the committee under the authority of Sections 74-6-4 and 74-6-5 NMSA 1978. The purpose of these regulations is to control discharges onto the surface or below ground surface to protect all groundwater of the state of New Mexico which has an existing concentration of 10,000 mg/L or less total dissolved solids (TDS), for present and potential future use as domestic and agricultural water supply. The standards also protect those segments of surface waters which gain because of groundwater inflow, for uses designated in the New Mexico Water Quality Standards. The New Mexico groundwater standards apply to the protection of human health, the use of groundwater for irrigation, and other domestic water supply uses. These standards are listed in Table 6-3. However, because groundwater at Cannon AFB is used for irrigation purposes, these standards may be over conservative.

**Table 6-2
New Mexico Surface Water Quality Standards**

Contaminant	Standard ^a
Domestic Water Supplies	
Dissolved Arsenic	0.05 mg/L
Dissolved Barium	1.0 mg/L
Dissolved Cadmium	0.010 mg/L
Dissolved Chromium	0.05 mg/L
Dissolved Lead	0.05 mg/L
Total Mercury	0.002 mg/L
Dissolved Nitrate	10.0 mg/L
Dissolved Selenium	0.05 mg/L
Dissolved Silver	0.05 mg/L
Dissolved Cyanide	0.2 mg/L
Dissolved Uranium	5.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L
Irrigation	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.10 mg/L
Dissolved boron	0.75 mg/L
Dissolved Cadmium	0.01 mg/L
Dissolved Chromium	0.10 mg/L
Dissolved Cobalt	0.05 mg/L
Dissolved Copper	0.20 mg/L
Dissolved Lead	5.0 mg/L
Dissolved Molybdenum	1.0 mg/L
Dissolved Selenium	0.13 mg/L
Dissolved Selenium in presence of >500 mg/L SO ₄	0.25 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	2.0 mg/L
Fisheries	
Acute Standards^b	
Dissolved Aluminum	750 µg/L
Dissolved Beryllium	130 µg/L
Total Mercury	2.4 µg/L
Total Recoverable Selenium	20.0 µg/L
Dissolved Silver ^{c,d}	$e^{(1.72[\ln(\text{hardness})]-6.52)}$ µg/L

Table 6-2
New Mexico Surface Water Quality Standards
(Continued)

Contaminant	Standard^a
Cyanide, amenable to chlorination	22.0 µg/L
Total chlordane	2.4 µg/L
Dissolved Cadmium	$e^{(1.128[\ln(\text{hardness})]-3.828)}$ µg/L
Dissolved Chromium ^{c,d}	$e^{(0.819[\ln(\text{hardness})]+3.688)}$ µg/L
Dissolved Copper	$e^{(0.9422[\ln(\text{hardness})]-1.464)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(\text{hardness})]-1.46)}$ µg/L
Dissolved Nickel	$e^{(0.8460[\ln(\text{hardness})]+3.3612)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(\text{hardness})]+0.8604)}$ µg/L
Total Chlorine residual	19 µg/L
Chronic Standards^c	
Dissolved Aluminum	87.0 µg/L
Dissolved Beryllium	5.3 µg/L
Total Mercury	0.012 µg/L
Total Recoverable Selenium	2.0 µg/L
Cyanide, amenable to chlorination	5.2 µg/L
Total Chlordane	0.0043 µg/L
Dissolved Cadmium ^c	$e^{(0.7852[\ln(\text{hardness})]-3.49)}$ µg/L
Dissolved Chromium ^d	$e^{(0.819[\ln(\text{hardness})]+1.561)}$ µg/L
Dissolved Copper	$e^{(0.8545[\ln(\text{hardness})]-1.465)}$ µg/L
Dissolved Lead	$e^{(1.273[\ln(\text{hardness})]-4.705)}$ µg/L
Dissolved Nickel	$e^{(0.846[\ln(\text{hardness})]+1.1654)}$ µg/L
Dissolved Zinc	$e^{(0.8473[\ln(\text{hardness})]+0.7614)}$ µg/L
Total chlorine residual	11.0 µg/L
Livestock Watering	
Dissolved Aluminum	5.0 mg/L
Dissolved Arsenic	0.2 mg/L
Dissolved Boron	5.0 mg/L
Dissolved Cadmium	0.05 mg/L
Dissolved Chromium ^d	1.0 mg/L
Dissolved Cobalt	1.0 mg/L
Dissolved Copper	0.5 mg/L
Dissolved Lead	0.1 mg/L
Total Mercury	0.01 mg/L

Table 6-2
New Mexico Surface Water Quality Standards
(Continued)

Contaminant	Standard ^a
Dissolved Selenium	0.05 mg/L
Dissolved Vanadium	0.1 mg/L
Dissolved Zinc	25.0 mg/L
Radium-226 + Radium-228	30.0 pCi/L
Tritium	20,000 pCi/L
Gross alpha	15 pCi/L

Source: Standards for Interstate and Intrastate Streams, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, January 23, 1995.

- ^a When a classified water of the State has more than a single designated use, the applicable numeric standards shall be the most stringent of those established for such classified water.
- ^b The acute standards shall be applied to any single grab sample. Acute standards shall not be exceeded.
- ^c For numeric standards dependent on hardness, hardness (as mg CaCO₃/L) shall be determined as needed from available verifiable data sources including, but no limited to, the U.S. Environmental Protection Agency's STORET water quality database.
- ^d The standards for chromium shall be applied to an analysis which measures both the trivalent and hexavalent ions.
- ^e The chronic standards shall be applied to the arithmetic mean of four samples collected on each of four consecutive days. Chronic standards shall not be exceeded more than once every three years.

**Table 6-3
New Mexico Groundwater Standards**

Contaminant	Standard*
Human Health Standards	
Arsenic	0.1
Barium	1.0
Cadmium	0.01
Chromium	0.05
Cyanide	0.2
Fluoride	1.6
Lead	0.05
Total Mercury	0.002
Nitrate	10.0
Selenium	0.05
Silver	0.05
Uranium	5.0
Radium-226 and -228	30.0 pCi/L
Benzene	0.01
Polychlorinated biphenyls	0.001
Toluene	0.75
Carbon Tetrachloride	0.01
1,2-dichloroethane	0.01
1,1-dichloroethylene	0.005
1,1,2,2-tetrachloroethylene	0.02
1,1,2-trichloroethylene	0.1
Ethylbenzene	0.75
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
Total Xylenes	0.62
Methylene chloride	0.1
Chloroform	0.1
1,1-dichloroethane	0.025
Ethylene dibromide	0.0001
1,1,1-Trichloroethane	0.06

**Table 6-3
New Mexico Groundwater Standards
(Continued)**

Contaminant	Standard^a
1,1,2-Trichloroethane	0.01
1,1,2,2-tetrachloroethane	0.01
Vinyl chloride	0.001
PAHs: total naphthalene plus monomethylnaphthalenes	0.03
Benzo(a)pyrene	0.0007
Other Standards for Domestic Water Supply	
Chloride	250.0
Copper	1.0
Iron	1.0
Manganese	0.2
Phenols	0.005
Sulfate	600.0
Total Dissolved Solids	1000.0
Zinc	10.
pH	between 6 and 9
Standards for Irrigation Use	
Aluminum	5.0
Boron	0.75
Cobalt	0.05
Molybdenum	1.0
Nickel	0.2

Source: Water Quality Control Commission Regulations, New Mexico Water Quality Control Commission, Santa Fe, New Mexico, November 18, 1993.

^a All standards are in mg/L unless otherwise noted.

Standards for groundwater and soils that have been contaminated by leaking USTs are listed in the UST Soil/Water Sampling and Disposal Guidelines of the Underground Storage Tank Bureau, of the State of New Mexico Environmental Department (USTB 1995). These standards are presented in Table 6-4. Alternatively, through a separate agreement with NMED, different criteria are often used for the cleanup of TPH contaminated soils. If the TPH concentration detected in the soils is less than 1000 mg/kg then the NMED requires no further action. However, if the TPH detected in the soils is greater than 1000 mg/kg, the soils must be remediated.

6.6.2 Screening Levels Proposed for Site Remediation Based on Future Land Use Options

The Base has developed a future land use plan and a long-range facilities development plan. Physical constraints, restrictions imposed by airfield or explosive safety criteria, and compatibility with the development of communities surrounding the Base are considered during base comprehensive planning. The range of reasonable future uses for a specific site was determined by surrounding land uses and projections for likely development in the area of the site, and to be consistent with the BCP. Each potential future land use option was evaluated to provide a thorough framework to allow decisions to be made by the Air Force, regulators and the community, thereby creating uniform expectations for the future use of each site and for corresponding cleanup levels that will provide a safe environment for future inhabitants of the property. Tables 6-5 and 6-6 summarize the likely future use of each site at Cannon AFB.

Table 6-4
New Mexico UST Standards for Soil and Groundwater

Contaminant	Action Level
Water	µg/L
Benzene	10
Ethylbenzene	750
Toluene	750
Xylenes	620
EDB	0.1
EDC	10
MTBE	100
Naphthalene	30
1,1,2 TCE	100
PCE	20
Benzo(a)pyrene	0.7
Lead	50
Iron	100
Manganese	200
Soil	mg/kg
Benzene	10
Total BTEX	100 (field) 50 (lab)
TPH	100

Source: UST Soil/Water Sampling and Disposal Guidelines, Underground Storage Tank Bureau, State of New Mexico Environmental Department, March 6, 1995.

TPH - Total Petroleum Hydrocarbons

**Table 6-5
Future Land Use Summary for Consideration in Developing Remedy Selections for IRP Sites**

Site ID	SWMU No.	Potential Risks	Contaminants			Current Use	Adjacent Uses	Likely Future Use	RNSI Land Use Designation	
			Groundwater	Soil	Surface/Sediments				Current	Future
LF-1	74	NR	NS	MCPP, low level oil & grease, TPH, and metals	NS	Golf course	Golf course	Golf course	Open Space	Open Space
LF-2	82	Ingestion of groundwater, dermal contact with soil during excavation	NS	Metals	Metals	Inactive	Runway	Limited access	Open Space	Open Space
LF-3	105	NR	ND	Low level oil & grease, TPH, and pesticides	ND	Inactive	Inactive IRP sites	Restricted access	Open Space	Open Space
LF-4	104	NR	ND	Low level oil & grease, 4,4-DDD, 4,4-DDE, and 4,4-DDT	ND	Inactive	Playa Lake	Restricted access	Open Space	Open Space
LF-5	113	Dermal contact/inhalation during excavation	Lead	VOCs, low level TRPH	Metals	Inactive	IRP sites	Restricted access	Open Space	Open Space
FT-6	78	NR	NS	Lead, zinc, TPH, oil & grease, 4,4-DDT, 4,4-DDE	Lead, zinc, TPH, 4,4-DDD, 4,4-DDE	Inactive	Runway	Limited access	Open Space	Open Space
FT-7	106	NR	NS	Low level oil & grease, TPH, lead, chromium	Copper	Inactive	Inactive IRP sites	Restricted access	Open Space	Open Space
FT-8	107	NR	NS	Low level TPH, VOCs	Lead	Inactive	Inactive IRP sites	Restricted access	Open Space	Open Space
OT-10	AOC C	NR	NS	PCBs, (soil has been removed)	PCBs (soil has been removed)	Inactive	Main Base Building 1437	Main Base	Industrial	Industrial
SD-11	86 through 90	Dermal contact/inhalation from soil contaminants	NS	TPH, acetone, toluene	TPH	Inactive	Flightline	Inactive	Industrial	Industrial
SD-12	85	NR	Low level pesticides	Low level oil & grease	NS	Inactive, prairie grass	Runway	Limited access	Open Space	Open Space
SD-13	75	NR	NS	ND	NS	Golf course	Golf course	Golf course	Open Space	Open Space
WP-14	76	NR	NS	Ethylbenzene, xylenes	NS	Inactive	Fuel Farm	Restricted access	Industrial	Industrial
SD-15	34	Ingestion of groundwater and dermal contact/inhalation of soil	NS	PAH, TRPH, lead, zinc	PAH, TRPH, lead, zinc	Stormwater	Runoff from AGE maintenance roads	Industrial	Industrial	Industrial
DP-16	81	NR	NS	Acetone	NS	Inactive	Runway	Limited access	Open Space	Open Space
SD-17	96	Ingestion of groundwater, dermal contact, inhalation from soil contaminants	Low level metals	4,4-DDD, 4,4-DDE, 4,4-DDT, chlordane	4,4-DDD, 4,4-DDE, 4,4-DDT, chlordane	Inactive	Sewage lagoons, IRP sites	Restricted access	Open Space	Open Space

**Table 6-5
Future Land Use Summary for Consideration in Developing Remedy Selections for IRP Sites
(Continued)**

Site ID	SWMU No.	Potential Risks	Contaminants			Current Use	Adjacent Uses	Likely Future Use	RNSI Land Use Designation	
			Groundwater	Soil	Surface/Sediments				Current	Future
SD-18	AOC B	NR	NS	TRPH	ND	Hangar-Building 120	Flightline	Hangar-Building 120	Industrial	Industrial
SS-19	AOC A	NR	NS	ND	Lead, DCE	Main Base, Argentia Ave.	Gymnasium	Main Base, Argentia Ave.	Industrial	Industrial
SD-20	95	Dermal contact with soil during excavation	ND	ND	Arsenic, cadmium, chromium, cobalt, copper, iron, lead, nickel, zinc	Stormwater drainage	Runway	Stormwater drainage	Open Space	Open Space
DP-25	97	Contact and inhalation during excavation	ND	ND	ND	Inactive	Inactive	Restricted access	Open Space	Open Space
DP-33		NR	NS	ND	ND	Inactive	Storage Yard	Storage Area	Industrial	Industrial
AOC D		Contact and inhalation during excavation	NS	Asbestos	Asbestos	Golf course	Golf course	Golf course	Open Space	Open Space
AOC 36		NR	NS	ND	ND	Parking Lot	Rec Area	Parking Lot	Open Space	Open Space
AOC E		Unknown	NE	NE	NE	Open Space	Open Space	Open Space	Open Space	Open Space
AOC F		Unknown	NE	NE	NE	Inactive	Small arms range	Inactive	Open Space	Open Space

AGE = Aerospace Ground Equipment
AOC = Area of Concern
DCE = dichloroethylene
DDE = Dichlorodiphenylethane
DDT = Dichlorodiphenyltrichloroethane
IRP = Installation Restoration Program
ND = no contaminants detected and/or contaminants detected below background or unacceptable risk levels
NE = not yet evaluated
NR = negligible risk
NS = not sampled
PAH - polynuclear aromatic hydrocarbons
PCB = polychlorinated biphenyl
SWMU = Solid Waste Management Unit
TPH = total petroleum hydrocarbons
TRPH = total recoverable petroleum hydrocarbon
VOC = volatile organic compound

**Table 6-6
RNSI Future Land Use for SWMUs at Cannon Air Force Base**

Site ID/SWMU No.	Potential Exposures	Contaminants	Current Use	Adjacent Uses	Likely Future Use
SWMU 3 Oil/Water Separator No. 108	Ingestion and dermal direct contact with soil and contact through intrusive actions	Barium, Benzo-(a)pyrene, Manganese, TPH	Industrial	Commercial	Industrial
SWMU 5 Oil/Water Separator No. 121	Ingestion and dermal direct contact with soil and contact through intrusive actions.	Aluminum, Barium, Manganese	Industrial	Industrial	Industrial
SWMU 31 AGE Maintenance Shop Pad	Ingestion and dermal direct contact with soil and contact through intrusive actions. Possible inhalation of fugitive dust.	PAHs, Manganese, TPH	Industrial	Commercial, Industrial	Industrial
SWMU 48 (SD-26) Waste Oil and Overflow Tanks	Ingestion and dermal direct contact with soil and contact through intrusive actions.	Metals, TPH, PAHs	Industrial	Industrial, Commercial	Industrial
SWMU 55 Lead Acid Battery Accumulation Point	Ingestion and dermal direct contact with soil and contact through intrusive actions. Inhalation of fugitive dust. Possible inhalation and dermal contact with groundwater.	Antimony, Manganese, TPH, PAHs	Industrial	Industrial, Commercial	Industrial
SWMU 77 Civil Engineering Container Storage Area (Facility 4038)	Ingestion and dermal contact with soil.	Barium, Manganese, PCB-1260, TPH	Industrial	Industrial, Commercial, Open Space	Industrial
SWMU 83 (ST-27) Sump for Flight Apron Wash-down	Ingestion and dermal direct contact with soil and contact through intrusive actions.	Benzo(a)pyrene	Industrial	Industrial	Industrial
SWMU 93 Oil/Water Separator No. 5121	Ingestion and dermal direct contact with soil and contact through intrusive actions.	Barium, Manganese, TPH	Industrial	Industrial	Industrial
SWMU 97 (LF-25) Concrete Rubble Pile	Ingestion and dermal direct contact with soil and contact through intrusive actions. Inhalation of fugitive dust. Possible ingestion, inhalation, and dermal contact with groundwater.	None identified	Open Space	Industrial	Open Space

Table 6-6
RNSI Future Land Use for SWMUs at Cannon Air Force Base
(Continued)

Site ID/SWMU No.	Potential Exposures	Contaminants	Current Use	Adjacent Uses	Likely Future Use
SWMUs 101, 102 (SD-21) Wastewater Treatment System Lagoon/Discharge	Ingestion and dermal contact with soil through intrusive actions. Ingestion and dermal contact with surface water. Possible inhalation of fugitive dust and possible ingestion and dermal direct contact through soil.	Metals, PCB-1254, bis(2-ethylhexyl)phthalate, toxaphene, PAHs	Industrial	Industrial	Open Space
SWMU 103 Wastewater Playa Lake	Ingestion and dermal direct contact with soil and contact through intrusive actions. Inhalation of fugitive dust. Ingestion and dermal contact with sediment and surface water.	Aluminum, Barium, Beryllium, Manganese	Open Space	Industrial	Open Space
SWMU 108 Explosive Ordnance Disposal Training Area	Ingestion and dermal direct contact with soil and contact through intrusive actions. Inhalation of fugitive dust.	Aluminum, Barium, Beryllium, Manganese	Open Space	Open Space	Open Space
SWMU 127 Oil/Water Separator No. 4095 and Leach Field	Ingestion and dermal direct contact with soil and contact through intrusive actions. Inhalation of fugitive dust. Inhalation of vapors and dermal contact with groundwater.	PAHs, Barium, Beryllium, Manganese, TPH	Industrial	Industrial	Industrial

Under the RNSI approach, sites that are remediated to meet designated land use criteria will be deed restricted, or another similar mechanism will be used to ensure that the land use does not change without prior evaluation of land use criteria. This will ensure that the actual future use of the property is limited to the future land use previously agreed upon by the Air Force, the regulatory agencies, and community planners. If the land use should be reassigned, then the land use criteria would be reopened and reviewed by the Base and regulatory agencies at that time.

There is a limited number of land uses that need to be considered at any given AFB. Under the RNSI approach, anticipated future land uses of sites have been categorized as residential, open space, commercial, and industrial. Restrictions on land and natural resources for each of these categories were adapted from *Future Use Considerations in the Cleanup of Air Force Installations* (USAF 1992), and are illustrated in Tables 6-7 and 6-8. Table 6-9 presents examples of facilities and operations included under future land use categories. A description of each of the four land use categories is presented below.

Residential Land Use

Residential land use is assumed when there are or may be occupied residences on or immediately adjacent to the site. The residential category includes family housing for permanent party or transient personnel and the associated support facilities, as well as all other forms of lodging for unmarried or unaccompanied personnel. Examples of residential structures are presented in Table 6-9. Potentially significant exposure pathways for residential land use include:

**Table 6-7
RNSI Soil Use Definitions**

Residential	Open Space	Commercial	Industrial
C Unrestricted surface and subsurface soil use	C Unrestricted surface soil use	C Unrestricted surface and subsurface soil use	C Unrestricted surface and subsurface soil use
C No commercial farming	C No subsurface soil use		
	C Possible farming		

USAF, 1992. Future Use Consideration In the Cleanup of Air Force Installations. Environmental Restoration Program, Department of the Air Force. October 1992.

**Table 6-8
RNSI Groundwater Use Definitions**

Residential	Industrial ^a	Restricted ^b
Drinkable groundwater	Limited groundwater use	No groundwater use

^a Water used for industrial processes only, with potential for dermal contact and inhalation. Exceptions where water is used for drinking, the contact rate is equivalent to residential.

^b Water is considered to be non-potable due to natural conditions, or there is no potential for the groundwater to be affected by the IRP/SWMU site.

Table 6-9
Example Facilities and Operations Included Under Land Use Categories

Industrial	Commercial	Open Space	Residential
Airfield	Administrative	Outdoor Recreation	Housing Accompanied
Runways/Taxiways	Combined Base Personnel	Parks	Single Family Houses
Parking Aprons	Civilian Personnel	Athletic Fields	Apartment Buildings
Navigational Aids	Finance Buildings	Tennis Courts	Duplexes
Aircraft Operations/Maintenance	Community Commercial	Golf Courses	Mobile Homes
Row Hangar Complexes	Retail Stores	Hunting Areas	Housing Unaccompanied
Squadron and Flight Operations	Commissary	Running Tracks	Barracks
Maintenance Apron	Exchange Facilities	Fishable Waters	Bachelor Officers
Miscellaneous Industrial	Theaters	Swimmable Waters	
Rail Road Yards	Bowling Alleys	Miscellaneous Open Space	
Active Landfills	Agricultural Buildings	Undeveloped Land	
Fuel Storage Arcas	Restaurants	Pastures	
Warehouses	Officers Clubs	Animal Fodder/Crop Lands	
Vehicle Storage/Maintenance	Community Service	Demolished Buildings	
Equipment Repair/Storage	Post Office	Explosive Ordnance Disposal	
Weapons Ranges	Library	Closed Landfills	
Tank Farms	Day Care Facilities		
USTs	Churches		
Drain Fields	Schools		
Burn Pits	Medical		
Pump Houses	Hospitals		
Fuel Hydrant Line Routes	Dental Clinics		
Radioactive Waste Areas	Veterinary Clinics		
Construction Debris Disposal Areas			
Pipeline Routes			
Waste Water Treatment Plants			
Chemical Storage Handling Facilities			

UST = Underground Storage Tank

(1) ingestion, inhalation, and dermal contact with groundwater; (2) ingestion and dermal contact with soil; (3) inhalation of ambient air; (4) ingestion and dermal contact with surface water; and (5) ingestion, inhalation, and dermal contact with soils during intrusive actions. Exposure assumptions selected to calculate screening levels for residential land reuse are noted in Table 4-4 of the PPE Report.

Open Space Land Use

The open space category includes undeveloped lands that are barren or where the naturally occurring vegetation includes grasses, shrubs, or trees that are to be retained as buffer zone easements or clear zones. It also includes those areas to be retained for conservation or grazing purposes and outdoor sports fields and courts. Table 6-9 presents some specific examples of open space land use options. Potentially significant exposure pathways for open space land use include: 1) ingestion and dermal contact with soil, 2) inhalation of ambient air, and 3) ingestion and dermal contact with surface water. Exposure assumptions selected to calculate cleanup standards for land for open space reuse are noted in Table 4-3 of the PPE Report.

Commercial Land Use

Commercial land use includes any structure of a commercial or institutional nature to which the general public, including children, the elderly, and other potentially sensitive populations, may have access. This category includes all office functions not directly associated with the flying mission, those facilities that provide for the sale of goods and services, those facilities that support morale and welfare, and physical and mental health facilities. Table 6-9 presents some examples of facilities and operations included under the commercial land use category. Potentially significant exposure pathways

for commercial land use include: 1) ingestion of and dermal contact with soil; 2) inhalation of ambient air; and 3) ingestion, inhalation, and dermal contact with soils during intrusive actions. Exposure assumptions selected to calculate cleanup standards for land for commercial reuse are noted in Table 4-2 of the PPE Report.

Industrial Land Use

Industrial land use options include areas of developed land used for manufacturing or industrial purposes. This category includes pavements and facilities which directly support the flying mission, those facilities required to operate and maintain aircraft in support of the flying mission, and maintenance and storage functions not directly related to the flying mission. Examples of facilities and operations included under the industrial land use category are presented in Table 6-9. Potentially significant exposure pathways for industrial land use include: 1) dermal contact or inhalation of constituents that volatilize from groundwater and surface water; 2) ingestion and dermal contact with soil; 3) inhalation of ambient air; and 4) ingestion, inhalation, and dermal contact with soils disturbed during intrusive actions. Exposure assumptions selected to evaluate screening levels for industrial land reuse are noted in Table 4-1 of the PPE Report.

6.6.3 Development of Risk-Based Screening Levels for Future Land Use Options

In the RNSI approach, risk-based screening levels have been developed from current guidance for soil and groundwater, as applicable, for active IRP/SWMU sites. However, groundwater screening levels were not calculated for Cannon AFB sites in many cases due to the depth to groundwater and lack of monitoring wells in the area. Monitoring wells surrounding Cannon AFB

have not shown the presence of contaminants at levels of concern in the groundwater.

Current guidance applicable to Cannon AFB include EPA Region III algorithms, and a *Risk Assessment Guidance for Superfund* (RAGS) equation for dermal contact with groundwater. The EPA Region III algorithms are commonly used for risk screening purposes. The screening algorithms and corresponding default exposure assumptions were presented in the General PPE report. Any deviations to the default assumptions are presented in the Site Specific Factors Tables presented in both the Cannon AFB PPE report and Appendix E.

EPA Region III developed algorithms to derive screening levels for tap water, and residential and industrial soil exposures. These screening levels address a single contaminant in a medium. The ingestion pathway is considered for soil exposures. Both ingestion and inhalation pathways are considered for tap water exposure. For the purpose of RNSI, tap water exposure is considered a residential exposure.

Groundwater use in an industrial area is considered to include process uses only; therefore only dermal exposure was considered in calculating screening levels. The algorithm used to calculate screening levels is the dermal exposure equation found in EPA's RAGS Part A (EPA 1989) and is presented in the General PPE report.

Both standard and modified (i.e., land uses not considered in EPA Region III algorithms) default exposure parameters were used to develop screening levels for various land use scenarios. Soil screening levels were calculated for constituents present at Cannon AFB IRP/SWMU sites for the following future land uses:

- Residential (age-adjusted exposure);
- Open Space Restricted Access (adult exposure);
- Open Space Recreational (child exposure);
- Commercial (adult exposure only),
- Commercial (adult and child exposures),
- Industrial (adult exposure).

The residential and open space recreational soil screening levels were based on the EPA Region III residential soil exposure equation. The open space restricted access, commercial adult, commercial child, and industrial soil screening levels were based on the EPA Region III industrial soil exposure equation.

Tables in Appendix K present the equations and future use screening levels calculated for constituents at Cannon AFB.

6.6.4 Determination of Final COPCs for Remedy Selection and Cost Estimating

This section explains the process by which the final list of COPCs were developed for each IRP site. The procedures are as follows:

- Obtain analytical results from the most recent field investigations;
- Reduce COPCs by comparison to field and laboratory blanks;
- If possible, reduce COPCs by comparison to background levels for each medium;
- If possible, reduce COPCs by comparison to sitespecific risk assessment conclusions;
- Identify the maximum concentration of each constituent in soil, groundwater, and surface water.

- Determine the appropriate set of algorithms to use to calculate future use screening levels;
- Calculate the future use screening levels for each constituent for residential, open space (restricted), open space (recreational), commercial (adult), commercial (child), and industrial land uses, and for residential and industrial groundwater uses.
- Those constituents whose maximum detect exceeds the future use cleanup standard remain on the list of COPCs. Those constituents whose maximum detection is below the future use screening levels are eliminated from the list of COPCs; and
- Future use screening levels cannot be calculated for constituents that do not have toxicity values. These constituents are segregated into two categories, toxic and non-toxic, except at extremely high concentrations. Non-toxic constituents are eliminated from the list of COPCs. Toxic constituents remain on the list of COPCs, unless otherwise eliminated by current environmental reports.

Current environmental reports were studied, and the recommendations of the contractor investigating each site were preserved. Specific measures that were taken to utilize work previously accomplished are as follows:

- The environmental reports accompanying the analytical results are analyzed to determine which of the remaining COPCs can be eliminated based on comparison to background levels, trip blanks, lab contaminants, etc., based on recommendations and conclusions cited in each report.
- Baseline risk assessments have been performed at some of the IRP sites and SWMUs. Chemicals eliminated in the baseline risk assessment were also eliminated from the list of COPCs.

No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). This lead soil screening level was used for all future land use scenarios.

Tables listing the COPCs and screening levels based on future uses of soil and groundwater are presented in Appendix K. The tables displaying soil screening levels also include RCRA Subpart S cleanup standards for each constituent for comparison. The tables displaying groundwater screening levels also include RCRA Subpart S, State Standards, and MCL cleanup standards for each constituent for comparison.

For several constituents, the soil screening levels calculated were greater than 1,000,000 mg/kg. For these cases, the screening level was set to 1,000,000 mg/kg. A soil screening level of 1,000,000 mg/kg means that no amount of the contaminant in soil will cause a receptor to exceed the oral reference dose by incidental ingestion of soil.

To identify those land uses for which remedial costs should be evaluated (i.e., the maximum detected concentration exceeds the screening level), the screening level has been shaded in the Appendix K tables. However, in some cases the screening level for a given land use may be lower than the maximum detected concentration and the screening level was not shaded if the MCL is higher than the screening level. For the purposes of remedial action costing, no screening levels more stringent than an MCL were used. Therefore, the MCL would become the level to cleanup to for remediation purposes and should be shaded if the maximum detected concentration exceeds the MCL.

6.6.5 Status/Strategy

The Base has identified ARARs and has used site-specific background data in its evaluation of appropriate cleanup standards. The Base has also developed screening levels on the basis of future land use. The strategies for

determining final cleanup standards and COPCs for remedy selection and cost estimating include the following:

- Continue to use the following available tools to develop cleanup standards: ARARs, background data, RNSI screening levels, and other site-specific criteria; and
- Coordinate meetings with NMED to finalize site-specific cleanup standards, COPCs, and remedial actions.

6.7 Relative Risk Evaluation

In FY 1994, the Relative Risk Site Evaluation (RRSE) replaced the Defense Priority Model as a method for evaluating and prioritizing sites. This hazard ranking method was introduced as DOD policy in the Management Guidance for Execution of FY94/95 and Development of FY 1996 Defense Environmental Restoration Program. The RRSE concept, in conjunction with information contained in regulatory agreements, is used to determine the general sequence in which active hazardous and petroleum waste IRP sites and AOCs are addressed. The RRSE is not a substitute for a BRA; it is used to ensure that sites with higher risk (relative to other sites and AOCs) are generally considered first in the priority-setting process. The sequencing of sites and AOCs is reviewed on an annual basis.

During an RRSE, available information is used to categorize IRP sites and AOCs into high, medium, and low relative risk groups, based on an evaluation of the contaminants, migration pathways, and receptors associated with groundwater, surface water/sediment, and surface soil at a site or an AOC. Sites or AOCs with insufficient information are assigned a "Not Evaluated" designation until information is available. Community representatives and other interested parties are encouraged to provide input to Cannon AFB for the RRSE.

6.8 Contracting Strategies

The following initiatives will be considered by the Project Team for expediting response actions at the Base:

- **Target Source Areas:** Target source areas for early RAs.
- **Identify ARARs:** Early in the project, develop a list of ARARs by obtaining lists of ARARs from the state and other agencies and examine the Records of Decision (RODs) for similar sites in the same state to identify which ARARs are likely to apply.
- **Risk-Based Cleanup:** Pursue negotiation with the regulators to agree on risk-based cleanup standards based on future land usage.
- **Single Regulatory Source:** Put all RAs/corrective actions at the Base/facility under one regulatory authority for threshold decisions (RCRA or CERCLA).
- **RCRA Permit:** Pursue modification of the RCRA permit to allow adequate time for obtaining required funding and contracting the work to be done.
- **Agreements:** Make use of Interagency Agreements, and Defense and State Memoranda of Agreement, as appropriate, to implement agreements and expedite cleanup.
- **Document Review:** Negotiate terms with the regulatory reviewers to streamline the review process by agreeing to a definitive time cycle (such as 12 months) from the submittal of a draft Corrective Measure Study to concurrence of the Corrective Measure Implementation.
- **Concurrent Review:** Develop a complete list of reviewers early and pursue parallel review tracks to eliminate delays.
- **Team Approach:** Build a strong team consisting of the Base, Major Command, and service agent RPMs, contractors, and state and federal regulatory personnel that has the authority, responsibility, and accountability for implementing innovative solutions to remediate and close sites in a timely, cost-effective manner.

- **Joint Preparation:** Expedite the document preparation and review/approval process by forming a working team with EPA and the state when preparing required documents such as DDs and HSWA permit modifications.
- **Community Involvement:** Involve the community during the remedial process to encourage support at the time of site closure. By informing the community during the process, the likelihood of opposing comments during the public comment period would be lessened.
- **Generic Procedures:** Develop generic procedures and SOWs for common problems or common types of contaminated sites (such as fuel contamination in soil). The procedures should be flexible enough for site-specific modifications to be made.
- **Innovative Contracting:** Maximize flexibility of contracting procedures; investigate use of level-of-effort, direct-cost reimbursement, and award incentives; and utilize other flexible contracting methods.
- **Single Contract:** Utilize a single contract throughout the entire process or, if separate contracts, maintain the same Architecture-Engineering contractor throughout the RI/Feasibility Study process.
- **Innovative Technologies:** Pursue collaborative projects using innovative technologies being researched at AFCEE and the Air Force Civil Engineering Service Agency or those suggested by the contractor.

APPENDIX A

COST ESTIMATE AND SCHEDULE CONFIRMATION

CANNON AIR FORCE BASE
NEW MEXICO

OCTOBER 1996

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A.1 INTRODUCTION

This appendix to the Cannon AFB MAP estimates the time and cost necessary to complete the IRP and restoration-related compliance work at the Base. Information and estimates presented on costs, schedules, and investigations and RAs do not necessarily represent those that have been or will be approved by the USAF or state and federal regulatory agencies. It was necessary to make certain assumptions and interpretations to develop the estimates. As additional information is made available, estimates could be dramatically altered. This would then be reflected in future updates to the MAP.

The estimated future funding requirements (current, fiscal year, and beyond) for the IRP at Cannon AFB are summarized by fiscal year in Table A1-1. These future cost estimates are also summarized by phase starting with the current fiscal year (FY 1995) and are presented in Table A1-2. Both capital and operation and maintenance (O&M) costs are included. O&M can include long-term monitoring and or long-term operation of a remedial system. These estimates were obtained from the projected fiscal year cost totals for each individual site found on the Time Line⁷ task vs. time reports in Attachment B to this appendix. Those reports also show the breakdown between capital and O&M costs by site.

This appendix also provides current year and future cost estimates for restoration-related compliance projects at Cannon AFB as summarized in Table A1-3. These estimates were provided by the Cannon AFB environmental managers with direct budget responsibilities for the various projects. Finally, this appendix provides a summary of the past funding requirements for the IRP at Cannon AFB. This summary is provided in Table A1-4 and is presented by fiscal year and by IRP stage.

**Table A1-1
Current and Future Year Defense Plan Reporting by Site**

Cannon AFB IRP Sites		Fiscal Year					
		1996	1997	1998	1999	2000	2001
LF-01 (Low RR)	Investigation						
	Cleanup						
LF-03 (Medium RR)	Investigation						
	Cleanup ^a	65,000	65,000	65,000	65,000	65,000	
LF-04 (Medium RR)	Investigation						
	Cleanup ^a	65,000	65,000	65,000	65,000	65,000	
LF-05 (Medium RR)	Investigation						
	Cleanup ^b		5,000,000	200,000	200,000	200,000	200,000
SD-11 (High RR)	Investigation						
	Cleanup		100,000	75,000	75,000	75,000	75,000
LF-25 (Medium RR)	Investigation						
	Cleanup	65,000	65,000	65,000	65,000	65,000	
SD-26 ^c (Low RR)	Investigation						
	Cleanup ^d	6,000					
DP-33 (Low RR)	Investigation						
	Cleanup ^d	6,000					

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**Table A1-1
Current and Future Year Defense Plan Reporting by Site
(Continued)**

Cannon AFB IRP Sites		Fiscal Year					
		1996	1997	1998	1999	2000	2001
AOC D (No RR score)	Investigation	175,000					
	Cleanup		167,000				
AOC E (No RR score)	Investigation	110,000					
	Cleanup		167,000				
AOC F (No RR score)	Investigation	110,000					
	Cleanup		167,000				

^aAll costs are associated with long-term monitoring

^b1997 cost for remedial action; 1998-2001 are costs for long-term monitoring

^cAwaiting decision from EPA Region VI of Appendix II, Phase II RFI (April 1995).

^dCost for closure

AOC = Area of Concern

IRP = Installation Restoration Program

**Table A1-2
Current and Future Year Cost Summary by Phase**

Fiscal Year	IRP Stage								Fiscal Year Total
	PA/SI	RI/FS	RD/FS	RA	LTO	LTM	DD	IRA	
FY 1996	\$395,000	0	0	0	0	\$156,800	\$100,000		\$ 651,800
FY 1997	0	\$500,000	\$1,000,000	\$ 4,000,000	\$ 75,000	\$ 200,000	0		\$ 5,775,000
FY 1998	0	0	0		\$ 37,500	\$ 395,000	0		\$ 432,500
FY 1999	0	0	0	0	\$ 37,500	\$ 395,000	0		\$ 432,500
FY 2000	0	0	0	0	0	\$ 395,000	0		\$ 395,000
Phase Total	\$395,000	\$500,000	\$ 1,000,000	\$ 4,000,000	\$150,000	\$ 1,541,800	\$100,000	0	\$ 7,686,800

DD = Decision Document
 FS = Feasibility Study
 IRA = Interim Removal Action
 LTM = long-term monitoring
 LTO = long-term operation
 PA = Preliminary Assessment
 RA = Remedial Action
 RD = Remedial Design
 RI = Remedial Investigation
 SI = Site Investigation

Table A1-3
Funding Requirements by Fiscal Year for Compliance Projects at Cannon AFB

Program Area/Project Description	1996\$	1997\$	1998\$	1999\$	2000\$
Underground Storage Tanks	5,000	5,000	5,000	C	C
Aboveground Storage Tanks*					
Hazardous materials/waste Management*					
NPDES requirements		90,000	90,000	90,000	90,000
RCRA Facility requirements	2,080,000	2,675,000	1,500,000	1,550,000	500,00
Air emissions (under the Clean Air Act)	400,00	100,00	100,000	100,000	100,000

*Funding requirements for these programs are not currently available.

NPDES = National Pollutant Discharge Elimination System
 RCRA = Resource Conservation and Recovery Act

Table A1-4

Past Funding Requirements Summary by Fiscal Year and by Phase for Cannon AFB

Fiscal Year	IRP Stage						
	RFA PA/SI	RFI/CMS RI/FS ¹	CMS/RD ²	CMI/RA	IRA	LTO/LTM	NFRAP
FY 1983	\$ 387,000						
FY 1986		\$ 284,300					
FY 1987		\$ 754,600				\$ 7,400	
FY 1988		\$ 29,000			\$ 176,400		
FY 1989					\$ 356,600		
FY 1990							
FY 1991	\$ 122,600	\$ 1,245,300				\$ 32,700	
FY 1992		\$ 3,651,600					
FY 1993		\$ 1,151,900					
FY 1994		\$ 928,000		\$ 1,650,000	\$ 403,800		
FY 1995		\$ 180,900	\$ 400,000			\$ 120,000	
Phase Total	\$ 509,600	\$ 8,225,600	\$ 400,000	\$ 1,650,000	\$ 936,800	\$ 160,100	

¹Includes the preparation of proposed plans and decision documents.

- CMI = corrective measures implementation
- CMS = corrective measures study
- FS = feasibility study
- IRP = installation restoration program
- IRA = interim removal action
- LTM = long-term monitoring
- LTO = long-term operation
- NFRAP = no further response actions planned
- PA = preliminary assessment
- RA = remedial action
- RD = remedial design
- RFA = RCRA facility assessment
- RFI = RCRA facility investigation
- RI = remedial investigation
- SI = site investigation

A.2 ESTIMATED COST AND TIME SCHEDULES

This section presents the estimated cost and time schedules for active IRP sites at Cannon AFB. The methodology used to develop these is described below, including the necessary assumptions and models used. Initial estimates were made using the methodology described below with input and review from the Major Command. The Base will make subsequent updates as additional information and/or estimating tools become available.

The purpose of this section is to present initial order-of magnitude estimates of the cost and time required to complete the IRP using a consistent methodology and format. This will allow the USAF to quickly and efficiently review the IRP at each Base. Available information for each IRP site at the Base was reviewed, and reasonable options for investigation and RA were selected.

It is likely that the RA technology ultimately selected for many of the sites will not be the same as the one selected for this analysis. However, the cost and time frame presented should be representative of reasonable order-of-magnitude estimates. As additional information becomes available, the Base will update these initial selections and estimates.

The schedules presented are based on continuous progress toward completion of the IRP process at each site and do not consider staff or budgetary limitations. The schedules also do not reflect events that cannot be predicted, such as the results of field investigations or

engineering studies, regulatory comments or relations, or emerging technologies. The schedules and costs presented could be dramatically altered by these factors.

A.2.1 Methodology

Two computer programs were employed to generate the cost and time schedules for this report. These programs are Time Line7, a commercially available project management program, and the RACER cost model, developed by the USAF for estimating IRP investigation and remediation costs. Used in conjunction, these two programs provide the tools necessary to estimate the costs and illustrate the time schedules.

It was necessary to make certain assumptions and interpretations to generate the required cost estimates and time schedules with the computer programs. These assumptions and interpretations are based on a review of the available data for each of the IRP sites, discussions with knowledgeable Base personnel, experience at similar sites, and engineering judgment. The selected RAs do not necessarily represent the RAs that have been or will be approved by the regulatory agencies or the USAF.

Discussions of the assumptions used and the computer models applied are presented below.

A.2.1.1 General Assumptions

The assumptions listed are those necessary to complete the initial cost and time schedules given the available information and limited scope of this project. These assumptions apply only to the initial estimates. Some or all may not apply to future updates and revisions made by the Base. None of the assumptions are to be construed as official solutions. Some assumptions used are but a few of several possible scenarios for site closeout.

- Relations among the Base and the regulatory agencies and local communities are assumed to be acceptable, such that there is no detrimental impact on the schedule and cost from these factors.
- Each IRP/SWMU site is assumed to be a single entity. The time schedule reflects taking each site through the RCRA process separately. Cost or time savings from combined actions are not factored into the estimates.
- Cost estimates or staff limitations are not considered. A staggering of start dates or delay of funding for the sites would lengthen the overall schedule.
- The governmental review and comment period for draft or interim deliverables is assumed to be 45 days. The time schedule given for draft documents includes time for contractor internal peer review.
- Weather was not considered in setting the schedules.
- The CMS process assumes no bench- or pilot-scale treatability studies are performed.
- CMD submittals will be made at 30, 65, 95, and 100% completion points (per EPA RCAP Guidance).
- For all sites, the RA/CMI task schedule includes a period of 150 days for advertisement, bidding, and construction contract award.
- The project closeout period is assumed to be 26 weeks (6 months) for all sites.

- Cost of RA/CMI includes capital cost only. No O&M costs are included.
- Long-term operation of pump and treat or other systems was not considered in this process.
- Median confidence level is assumed.
- Borrow material is available on-site.

A.2.1.2 Base-Specific Assumptions

Base- and site-specific conditions such as the regulatory environment, nature and extent of contamination, and hydrogeologic conditions are different at each AFB. Therefore, the following list of assumptions was made during the development of RFI/CMS and CMD/CMI costs for the IRP sites at Cannon AFB.

- Regulatory authorities will require the construction of a soil cap on landfills requiring corrective measures.
- A soil cap will be constructed only over the landfill portion of the Concrete Rubble Pile (SWMU 97).
- Remediation of soils in the vadose zone by soil vapor extraction was not considered feasible due to the low permeability of the caliche at the Base.
- No groundwater contamination is present at the Base with the exception of LF-05 (SWMU 113). This is due to the fact that groundwater is located more than 200 ft below ground surface (BGS) and the soils have a characteristically low permeability.
- Of the Appendix I sites, the following are anticipated to require corrective action:

LF-05: Landfill No. 5 (SWMU 113)

SD-11:

- " Engine Test Cell (SWMU 86)
- " Former Overflow Pit (SWMU 87)
- " Former Leaching Field (SWMU 88)
- " Evaporation Pond (SWMU 89)
- " OWS No. 5114 (SWMU 90)

LF-01, Landfill No. (SWMU 74)

AOC D, Nonfriable Asbestos Burial Pit

- No Appendix II sites are anticipated to require RA.
- IRP site DP-33 Old Disposal Pit is pending NFA.

Input parameter values and assumptions specific to the development of RFI/CMS and CMD/CMI costs for each IRP site are documented in the RACER model output in Attachment B.

A.2.1.3 Time Line7

Time Line7 is a project management program that allows the tracking of both schedules and resources (costs) associated with a project. The cost estimates and schedules developed for the IRP sites were entered directly into Time Line7 so that cost and time schedules could be prepared. Once the data are entered into Time Line7, the costs and schedules can be tracked for each site and presented to aid in project management.

A.2.1.4 RACER Model

The costs for the FY 1996 through FY 2000 programmed projects were estimated using the RACER model. RACER was developed by the USAF. The components of the system include the Remedial Action Assessment System and a parametric environmental costs engineering model (ENVESTJ). ENVESTJ includes modules for costing the RI/FS, RD, and RA portions of a hazardous waste site cleanup. The ENVESTJ component of the model was used to cost RAs for sites with recent changes in the treatment technology train and for new sites. Table A2-1 presents a summary of the IRP by project phase and programmed funds.

**Table A2-1
Programmed Costs for Cannon AFB IRP**

Site No.	Description	Project No.	Estimated Cost	Time Frame	Phase	Comments
LF-05	Landfill No. 5 (SWMU 113)	97-7005	\$ 5,000,000	FY 1997	RD/RA	
		98-7006	\$ 60,000	FY 1998	LTO	
		99-7006	\$ 60,000	FY 1999	LTO	
		00-7006	\$ 60,000	FY 2000	LTO	
SD-11	Old Engine Test Cell (SWMUs 86-90)	97-7103	\$ 75,000	FY 1997	LTO	Bioventing operation
		98-7103	\$ 75,000	FY 1997	LTO	
		99-7103	\$ 75,000	FY 1997	LTO	
LF-25	Landfill No. 25/Old Rubble Pile (SWMU 97)	96-7006	\$ 52,300	FY 1996	LTO	
		97-7006	\$ 50,000	FY 1997	LTO	
		98-7006	\$ 60,000	FY 1998	LTO	
		99-7006	\$ 60,000	FY 1999	LTO	
		00-7000	\$ 60,000	FY 2000	LTO	

LTO = long-term operation

RA = remedial action

RD = remedial design

SWMU = solid waste management unit

A.3 CANNON AFB SITE DESCRIPTIONS

The surface soils at Cannon AFB are unconsolidated alluvium deposits of Pleistocene age. The soils overlie a 25- to 60-ft layer of caliche that occurs 2 to 4 ft BGS. The caliche is underlain by unconsolidated silts, sands, and gravels up to 400 ft BGS. Groundwater occurs at approximately 265 ft BGS; this groundwater forms part of the Ogallala Aquifer. The geology at each site on-base varies only slightly with respect to the thickness of the soil and caliche layers. The land use for the region surrounding the Base is mainly agricultural and is primarily rural.

To the knowledge and belief of Cannon AFB Environmental Management personnel, all active IRP sites meet the requirements of DERA eligibility in accordance with USAF DERA eligibility and programming guidance. All sites fall into one or more of the following eligibility categories:

- investigations to identify, confirm, and determine the risk to human health and the environment, in addition to FSs, RA plans and designs, and removal actions or RAs;
- RAs to protect or restore natural resources damaged by contamination from past hazardous waste disposal activities; and
- responses to releases from in-service tanks discovered during initial integrity testing per 40 CFR 280, where testing is conducted before 22 December 1993.

These field investigations have consisted of surface and subsurface soil drilling and sampling, surface and groundwater sample collection, and sediment sampling of the Wastewater Treatment System Lagoons. The samples were analyzed for various chemical parameters based on the history of use for each SWMU. The following analyses were performed depending on the SWMU location of the sample:

- total organic lead,
- PCB/pesticides,
- metals,
- semivolatile organic compounds (SVOCs),
- TPH,
- lead and chromium,
- total organic carbon,
- Appendix IX analytes, and
- target compound list volatile organic compounds (VOCs).

The laboratory methods followed Contract Laboratory Program (CLP) guidelines or SW-846 methodologies when no CLP methodology existed.

The following are brief descriptions of IRP/SWMU/AOC sites at Cannon AFB. These descriptions have been updated based on the most recent investigation reports and regulatory requirements.

A.3.1 IRP No. LF-01 Landfill No. 1, Appendix I Site SWMU 74
(Relative Risk: Low)

Landfill No. 1 is an inactive landfill of approximately 4 acres on the golf course in the northwest corner of the Base. The landfill was reportedly operated from 1942 to 1946. The exact location of the landfill is currently unknown; however, it is believed to be located at the newly discovered burn pits, which were unearthed when workers were installing sprinkler lines for hole No. 14 in the new section of the golf course. Potential contaminants

include spent solvents, oil and grease, paint thinners, herbicides, and pesticides. A soil boring drilled during the IRP Phase II study encountered debris both in the topsoil and in the subsurface at 22 ft.

Five borings were drilled during the IRP Phase II study in what was believed to be the landfill. The 15 soil samples collected from the borings were analyzed for priority pollutant metals, VOCs, and oil and grease. Elevated levels of oil and grease (from 100 to 850 mg/kg) were detected in samples from two of the boreholes, and slightly elevated selenium concentrations of 2.1 to 2.7 mg/kg were detected in the samples collected from one borehole. Background concentrations of selenium vary from 0.61 to 0.68 mg/kg. This site was investigated during the Appendix I, Phase I RFI investigation by Woodward-Clyde Consultants and funding left over from that investigation will be used to investigate the area around the newly discovered burn pits.

A.3.2 IRP No. LF-02 Landfill No. 2, Appendix I Site SWMU 82
(Relative Risk: Low)

Landfill No. 2 was a cut and burn landfill covering approximately 4 acres that was active from 1946&1947 and 1951&1959. The landfill received domestic and industrial waste including solvents, paint, thinners, waste oils, and peroxide containers. The landfill is on the far northeast corner of the installation boundary. The area is marked by a slightly hummocky ground surface and is covered with prairie grasses. There is no evidence of stressed vegetation.

Four borings were drilled to a depth of 10 ft and one boring was drilled to 53.5 ft during the IRP Phase II study conducted during 1994. The 11 soil samples collected from the borings were analyzed for priority pollutant metals, VOCs, and oil and grease. No contaminants were detected above background levels in the samples. This site was investigated during the Appendix I, Phase I

RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The Base deed needs to be modified and the DD rewritten in order to close out this site.

A.3.3 IRP No. LF-03 Landfill No. 3, Appendix I Site SWMU 105
(Relative Risk: Medium)

Landfill No. 3 is an inactive cut and burn landfill that was in operation from 1959 to 1967. The 9-acre landfill is on the east boundary of the Base. The ground surface is slightly hummocky and is covered with prairie grasses. The landfill received domestic and industrial wastes including solvents, paint, thinners, waste oils, and peroxide containers. There is no evidence of stressed vegetation.

A total of 27 soil samples were collected from 9 soil borings placed in the landfill during the IRP Phase II study. The samples were analyzed for priority pollutant metals (total); total iron, nickel, and zinc; oil and grease; and VOCs. No VOCs were detected, and metal concentrations were within the range of background values. Oil and grease values varied from <10 to 83 mg/kg.

This site was also investigated along with Landfill No. 4 during the Appendix I, Phase I study by Radian. This Phase I RFI report also recommended NFA; however, EPA Region VI wanted boundary markers and one downgradient monitoring well installed. The boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A downgradient monitoring well (MW-0) was installed under project CZQZ 94-7001 in October 1994. Aside from the installation of the monitoring well and a base deed modification, NFA is anticipated.

A.3.4 IRP No. LF-04 Landfill No. 4, Appendix I Site, SWMU 104

(Relative Risk: Medium)

Landfill No. 4 is an inactive 7-acre cut and burn landfill that was operated from 1967 to 1968. The landfill is immediately north of Playa Lake on the east boundary of the Base. The landfill received domestic and industrial wastes including solvents, paint, thinners, waste oils, and peroxide containers. The area is covered with prairie grasses. There is no sign of stressed vegetation. Munitions personnel want to construct a facility on this site. The site should be safe to construct on as long as no excavation takes place. The only problem would be a structural one on building over a landfill.

A total of 21 soil samples were collected from 7 soil borings placed within the landfill during the IRP Phase II study. The samples were analyzed for priority pollutant metals, oil and grease, and VOCs. No VOCs were detected, and the metal concentrations were within the range of background values. Oil and grease was detected in quantities between 18 and 45 mg/kg.

This site was also investigated along with Landfill No. 3 during the Appendix I, Phase I study by Radian. This Phase I RFI report also recommended NFA; however, EPA Region VI wanted boundary markers and one downgradient monitoring well installed. The boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. A downgradient monitoring well (MW-N) was installed under project CZQZ 94-7001 in December 1994. Aside from the installation of the monitoring well and a base deed modification, NFA is anticipated for this site.

A.3.5 IRP No. LF-05 Landfill No. 5, Appendix I Site SWMU 113
(Relative Risk: Medium)

Landfill No. 5 is a 33-acre landfill on the southeast corner of the Base. The landfill was active from 1968 to 1988 and operated as a cut and burn landfill from 1968 to 1972. Thereafter, the wastes were buried. The landfill received domestic and industrial wastes and debris from 1984 to 1988, at which time it was deactivated. No closure activities have been conducted at the landfill.

One upgradient (MW-A) and six downgradient (MW-B, C, D, I, J, L, and M) groundwater monitoring wells were installed around the perimeter of the landfill. The wells are sampled quarterly and analyzed for Appendix IV constituents. No groundwater contamination has been detected to date. A new upgradient monitoring well will be installed in early 1996 because the well screen in MW-A is not intersecting the water table.

A RCRA landfill cap was constructed over Cell 3 in 1988. This cell allegedly received RCRA-characteristic wastes, such as spent paint strippers, thinners, and solvents, for approximately six weeks following the landfill disposal restrictions on these wastes that became effective on 1 November 1980. The RFI Phase I Work Plan that was submitted to NMED in February 1994 has been approved and field work was completed in 1995. The RFI report is expected to be finished in 1996.

**A.3.6 IRP No. FT-06 Fire Department Training Area No. 1, Appendix I
Site SWMU 78 (Relative Risk: Low)**

Fire Department Training Area No. 1 is in the northeast corner of the Base. The facility is an unlined surface approximately 100 ft in diameter and was in use from 1959 to 1968. Approximately 300 gal of waste oils, solvents, and fuels were poured on the ground surface twice monthly to create fires. The area is defined by abundant aluminum slag and slightly stressed vegetation.

Two 50-ft soil borings were drilled in the unit in 1985 during the IRP Phase II investigation. The soil samples were analyzed for oil and grease, lead, and VOCs. Oil and grease analyses ranged from 140 to 2800 mg/kg. Lead was detected in quantities up to 28 mg/kg, which is only slightly above the Base's lead background levels of 2 to 20 mg/kg. No VOCs were detected.

This unit was investigated during the Appendix I, Phase I RFI investigation and NFA was recommended; the EPA agreed but required that boundary markers be installed. These boundary markers were installed under the Appendix I, Phase II Investigation. The base deed needs to be modified and the DD rewritten to close out this site.

**A.3.7 IRP No. FT-07 Fire Department Training Area No. 2, Appendix I
Site SWMU 106 (Relative Risk: Low)**

Fire Department Training Area No. 2 is a 100-ft-diameter unlined surface area in the southeast area of the Base. The facility was active from 1968 to 1974. Approximately 300 gal of fuel was poured on the ground monthly to create fires. The vegetation in the area appears mildly stressed. One deep soil boring was drilled in the area during the IRP Phase II study. Oil and

grease concentrations ranged from 80 to 3400 mg/kg; the lead concentrations of 3.1 to 3.9 mg/kg are well within the background levels of 2 to 20 mg/kg. No VOCs were detected. This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The base deed needs to be modified and the DD rewritten in order to close out this site.

A.3.8 IRP No. FT-08 Fire Department Training Area No. 3, Appendix I Site SWMU 107 (Relative Risk: Low)

This unit is a circular area approximately 100 ft in diameter in the southeast area of the Base. The unit was active from 1968 to 1974. Approximately 300 gal of fuel was poured on the ground monthly to create fires. The area is unremarkable in appearance. One 61.5 ft soil boring was drilled in the facility during the IRP Phase II investigation. Oil and grease concentrations from the three soil samples collected from the boring ranged from 1700 to 3800 mg/kg, and lead values varied from 1.7 to 3.7 mg/kg. No VOCs were detected. This site was investigated during the Appendix I, Phase I RFI study and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The base deed needs to be modified and the DD rewritten in order to close out this site.

A.3.9 IRP No. OT-10 Blown Capacitors Site, Appendix III Site AOC C (Relative Risk: Low)

Three pole-mounted capacitors exploded in 1978 in the northwest area of the Base. Approximately 6 gal of oil thought to contain PCBs were released to the ground surface. Approximately 100 yd³ of soil was excavated and

drummed immediately following the incident. The drummed soil was disposed of off-base in a permitted disposal facility. No visible evidence of the spill was observed during an April 1992 site visit.

This site has not been investigated in the past. Because the definition of an SWMU does not include accidental spills, it is anticipated that EPA Region VI will concur that the site was improperly identified as an SWMU in the RFA report. This report has, therefore, declared NFA for this site.

A.3.10 IRP No. SD-11 Engine Test Cell, SWMU 86, Appendix I Site; Overflow Pit, SWMU 87, Appendix I Site; Leach Field, SWMU 88, Appendix I Site; Evaporation Pond, SWMU 89, Appendix I Site; Oil/Water Separator No. 5114, SWMU 90, Appendix III Site (Relative Risk: High)

Although these five sites were listed in two different appendices they were all studied during the Appendix I, Phase I RFI investigation. The Engine Test Cell, SD-11, was the main component of the entire system, and all effluent from that test cell drained through or into the other four SWMUs. The remains of this test cell are located in the central area of the Base in the Engine Test Cell Area. The unit was active from 1965 to 1988. The building structure was removed, and only the concrete foundation and underground utilities remain. Potential contaminants from the test cell include JP-4 fuel, oils and greases, and solvents mixed with washdown water generated from aircraft engine cleaning operations. The test cell area was covered with prairie grasses until the unit became temporarily active, which resulted in the grass being killed off due to jet blast. The unit will remain active until a new hush-house is constructed. Despite the fact that the oil/water separator was removed in July and August 1994, not all contamination could be removed due to the depth at which it occurred.

Several components of the test cell have been identified as SWMUs. The effluent from the test cell was initially discharged to the Oil/Water Separator (SWMU 90) and the associated Leach Field (SWMU 88). A 6- to 8-ft diameter Overflow Pit (SWMU 87) was added in 1982 to relieve overloading in the oil/water caused by reduced hydraulic capacity of the leach field. A second larger oil/water separator was added in 1985. The discharge was directed to a lined Evaporation Pond (SWMU 89) that was constructed in 1985 in the area of the former leach field. The evaporation pond is connected to other oil/water separators and is therefore still active. The entire engine test cell area covers approximately 1.5 acres.

A borehole was drilled in the former leachfield and in the overflow pit during the IRP Phase II investigation. A total of six soil samples were collected to a depth of 47.5 ft. Lead was detected in concentrations ranging from 1.5 to 4.8 mg/kg. Cannon AFB background levels for lead ranged from 2 to 20 mg/kg. No oil and grease or VOCs were detected.

Five boreholes were drilled to depth of 30 to 60 ft in the area of the evaporation pond and oil/water separators during the 1989 IRP Phase IV investigation. A total of 45 soil samples were analyzed for VOCs, base/neutral extractables, and total metals using EPA SW-846 methods. Very low levels (below 1 ppm) of phenol, 2,2-methylene bis(6-(1,1-dimethylethyl)-4-ethyl-), or Antioxidant 425 were found. Silver was the only metal found to exceed background levels; however, the distribution of silver was uniform and was, therefore, considered to be naturally occurring.

The immediate area around the concrete foundation of the Engine Test Cell (SWMU 86) was investigated during the Appendix I, Phase I study. Because not all contaminated soil could be removed due to the depth of the

contamination, a Phase III RFI study was conducted and completed in October 1995. The study found oil and grease to a depth of 60 ft below surface at the site. Low to moderate levels of TPH (<1000 mg/kg) were detected in surface soils, while moderate to high concentrations (>1000 mg/kg) of TPH were detected in soils below the zone of backfill. Although the Phase III RFI recommended NFA, RA in the form of bioventing is anticipated for the site in CY 1996. In October 1990, SWMUs 87, 88, 89, and 90 were considered by EPA Region VI to be sufficiently characterized to warrant NFA.

A.3.11 IRP No. SD-12 Stormwater Collection Point, Appendix I Site
SWMU 85 (Relative Risk: Low)

This unit is commonly called the South-Playa Lake. It is a naturally occurring 9-acre playa in the south-central area of the Base. The playa is approximately 15 ft at its deepest point. It receives stormwater runoff from portions of the flightline area. Solvents, fuels, oils, and greases are the potential contaminants. The playa has also been a repository for rubble from the destruction of runways. The area is covered with prairie grasses.

Three 5-ft soil borings were drilled in the playa during the IRP Phase II study. One soil sample was collected from each boring at 3 to 4 ft. Oil and grease was detected in one sample at 40 mg/kg. No VOCs were detected, and metals remained within the range of background values. Eight 5- to 70-ft boreholes were drilled in the area during the IRP Phase IV investigation. Soil samples collected in 2.5- to 5-ft intervals showed no VOCs or acid/base/neutral extractables. Metals were within the range of naturally occurring background levels.

This unit was originally scheduled for investigation during the Appendix I, Phase I RFI; however, in October 1990, EPA Region VI

concluded that the Stormwater Collection Point warrants NFA. The unit will be removed from the Part B permit after the Base submits a Class III permit modification by the Base.

Since this recommendation of NFA, two items of interest have come to light about Playa Lake.

- Low levels of pesticides have been discovered in Water Well Number 6, which is downgradient of Playa Lake.
- A unverified verbal testimony says that a lot of barrels were removed from around this area in the 1970s.

A.3.12 IRP No. SD-13 Sanitary Sewage Lift Station Overflow Pit,
Appendix I Site SWMU 75 (Relative Risk: Low)

This unit served as an emergency overflow containment area for a lift station in the northwest area of the Base. Since the original IRP investigation, this area has been reworked twice to improve drainage around the old golf course and to create new water hazards for the new section of the golf course. Therefore, there are no remnants of this pit. The pit was approximately 100 H 600 H 2 to 3 ft, or approximately 6700 yd³. The pit was used once in February 1983 when 100,000 to 150,000 gal of raw domestic sewage was bypassed to the pit when the lift pumps failed. The only hazardous wastes would have been from the domestic sewage. The pumps were repaired in approximately one week, and the sewage was cycled through the lift station.

Four soil samples were collected from the pit following the pump malfunction. Six additional samples were collected in 1988 before additional excavation of the pit. No hazardous constituents were detected in any of the

samples. However, one sample was hazardous by the EPA ignitability criterion. This analysis was believed to be in error by Base personnel.

In October 1990, EPA Region VI concluded that the Sanitary Sewage Lift Station Overflow Pit warranted NFA because this site was an accidental spill and, therefore, did not qualify as an SWMU. Accidental spills are not included in the definition of an SWMU as defined in the following excerpt from the EPA RFA Guidance (3): "The definition does not include accidental spills from production areas and units in which wastes have not been managed (e.g., product storage areas)." The unit will be removed from the Part B permit after the Base submits a Class III permit modification.

A.3.13 IRP No. WP-14 Sludge Weathering Pit, Appendix I Site SWMU 76 (Relative Risk: Low)

The Sludge Weathering Pit is a shallow (approximately 10 ft²) depression near the 20,000 barrel POL tank number 396 and adjacent to the north installation boundary fence. The pit, last used in 1980, was used to weather sludge from leaded gas storage tanks. The sludge was landfilled after it was judged to be sufficiently weathered. A soil sample collected in 1981 was analyzed for lead and oil and grease. The lead analysis was negative, and 0.012 mg/kg of oil and grease was detected. This unit was investigated during the Appendix I, Phase I RFI investigation and NFA was recommended and EPA agreed but required that boundary markers be installed. These boundary markers were installed under the Appendix I, Phase II investigation. The base deed needs to be modified and the DD rewritten to close out this site.

A.3.14 IRP No. SD-15 AGE Drainage Ditch, Appendix I Site SWMU 34
(Relative Risk: Low)

The Aerospace Ground Equipment (AGE) Drainage Ditch is a man-made depression in the maintenance operation area that remained after railroad tracks were removed in the late 1960s. The ditch was originally 1200 ft long, 12 ft wide (1/3 acre), and approximately 1 ft deep. It originated on the northwest corner of Building 184 and ran northeast parallel to the flightline sides of Building 186, 191, 192, and 193. In 1991, approximately 400 ft of the ditch in the area of Building 192 was filled and covered with concrete associated with nearby construction. The ditch receives stormwater runoff from several flightline operations and from roads, such as the concrete AGE Maintenance Shop Pad (SWMU 31), Torch Boulevard, and the parking area near Building 189. Water carried by the ditch flows into an open field and evaporates. Potential contaminants carried by surface water runoff include oil and grease, fuels, and solvents.

The Phase II RFI Work Plan was approved by EPA Region VI in March 1992; however, the field investigations have not yet begun. The Phase III RFI Work Plan was submitted in June 1992 to EPA Region VI. Two sampling investigations conducted on the AGE Drainage Ditch in 1987 and 1988 identified oil and grease contamination. The drainage ditch soil was tilled in October 1988 to aerate the soil. Further investigations of the ditch were performed during the RFI Phase I study.

A.3.15 IRP No. DP-16 Solvent Disposal Site, Appendix I Site SWMU 81
(Relative Risk: Low)

This site was first identified in the 1983 IRP Phase 1 Records Search as consisting of two empty drums labeled "trichloroethylene" lying on the ground. The drums were positioned to drain into a shallow pit. The site was about 300 ft east of Fire Training Area No. 1 and 100 ft south of the north installation fence. The site could not be located during the preparation of the RFA in 1987 or during the site visit for the Appendix I, Phase I RFI Work Plan. A 10,000 ft² area of the suspected site was gridded and sampled for total VOCs during the RFI Phase 1 study. This site was investigated during the Appendix I, Phase I RFI study, and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The base deed needs to be modified and the DD rewritten in order to close out this site.

A.3.16 IRP No. SD-17 Old Entomology Rinse Area, Appendix I Site
SWMU 96 (Relative Risk: Low)

The Old Entomology Rinse Area was behind pesticide storage Building 2160, approximately 200 ft north of the sewage lagoons. Building 2160 was abandoned in October 1983 and demolished in September 1984. Pesticide and herbicide application equipment was rinsed in a sink behind Building 2160. The sink drained to a shallow depression on the ground surface. Potential contaminants include dieldrin, toxaphene, 2,4-D, and dichlorodiphenyltrichloroethane.

An IRP Phase IV-AA investigation was conducted at the site in 1986. Although data from the investigation have not been made available for the

purposes of this report, the Appendix I, Phase I Work Plan states that the Phase IV-AA investigation resulted in a finding that no RA was necessary at this site. An existing groundwater monitoring well approximately 600 ft downgradient of the site was sampled during the RFI Phase I investigation. Although NFA was recommended, a 100-ft borehole was drilled during the Appendix I, Phase II investigation. It is now anticipated that NFA will be required at this site.

A.3.17 IRP No. SS-18 JP-4 Fuel Spill, Appendix III Site AOC B (Relative Risk: Low)

The JP-4 Fuel Spill site was on the south apron southwest of Building 120. Building 120 was moved to another location and a new facility constructed over the site. Approximately 400 gal of JP-4 fuel spilled onto the apron from a broken fuel coupling on an aircraft fuel tank in 1980. Although the site was scheduled to be investigated during the Appendix III, Phase I RFI investigation, 13 soil borings were drilled in the area in February 1992 in anticipation of the construction of the new hangar. The borings were drilled to 20 ft, and one soil sample was collected from each boring at depths varying from 1 to 20 ft. The samples were analyzed for TPH, total recoverable petroleum hydrocarbon (TRPH), TPH extractables, and total VOCs. TPH was recorded in three samples; the highest recording was 0.120 ppm. TRPH was also found in three samples with the highest being 7500 ppm. TPH extractables were found in two samples at 8.4 and 65 ppm. VOCs were not detected in the samples.

A DD was generated in October 1994. The Base is awaiting NFA designation from NMED and EPA. An NFA conclusion is based on the results of the February 1992 investigation and the fact that sites of accidental spills are

not considered SWMUs. Further investigation or remediation of the site is not anticipated.

A.3.18 IRP No. SS-19 MOGAS Spill, Appendix III Site AOC A (Relative Risk: Low)

This is the site of two spills of motor gasoline (MOGAS) from overturned fuel trucks. The site is approximately 400 H 200 ft. Both spills occurred in the early 1960s at the present location of Argentia Avenue southeast of the gymnasium (Building 444). The total quantity of both spills is estimated to have been 2000 to 3000 gal. The physical features of the site were changed in 1977 during the construction of Building 444. A portion of the spill site is now under Argentina Avenue.

Two boreholes were drilled to a total depth of 60 ft each at the site during the IRP Phase II investigation. None of the soil samples collected from the borings contained oil or grease above detection limits; however, lead was detected in one surface soil sample at 35 mg/kg, and 1,2-dichloroethylene (DCE), a solvent, was detected at 237 Fg/kg. The 1,2-DCE is not a component of automotive gasoline.

The IRP Phase II investigation results do not warrant further action on this site. Also, sites of accidental spills are not defined by the EPA as an SWMU. Therefore, this site was removed from Cannon's Part B permit and received a final decision of NFA by EPA Region VI.

**A.3.19 IRP No. SD-20 NE Stormwater Drainage Area, Appendix I Site
SWMU 95 (Relative Risk: Low)**

This area is a natural depression extending approximately 40 ft from the northeast end of Runway 4/22 to an open field. The 3.5-acre area receives water from several oil/water separators along the flightline and runoff water from runways and stormwater drains in the east area of the Base. Water entering this SWMU may contain oil and grease, fuels, solvents, and alkaline-based aircraft cleaning compounds. The area is covered with prairie grasses and grasses associated with wetlands. Due to the volume of water it receives from runoff, its vegetation is thicker and remains greener throughout the summer.

In 1989, an IRP RI was conducted at the site (4). Eleven soil borings were drilled in the area to a depth of 61.5 ft. Long-chain organics were detected in the first 3 ft of a borehole drilled at the mouth of one of two culverts that empty into the ditch. JP-4 fuel constituents that were detected included a single occurrence of ethylbenzene (0.37 mg/kg), and total xylene (0.70 mg/kg) was detected in a downgradient borehole at 0 to 1 ft. This analysis was believed to be in error.

Because organics were not detected in any downgradient samples, the investigation concluded that there is no significant lateral or vertical contaminant migration. This site was investigated during the Appendix I, Phase I RFI study and NFA was recommended. Boundary markers were installed around the suspected location under the Appendix I, Phase II investigation. The base deed needs to be modified and the DD rewritten in order to close out this site.

A.3.20 IRP No. LF-25 Concrete Rubble Pile, Appendix I Site SWMU 97
(Relative Risk: Medium)

This unit occupies approximately 30 acres adjacent to the perimeter road on the east area of the Base. The Rubble Pile dates to the mid-1950s in historical aerial photographs. The rubble consists primarily of construction debris, bricks, concrete blocks, and asphalt road and runway material. Most of the material originated from demolished World War II era facilities.

An Environmental Assessment was performed on the Rubble Pile by the Corps of Engineers in February 1991. Material from nine backhoe trenches dug in the rubble were sampled for asbestos, PCBs, extractable organics, VOCs, herbicides, pesticides, and metals. None of the above parameters were detected in the rubble material. However, at least two cut and burn landfill trenches were discovered under the rubble. The trenches were an unexpected discovery; apparently, a portion of the land where the Rubble Pile now exists was once used as a landfill. Newspaper dating from 1943 was recovered from one of the trenches. Detectable levels of barium, cadmium were found in one trench; however, the levels were well below background. Benzidine was also found at extremely low levels.

The Rubble Pile was scheduled for investigation during the Appendix III, Phase I RFI investigation. However, because munitions personnel wanted to construct a facility over the northern half of this rubble pile, the site was investigated along with the Appendix I, Phase I RFI for Landfill No. 3 and No. 4. Because of piles of uncovered nonfriable asbestos debris and the unknowns buried under the rubble, Cannon AFB IRP/RFI personnel recommended that this site be left alone. Removing this rubble would necessitate an asbestos abatement project.

The Phase I RFI Report recommended NFA, but the EPA directed Cannon to reopen monitoring Well K and use it as a downgradient monitoring well. Well K was originally installed to monitor SWMU 96, which is the Old Entomology Rinse Area. No further investigations or RAs are planned for this SWMU. However, the mounds of asbestos siding material should be buried and the landfill covered with top soil.

A.3.21 IRP No. SD-26 Underground Waste Oil Tank (SD-22 and ST-26), Appendix II SWMU 48a and Aboveground Overflow Capacity Tank, Appendix II SWMU 48b (Relative Risk: Low)

Due to the multiple uses of this location, multiple SWMU numbers were inadvertently assigned to the same UST locations. This site was originally constructed as the base military gas station during World War II. The records are scanty for this location but original drawings do show that two USTs were originally planned to be installed. However, when the location was used as a solvent disposal site only one UST is mentioned. It is unknown at this time when the second tank was removed or it was ever installed. (For further details, consult the Cannon AFB UST files on UST 4028).

When a new military gas station was constructed around 1965, the facility was partially demolished and at least one UST of 20,000 gal was left in place and then used for waste solvent disposal. The location around the 20,000-gal UST was identified as Facility 4028. The Aboveground Overflow Capacity Tank (SWMU 48b) was an adjacent 2000-gal tank that was brought in to provide overflow protection for the underground tank.

These tanks were on the northeast lot at the corner of Torch Boulevard and Argentinia Boulevard. They were active as solvent disposal tanks from approximately 1965 to 1984. Prior to 1965, the 20,000-gal tank was used as a fuel tank for the base gas station. Both tanks were removed in 1988, but apparently no soil tests were taken for the USTs.

Materials stored in the tanks included waste oils, spent solvents, paint thinners, and recovered fuels. The 20,000-gal tank would have contained fuel products prior to 1965. Soil staining around the fill pipe was observed during the 1987 RFA field visit. The site was defined in 1992 by the observation of broken areas of asphalt on the ground surface. The Appendix II investigation, completed in conjunction with the Appendix III, Phase II RFI recommended NFA. This site is now covered by asphalt and no RA is anticipated.

A.3.22 IRP No. ST-27 Sump, Appendix II Site SWMU 83 (Relative Risk: Low)

This sump was located just off the south edge of the south ramp. The location for this old sump is now surrounded by concrete pavement or concrete pads on the north, east, and south. It is the 22 H 22 ft dirt and grass covered area just between the telephone pole to the north and new hazardous waste storage area to the south. The hazardous waste storage area is in the small facility covered by a canopy and surrounded by a chain link fence. To the east is the new concrete ramp constructed around the new three-bay small aircraft maintenance dock and to the north is the old concrete ramp. The area was deliberately left uncovered to facilitate future investigations, otherwise the hazardous waste storage facility would have been constructed over it.

This sump was still in existence when the IRP and RFI programs started and was described as being located 120 ft west of Building 120.

Building 120 along with Buildings 113, 114, 118, and 119 were moved to a new location on-base and the new small aircraft maintenance dock constructed over the old sites. The sump was self-contained and measured approximately 6 ft H 8 in. H 5 in. and was constructed in a 12- by 14-ft concrete pad. During the construction of the small aircraft maintenance dock the only thing found remaining was a French drain that was apparently constructed in the bottom of the sump. This French drain consisted of a gravel filled pit 1 ft wide and at least 5 ft long, the total length was not uncovered and the depth is unknown. The gravel was completely covered with black oily wastes and is now covered with up to 2 ft of clean soil. This oily gravel could be relocated by digging trenches east to west across the grassy area.

The purpose of the sump, potential contaminants, and the date of construction are unknown; however, it apparently received drainage off the south ramp. This unit was investigated during the Appendix II, Phase I investigation. NFA was recommended; however, EPA directed a Phase II investigation, which will be completed in conjunction with the Appendix III, Phase II investigation under Project CZQZ 94-0135. NFA following the investigation is anticipated for this SWMU.

A.3.23 IRP No. DP-33 Disposal Pit (Relative Risk: Low)

This Disposal Pit was discovered in July 1992 just east of the Civil Engineering Container Storage Area, which is SWMU 77. The site was discovered when a bulldozer operator ripped through the top of a barrel containing oily wastes. An Interim Removal Action was initiated, which resulted in the removal of 28 barrels during May through June 1994. Most of these barrels were crushed and empty. A few barrels contained oily wastes and one barrel appeared to contain antifreeze products. As of the time of this writing, complete lab results have yet to be received. Preliminary results from the excavation indicate NFA may be justified.

A.3.24 AOC D Non-Friable Asbestos Burial Pits (Relative Risk: Not Evaluated)

These are three disposal pits containing asbestos siding material discovered during the expansion of the golf course. The sites were uncovered by a bulldozer operator while pushing topsoil into mounds in order to construct tee boxes and bunkers. A 6- to 12-in. layer of soil was pushed back over the debris piles.

During the Phase I RFI for Landfill No. 1, a borehole was drilled within 20 ft of one of these pits but it did not encounter any of them. It is believed that these pits were excavated for clean fill material or for building material disposal, or both, and not for landfill disposal. The general area was investigated during a Phase RFI investigation for Landfill No. 1, but no landfill type debris could be located. Investigation of the specific area will be conducted in 1996.

A.3.25 AOC 36 Disposal Pit (New AOC Added to IRP List) (Relative Risk: Not Evaluated)

This is a possible disposal pit found near the current MWR Outdoor Recreation Center. This facility was originally the MWR auto hobby shop. When a new auto hobby shop was constructed, this building was turned into the Outdoor Recreation Center. The operations at the Outdoor Recreation Center should not have created this problem. This pit could be a remnant of the old Auto Hobby Shop or a disposal site for fluids coming from an aircraft engine maintenance shop in the early 1950s. This site has a PA/SI programmed and has not been declared an SWMU.

A.3.26 AOC E

AOC E was discovered after a 1995 training exercise accidentally started a brush fire that destroyed the vegetation covering the area. The fire exposed a rubble pile along the west side of the abandoned runway, which had not previously been detected. Research by Cannon AFB Environmental Flight staff has determined the deposition of materials occurred in the late 1950s or early 1960s time frame, verifiable by aerial photos and interviews with long-time Cannon AFB personnel. The rubble may have accumulated as a result of a project that demolished an old World War II runway.

A.3.27 AOC F

AOC F is the location of the targeting area for aircraft boresight maintenance operations conducted during 1950s and 1960s. The site can be described as a large earthen berm with limited amounts of expended small caliber practice munitions and construction materials around the perimeter.

A.4 REMEDY SELECTION AND ESTIMATED COSTS SUPPORTING THE CLEANUP OF SITES BASED ON FUTURE LAND USE CONSIDERATIONS

This section presents the procedures used to select likely remedial technologies and estimate costs to clean up IRP/SWMU sites based on future land use considerations. The remedy selections were made using the approach described below with input from Base representatives, current environmental reports, USACE, and HQ ACC.

The results of this initiative are displayed at the end of this section. For each site, a "Future Land Use Remedial Action Summary" table has been prepared that displays the suggested remedial technologies, costs, and timeframes required to clean up IRP sites based on the potential future use of each site and the screening levels presented in Appendix K.

A.4.1 Selection of COPCs

Current data were used to identify pathways and receptors affected by the contaminants at each IRP site or SWMU. From this, a conceptual site model (CSM) was prepared for the anticipated future land use of each site. These CSMs are presented in Appendix E. Available analytical data were used to determine the maximum detected concentration for each contaminant present at each site. Data from the RFI reports were used for this determination. In addition, information was obtained from HQ ACC, USACE, and Base representatives. The following table outlines the source from which the data for each site was taken.

SWMU No.	Site Name	Data Source
3	Oil/Water Separator 108	Appendix II, Phase II
5	Oil/Water Separator 121	Appendix II, Phase II
51	AGE Maintenance Shop Pad	Appendix III, Phase II
48A	Underground Waste Oil Tank	Appendix II, Phase II
48B	Aboveground Overflow Capacity Tank	Appendix II, Phase II
55	Lead-Acid Battery Accumulation Point	Appendix III, Phase II
77	Civil Engineering Container Storage Area, Facility No. 4038	Appendix III, Phase II
83	Sump for Flight Apron Wash Down	Appendix III, Phase II
93	Oil/Water Separator No. 5121	Appendix III, Phase II
97	Concrete Rubble Pile	Appendix III, Phase II
101/102	Wastewater Treatment System Lagoons and Effluent Discharge	RI Report for 18 SWMUs
103	Wastewater Playa Lake	Appendix III, Phase II
127	Oil/Water Separator Near Tank 4095 and Leach Fields	Appendix III, Phase II

Once the contaminants present at each site were identified, screening levels were calculated for each contaminant. Constituents whose concentrations exceed the screening levels represent the chemicals of potential concern (COPCs) that may pose a risk to human health for that site. Information regarding identification of COPCs and development of screening levels is presented in Section 6.6.

The remaining sites have been designated for no further action (NFA), have Decision Documents specifying a remedial action or LTM, or are in remediation planning stages. Table A3-1 lists the status of each site.

A.4.2 Remedial Technology Selection

This section summarizes the procedures used to select likely technologies to remediate the COPCs at each site. COPCs at each site having similar characteristics were categorized into one of the following contaminant groups:

- Halogenated volatiles;
- Halogenated semivolatiles;
- Fuel hydrocarbons;
- Pesticides; and
- Inorganics.

Contaminants were categorized as such so that a single remedial technology could be applied to remediate all COPCs in each group. Generally, the presence of metals at elevated levels hindered the remedial action selection process.

An assessment of the area and depth of each COPC was made to clearly define the extent and location (e.g., surface or subsurface) of the contamination. Analytical data from the RFI sampling effort were plotted on maps showing sampling locations. The area of contamination was estimated and drawn on the map, and area and volume calculations were made. The area drawn represents the area of the site where the COPC

exceeds the screening level. Quite often, these areas will vary at a given site for each land use, because the screening levels for each land use vary. At some sites, data were insufficient to distinguish alternative areas for various land uses, especially when the various screening levels were similar in magnitude. The drawings showing the extent of contamination exceeding screening levels for each potential future land use are presented in Attachment C (bound separately) to this appendix.

Once the extent of contamination was drawn and defined, the remedial technology or technologies were selected. The *EPA Remediation Technologies Screening Matrix and Reference Guide* (EPA and USAF, 1994) was used to help select appropriate remedial technologies. This document was developed by the U.S. Air Force and the U.S. Environmental Protection Agency, with extensive input from professionals in the field to provide guidance for the selection of technologies to clean up hazardous waste sites. Additionally, Base knowledge of previous remedial actions was considered. Remedial technologies were chosen which represent the most cost-effective technologies that have been proven effective in removing the contamination at each site. A calculation sheet summarizing the technology selection process is included for each site and land use requiring cleanup in Attachment C to this appendix.

A.4.3 Cost Estimates

This section summarizes the approach used to develop cost estimates for site cleanups based on the potential future land uses of each IRP site.

Using the area and volume calculations and the selected remedial technology, RACER Version 3.1 was used to develop cost estimates for

each land use. The detailed RACER cost estimates for each site are also included in Attachment C to this appendix.

It was necessary to make certain assumptions and interpretations to generate the cost estimates using the RACER Version 3.1 software. These assumptions were based on a review of the available data for each of the IRP sites, discussions with knowledgeable Base personnel, experience at similar sites, and engineering judgment. These assumptions are listed below.

- Soil remediation technologies were chosen from the following list:
 - Removal and landfarming;
 - Removal and landfilling;
 - Asphalt or modified RCRA cap;
 - In-situ stabilization; and
 - Bioventing.
- The decision of which technologies to use was based on similar remedial actions, input from the base, and engineering judgment based on nature and extent of contamination.
- Remedial action time periods (also presented as long-term operation and maintenance, LTO) were developed based on experience at similar sites and engineering judgment.
- Groundwater extraction well depth is based on groundwater data available for each site.

- Groundwater extraction rates were set at 1 gpm based on available information.
- Groundwater monitoring was set as semi-annual.
- Landfill disposal costs were assumed to be 25¢/lb for soil with arsenic, mercury, PCB, pesticide, or TPH contamination. These costs are based on estimates received from the Base.
- In-situ stabilization costs were based on verbal estimates received from Geo-Con, Inc. in Denton, Texas.
- The effects of inclement weather or seasonal construction limitations were not considered in setting the schedules for field work.

After the RACER cost estimating step was completed, a spreadsheet was used to summarize the costs and to calculate and present the total cost by individual remedial technology for each land use. The costs from RACER were escalated from January 1995 to August 1996 using a RACER generated escalation factor. RACER also calculates indirect overhead and profit (IO&P) for both remedial action (RA) construction costs and operation and maintenance (O&M) costs. The spreadsheet determines the percentage that RACER estimates to be IO&P and calculates an adjusted RA construction cost and adjusted O&M cost which includes IO&P for each individual remedial technology.

Finally, the spreadsheet calculates the present worth O&M based on the remediation time period. An overall cost including RA construction and present worth O&M is also presented. The output from the spread-

sheet for each land use requiring cleanup is presented in Attachment C to this appendix.

The remaining portions of this section presents the results, in tabular form, of the approach to clean up sites to levels consistent with the potential future land and groundwater uses. The tables in this section summarize the following information for both soil and groundwater remediation:

- Contaminants of concern and cleanup volume;
- Suggested remedial technology;
- Alternate remedial technologies considered;
- Basis of choosing the suggested remedial technology;
- Time required to implement cleanup; and
- RA Construction and Present Worth O&M Cost.

This analysis was performed for each active IRP site at Cannon AFB. A guide to The Future Land Use Remedial Action Summary is presented as Figure A4-1. Summaries of results for each site are presented in Tables A4-1 through A4-14.

**Table A4-1
Cannon AFB: SWMU 3
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 3	Brief Description: SWMU 3 was either an oil/water separator or a grease trap located on the west side of former Hangar 125. SWMU 3 was active from 1943 until about 1990 when it was removed. The exact location of the former unit is unknown, but it is			
Current Site Use: Industrial	believed to be near the northwest corner of Building 108 and is covered with asphalt pavement. The unit received wastewater from Building 102 and wash water from air-			
Use of Adjacent Property: Commercial	craft maintenance operations in Building 121. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Ba, Mn, Benzo(a)-pyrene, TPH; 64 cy	None	Mn; 64 cy	None
Most Likely Remedial Technology	Excavation, and landfill disposal, capping	NFA	Pavement resurfacing	NFA
Other Remedial Technologies Considered	None	NA	Excavation and landfill disposal, capping	NA
Basis for Choosing the Remedial Technology Selected	Contamination is not widespread and organic contaminants are primarily at the surface	NA	Inorganic contamination is primarily at the surface, and is covered by pavement	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$119,000	\$0	\$20,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is con-	
Most Likely Remedial Technology	NFA	NFA	sidered non-potable, or due to the location of the aquifer there is no potential for contamina-	
Other Remedial Technologies Considered	NA	NA	tion of the groundwater by the IRP site.	
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0

^a Soil investigation results indicate no likelihood for potential impact to groundwater
cy = cubic yards

Table A4-2
Cannon AFB: SWMU 5
Future Land Use Remedial Action Summary

Cannon AFB: SWMU 5	Brief Description: SWMU 5 was either an oil/water separator or a grease trap located on the west side of former Hangar 121. SWMU 5 was active from 1943 until about			
Current Site Use: Industrial	1990 when it was removed. The exact location and depth of the unit is unknown, but it is covered with asphalt pavement. The unit received wastewater from Building 102			
Use of Adjacent Property: NA	and Building 125 and wash water from aircraft maintenance operations in former Hangar 121. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Area	Al, Ba, Mn; 2800 ft ²	None	None	None
Most Likely Remedial Technology	Pavement resurfacing	NFA	NFA	NFA
Other Remedial Technologies Considered	None	NA	None	NA
Basis for Choosing the Remedial Technology Selected	Low-level inorganic contaminants present down to 20 ft bgl; site is already covered with pavement	NA	NA	NA
Time To Implement Cleanup	1 year	NA	NA	NA
RA Construction and Present Worth O&M Cost	\$56,000	\$0	\$0	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site.	
Most Likely Remedial Technology	NFA	NFA		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	

^a Soil investigation results indicate no likelihood for potential impact to groundwater
 cy = cubic yards

**Table A4-3
Cannon AFB: SWMU 31
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 31	Brief Description: The AGE Maintenance Shop Pad (SWMU 31), used since 1971, is an open concrete area adjacent to the southeast side of the AGE Maintenance Shop,			
Current Site Use: Industrial	located in Building 186. The pad is approximately 70 ft wide and 240 ft long. Wash water and surface or storm waters (potentially contaminated with JP-4 oils, and			
Use of Adjacent Property: Commercial, Industrial	diesel) flow off the pad to the southeast toward the AGE Drainage Ditch (SWMU 34) which collects and transports the water in a northeasterly direction.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	TPH, Mn, PAHs; 1444 cy	None	TPH, PAHs, Mn; 844 cy	Benzo(a)pyrene; 69 cy
Most Likely Remedial Technology	Excavation and landfill disposal, backfill, replace concrete	NFA	Excavation and landfill disposal, backfill, replace concrete	Excavation and landfill disposal, backfill, replace concrete
Other Remedial Technologies Considered	Capping	NA	Capping	Capping
Basis for Choosing the Remedial Technology Selected	Eliminates contamination through removal of contaminated soil	NA	Eliminates contamination through removal of contaminated soil	Eliminates contamination through removal of contaminated soil
Time To Implement Cleanup	1 year	NA	1 year	1 year
RA Construction and Present Worth O&M Cost	\$2,170,000	\$0	\$1,329,000	\$296,000
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is con-	
Most Likely Remedial Technology	NFA	NFA	sidered non-potable, or due to the location of the aquifer there is no potential for contamina-	
Other Remedial Technologies Considered	NA	NA	tion of the groundwater by the IRP site.	
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0

^a Soil investigation results indicate no likelihood for potential impact to groundwater

cy = cubic yards

sf = square feet

**Table A4-4
Cannon AFB: SWMUs 48A & 48B
Future Land Use Remedial Action Summary**

Cannon AFB: SWMUs 48A & 48B	Brief Description: SWMUs 48A (20,000-gallon UST) and 48B (2,000-gallon AST) are located about 125 feet east of the intersection of Argentia Ave. and Torch Blvd.			
Current Site Use: Industrial	Presently, the area is paved and used for parking. From 1941 to 1965 the site was utilized as a gas station, and from 1965 to 1985 both tanks were used for storage of waste			
Use of Adjacent Property: Industrial, offices	products, including waste oils, spent solvents, paint thinners, and recovered fuels. The tanks and associated piping were removed in 1988 (48A) and 1992 (48B).			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Al, Sb, Ba, Mn, TPH; 888 cy	None	Al, Sb, Ba, Mn, TPH; 148 cy	TPH; 148 cy
Most Likely Remedial Technology	In situ bioventing, pavement resurfacing	NFA	In situ bioventing, pavement resurfacing	In situ bioventing, pavement resurfacing
Other Remedial Technologies Considered	Excavation, and landfill disposal, capping	NA	Excavation and landfill disposal, capping	Excavation and landfill disposal, capping
Basis for Choosing the Remedial Technology Selected	Bioventing is effective for TPH in subsurface soil; site is currently paved	NA	Bioventing is effective for TPH in subsurface soil; site is currently paved	Bioventing is effective for TPH in subsurface soil; site is currently paved
Time To Implement Cleanup	5 years	NA	5 years	5 years
RA Construction and Present Worth O&M Cost	\$191,000	\$0	\$114,000	\$114,000
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is con-	
Most Likely Remedial Technology	NFA	NFA	sidered non-potable, or due to the location of the aquifer there is no potential for contamina-	
Other Remedial Technologies Considered	NA	NA	tion of the groundwater by the IRP site.	
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0

^a Soil investigation results indicate no likelihood for potential impact to groundwater
cy = cubic yards

Table A4-5
Cannon AFB: SWMU 55
Future Land Use Remedial Action Summary

Cannon AFB: SWMU 55	Brief Description: The lead-acid battery accumulation point (SWMU 55) is located about 100 feet north of the Vehicle Maintenance Shop, Building 379. The lead-acid			
Current Site Use: Industrial	battery accumulation point has been in operation since 1965 and consists of asphalt pavement measuring 8 feet square. Used lead-acid motor vehicle batteries are stored			
Use of Adjacent Property: Industrial	"wet" on pallets on the asphalt pad until a sufficient number are accumulated for sale to a battery recycling company.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	TPH, PAHs, Sn, Mn; 1833 cy	None	TPH, PAHs, Sn, Mn; 1333 cy	None
Most Likely Remedial Technology	Excavation and landfill disposal, backfill, replace concrete	NFA	Excavation and landfill disposal, backfill, replace concrete	NFA
Other Remedial Technologies Considered	Capping	NA	Capping	NA
Basis for Choosing the Remedial Technology Selected	Eliminates contamination through removal of contaminated soil	NA	Eliminates contamination through removal of contaminated soil	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$2,747,000	\$0	\$1,698,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is con-	
Most Likely Remedial Technology	NFA	NFA	sidered non-potable, or due to the location of the aquifer there is no potential for contamina-	
Other Remedial Technologies Considered	NA	NA	tion of the groundwater by the IRP site.	
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	

^a Soil investigation results indicate no likelihood for potential impact to groundwater
cy = cubic yards

**Table A4-6
Cannon AFB: SWMU 77
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 77	Brief Description: SWMU 77 serves as the Civil Engineering Container Storage Area (Facility #4038). It is located along the northern border of the base (just east of Building 252) and consists of an open concrete pad measuring approximately 150 by 250			
Current Site Use: Industrial	feet. The pad is the remaining floor of the old Portair Airfield Hangar constructed in			
Use of Adjacent Property: NA	the 1930s. The hangar was demolished in 1942 and the pad remained unused until about 1970 when it became a storage area for 55-gallon drums containing water, oil, solvents, and asphaltic material.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Area	TPH, Ba, Mn, PCB - 1260; 67,500 sf	None	TPH, Ba, Mn; 46,800 sf	None
Most Likely Remedial Technology	Capping	NFA	Capping	NFA
Other Remedial Technologies Considered	Excavation and landfill disposal	NA	Excavation and landfill disposal	NA
Basis for Choosing the Remedial Technology Selected	Adequately reduces risk for large area; lower cost than other remedial alternatives	NA	Adequately reduces risk for large area; lower cost than other remedial alternatives	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$538,000	\$0	\$393,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site.	
Most Likely Remedial Technology	NFA	NFA		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0

^a Soil investigation results indicate no likelihood for potential impact to groundwater
sf = square feet

**Table A4-7
Cannon AFB: SWMU 83
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 83	Brief Description: SWMU 83 is the former location of a sump located about 90 feet northwest of Building 120. The sump was constructed in a 12- by 14-foot concrete			
Current Site Use: Industrial	slab, but the actual depth is unknown. The installation date of the sump is unknown but it was removed in 1993. Historically, the sump received rain water, wash water,			
Use of Adjacent Property: NA	and dilute waste oil generated from flight line activities. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Benzo(a)pyrene; 83 cy	None	None	None
Most Likely Remedial Technology	Excavation and landfill disposal	NFA	NFA	NFA
Other Remedial Technologies Considered	In situ bioventing, capping	NA	NA	NA
Basis for Choosing the Remedial Technology Selected	Contamination was isolated and shallow (surface)	NA	NA	NA
Time To Implement Cleanup	1 year	NA	NA	NA
RA Construction and Present Worth O&M Cost	\$128,000	\$0	\$0	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is con-	
Most Likely Remedial Technology	NFA	NFA	sidered non-potable, or due to the location of the aquifer there is no potential for contamina-	
Other Remedial Technologies Considered	NA	NA	tion of the groundwater by the IRP site.	
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	

^a Soil investigation results indicate no likelihood for potential impact to groundwater
cy = cubic yards

**Table A4-8
Cannon AFB: SWMU 93
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 93	Brief Description: Oil Water Separator (OWS) No. 5121 (SWMU 93) was active from approximately 1957 to 1988 when the OWS and the associated leach well were			
Current Site Use: Industrial	removed during demolition of Building 5121. The hush house portion of Building 5123 covers the location of the former OWS. The OWS was a two-compartment underground unit with a detached 100-gallon oil storage tank, which received engine			
Use of Adjacent Property: Industrial	maintenance waste wash water. Potential residual contaminants include JP-4 fuel, petroleum and synthetic lube oils, solvents, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	TPH, Ba, Mn; 10,000 sf to a depth of at least 10 ft.	None	TPH, Ba, Mn; 6,750 sf to a depth of at least 10 ft.	None
Most Likely Remedial Technology	Capping	NFA	Capping	NFA
Other Remedial Technologies Considered	Excavation and landfill disposal, replace concrete and soil	NA	Excavation and landfill disposal, replace concrete and soil	NA
Basis for Choosing the Remedial Technology Selected	Lower cost alternative to excavation; some of the area is already paved	NA	Lower cost alternative to excavation; some of the area is already paved	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$94,000	\$0	\$57,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site.	
Most Likely Remedial Technology	NFA	NFA		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0

^a Soil investigation results indicate no likelihood for potential impact to groundwater
sf = square feet

**Table A4-9
Cannon AFB: SWMU 97
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 97	Brief Description: SWMU 97 is a landfill occupying approximately 29 acres within the boundary of Cannon AFB. The landfill is nearly rectangular in shape with overall			
Current Site Use: Open Space	dimensions of about 650 feet by 1,950 feet. Disposal activities at the landfill began in about 1943. Potential contaminants include PCBs, herbicides, pesticides, organics,			
Use of Adjacent Property: Industrial	VOCs, and metals. The landfill has not been active since 1992. Presently, the site consists of rubble piles ranging in height from 4 to 15 feet above grade and covered with vegetation.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	No Data	No Data	No Data	No Data
Most Likely Remedial Technology	NFA	NFA	NFA	NFA
Other Remedial Technologies Considered	NA	NA	NA	NA
Basis for Choosing the Remedial Technology Selected	NA	NA	NA	NA
Time To Implement Cleanup	NA	NA	NA	NA
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted^a	
Contaminants of Concern & Plume Area	None	None	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site. Groundwater monitoring will be conducted for 3 years to ensure water quality does not degrade over time.	
Most Likely Remedial Technology	Groundwater monitoring	Groundwater monitoring		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	Groundwater monitoring conducted to ensure water quality does not degrade over time	Groundwater monitoring conducted to ensure water quality does not degrade over time		
Time To Implement	3 years	3 years		
RA Construction and Present Worth O&M Cost	\$153,000	\$153,000	\$153,000	

^a Restricted to ensure the integrity of the landfill.
sf = square feet

**Table A4-10
Cannon AFB: SWMU 101
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 101	Brief Description: SWMU 101 consists of two surface impoundments that have been in use since 1966. Combined sanitary and industrial wastewater is treated in the sewage lagoons which are constructed with bentonite clay-lined bottoms and concrete-lined banks.			
Current Site Use: Industrial	The average depth of water is 3.5 feet with a maximum of 4.5 feet. The treated wastewater is discharged to an on-base playa (SWMU 103); no NPDES permit is required.			
Use of Adjacent Property: Industrial & Open Space				
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Al, bis(2-ethylhexyl)-phthalate, Cd, Cr, Cu, PCBs, Ag, Vn, Hg, Toxaphene; 233,337 cy	None	Bis(2-ethylhexyl)-phthalate, Hg, PCB - 1254; 66,600 cy	None
Most Likely Remedial Technology	Drain lagoons and stabilize sludge <i>in situ</i>	NFA	Drain lagoons and stabilize sludge <i>in situ</i>	NFA
Other Remedial Technologies Considered	Excavation and landfill disposal	NA	Excavation and landfill disposal	NA
Basis for Choosing the Remedial Technology Selected	Excavation costs too high, stabilization will bind constituents and reduce exposure and infiltration	NA	Excavation costs too high, stabilization will bind constituents and reduce exposure and infiltration	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$14,847,000	\$0	\$4,799,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted^a	
Contaminants of Concern & Plume Area	None	None	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site. Groundwater monitoring will be conducted for 3 years to ensure the water quality does not degrade over time.	
Most Likely Remedial Technology	Groundwater monitoring	Groundwater monitoring		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	Groundwater monitoring conducted to ensure water quality does not degrade over time.	Groundwater monitoring conducted to ensure water quality does not degrade over time.		
Time To Implement	3 years	3 years		
RA Construction and Present Worth O&M Cost	\$87,000	\$87,000	\$87,000	

^a Restricted to ensure the integrity of the lagoons' liner.
cy = cubic yards

**Table A4-11
Cannon AFB: SWMU 102
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 102	Brief Description: The Effluent Discharge, SWMU 102, receives the treated effluent			
Current Site Use: Industrial	from SWMU 101, and has been used since 1966. It consists of the discharge pipe			
Use of Adjacent Property: Industrial and Open Space	(and surrounding soil) that runs from SWMU 101 (wastewater lagoons) to SWMU 103 (on-base playa).			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern ^a & Cleanup Volume	Metals, PCBs, PAHs; 1481 cy	No Data	No Data	No Data
Most Likely Remedial Technology	Excavation and landfill disposal	NFA	NFA	NFA
Other Remedial Technologies Considered	Capping, stabilization	NA	NA	NA
Basis for Choosing the Remedial Technology Selected	Eliminates source of contamination	NA	NA	NA
Time To Implement Cleanup	1 year	NA	NA	NA
RA Construction and Present Worth O&M Cost	\$2,840,000	\$0	\$0	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted^b	
Contaminants of Concern & Plume Area	None	None	By definition, the restricted groundwater use scenario applies when the groundwater	
Most Likely Remedial Technology	Groundwater monitoring	Groundwater monitoring	is considered non-potable, or due to the location of the aquifer there is no potential	
Other Remedial Technologies Considered	NA	NA	for contamination of the groundwater by the IRP site. Groundwater monitoring will	
Basis for Choosing the Remedial Technology Selected	Groundwater monitoring conducted to ensure water quality does not degrade over time.	Groundwater monitoring conducted to ensure water quality does not degrade over time.	be conducted for 3 years to ensure the water quality does not degrade over time.	
Time To Implement	3 years	3 years		
RA Construction and Present Worth O&M Cost	\$195,000	\$195,000	\$195,000	

^a Insufficient soil data were available for this site. To provide a conservative estimate of the remedial action cost (for the residential scenario), the same constituents were assumed to be present as for SWMU 101.

^b Restricted to ensure the integrity of the lagoons' liner and the playa.
cy = cubic yards

**Table A4-12
Cannon AFB: SWMU 103
Future Land Use Remedial Action Summary**

Cannon AFB: SWMU 103	Brief Description: The wastewater playa lake, SWMU 103, occupies approximately 13 acres near the east-central edge of the Base. The playa received all of the Base sanitary and industrial wastewater from 1943 to 1966. The playa has received treated			
Current Site Use: Open Space	sanitary and industrial wastewater effluent from the wastewater treatment lagoons from 1966 to the present. The playa is maintained at approximately two-thirds total			
Use of Adjacent Property: Industrial	capacity by inflow from the wastewater treatment lagoons. Potential contaminants include organics, PCBs, pesticides, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Al, Ba, Be, Mn; 103,700 cy	None	Al, Be, Mn; 74,000 cy	Be; 22,200 cy
Most Likely Remedial Technology	Drain playa and stabilize sediments <i>in situ</i>	NFA	Drain playa and stabilize sediments <i>in situ</i>	Drain playa and stabilize sediments <i>in situ</i>
Other Remedial Technologies Considered	Excavation and landfill disposal	NA	Excavation and landfill disposal	Excavation and landfill disposal
Basis for Choosing the Remedial Technology Selected	Excavation costs too high, stabilization will bind constituents and reduce exposure and percolation	NA	Excavation costs too high, stabilization will bind constituents and reduce exposure and percolation	Excavation costs too high, stabilization will bind constituents and reduce exposure and percolation
Time To Implement Cleanup	1 year	NA	1 year	1 year
RA Construction and Present Worth O&M Cost	\$6,652,000	\$0	\$4,874,000	\$1,712,000
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted^b	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater	
Most Likely Remedial Technology	Groundwater monitoring	Groundwater monitoring	is considered non-potable, or due to the location of the aquifer there is no potential for	
Other Remedial Technologies Considered	NA	NA	contamination of the groundwater by the IRP site. Groundwater monitoring will be	
Basis for Choosing the Remedial Technology Selected	Groundwater monitoring conducted to ensure water quality does not degrade over time.	Groundwater monitoring conducted to ensure water quality does not degrade over time.	conducted for 3 years to ensure the water quality does not degrade over time.	
Time To Implement	3 years	3 years		
RA Construction and Present Worth O&M Cost	\$195,000	\$195,000	\$195,000	

^a Soil investigation results indicate no likelihood for potential impact to groundwater.

^b Restricted to ensure the integrity of the playa.

cy = cubic yards

Table A4-13
Cannon AFB: SWMU 108
Future Land Use Remedial Action Summary

Cannon AFB: SWMU 108	Brief Description: SWMU 108 is the Explosive Ordnance Disposal Training Area located on the south corner of the Base directly west of the Fire Department Training			
Current Site Use: Open Space	Area. The circular area has a diameter of about 200 feet, is 2 to 3 feet below grade,			
Use of Adjacent Property: Open Space	and slopes downward toward the center. The area has been active since the early 1970s. Potential contaminants include organic compounds, explosives, and metals.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	Al, Ba, Be, Mn; 6861 cy	None	Be, Ba, Mn ; 1372 cy	None
Most Likely Remedial Technology	Excavation, landfill disposal, and capping	NFA	Excavation, landfill disposal, and capping	NFA
Other Remedial Technologies Considered	None	NA	None	NA
Basis for Choosing the Remedial Technology Selected	Contamination was widespread across the site and was at a depth that could be excavated	NA	Contamination was widespread across the site and could easily be excavated	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$8,470,000	\$0	\$2,308,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site.	
Most Likely Remedial Technology	NFA	NFA		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	

^a Soil investigation results indicate no likelihood for potential impact to groundwater
 cy = cubic yards

Table A4-14
Cannon AFB: SWMU 127
Future Land Use Remedial Action Summary

Cannon AFB: SWMU 127	Brief Description: SWMU 127 is a 135-gallon sand trap that serves the POL refueling truck washrack at Facility 4095. The sand trap, which previously discharged to a			
Current Site Use: Industrial	300-sf rectangular leach field east of the washrack, has been used since 1977. The use of the leach field (which remains in place) was ceased in the late 1980s. An oil/water			
Use of Adjacent Property: NA	separator enclosed in a concrete vault was installed downstream of the sand trap in 1991. The wastewater now drains to a new leach field southeast of the washrack.			
FUTURE LAND USE SOIL REMEDIAL ACTION SUMMARY				
Soil	Residential	Open Space	Commercial	Industrial
Contaminants of Concern & Cleanup Volume	TPH, Ba, Mn, PAHs; 1097 cy	None	TPH, Ba, benzo(a)pyrene, Mn; 582 cy	None
Most Likely Remedial Technology	Excavation, and land-fill disposal	NFA	Excavation and landfill disposal	NFA
Other Remedial Technologies Considered	Capping	NA	Capping	NA
Basis for Choosing the Remedial Technology Selected	Eliminates contamination through removal of contaminated soil	NA	Eliminates contamination through removal of contaminated soil	NA
Time To Implement Cleanup	1 year	NA	1 year	NA
RA Construction and Present Worth O&M Cost	\$1,640,000	\$0	\$917,000	\$0
FUTURE USE GROUNDWATER REMEDIAL ACTION SUMMARY				
Groundwater	Residential	Industrial	Restricted	
Contaminants of Concern & Plume Area	No Data ^a	No Data ^a	By definition, the restricted groundwater use scenario applies when the groundwater is considered non-potable, or due to the location of the aquifer there is no potential for contamination of the groundwater by the IRP site.	
Most Likely Remedial Technology	NFA	NFA		
Other Remedial Technologies Considered	NA	NA		
Basis for Choosing the Remedial Technology Selected	NA	NA		
Time To Implement Cleanup	NA	NA		
RA Construction and Present Worth O&M Cost	\$0	\$0	\$0	

^a Soil investigation results indicate no likelihood for potential impact to groundwater
 sf = square feet
 cy = cubic yards

A.5 BIBLIOGRAPHY

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3. U.S. Environmental Protection Agency. Draft RCRA Facility Investigation Guidance: Development of an RFI Plan. Waste Management Division, Office of Solid Waste, October 1986.
4. Walk, Haydel & Associates. Installation Restoration Program Remedial Investigation: Remedial Investigation Report, Cannon AFB, New Mexico. New Orleans, January 1990.
5. U.S. Army Corps of Engineers, Tulsa District. Environmental Assessment: Concrete Rubble Pile, SWMU 97. Tulsa, Oklahoma, February 1991.
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APPENDIX B
INSTALLATION ENVIRONMENTAL RESTORATION DELIVERABLES

CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

January 1996

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Table B-1

Cannon AFB Technical Documents/Data Loading Summary

Project Title	Sites	Date*	IRPIMS Status
Records Search	LF-1, FT-2, LF-2, LF-3, LF-4, LF-5, FT-6, FT-8, FT-9, OT-10, SD-11, SD-12, SD-13, DP-16, SD-17, SS-18, SS-19	1983	
IRP Phase I Confirmation/ Quantification Stage I	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, FT-9, SD-11, SD-12, SD-13, SD-15, DP-16, SD-17, SS-18	1986	
Preliminary Review/VSI Report RCRA Facility Assessment	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, FT-9, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, SD-21, SD-22, OP-25	1987	
Remedial Investigation	FT-9, SD-11, SD-12, SD-20	1990	
Decision Documents	LF-2, LF-3, LF-4, LF-5, FT-6, FT-7, FT-8, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, OT-23, OT-24	1990	
Environmental Assessment	LF-25	1991	
RCRA Facility Investigation	LF-1, LF-2, LF-3, LF-4, LF-5, FT-6, PI-7, FT-8, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SD-20, SD-21	1992	
RFI Work Plan, Appendix II	OT-10, SS-18, SS-19, SD-22, DP-25	1992	
RFI Work Plan, Appendix III	Appendix III SWMUs	1993	
Multi-Sites RI Report	LF-01, LF-02, LF-03, LF-04	1192	
RI Report for 18 SWMUs	Appendix I SWMUs	1992	
RFI at Landfill Nos. 1 and 2	LF-01, LF-02	1993	
Phase I RFI Work Plan	LF-05	1993	
Phase I RFI	Appendix II SWMUs	1993	
RFI Final Report	LF-03	1994	
Phase I RFI Appendix III	Appendix III SWMUs	1994	
RFI Final Report	LF-04	1994	

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Table B-1

(Continued)

Project Title	Sites	Date*	IRPIMS Status
Bioventing Pilot Test Work Plan for SWMU No. 70	Appendix I SWMUs	1995	
Phase II Supplemental RFI Report, Appendix I	SWMU to Oil/Water Separator No. 326	1994	
RFI Work Plan for SD-11, Phase I SWMU 86-90	SD-11	1995	
Post-Closure Case Plan	LF-05 (6113)	1995	
RFI Work Plan for LF-05	LF-05	1995	
RFI Work Plan for LF-01	LF-01	1995	

*Date contract began.

Note: Data collected prior to RCRA Facility Assessment is not usable. Data collected subsequently must be validated and loading will be required.

- AFB = Air Force Base
- IRP = Installation Restoration Program
- IRPIMS = Installation Restoration Program Information Management System
- RCRA = Resource Conservation and Recovery Act
- RFI = RCRA Facility Investigation
- RI = Remedial Investigation
- SWMU = solid waste management unit
- VSI = Visual Site Investigation

**Table B-2
Cannon AFB Project Deliverables**

Phase Title	Deliverable Title	Sites Examined	Date	Contractor
PA	Records Search	LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, OT-10, SD-11, SD-12, SD-13, DP-16, SD-17, SS-18, SS-19, SD-20, WP-21, ST-22, OT-23, OT-24, LF-25, ST-26, ST-27, ST-28, ST-29, ST-30, ST-31, ST-32	1983	CH2M Hill
RI	IRP Phase I Confirmation/Quantification Stage I	LF-01, FT-02, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, SD-11, SD-12, SD-13, SD-15, DP-16, SD-17, SS-18	1986	Radian Corporation
RFA	Preliminary Review/VSI Report RCRA Facility Assessment	LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, OT-10, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, SD-21, SD-22, OP-25	1987	A.T. Kearney
RI	Remedial Investigation	FT-09, SD-11, SD-12, SD-20	1990	Walk, Hadel, and Associates, Inc.
DD	Decision Documents	LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SS-18, SS-19, SD-20, OT-23, OT-24	1990	EA Engineering Science and Technology, Inc.
EA	Environmental Assessment	LF-25	1991	USACE, Tulsa District
RFI	RCRA Facility Investigation	LF-05, FT-06, FT-07, FT-08, SD-11, WP-14, SD-15, DP-16, SD-17	1991	Woodward-Clyde Consultants
RFI	RFI Work Plan Appendix II	OT-10, SS-18, SS-19, SD-22, DP-25	1992	Woodward-Clyde Consultants
RFI	RFI Work Plan Appendix III	Appendix III SWMUs (SD-11, LF-25, AOC A, AOC B, and AOC C)	1992	Woodward-Clyde Consultants

Table B-2

(Continued)

Phase Title	Deliverable Title	Sites Examined	Date	Contractor
RI	RI Multi-Sites	LF-01, LF-02, LF-03, LF-04	1992	Woodward-Clyde Consultants
RI	Remedial Investigation Report for 18 SWMUs	Appendix I SWMUs (LF-01, LF-02, LF-03, LF-04, LF-05, FT-06, FT-07, FT-08, FT-09, SD-11, SD-12, SD-13, WP-14, SD-15, DP-16, SD-17, SD-20, SD-21)	1992	Woodward-Clyde Consultants
RFI	RFI at Landfills Nos. 1 and 2	LF-01, LF-02	1993	Woodward-Clyde Consultants
RFI	Phase I RFI Work Plan	LF-05	1993	Woodward-Clyde Consultants
RFI	Phase I RFI	Appendix II SWMUs (ST-26, ST-27, ST-28, ST-29, ST-30, ST-31, ST-32)	1993	LRL Sciences
RFI	RFI Final Report	LF-03	1994	Radian Corporation
RFI	Phase I RFI Appendix III	Appendix II SWMUs (SD-11, LF-25, AOC A, AOC B, AOC C)	1994	Woodward-Clyde Consultants
RFI	RFI Final Report	LF-04	1994	Radian Corporation
CMS/IRA	Bioventing Pilot Test Work Plan for SWMU 70	SWMU 70	1994	Parsons Environmental Science
RFI	Phase II Supplemental RFI Report, Appendix I	Appendix I SWMUs	1995	Woodward-Clyde Consultants
RFI	RFI Work Plan for SD-11 Phase I, SWMUs 86-90	SD-11	1995	Woodward-Clyde Consultants
CMI	Post-Closure Care Plan	LF-05 (Cell 3)	1995	Parsons Environmental Science
RFI	RFI Work Plan for LF-05	LF-05	1995	Woodward-Clyde Consultants

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(Continued)

Phase Title	Deliverable Title	Sites Examined	Date	Contractor
RFI	RFI Work Plan for LF-01	LF-01	1995	Woodward-Clyde Consultants

- AOC = Area of Concern
- CMI = Corrective Measures Implementation
- CMS = Corrective Measures Study
- DD = Decision Document
- EA = Environmental Assessment
- IRA = Interim Remedial Action
- IRP = Installation Restoration Program
- PA = Preliminary Assessment
- RCRA = Resource Conservation and Recovery Act
- RFA = RCRA Facility Assessment
- RFI = RCRA Facility Investigation
- RI = Remedial Investigation
- SWMU = Solid Waste Management Unit
- USACE = U.S. Army Corps of Engineers
- VSI = Visual Site Investigation

Table B-3

Cannon AFB Site Deliverables

Site Number	RFA/PA/SI/EA	RFI/CMS RI/FS	CMD/CMI RD/RA	ICA	NFRAP	LTM/LTO	Comments
LF-01	1,2,3	7,10,12,19,23					
LF-02	1,2,3	7,10,12,19					
LF-03	1,2,3	7,10,15,19					
LF-04	1,2,3	7,10,17,19					
LF-05	1,2,3	8,10,13,19,22	21				
FT-06	1,2,3	8,10,19					
FT-07	1,2,3	8,10,19					
FT-08	1,2,3	8,10,19					
OT-10	1,3	9,					
SD-11	1,2,3	4,8,10,11,16,19					
SD-12	1,2,3	4,10,19,20					
SD-13	1,2,3	10,19					
WP-14	1,3	8,10,19					
SD-15	1,2,3	8,10,19					
DP-16	1,2,3	8,10,19					
SD-17	1,2,3	8,10,19					
SS-18	1,2,3	9,					
SS-19	1,3	9,					
SS-20	1,3	4,10,19					

Table B-3
(Continued)

Site Number	RFA/PA/SI/EA	RFI/CMS RI/FS	CMD/CMIRD/RA	ICA	NFRAP	LTM/LTO	Comments
LF-25	1,3,6	9,11,16,					
ST-26	1,3	14,					
ST-27	1,3	14,					
DP-33							
AOC A		11,16					
AOC B		11,16					
AOC C		11,16					
AOC D							
AOC 36							
AOC E							
AOC F							

Legend:

1. Records Search, CH2M Hill, August 1983.
2. IRP Phase I Confirmation/Quantification Stage I, Radian Corporation, September 1986.
3. Preliminary Review/VSI Report RCRA Facility Assessment, A.T. Kearney, July 1987.
4. Remedial Investigation, Walk, Hadel, and Associates, January 1990.
5. Decision Documents, EA Engineering Science and Technology, November 1990.
6. Environmental Assessment, USACE, Tulsa District, February 1991.
7. RI Multi-Sites, Woodward-Clyde Consultants, April 1992.
8. RCRA Facility Investigation, Woodward-Clyde Consultants, May 1992.

Table B-3

(Continued)

Site Number	RFA/PA/SI/EA	RFI/CMS RI/FS	CMD/CMIRD/RA	ICA	NFRAP	LTM/LTO	Comments
Legend: (continued)							
9. RFI Work Plan Appendix II, Woodward-Clyde Consultants, August 1992.							
10. Remedial Investigation Report for 18 SWMUs, Woodward-Clyde Consultants, October 1992.							
11. RFI Work Plan Appendix III, Woodward-Clyde Consultants, December 1992.							
12. RFI at Landfills Nos. 1 and 2, Woodward-Clyde Consultants, January 1993.							
13. Phase I RFI Work Plan, Woodward-Clyde Consultants, November 1993.							
14. Phase I RFI, LRL Sciences, 1993.							
15. RFI Final Report, Woodward-Clyde Consultants, February 1994.							
16. Phase I RFI Appendix III, Woodward-Clyde Consultants, February 1994.							
17. RFI Final Report, Radian Corporation, March 1994.							
18. Bioventing Pilot Test Work Plan for SWMU 70, AFCEE, 1994.							
19. Phase II Supplemental RFI Report, Appendix I, Woodward-Clyde Consultants, January 1995.							
20. RFI Work Plan for SD-11 Phase I, SWMUs 86-90, Woodward-Clyde Consultants, January							
21. Post-Closure Care Plan, Parsons Environmental Science, 1995.							
22. RFI Work Plan for LF-05, Woodward-Clyde Consultants, July 1995.							

Table B-3
(Continued)

Site Number	RFA/PA/SI/EA	RFI/CMS RI/FS	CMD/CMI RD/RA	ICA	NFRAP	LTM/LTO	Comments
Legend: (continued)							
23. RFI Work Plan for LF-01, Woodward-Clyde Consultants, August 1995.							

- CMI = Corrective Measures Implementation
- CMS = Corrective Measures Study
- CMD = Corrective Measures Design
- EA = Environmental Assessment
- FS = Feasibility Study
- ICA = Interim Corrective Action
- LTM = Long-Term Monitoring
- LTO = Long-Term Operation
- NFRAP = No Further Remedial Action Planned
- PA = Preliminary Assessment
- RA = Remedial Action
- RCRA = Resource Conservation and Recovery Act
- RD = Remedial Design
- RFA = RCRA Facility Assessment
- RFI = RCRA Facility Investigation
- RI = Remedial Investigation
- SI = Site Inspection
- USACE = U.S. Army Corps of Engineers

APPENDIX C
REMEDY SELECTION DECISION DOCUMENT SUMMARIES

CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO

January 1996

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Appendix C

REMEDY SELECTION DECISION DOCUMENT SUMMARIES

This appendix provides a summary of remedy selection records, including DDs, that describe the selection of corrective actions. These summaries list those sites requiring remediation and include the names of signed DDs for non-NPL sites. Currently, there are no signed DDs for Cannon AFB. However, ten sites were deemed ineligible for the IRP, and the Base sent a letter to HQ ACC requesting that they be removed. A copy of the letter is included in this appendix.

27 CES/CEV
111 Engineers Way
Cannon AFB NM 88103-5136

Mr David Dentino
HQ ACC CEVR
129 Andrews Street
Langley AFB VA 23665-2769

RE: Removal of IRP Sites from the Cannon AFB IRP Listing

Dear Mr Dentino

There are currently 10 IRP sites at Cannon AFB that should have never been included in the Installation Restoration Program (IRP). Request immediate administrative action be taken to remove these sites from our IRP listing.

The following are "Active" sites and therefore are not DERA eligible:

- 1. IRP Site FT-09, Fire Department Training Area No. 4
- 2. IRP Site WP-21, Wastewater Treatment System Lagoons and Effluent Discharge
3. IRP Site OT-23, Melrose Bombing Range

The following were sites of 2,000 gallon underground heating oil storage tanks which were removed under the UST program in accordance with NMED Underground Storage Tank regulations. No action under the IRP was required.

- 1. IRP Site ST-28, Recovered Diesel Tank # 108
- 2. IRP Site ST-29, Recovered Diesel Tank # 121

The following was the site of an underground storage tank which was removed under the UST program in accordance with NMED Underground Storage Tank regulations. No action under the IRP was required.

- 1. IRP Site ST-32, UST Near Bldg 192

The following sites do not exist:

- 1. IRP Site ST-30, UST Old Service Station
- 2. IRP Site ST-31, UST Near Bldg 357

The following site is a duplication of IRP Site ST-26, UST Waste Oil & Above Ground Overflow Capacity Tank:

1. IRP Site ST-22, UST Waste Oil

The following site no longer belongs to Cannon AFB as the property was transferred to the Army Corps of Engineers on 31 Mar 92.

1. IRP Site OT-24, Conchas Lake Recreation Annex

Your cooperation in these matters is greatly appreciated. Please direct any questions to Mr John Ekhoﬀ at DSN 681-4348.

Sincerely

MAC A. CRAWFORD, Capt, USAF
Chief, Environmental Restoration

**APPENDIX D
NO FURTHER RESPONSE ACTIONS PLANNED SUMMARIES**

**CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO**

January 1996

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Appendix D

NO FURTHER RESPONSE ACTIONS PLANNED SUMMARIES

This appendix provides the No Further Response Action Planned (NFRAP) DD summaries indexed by site. NFRAP decisions will include those made after the VSI, where no contamination was found; the RFI, where the contaminant concentrations did not exceed ARARs; the RFI, where the levels of contamination did not pose risk to human health or the environment; the CMI, where removal, treatment, containment, or other appropriate method was determined to be satisfactory; and long-term monitoring, where monitoring has confirmed that there is no longer a threat to human health or the environment from contamination left in place.

Table D-1

No Further Response Action Planned Document Status

WIMS-ES ID	Site Name	Date Written*	Date Signed
LF-02	Landfill No. 2	November 1990 November 1992	Pending
FT-06	Fire Department Training Area No. 1	November 1990 November 1992	Pending
FT-07	Fire Department Training Area No. 2	November 1990 November 1992	Pending
FT-08	Fire Department Training Area No. 3	November 1990 November 1992	Pending
OT-10	Blown Capacitor Site	November 1990 November 1992	Pending
SD-12	Stormwater Collection Point	November 1990	Pending
SD-13	Sanitary Sewage Lift Station Overflow Pit	November 1990	Pending
WP-14	Sludge Weathering Pit	November 1990 November 1992	Pending
SD-15	AGE Drainage Ditch	November 1990	Pending
DP-16	Solvent Disposal Site	November 1990	Pending
SD-17	Old Entomology Rinse Area	November 1990 November 1992	Pending
SS-18	JP-4 Fuel Spill	November 1990	Pending
SS-19	MOGAS Spill	November 1990	Pending
SD-20	NE Stormwater Drainage Area	November 1990 November 1992	Pending
ST-26	Aboveground Overflow Capacity Tank	November 1990	Pending
OT-27	Inactive Sump	—	Pending
DP-33	Disposal Pit	—	Pending

*Fourteen of the seventeen sites have previously had Decision Documents produced for submittal to regulatory officials. These were never signed and there is no record of rejection or suggestions for future work. It is assumed that these documents were never reviewed. These documents will require reevaluation and reformatting in order to comply with current requirements as outlined by HQ USAF/CEVR "NFRAP Guide: A Resource for Making, Documenting, and Evaluating No Further Response Action Planned Decisions," June 1995.

APPENDIX E

CONCEPTUAL SITE MODELS

CANNON AIR FORCE BASE
NEW MEXICO

OCTOBER 1996

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E.1 RNSI CONCEPTUAL SITE MODELS

This appendix presents RNSI conceptual site models and site-specific factors tables from the Cannon AFB PPE report (Radian 1996) for each IRP/SWMU site.

Each RNSI conceptual site model and its associated site-specific factors table present the potential pathways, exposure routes, and affected human receptors in relation to the IRP site or SWMU's proposed land use. These were developed from visual inspections of each site in relation to the probable future land use for each site. Future land use/reuse options for the sites include residential, open space, commercial, and industrial.

Screening levels were calculated for each of the four possible land uses (Appendix K). Some conceptual site models identify exposures in land use scenarios which do not pertain to the site. In these cases, it is believed that contaminants may potentially migrate and impact the surrounding land use areas and/or populations. These potential exposures are noted in both the conceptual site model and site-specific factors table and will be quantified according to the land use where they will occur.

The RNSI conceptual site models were developed using the screening methodology of EPA Region III. The accompanying tables for each of the conceptual site models discuss the site-specific factors that impact the selection of the potential pathways and routes for human receptors. The default exposure scenarios for the four basic land uses are given in the *RNSI Air Combat Command PPE Report* (Radian 1995). The site-specific factors tables also included in the aforementioned report provide a general discussion of the analytical data collected for the particular site. The

algorithms, exposure parameters, and screening levels used for Cannon AFB are presented in Appendix K.

E.2 CONCEPTUAL SITE MODELS DATA SUMMARY

A conceptual site model describes a site and its environment and presents hypotheses about the known site contaminants, their potential routes of migration, and their potential impact on sensitive receptors. The objective of the conceptual site model is to identify potential contaminants, source areas, release mechanisms, transport media, and potential exposure routes and receptors. This information, along with geologic and hydrologic data, provide the details necessary to evaluate human health and ecological risk, as well as remedial action alternatives. As additional data are collected, the preliminary model is updated and refined.

Table E-1

**Cannon Air Force Base
SWMU 1 - Oil/Water Separator 119**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 199 is located on the southeast corner of Building 119 next to the aircraft parking ramp. The separator is a 3-compartment underground unit, with a 700 gallon main compartment and a 280 gallon oil compartment. The unit is underground, with its opening in a concrete pad. The entire unit is surrounded by asphalt. This separator is currently in use.	
Types of Waste: The facility discharging to the separator was historically used for x-rays of aircraft and parts, and other operations which did not use chemicals. The unit has and still receives wash water generated from aircraft maintenance operations. Past analysis of the O/WS indicated the presence of metals and organics, including cadmium, chromium, nickel, lead, benzene, bromoform, bis(2-ethylhexyl)phthalate and di-n-butylphthalate in the influent/ effluent of this separator. Wastewater from the site is discharged to the storm drainage system which flows to the Stormwater Collection Point (SWMu 85).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Soil analysis indicates the presence of TCL VOCs and metals in the surface and subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water from the site enters the base storm water drainage system and flows to the Stormwater Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	

Table E-1

(Continued)

Site Specific Factors	Other Considerations
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

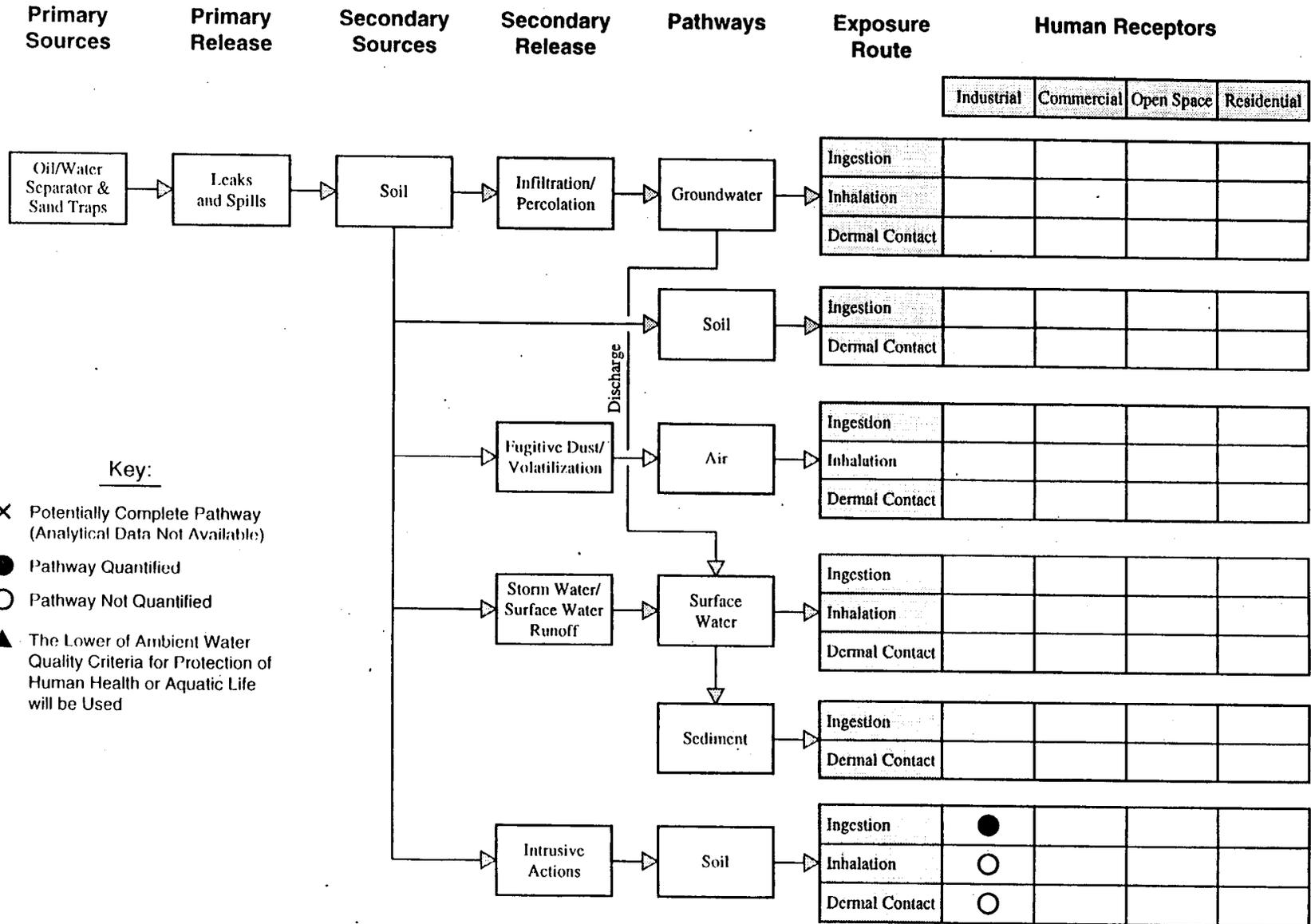
Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

TCL VOCs = Target Compound List Volatile Organic Compounds

SWMU 1-Oil/Water Separator 119, Conceptual Site Model Proposed Future Land Use: Industrial



Key:

- ✕ Potentially Complete Pathway (Analytical Data Not Available)
- Pathway Quantified
- Pathway Not Quantified
- ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used

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Figure E-1. SWMU 1-Oil/Water Separator 119 Conceptual Site Model, Cannon AFB

Table E-2

**Cannon Air Force Base
SWMU 3 - Oil/Water Separator 108**

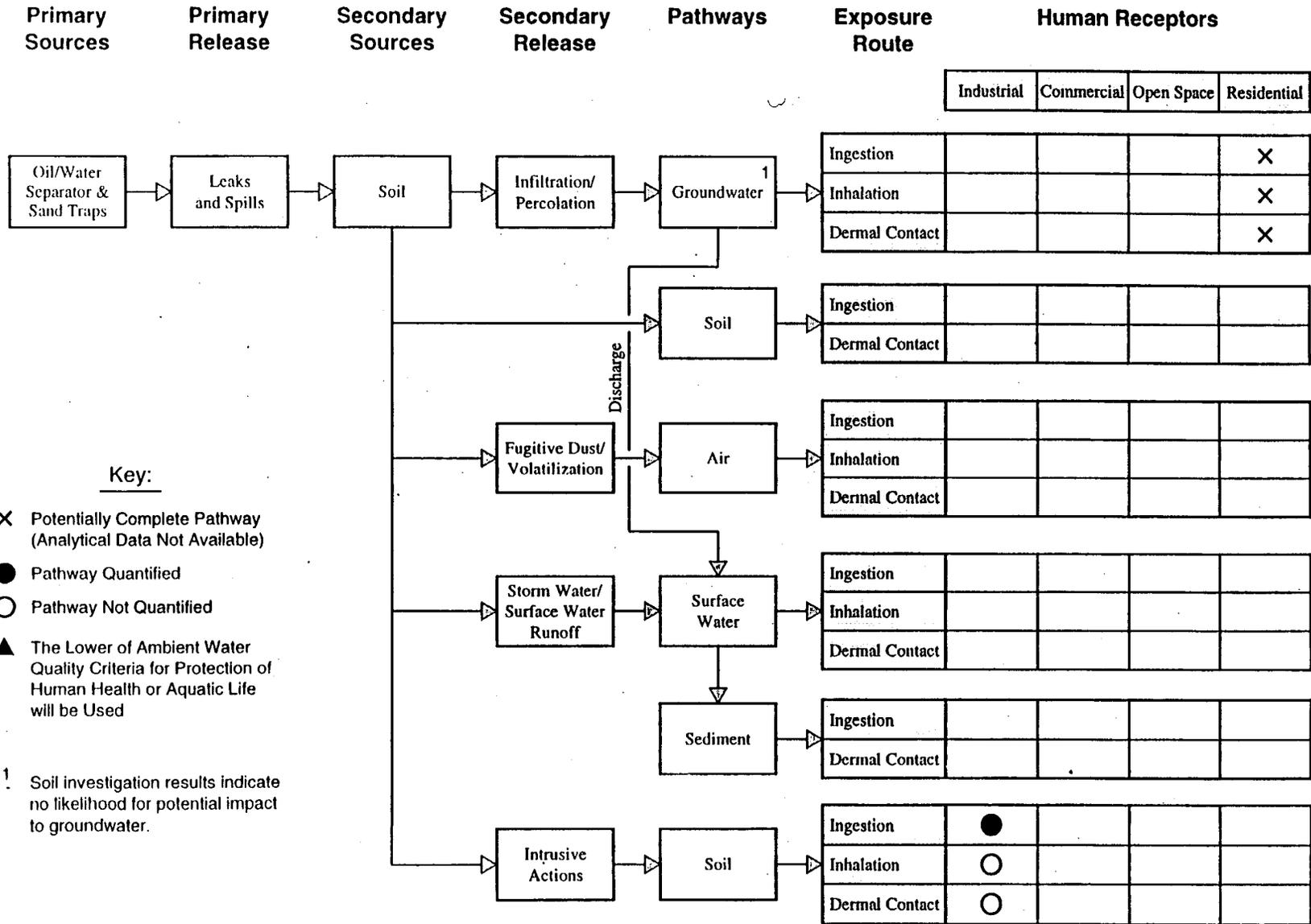
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 108 was located on the west side of former Hangar 125. Active since 1943, the unit was removed in 1990 during the demolition of Building 108. The site is covered with asphalt.	
Types of Waste: Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Groundwater was not sampled at this site. Depth for groundwater is approximately 250 ft.	Groundwater is not considered an potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of an alluvial material below the surface soils. This material is a loose to dense, reddish-brown, clayey silt with traces of caliche. Surface soils are a silty clay. TRPH and toluene were detected in the soils, but below residential RBCs. Barium and manganese were detected at concentrations that exceeded background, but these concentrations did not exceed the screening criteria for residential soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water from the site enters the base storm water drainage system and flows to the storm water collection point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Commercial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be a suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase II, Cannon Air Force Base, New Mexico. April 1993.

SWMU = Solid Waste Management Unit
O/WS = Oil/Water Separator

TRPH = Total Recoverable Petroleum Hydrocarbons
RBCs = Risk-Based Concentrations

SWMU 3-Oil/Water Separator 108, Conceptual Site Model Proposed Future Land Use: Industrial



NC0274 05/27/1995

Figure E-2. SWMU 3-Oil/Water Separator 108 Conceptual Site Model, Cannon AFB

Table E-3

**Cannon Air Force Base
SWMU 5 - Oil/Water Separator 121**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 121 was located on the west side of Hangar 121 and was removed in 1990. This area is presently covered with asphalt. The exact location of the former soil/water separator is unknown.	
Types of Waste: Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Depth to groundwater is approximately 250 ft. There is uncertainty associated with the vertical distribution of contaminants. Due to the low levels detected and the large depth to groundwater, this SWMU will not be further evaluated.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of a silty clay alluvium below fill material. This silty clay contains varying amounts of calcium carbonate nodules and occasionally cemented caliche zones. TRPH and toluene were detected in the subsurface soils. Only manganese and nickel exceeded the background upper tolerance limit. None of the detected compounds exceeded the screening criteria for residential soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage from the site enters the base storm water drainage system and flows to the Storm Water Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be a suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

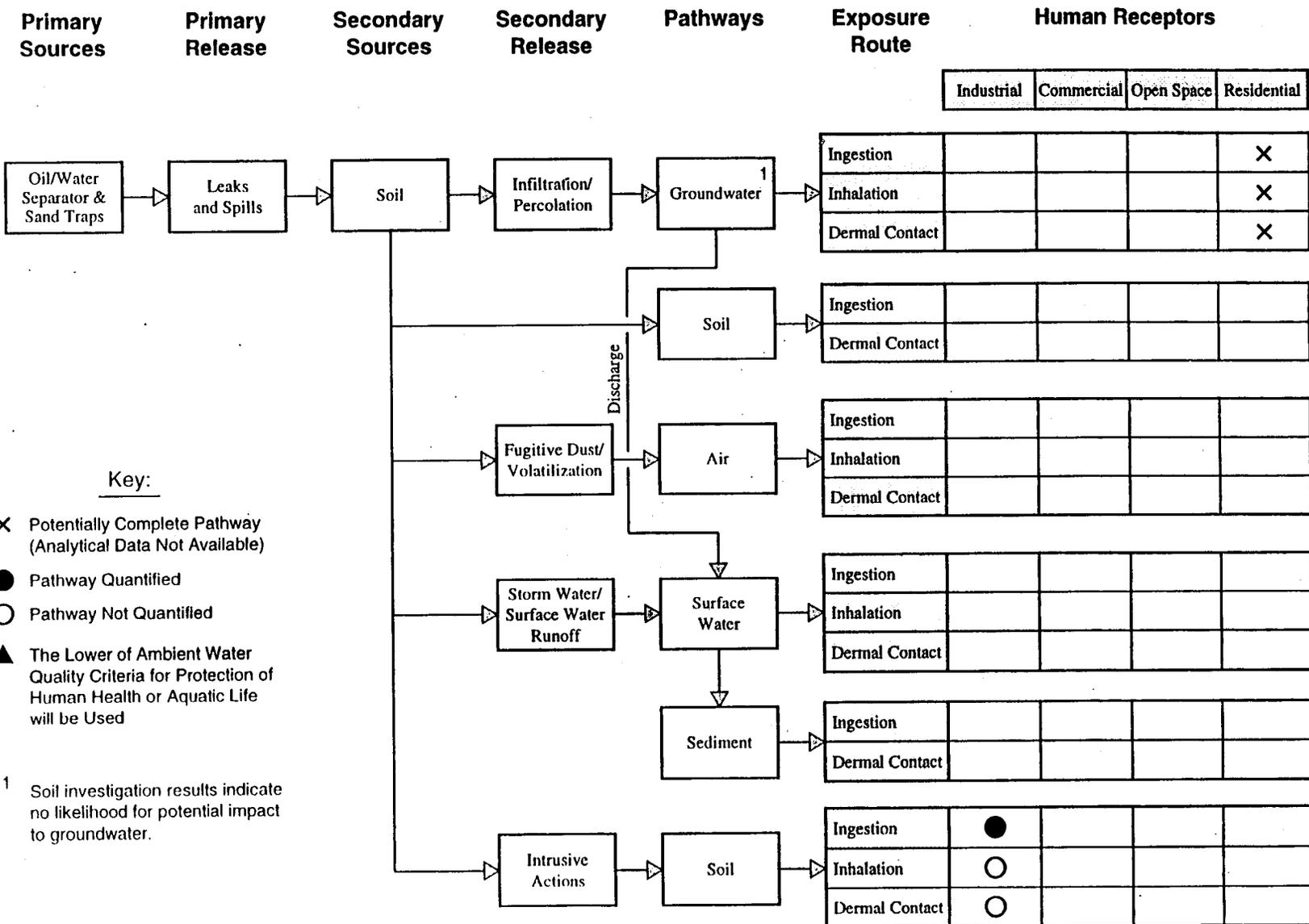
Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs, Phase II, Cannon Air Force Base, New Mexico, April 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

TRPH = Target Recoverable Petroleum Hydrocarbons

SWMU 5-Oil/Water Separator 121, Conceptual Site Model Proposed Future Land Use: Industrial



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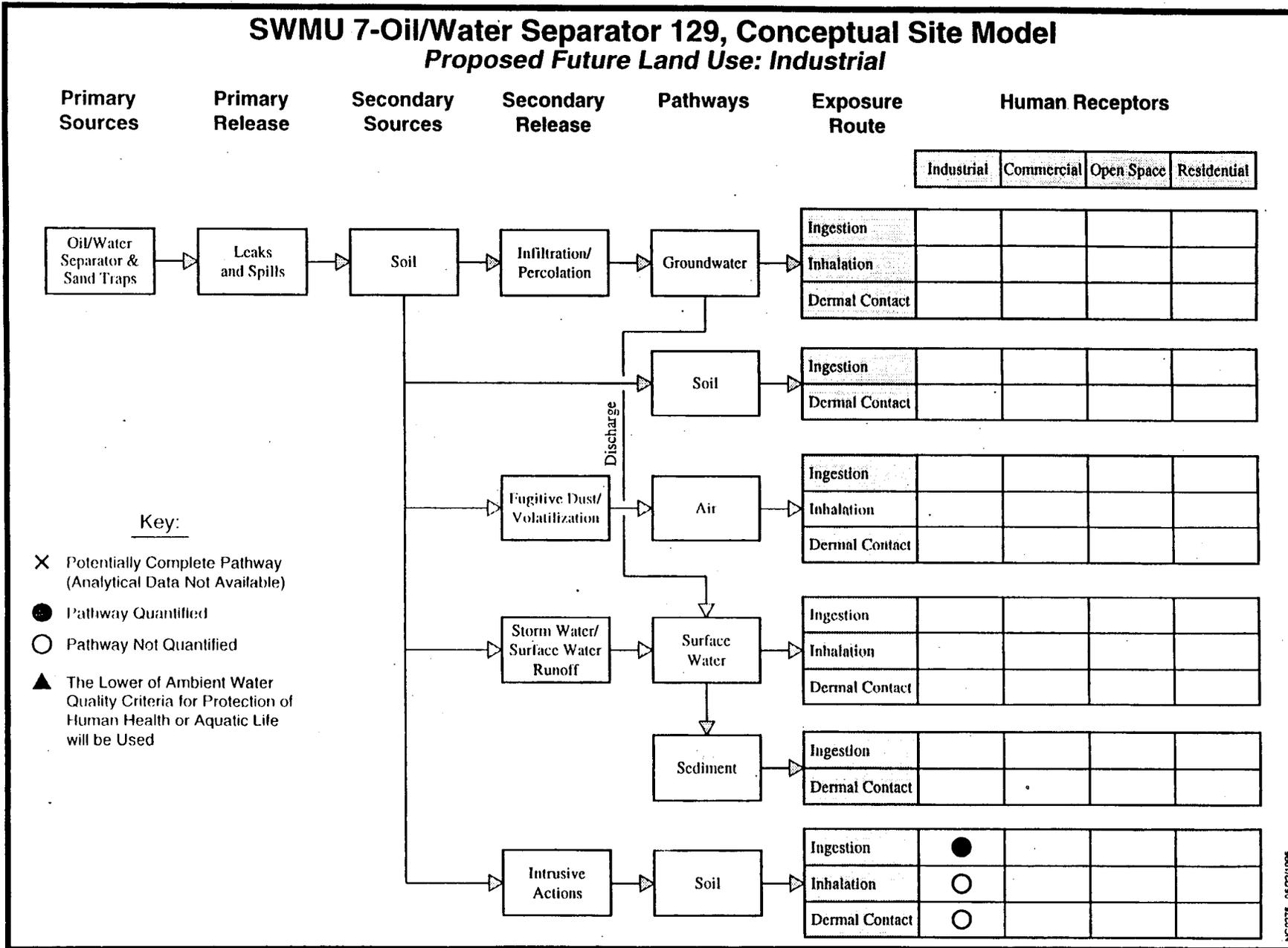
Figure E-3. SWMU 5-Oil/Water Separator 121 Conceptual Site Model, Cannon AFB

Table E-4

**Cannon Air Force Base
SWMU 7 - Oil/Water Separator 129**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 129 is located on the northwest corner of Building 129, approximately 33 ft east of the northwest corner. The separator is a 3-compartment underground unit, with a 700 gallon main compartment, a 280 gallon oil compartment, and a skimmer. The site is covered by asphalt. The O/WS is currently in use.	
Types of Waste: The O/WS receives wastewater from Building 129. Historically, the O/WS received washwater generated from aircraft washing and aircraft maintenance operations. Past analysis of the O/WS indicated the presence of metals and organics, including benzene, toluene, ethylbenzene, xylene, 2-hexanone, lead, cadmium, 2-methylnaphthalene, and several phthalates in the influent/effluent of this separator. Wastewater is discharged to the Sanitary Sewage Line (SWMU 98).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Samples indicate the presence of VOCs and metals in both surface and subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water from the site enters the Base storm water drainage system and flows to the Stormwater Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.
 SWMU = Solid Waste Management Unit O/WS = Oil/Water Separator VOCs = Volatile Organic Compounds



NC0276 05/22/1995

Figure E-4. SWMU 7-Oil/Water Separator 129 Conceptual Site Model, Cannon AFB

Table E-5
Cannon Air Force Base
SWMU 8 - Oil/Water Separator 165

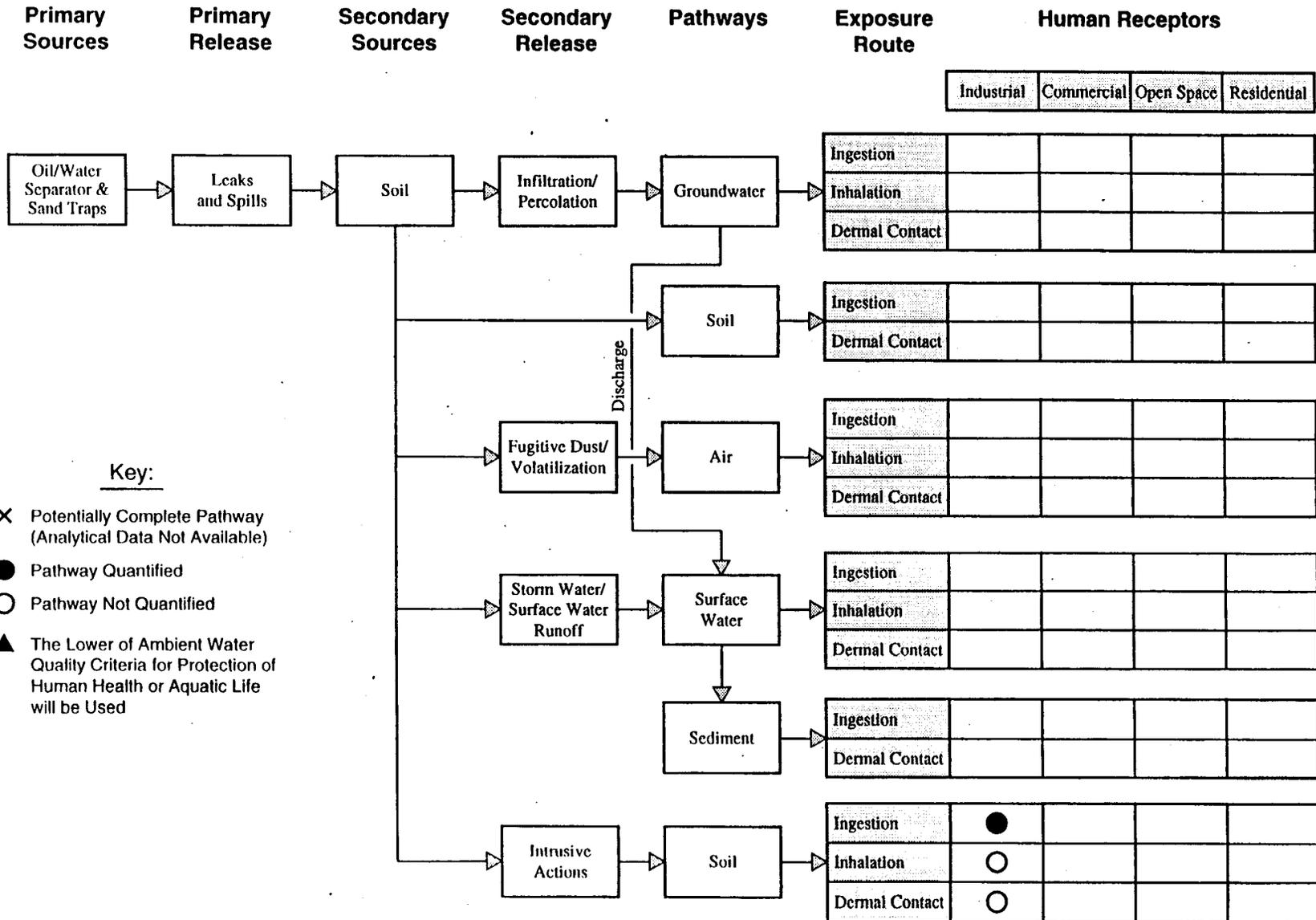
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 165 is located on the south end of the aircraft washrack at Facility 165. The separator is a 3-compartment underground unit with a 4,500 gallon main compartment and a 710 gallon oil compartment. The site is covered with asphalt. The O/WS is currently in use.	
Types of Waste: The O/WS receives wastewater from the washing of aircraft. No previous investigations are available for this site; chemical compounds that may be in the influent/effluent of this site would be similar to those associated with SWMU 9 which is served by this separator. These compounds included ethylene glycol n-mono butyl ether and PD-680 constituents. Washrack components would include fuels, solvents, and lubricating oils. Wastewater from the site is discharged to the storm drainage system which flows to the Stormwater Collection Point (SWMU 85).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Soil analysis indicates the presence of xylenes and metals.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water from the site enters the base storm water drainage system and flows to the Stormwater Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 8-Oil/Water Separator 165, Conceptual Site Model Proposed Future Land Use: Industrial



NC2277 05/23/1995

Figure E-5. SWMU 8-Oil/Water Separator 165 Conceptual Site Model, Cannon AFB

Table E-6

**Cannon Air Force Base
SWMU 9 - Aircraft Washrack Drain System**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: SWMU 9 is a drain leading underground in the center of a concrete wash-rack pad used for cleaning aircraft. The drain discharges to O/WS 165 (SWMU 8). SWMU 9 is close to the flightline. The washrack pad is currently in use, with about four aircraft washed per week. The washrack also is currently used as a staging area for mobilization exercises and air shipments. The area is covered with asphalt.	
Types of Waste: Aircraft are washing on the pad associated with SWMU 9 with water and an aircraft cleaning compound solution. Since 1984, the cleaning compound solution used is biodegradable and consists of 5% by weight ethylene glycol n-mono butyl ether. Prior to 1984, approximately 3,600 gallons of PD-680 and 1,700 gallons of aircraft cleaning compound drained into O/WS 165 (SWMU 8) from SWMU 9. Wastewater from the site eventually drains into the Storm Water Drainage Area (SWMU 85).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Soil analysis indicates the presence of VOCs and metals in both surface and subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage from SWMU 9 flows through a series of ditches the Stormwater Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	

Table E-6

(Continued)

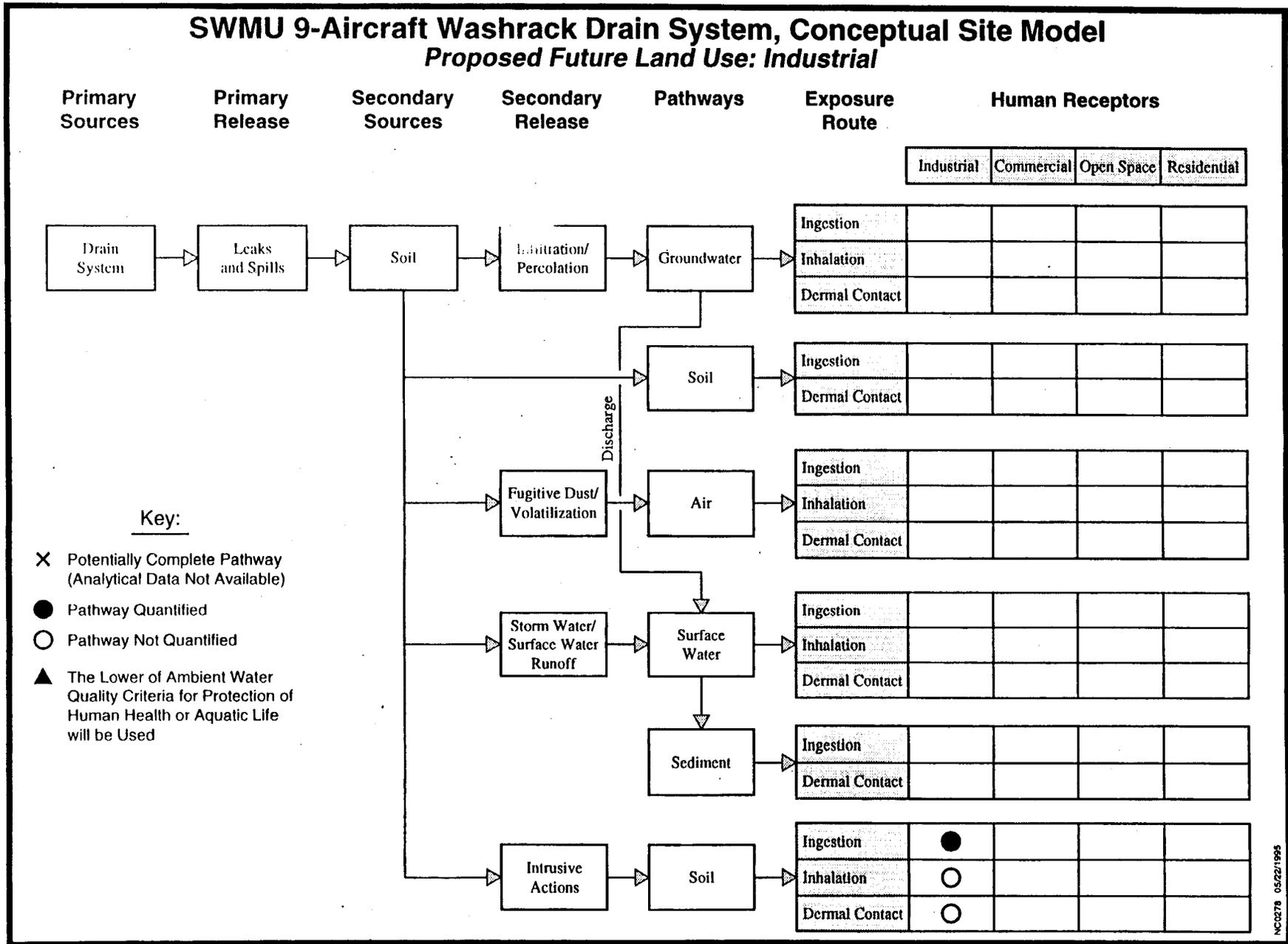
Site Specific Factors	Other Considerations
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I Cannon Air Force Base, New Mexico. Volume I, November 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

VOCs = Volatile Organic Compounds



NC0278 05/22/1995

Figure E-6. SWMU 9-Aircraft Washrack Drain System Conceptual Site Model, Cannon AFB

Table E-7

**Cannon Air Force Base
SWMU 11 - Oil/Water Separator 170**

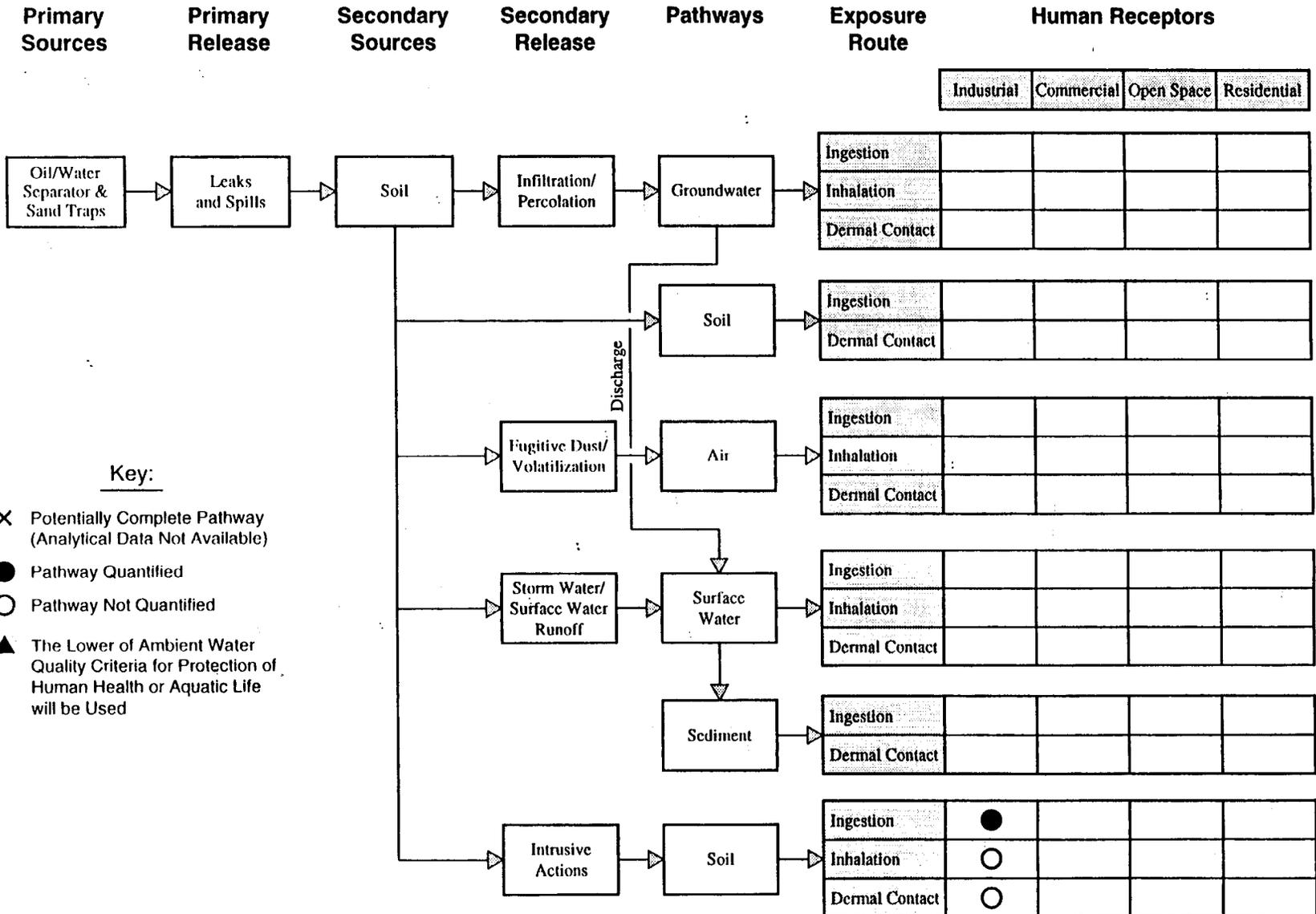
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 170 is located on the west side of Building 170. The O/WS is constructed of concrete and has a 3-compartment underground unit, with a 700-gallon main compartment and a 280-gallon oil compartment. The O/WS was active from 1963 until 1989. The separator has been removed and the area is currently covered with asphalt.	
Types of Waste: O/WS 170 received wash water form aircraft maintenance operations in Building 170. Potential contaminants include petroleum, synthetic lubricating oils and dirt.	
Groundwater: Depth to groundwater at Cannon AFB is greater than 250 ft at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Low levels of methylene chloride and toluene were detected in surface soils at the site. No metals were detected above background at the surface, however, low levels of nickel were found at 2.5 ft. Low levels of mercury and methylene chloride were identified at 10 ft.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage is directed topographically through a series of ditches to SWMU 85 (Stormwater Collection Point). SWMU 85 is an ephemeral lake basin (playa) located in the southwest corner of the Base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 11-Oil/Water Separator 170, Conceptual Site Model Proposed Future Land Use: Industrial



Key:

- ✗ Potentially Complete Pathway (Analytical Data Not Available)
- Pathway Quantified
- Pathway Not Quantified
- ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used

NC0379 05/22/1996

Figure E-7. SWMU 11 - Oil/Water Separator 170 Conceptual Site Model, Cannon AFB

Table E-8

**Cannon Air Force Base
SWMU 16 - Oil/Water Separator No. 680**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 680 was located near the southwest corner of Building 690 inside and under a garage. The O/WS has been removed, and the area covered with concrete. This unit was active in 1965 to 1991.	
Types of Waste: Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Groundwater was not sampled at this SWMU. The soil contamination does not pose a risk to the groundwater.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.	
Surface Water: Surface water bodies are not present at this SWMU. Surface water drainage is directed through a series of ditches to the Storm Water Collection Point (SWMU 85).	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMU-Phase II Cannon Air Force Base, New Mexico. Volume 1, April 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

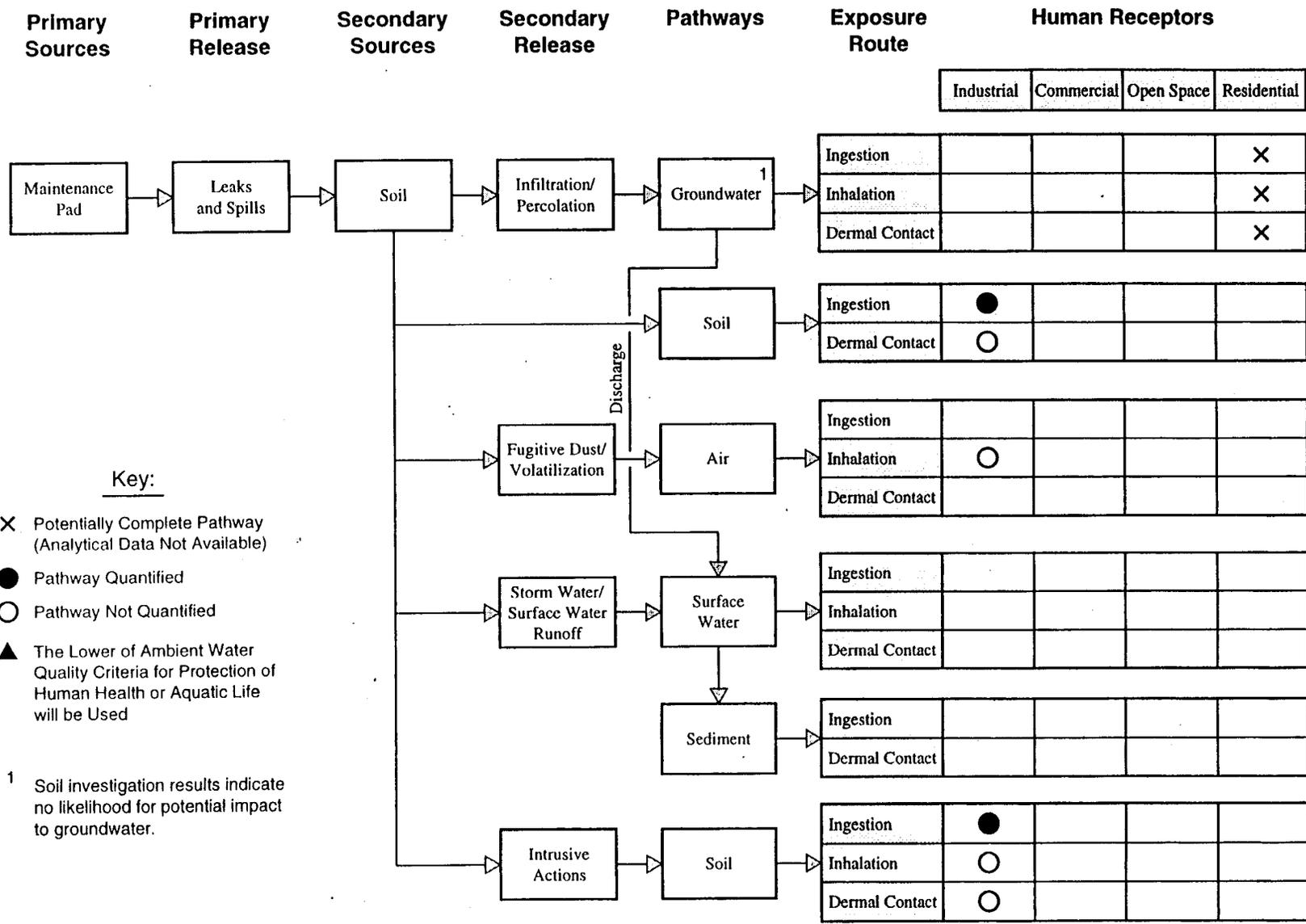
Table E-9

**Cannon Air Force Base
SWMU 31 - AGE Maintenance Shop Pad**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: The AGE Maintenance Pad is an open concrete area approximately 70 ft wide by 240 ft long. The Maintenance Pad drains to the AGE Drainage Ditch. Much of the site is covered with concrete.	
Types of Waste: JP-4, synthetic and mineral oils, diesel fuel, and solvents.	
Groundwater: Fate and transport modeling for the Phase 1 investigation showed migration of contaminants to groundwater to be insignificant pathways. Groundwater is located 200-300 ft below ground surface.	Groundwater is not considered a potential route of exposure due to its depth and the conclusions of fate and transport modeling.
Soil: Soils at the site consist of fine sandy clays and silts found 0.5-3.5 ft below ground surface. This layer is underlain by interbedded white sandy clay and reddish brown sandy clay. Visually contaminated surface soils were present in 2 borings, but only low levels of subsurface soil contamination were detected.	
Surface Water: Runoff from the northwest area of the Maintenance Pad is directed along an expansion joint offsite. Drainage for the rest of the area is carried by the AGE Drainage Ditch to the southeast. The AGE Drainage Ditch was investigated as part of the Appendix 1 RI and determined to be a candidate for NFA.	
Sediment: No sediment data is available for this site. Investigation of the drainage ditch showed negligible to nondetectable contaminant levels in the soils lining the ditch.	
Surrounding Land Use: Industrial	
Ecological Factors: An ecological risk assessment conducted in conjunction with the Phase 1 investigation showed that no unacceptable ecological risks were expected at this SWMU.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico Draft, Volume 1A, April 1995.
AGE = Aerospace Ground Equipment

SWMU 31-AGE Maintenance Shop Pad, Conceptual Site Model Proposed Future Land Use: Industrial



Key:

- X Potentially Complete Pathway (Analytical Data Not Available)
- Pathway Quantified
- Pathway Not Quantified
- ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used

¹ Soil investigation results indicate no likelihood for potential impact to groundwater.

NC0281 05/22/1995

Figure E-9. SWMU 31-AGE Maintenance Pad Conceptual Site Model, Cannon AFB

Table E-10

**Cannon Air Force Base
SWMU 32a - Oil/Water Separator 186 (#1-East)**

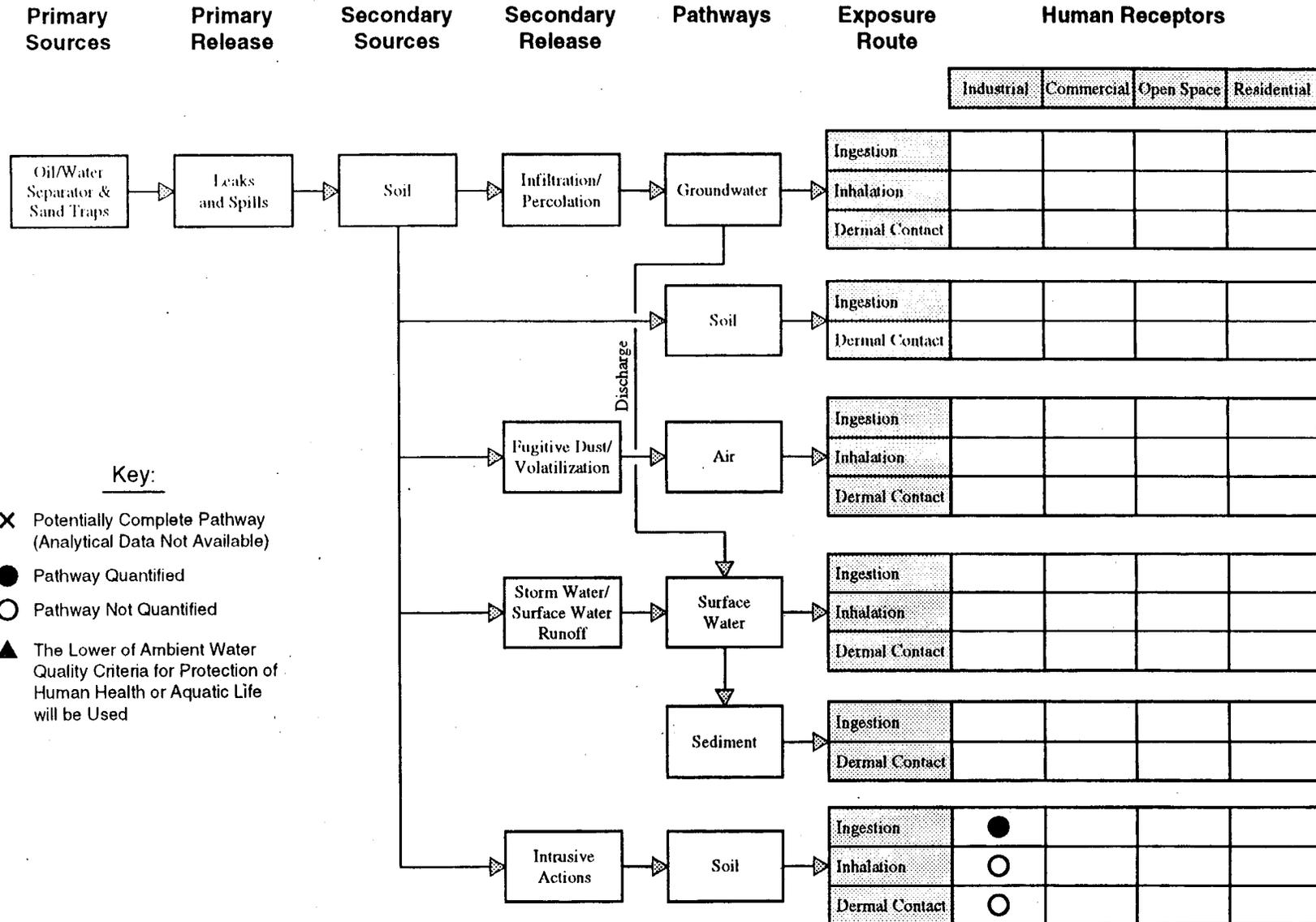
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 186 (#1-East) is on the east side of Building 186, closest to the flightline and next to the washrack. The O/WS is constructed of concrete and is a 2-compartment underground unit, with a 300-gallon main compartment and a 300-gallon oil compartment. The O/WS has been active since 1971 and is still in use. Containers of used JP-4 and synthetic oil are stored nearby on carts. Two underground JP-4 filling tanks are located about 25 ft from the separator; these tanks were reportedly placed in vaults. The SWMU is underground and the area is currently covered with asphalt.	
Types of Waste: The O/WS receives wastewater from the cleaning of aircraft ground-support equipment at the washrack. Potential contaminants include petroleum, synthetic lubricating oils and dirt.	
Groundwater: Depth to groundwater is greater than 250 ft at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Xylene was detected in one surface soil sample. Nickel, mercury, and barium were detected in subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage is directed topographically through a series of ditches to SWMU 85 (Stormwater Collection Point). SWMU 85 is an ephemeral lake basin (playa) in the southwest corner of the Base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume I, November 1993.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 32a-Oil/Water Separator 186 (#1-East), Conceptual Site Model Proposed Future Land Use: Industrial



NC0282 05/22/1996

Figure E-10. SWMU 32a-Oil/Water Separator 186 (#1-East) Conceptual Site Model, Cannon AFB

Table E-11

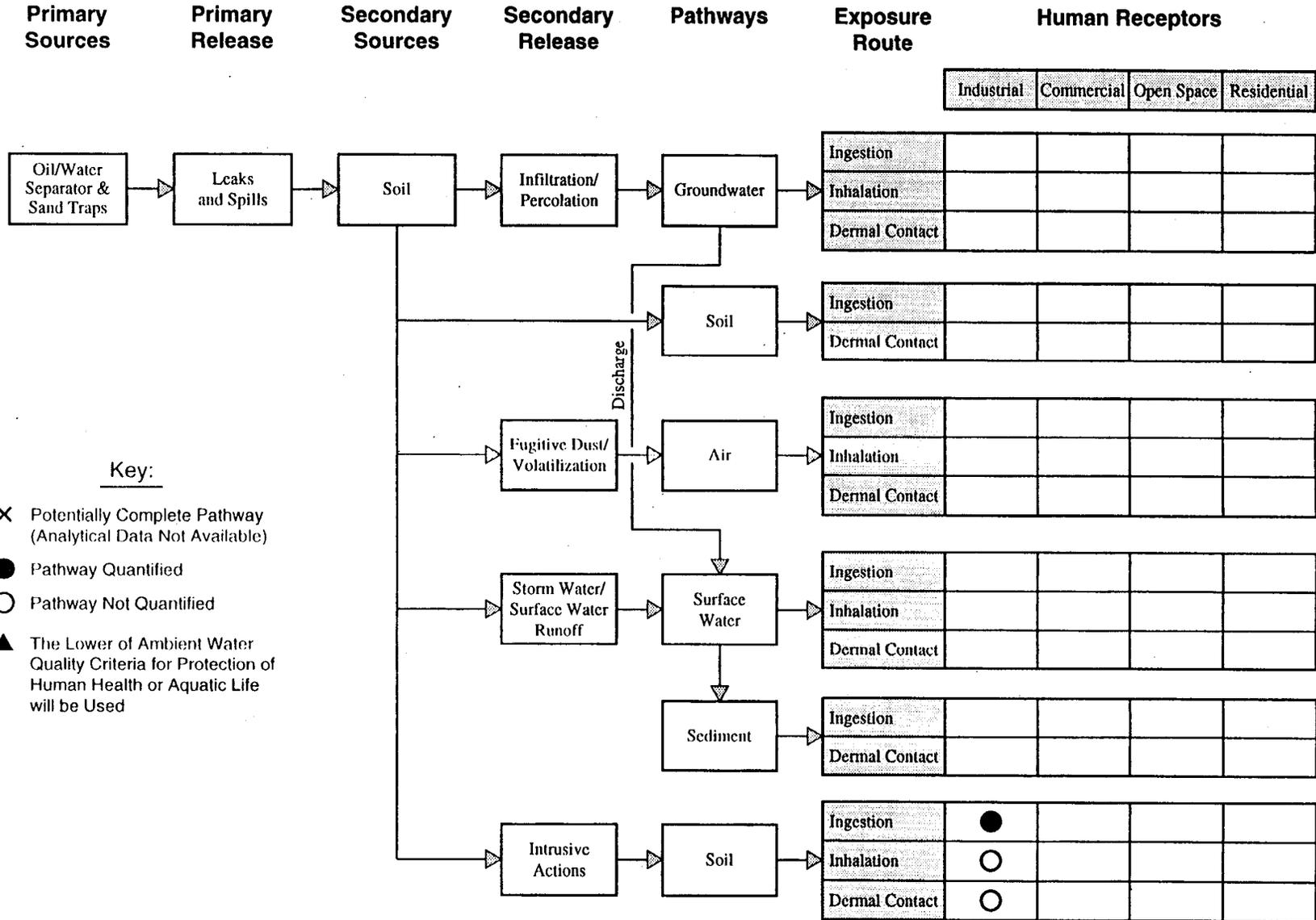
**Cannon Air Force Base
SWMU 33b - Oil/Water Separator 186 (#2-West)**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 186 (#2-West) is on the southwest corner of Building 186. The O/WS is constructed of concrete and is a 2-compartment underground unit, with a 584-gallon main compartment and a 140-gallon oil compartment. The O/WS has been active since 1971 and is still in use. The SWMU is underground and the area is covered with asphalt.	
Types of Waste: The O/WS receives wastewater from the cleaning of aircraft ground-support equipment at the washrack. Potential contaminants include petroleum, synthetic lubricating oils and dirt.	
Groundwater: The depth to groundwater is greater than 250 ft.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Acetone, chromium, and nickel were detected in surface soils. Acetone, arsenic, and barium were detected in subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage is directed topographically through a series of ditches to SWMU 85 (Stormwater Collection Point). SWMU 85 is an ephemeral lake basin (playa) in the southwest corner of the Base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume I, November 1993.

SWMU = Solid Waste Management Unit
O/WS = Oil/Water Separator

SWMU 33b-Oil/Water Separator 186 (#2-West), Conceptual Site Model Proposed Future Land Use: Industrial



NC0083 05/22/1995

Figure E-11. SWMU 33B-Oil/Water Separator 186 (#2-West) Conceptual Site Model, Cannon AFB

Table E-12

**Cannon Air Force Base
SWMU 38 - Oil/Water Separator 194**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 194 is located on the northeast corner of Building 194. The separator is an underground 3-compartment unit, with a 584-gallon main compartment and a 140-gallon oil compartment. The O/WS is currently in use. The site is covered with asphalt.	
Types of Waste: O/WS 194 receives washwater from aircraft maintenance operations. The facility that was historically served by this O/WS was a wheel and tire shop and an aircraft maintenance bay. The wheel and tire shop used PD-680, Turco stripping compound (containing 50% tetrachloroethylene), and Mirachem-100 for stripping and degreasing. The O/WS also received washwater from aircraft maintenance operations containing petroleum and synthetic lubricating oils. Past analysis of the O/WS indicated the presence of benzene, toluene, ethylbenzene, xylene, naphthalene, 2-methylnaphthalene, benzoic acid, di-n-butylphthalate, bis (2-ethylhexyl)phthalate, lead, and other compounds in the influent/effluent. Wastewater from the site is discharged to the Storm Drainage System which flows to the Stormwater Collection Point (SWMU 95).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Soil analysis indicates the presence of VOCs and metals in the surface and subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water drainage from SWMU 38 enters the base storm water drainage system and flows to the Stormwater Collection Point (SWMU 98). SWMU 95 is a stormwater collection ditch located east of the sewage lagoons.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	

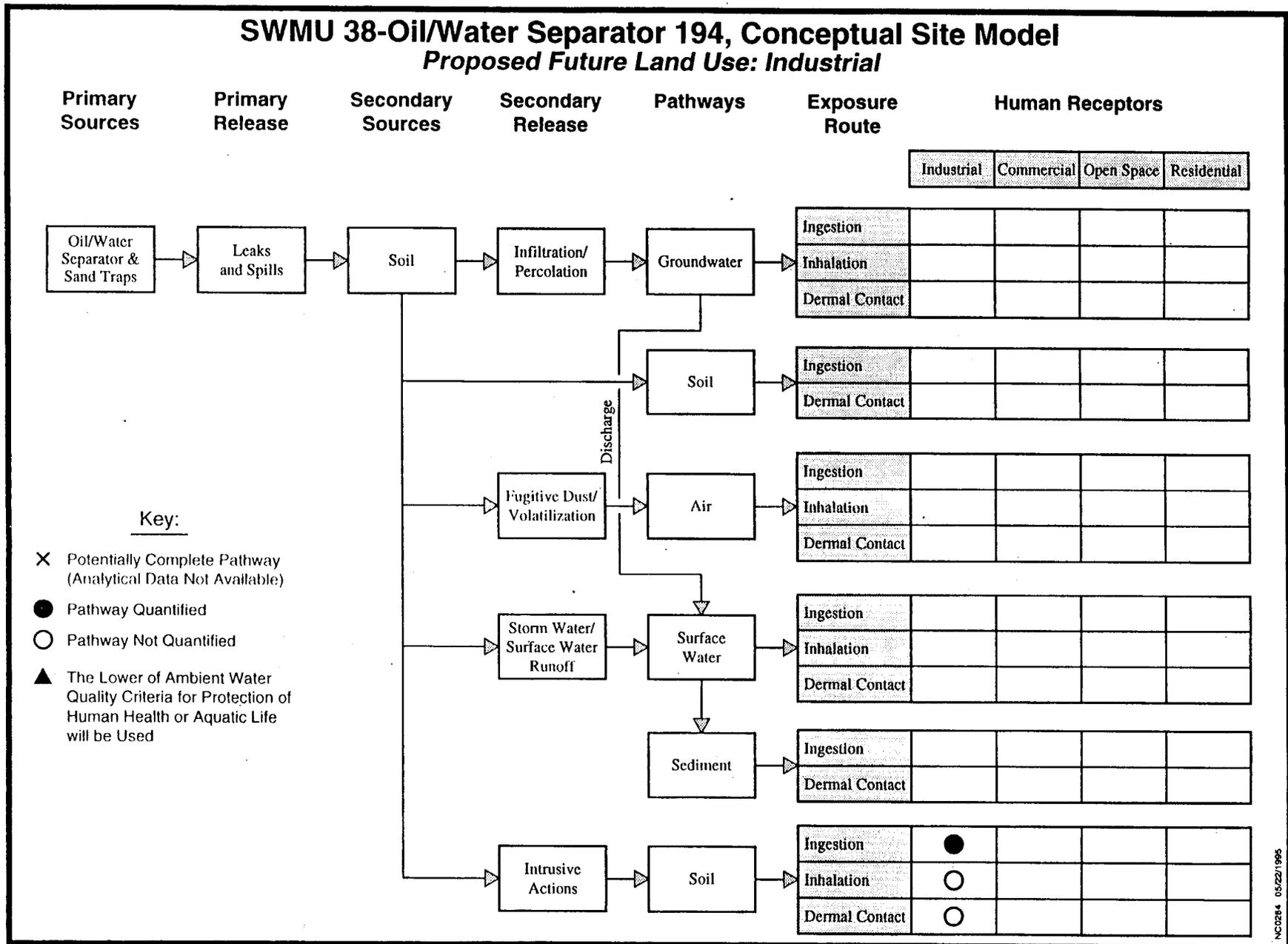
Table E-12

(Continued)

Site Specific Factors	Other Considerations
<p>Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.</p>	
<p>Data Availability: Soil data are available for this site.</p>	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume I, November 1993.

SWMU = Solid Waste Management Unit
 O/WS = Oil/Water Separator
 VOCs = Volatile Organic Compounds



NC0284 05/22/1995

Figure E-12. SWMU 38-Oil/Water Separator 194 Conceptual Site Model, Cannon AFB

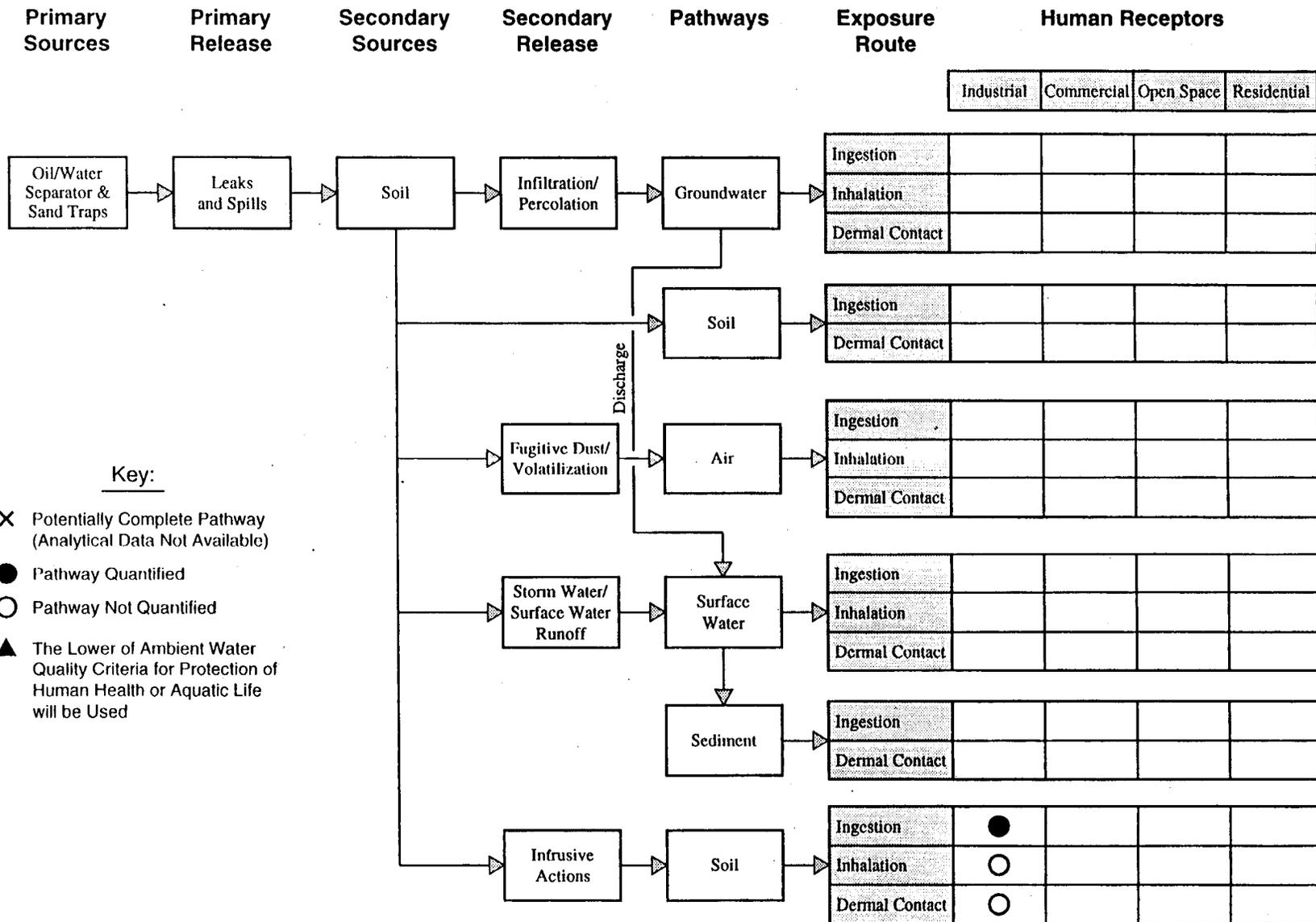
Table E-13

**Cannon Air Force Base
SWMU 39 - Oil/Water Separator 195**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 195 is located on the northeast corner of Building 195. The separator is an underground 2-compartment unit, including a skimmer, with a 584-gallon main compartment and a 140-gallon oil compartment. The O/WS is currently in use. The site is covered with asphalt.	
Types of Waste: The O/WS receives washwater from aircraft maintenance operations. The effluent contains petroleum and synthetic lubricating oils and dirt. The O/WS historically served a munitions facility. Past analysis of O/WS indicated the presence of benzene, toluene, ethylbenzene, xylene, naphthalene, 2-methylnaphthalene, benzoic acid, bis (2-ethylhexyl)phthalate, phenol, 4-methylphenol, lead, and other compounds in the influent/effluent of this separator. Wastewater from the site is discharged to the Storm Drainage System which flows to Stormwater Collection Point (SWMU 95).	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater was not encountered during soil boring.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soils at the site consist of fine sandy loam interbedded with thin to moderately thin layers of caliche. Soil analysis indicates the presence of TCL VOCs and metals in the surface and subsurface soils.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water from the site enters the base storm water drainage system and flows to the Stormwater Collection Point (SWMU 95). SWMU 95 is a stormwater collection ditch located in the east corner of the sewage lagoons.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.
 SWMU = Solid Waste Management Unit O/WS = Oil/Water Separator VOCs = Target Compound List Volatile Organic Compounds

SWMU 39-Oil/Water Separator 195, Conceptual Site Model Proposed Future Land Use: Industrial



NCCRS 05/22/1995

Figure E-13. SWMU 39-Oil/Water Separator 195 Conceptual Site Model, Cannon AFB

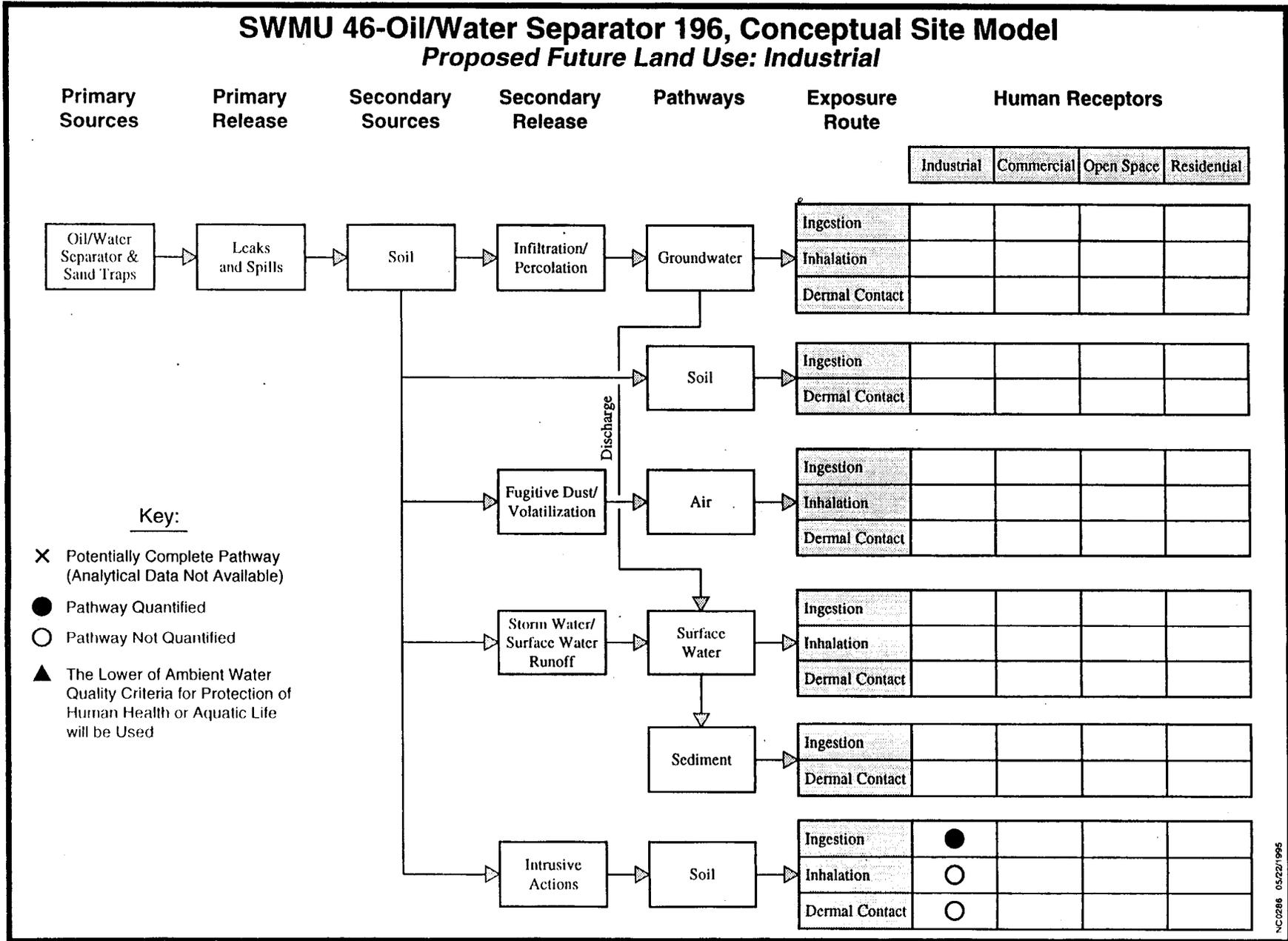
Table E-14

**Cannon Air Force Base
SWMU 46 - Oil/Water Separator 196**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 196 is located between Buildings 195 and 196. The dimensions of the O/WS are approximately 7 ft by 9 ft extending about 7.5 ft below the surface of the pavement. The area around the O/WS is paved with asphalt.	
Types of Waste: O/WS 196 receives wash water generated from aircraft maintenance operations. Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Depth to groundwater is greater than 200 ft.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soil sampling did not indicate the presence of organic contaminants at levels of concern. Inorganic chemicals were detected at levels of concern but were considered to be background concentrations.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Drainage from the site flows southeast toward the flightline, but no SWMU related contaminants would be carried in this drainage as the O/WS is below the surface.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1A, February 1994.

SWMU = Solid Waste Management Unit
O/WS = Oil/Water Separator



NC0286 05/22/1995

Figure E-14. SWMU 46-Oil/Water Separator 196 Conceptual Site Model, Cannon AFB

Table E-15

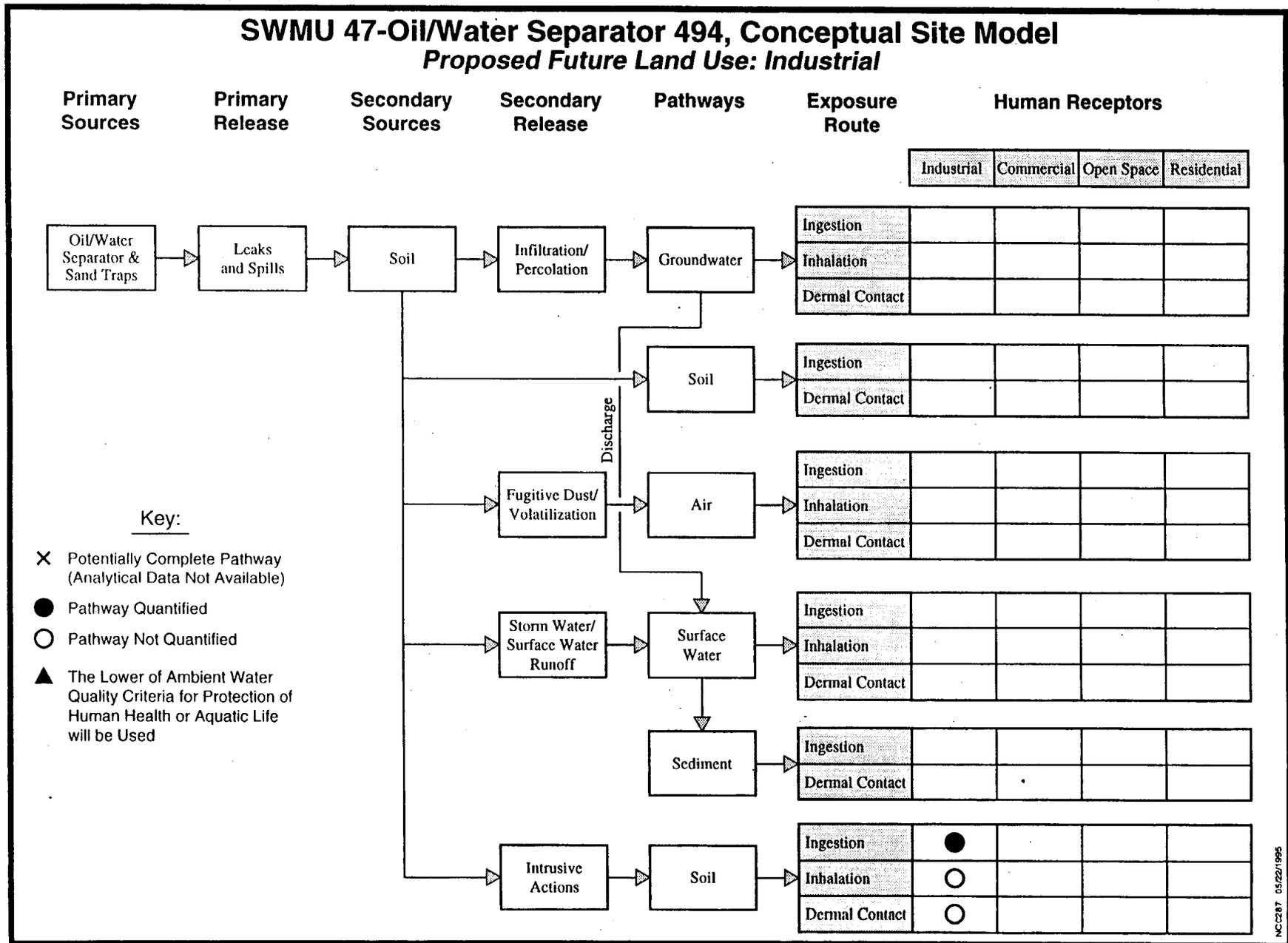
**Cannon Air Force Base
SWMU 47 - Oil/Water Separator 494**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 494 is located beneath the asphalt drive adjacent to the northeast wall of Building 494. The dimensions of the O/WS are approximately 1 ft by 2.5 ft extending to a depth of less than 10 ft below the surface of the pavement. A sand trap is also associated with this SWMU.	
Types of Waste: O/WS 494 receives washwater from personal vehicle maintenance operations in the Auto Hobby Shop (Building 494). Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, paint chips and metals.	
Groundwater: Depth to groundwater is greater than 200 ft and detected levels of analytes are negligible.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soil sampling did not indicate the presence of contaminants at levels above screening criteria.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Drainage from this site flows to the northeast, but SWMU related contaminants are not expected to be carried in this drainage as the O/WS is below the surface.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: This SWMU is located in an industrial/commercial area. However, surrounding land west of the SWMU is recreational open space.	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume IA, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator



NC287 05/22/1996

Figure E-15. SWMU 47-Oil/Water Separator 494 Conceptual Site Model, Cannon AFB

Table E-16

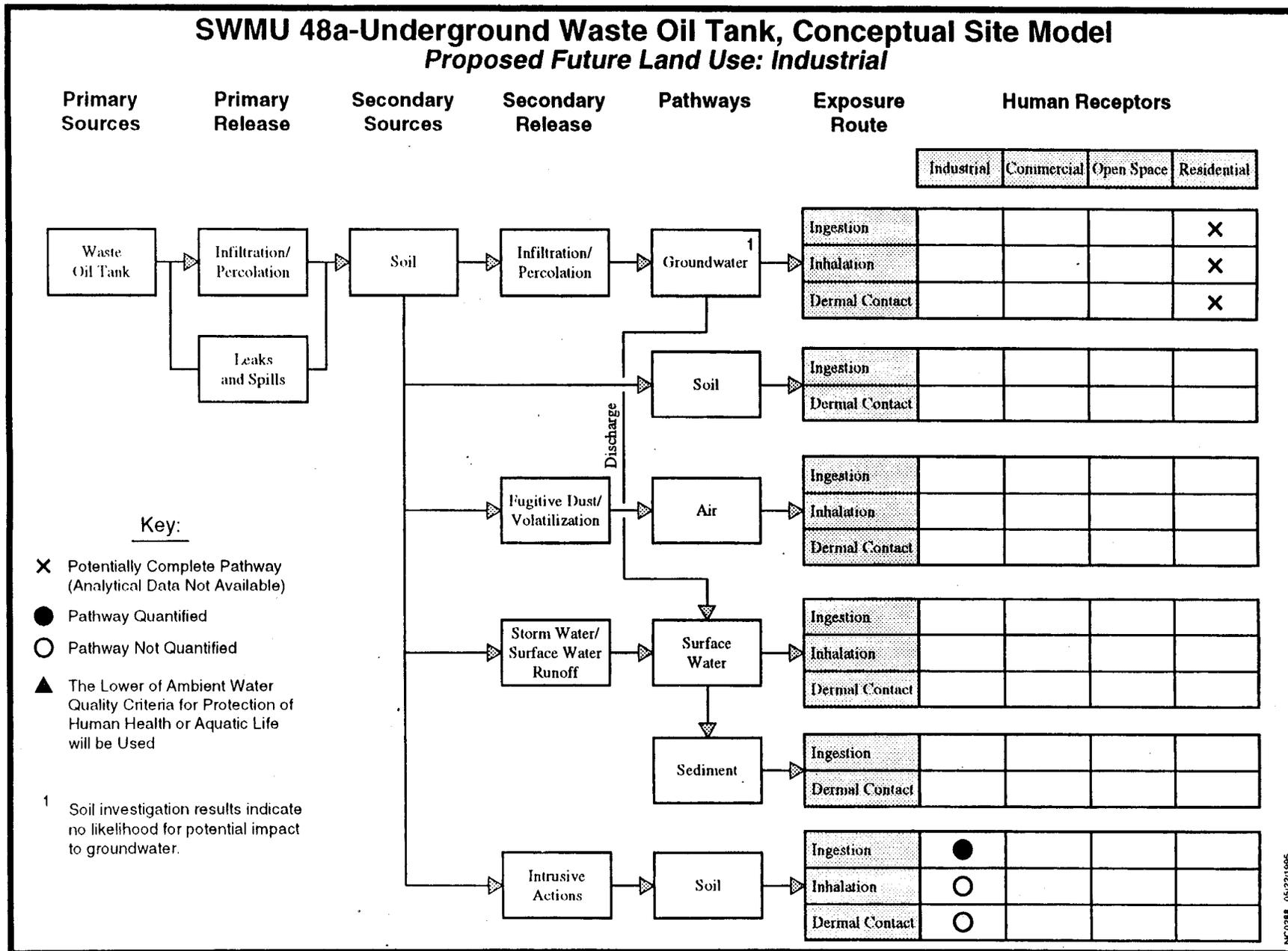
**Cannon Air Force Base
SWMU 48a - Underground Waste Oil Tank**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: SWMU 48a was a 20,000-gallon underground storage tank located about 125 ft east of the intersection of Argentinia and Torch. The tank and the associated piping were removed in 1988. The area is paved and is presently used as a parking lot. The tank was active from 1941 to 1985.	
Types of Waste: The tank was used to store waste products including waste oils, spent solvents, paint thinners, and recovered fuels. These products were periodically removed and placed elsewhere.	
Groundwater: Groundwater was not sampled at this SWMU. The soil contamination does not pose a risk to the groundwater.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: The asphalt pavement is underlain by a 5-7 inch layer of sandy gravel fill. Silty clay was encountered below the fill to depths ranging from 8-13 ft. Toluene was detected at concentrations that did not exceed the screening criteria (residential RBC). Under the silty clay present at 8-13 ft below ground surface lies zones of varying amounts of silts and sands, with some clays. VOCs, PAHs and other SVOCs, and metals were detected, but no exceedances of residential screening criteria used in the RFI were noted.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water is not present at this SWMU.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that this site lies below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase II, Cannon Air Force Base, New Mexico. April 1993.

SWMU = Solid Waste Management Unit
VOCs = Target Compound List Volatile Organic Compounds

PAHs = Polycyclic Aromatic Hydrocarbons
SVOCs = Semivolatile Organic Compounds



NC0288 05/22/1995

Figure E-16. SWMU 48a-Underground Waste Oil Tank Conceptual Site Model, Cannon AFB

Table E-17

**Cannon Air Force Base
SWMU 48b - Aboveground Storage Tank**

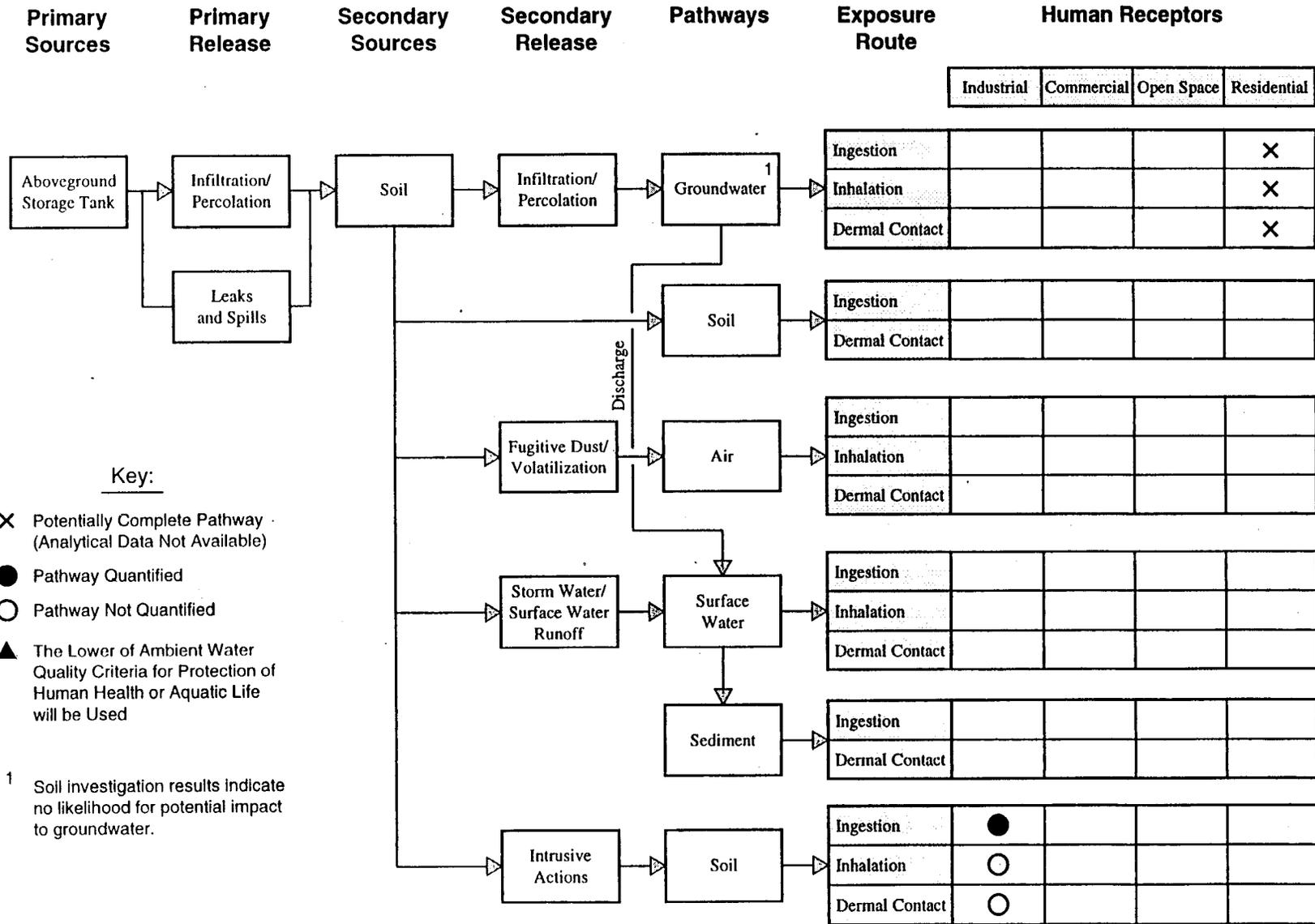
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: SWMU 48b was a 2,000-gallon aboveground storage tank located about 125 ft east of Argentinia and Torch. The storage tank has been removed and the site covered with asphalt.	
Types of Waste: Potential contaminants include waste oils, spent solvents, paint thinners, and recovered fuels.	
Groundwater: Groundwater was not sampled at this SWMU. The soil contamination does not pose a risk to the groundwater.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Under the silty clay present to 8-13 ft lie zones of varying amounts of silts and sands, with some clays. Toluene, bis(2-ethylhexyl)phthalate, fluoranthene, TRPH and metals were detected, but no exceedances of the screening criteria were noted.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water is not present at this SWMU.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1, November 1993.

SWMU = Solid Waste Management Unit

TRPH = Total Recoverable Petroleum Hydrocarbons

SWMU 48b-Aboveground Storage Tank, Conceptual Site Model Proposed Future Land Use: Industrial



NC0218 05/22/1995

Figure E-17. SWMU 48B-Aboveground Storage Tank Conceptual Site Model, Cannon AFB

Table E-18

**Cannon Air Force Base
SWMU 51 - Oil/Water Separator 375**

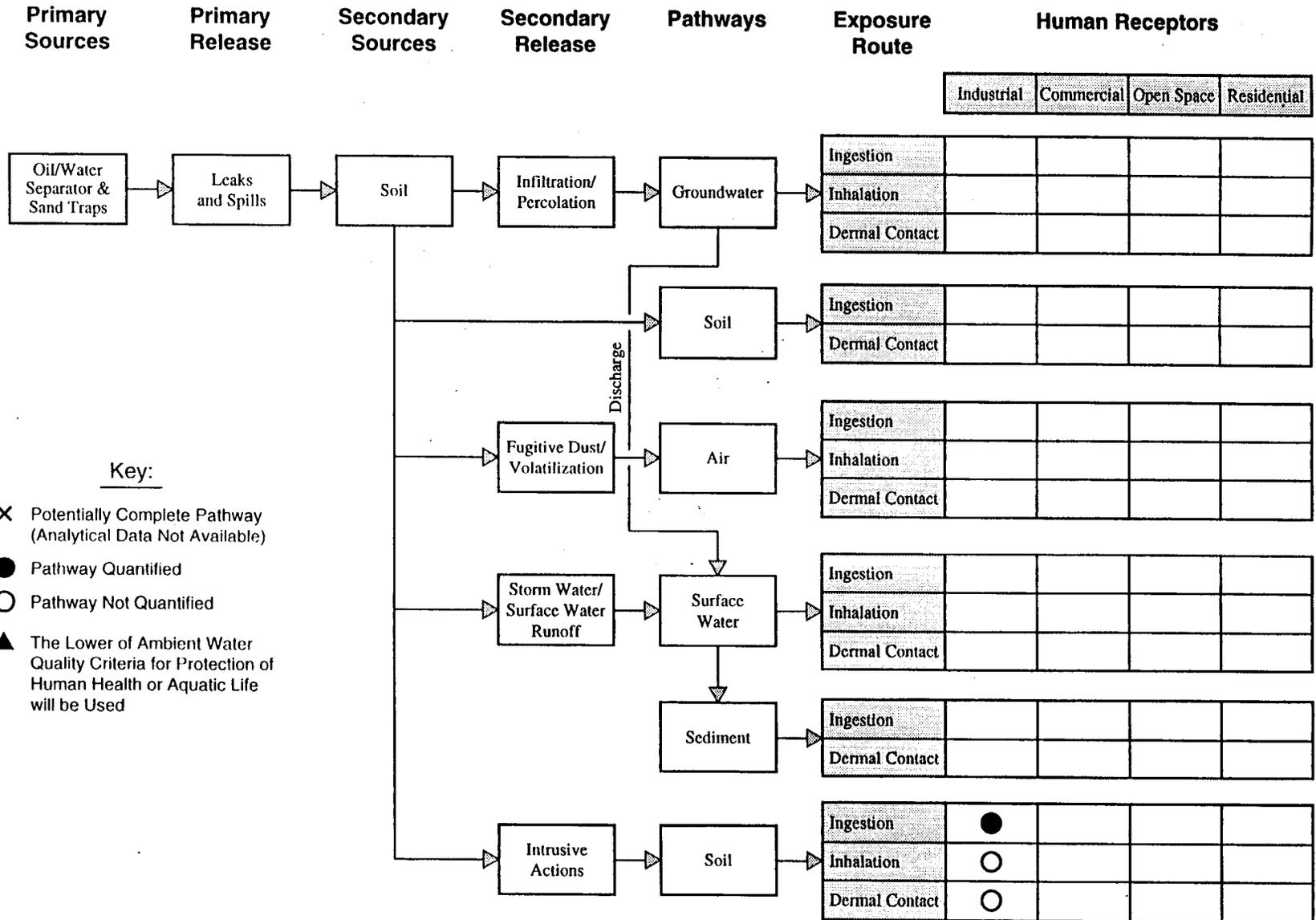
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 375 is located within the motor pool compound adjacent to the north-west side of Building 375. The capacity of the O/WS is approximately 1000 gallons and the unit extends to a depth of less than 5.5 ft below the surface of the pavement. The sites is covered by asphalt.	
Types of Waste: O/WS 375 receives wash water from light vehicle maintenance operations in Building 375. Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Depth to groundwater is greater than 200 ft and sampling has indicated contaminants are not being significantly transported vertically.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Soil sampling indicated that the highest concentrations of contaminants are in the near-surface soils. Concentrations decreased with depth and vertical extent of contamination has been characterized.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Drainage from the site flows northwest to a drainage channel that empties into a storm sewer. SWMU related contaminants are not expected to be carried in this drainage as the O/WS is below the surface.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat. An ecological risk assessment was initiated but no affected species were identified so the assessment was not carried through.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1A, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 51-Oil/Water Separator 375, Conceptual Site Model Proposed Future Land Use: Industrial



NC 0209 05/22/995

Figure E-18. SWMU 51-Oil/Water Separator 375 Conceptual Site Model, Cannon AFB

Table E-19

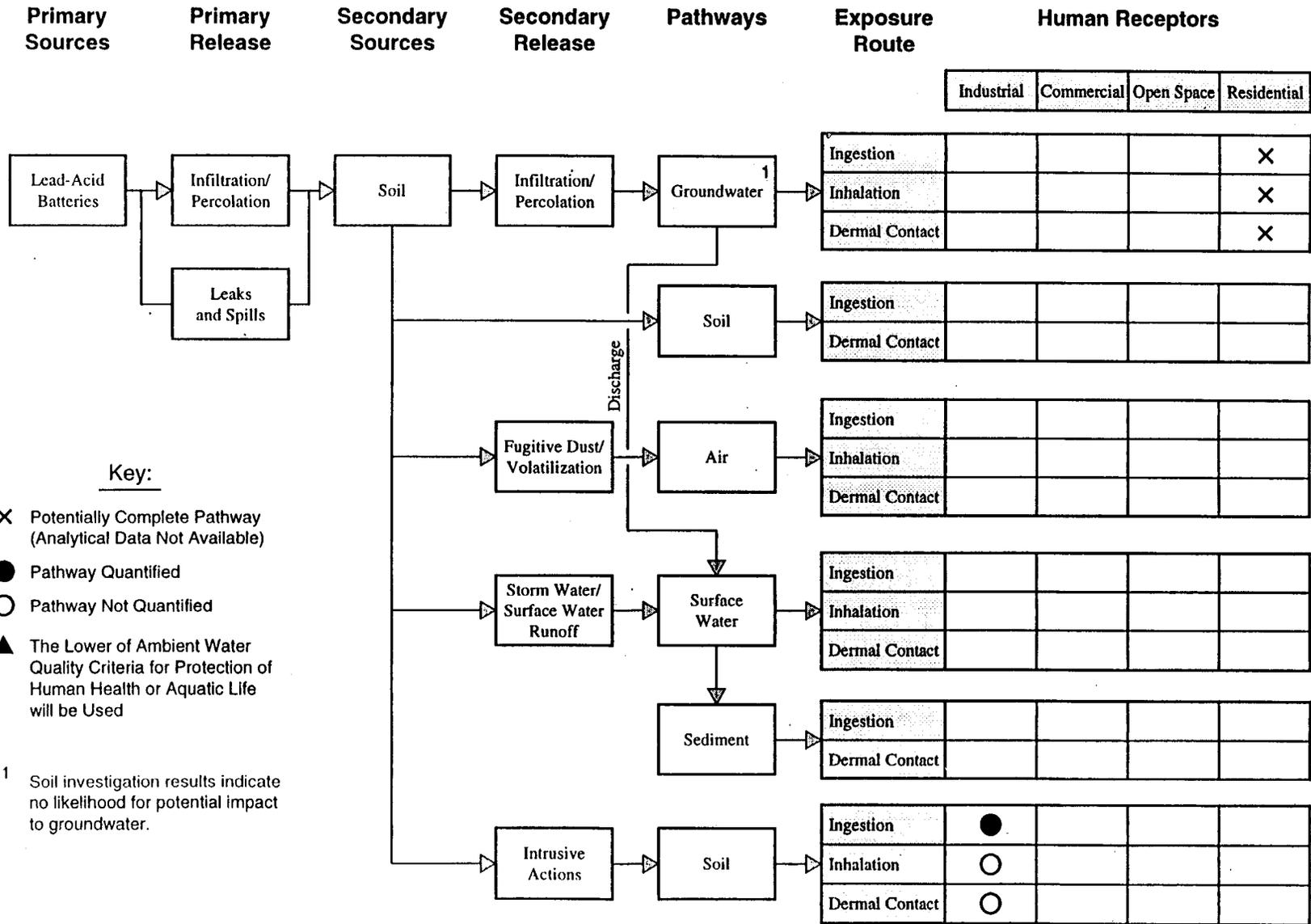
**Cannon Air Force Base
SWMU 55 - Lead-Acid Battery Accumulation Point**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: Used lead-acid batteries are stored in an open 8-ft square asphalt area approximately 100 ft north of the Vehicle Maintenance Shop. The site is covered with asphalt.	
Types of Waste: Lead and sulfuric acid.	
Groundwater: Groundwater was not sampled.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: The soil under the SWMU is sandy clay/silt with occasional gravel. Some areas appeared to have been backfilled during construction activities. No visual contamination or odors were observed during sampling. A 3-4 inch asphalt cover was present at the surface.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: No surface water bodies are present on this site. Storm water runoff flows off site to the northwest over a parking lot and ultimately into a street drainage ditch.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial. This site is surrounded by asphalt parking areas and other industrial buildings.	
Ecological Factors: An ecological assessment has not been done at this site. It is unlikely that this SWMU would be a habitat for many species as it is asphalt and the surrounding areas also are largely asphalt and highly trafficked areas.	
Data Availability: Phase I and Phase II soil boring data is available for both surface and subsurface soil. No groundwater sampling has occurred.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico, Draft, Volume 1A, April 1995.

SWMU = Solid Waste Management Unit

SWMU 55-Lead Acid Battery Accumulation Point, Conceptual Site Model Proposed Future Land Use: Industrial



Key:

- X Potentially Complete Pathway (Analytical Data Not Available)
 - Pathway Quantified
 - Pathway Not Quantified
 - ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used
- ¹ Soil investigation results indicate no likelihood for potential impact to groundwater.

NCC291 05/22/1996

Figure E-19. SWMU 55-Lead Acid Battery Accumulation Conceptual Site Model, Cannon AFB

Table E-20

**Cannon Air Force Base
SWMU 57 - Oil/Water Separator 379**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 379 is located within the motor pool compound adjacent to the southwest side of Building 379. The capacity of the O/WS is approximately 500 gallons. The dimensions of the unit are 5 ft by 6.5 ft and it extends to a depth of approximately 6 ft below the surface of the pavement. The site is covered by asphalt.	
Types of Waste: O/WS 375 receives washwater from heavy vehicle maintenance operations in Building 379. Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Depth to groundwater is greater than 200 ft and sampling has indicated that there are no constituents in the soil at levels of concern.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: No contaminants were found to be above screening levels. No visual evidence of leaks or spills was observed.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Drainage from the site flows southwestward from Building 379 and eventually empties into a storm sewer. SWMU related contaminants are not expected to be carried in this drainage as the O/WS is below the surface.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

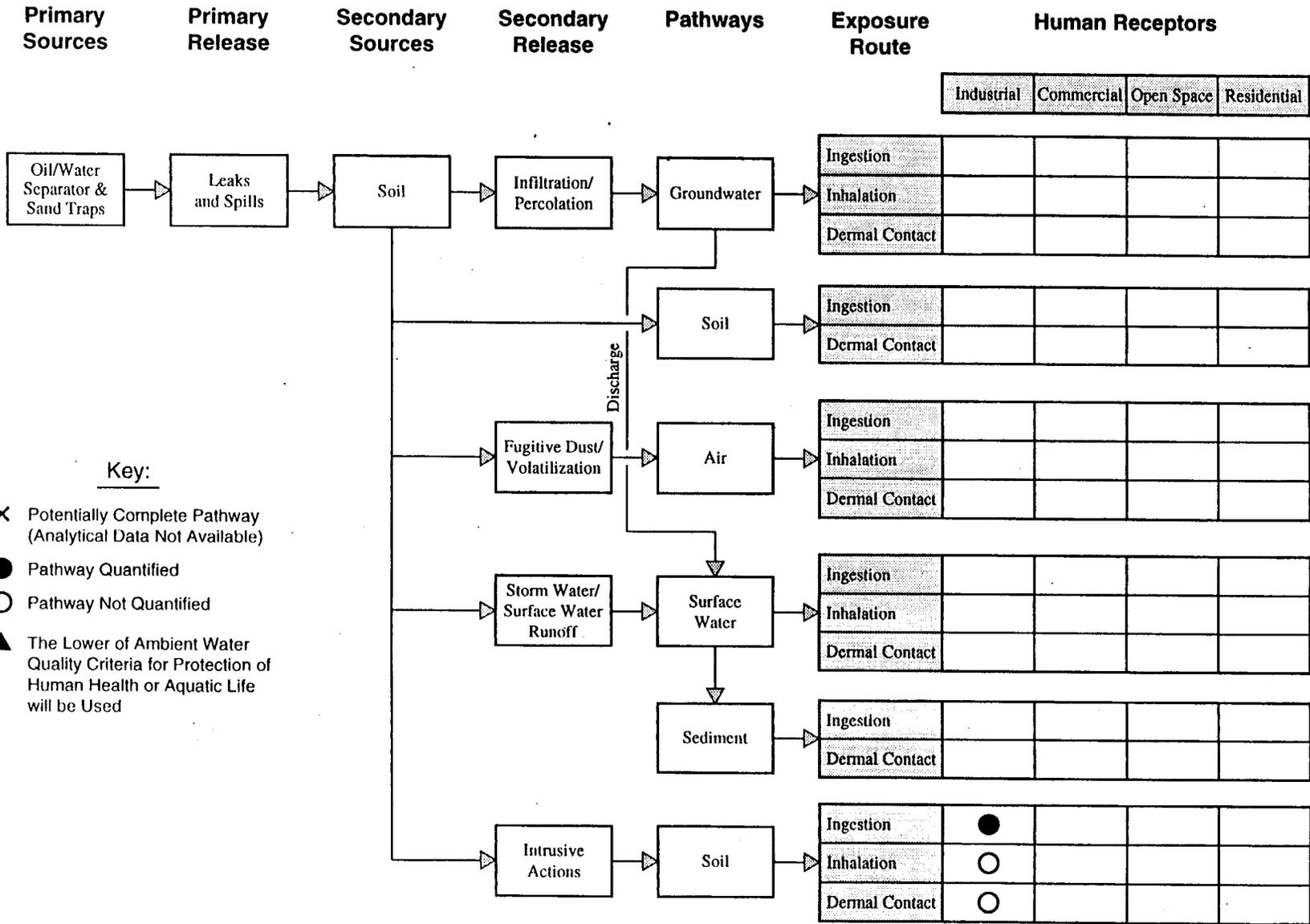
Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1A, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 57-Oil/Water Separator 379, Conceptual Site Model

Proposed Future Land Use: Industrial



Key:

- ✕ Potentially Complete Pathway (Analytical Data Not Available)
- Pathway Quantified
- Pathway Not Quantified
- ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used

Figure E-20. SWMU 57-Oil/Water Separator 379 Conceptual Site Model, Cannon AFB

Table E-21

**Cannon Air Force Base
SWMU 61, 62, and 63 - Facility 5077**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: Facility 5077 is a washrack that includes two 380-gallon sand traps (SWMUs 61 and 62) and an O/WS (SWMU 63) southeast of the concrete pad. Although designated to be an O/WS, SWMU 63 has been found to be a concrete box with no baffles. It appears to be a sand trap also. This facility is rarely used and may be completely out of service.	
Types of Waste: These units received washwater from motor vehicles washed down in the washrack. Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Sampling has indicated that depth to groundwater is approximately 200 ft.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Organic constituents were not detected at levels above the screening levels of the Base Line Risk Assessment (Woodward-Clyde 1994) at SWMUs 62 and 63. Inorganic constituents were not detected at levels outside the background ranges for any of the SWMUs.	Organics were detected at levels above the screening levels, but a Baseline Risk Assessment (Woodward-Clyde, 1994) has indicated that these contaminants do not pose a risk to human health or the environment. Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Drainage from the washrack flows into the sand traps and O/WS. The area around the O/WS is flat with no discernible gradient.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial/Open space. An area classified as recreational open space exists west of the SWMU a short distance away.	
Ecological Factors: Approximately 70% of the area in the immediate vicinity of the facility is asphalt. An ecological assessment evaluated risk to birds that use the grassy area around SWMU 63. The assessment concluded that no unacceptable risk to wildlife is expected.	
Data Availability: Soil data are available for this site.	

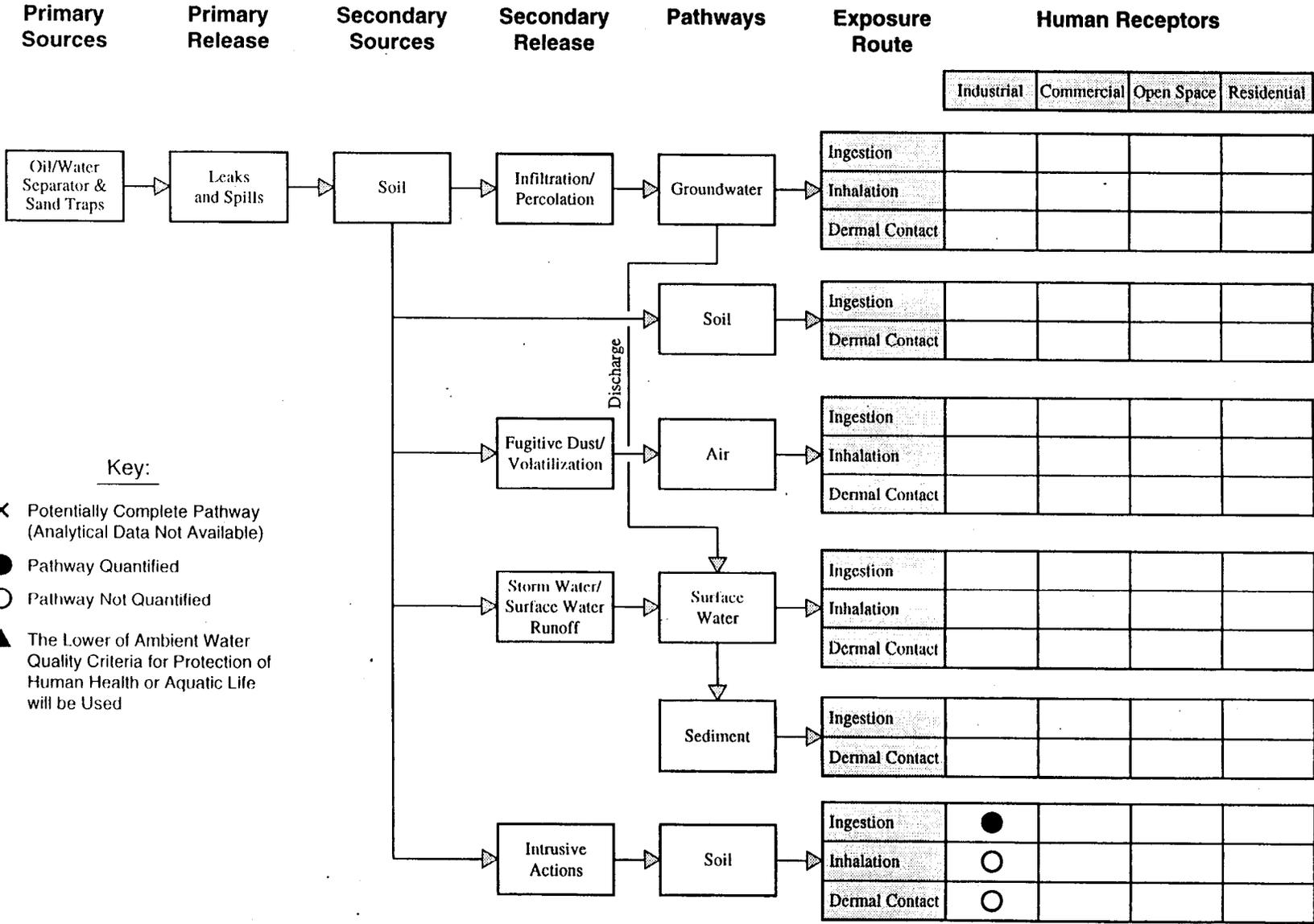
Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1B, February 1994.

Woodward-Clyde. Baseline Risk Assessment for Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico, Volume II, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMUs 61, 62, and 63-Facility 5077, Conceptual Site Model Proposed Future Land Use: Industrial



NC0295 05/22/1995

Figure E-21. SWMU's 61, 62, and 63-Facility 5077 Conceptual Site Model, Cannon AFB

Table E-22

**Cannon Air Force Base
SWMU 70 - Oil/Water Separator 326 and Leach Field**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: The O/WS is located in the northwest corner of the POL maintenance facility. The dimensions of the O/WS are approximately 1.5 ft by 2 ft and it extends about 6 ft below the surface. It is connected to an oil storage tank approximately 7 ft below the surface and a leach well 7 ft north of the O/WS. An area of stressed vegetation was identified northwest of the SWMU. Overflow of the O/WS draining to this area may be the cause. The unit has been inactive since 1993.	
Types of Waste: O/WS 326 received wash water from JP-4 fuel truck maintenance operations in Building 326. Potential contaminants include JP-4, petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: No groundwater samples have been taken and the vertical extent of soil contamination is unknown. Migration of contaminated groundwater off-site is possible if soil contamination has leached to groundwater.	Ingestion of groundwater is a potential exposure pathway due to the possibility of migration of contaminated water.
Soil: Soil sampling indicated the presence of contamination at this SWMU. The extent of contamination has not been adequately defined and additional field work along with a corrective measures study was recommended for this SWMU.	Because the unit is no longer in service, the source of contamination has been removed. There is concern regarding the leaching of soil contamination to groundwater.
Surface Water: Drainage from this site appears to flow to the north though the gradient is slight. There are no surface water bodies on this SWMU but it is possible that overflow from the separator may have drained offsite as runoff.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: No evaluation of ecological impacts has been conducted at this SWMU. The area is in a highly trafficked industrial use area so it is unlikely that the habitat is attractive to wildlife. Further investigation has been recommended regarding ecological risk.	

Table E-22

(Continued)

Site Specific Factors	Other Considerations
Data Availability: Soil data are available for this site. Additional sampling is required to establish extent of contamination in soil as well as to determine the presence or absence of contamination in groundwater.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume 1B, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

POL - Petroleum Oils and Lubricants

Table E-23

**Cannon Air Force Base
SWMU 77 - Civil Engineering Container Storage Area, Facility No. 4038**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: The Container Storage Area is an open concrete pad approximately 150 ft by 250 ft. It is located east of Bldg 252 and south of the north boundary fence of the base. The area is secured by an 8 ft fence and a locked gate. The pad is the remaining foundation of the Portair Airfield Hangar from the 1930s. Grass surrounds the pad. The site is also known as Facility 4038.	
Types of Waste: Waste oil, solvents, aviation fuel, waste paint, PCBs and pesticides. Previous visual inspections have shown the presence of 55-gallon drums containing water, oil, solvents, and asphaltic material.	
Groundwater: Fate and transport modeling done in the Phase I RFI indicated that contaminants in soil at SWMU 77 would not be transported to groundwater at concentrations of concern. The Phase II chemicals of concern were detected almost entirely in the top 5 ft of soil and at low concentrations making it unlikely that groundwater would be impacted. No groundwater sampling has been done at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: The soil under the SWMU is sandy clay/silt with occasional caliche. No visual contamination or odors were observed during sampling. Drilling and sampling activities for the Phase II investigation were designed to assess the lateral extent of soil contamination to the 20-ft depth.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with concrete.
Surface Water: There are no surface water bodies or drainage channels present on the site. Precipitation runs off the pad on all sides. Native surfaces in the area have no discernible slope.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Open space. This site is surrounded by a small grassy perimeter on all sides with a driveway leading into the south side. The base boundary fence is approximately 50 ft north of the storage area perimeter fence.	It is expected that the land use for the offsite area immediately adjacent to the base boundary would also be open space because of the presence of railroad tracks. This land is not expected to be used for recreational activities and would be categorized as restricted access due to its close proximity to the runway and railroad tracks.

Table E-23

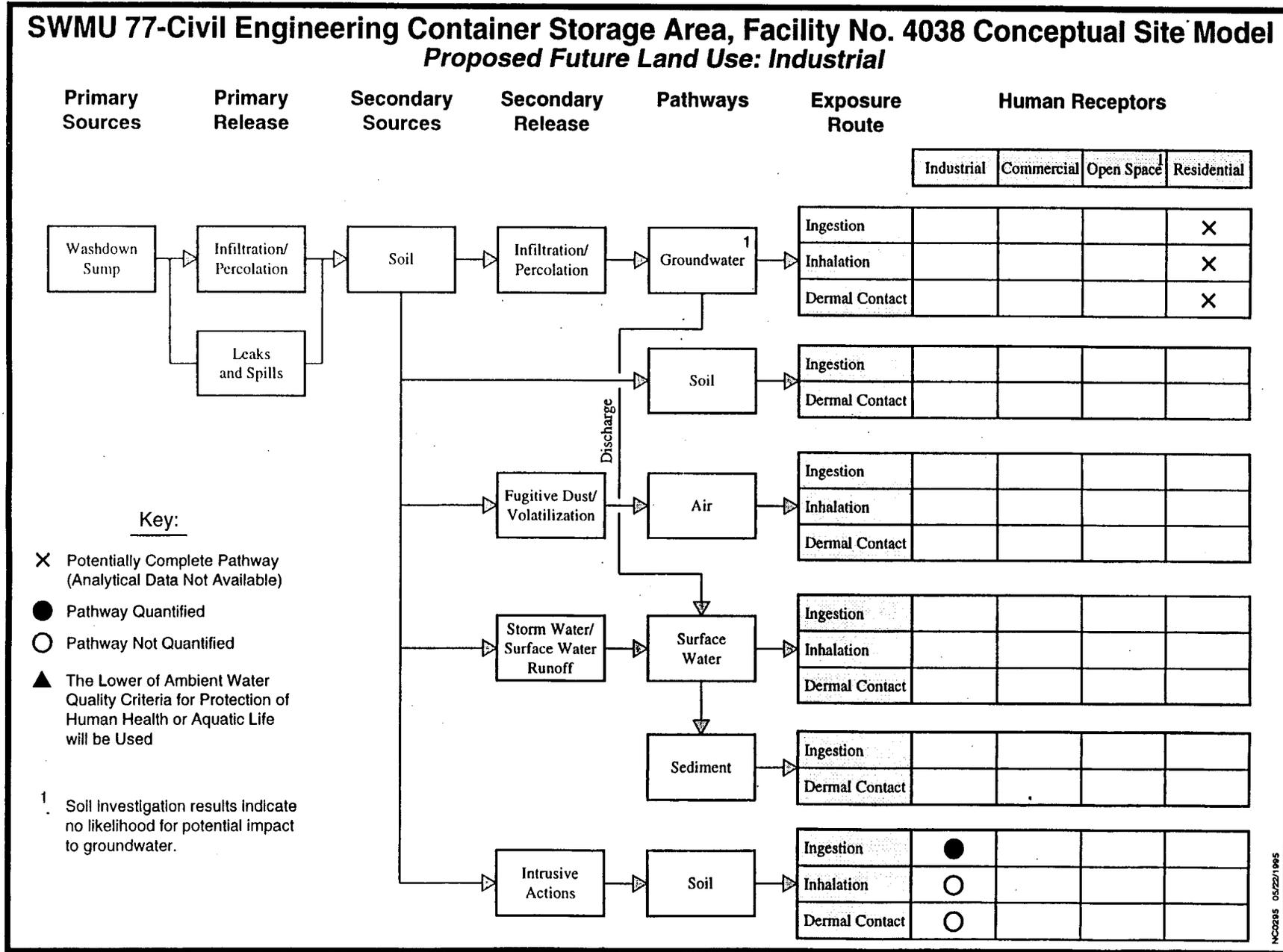
(Continued)

Site Specific Factors	Other Considerations
Ecological Factors: An ecological assessment has been performed at this site. The results of this assessment showed no unacceptable risks due to chemical releases at this SWMU.	
Data Availability: Phase I and Phase II soil boring data are available for both surface and subsurface soil. No groundwater sampling has occurred.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico, Draft. Volume 1A, April 1995.

SWMU = Solid Waste Management Unit

RFI = RCRA Facility Investigation



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Figure E-23. SWMU 77-Civil Engineering Container Storage Area, Facility No. 4038, Conceptual Site Model, Cannon AFB

Table E-24

**Cannon Air Force Base
SWMU 83 (ST-27) - Sump for Flight Apron Washdown**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: This SWMU was a sump located about 90 ft northwest of Building 120. The sump was constructed in a concrete slab and was removed in 1993. The site is partially covered with asphalt.	
Types of Waste: Potential contaminants include petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals. The separator also received rain and wash water.	
Groundwater: Groundwater was not sampled at this SWMU.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Below the asphalt pavement lies a silty clay fill material to about 4.2 ft. Toluene, 2-butanone, and phenol were detected, but did not exceed the screening criteria used in the RFI. Below the fill layer, a silty clay alluvium was found to a depth of 18 ft. A light brown, hard silt was encountered below the silty clay. PAHs and TRPH were detected in the near surface soils; only benzo(a)pyrene was found to exceed the residential screening criteria used in the RFI.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water is not present at this SWMU.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, in addition to the fact that the actual O/WS is below asphalt, this SWMU is not considered to be suitable ecological habitat.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase II, Cannon Air Force Base, New Mexico. April 1994.

SWMU = Solid Waste Management Unit
TRPH = Total Recoverable Petroleum Hydrocarbon

PAHs = Polycyclic Aromatic Hydrocarbons

Table E-25

**Cannon Air Force Base
SWMUs 86-90 (SD-11) Engine Test Cell Area**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: The test cell (SWMU 86) was an enclosed tank and rested on a concrete slab near a taxiway in the southeastern area of the base. Aircraft engines were cleaned with steam and operated to perform various tests at this site. SWMU 86 initially discharged to an overflow pit (SWMU 87). An oil/water separator (SWMU 90) was added; this discharged to a leach field (SWMU 88). The effluent from SWMU 90 was likely discharged to an evaporation pond (SWMU 89); SWMU 89 was constructed in the area of the former leach field. The unit was active from 1965 to 1988.	
Types of Waste: Solvents and fuels from aircraft engine testing. The possible contaminants are the same for all units.	
Groundwater: Groundwater was not investigated at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: The surface soils underlying the Engine Test Cell Area consist of sandy loam and loamy sand of the Amarillo soil group to only a few feet. The near surface soils (upper 30 ft) at this site consist of well sorted sands of the Ogallala formation and thin layers of caliche. Acetone, toluene, TPH, Sn, Ba, Cd, Cr, Co, Cu, Pb, Mn, Ni, and Zn were detected at elevated concentrations.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Surface water may collect from time to time in the evaporation pond, but is not permanent.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: This site is disturbed and industrial and has little potential for impacts to ecological receptors.	
Data Availability: Soil data are available for this site.	

Source: Remedial Investigation Report for 18 Solid Waste Management Units, Woodward-Clyde and Consultants, 1992.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

TPH = Total Petroleum Hydrocarbons

Table E-26

**Cannon Air Force Base
SWMU 92 - Oil/Water Separator 5120**

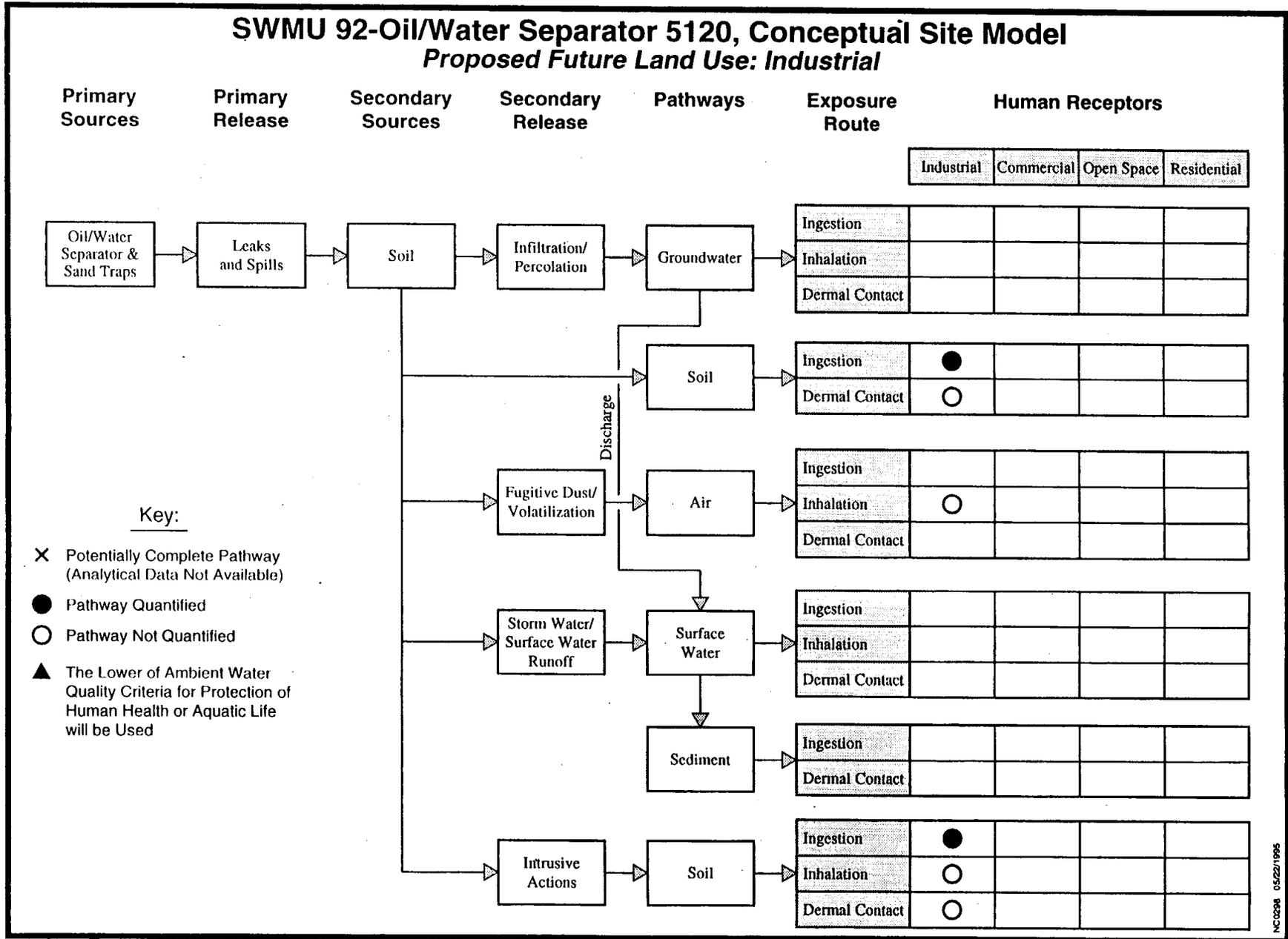
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 5120 and the associated leach well are located in a grassy area east of Power Check Pad No. 5120. The dimensions of the O/WS are approximately 4 ft by 6 ft. The depth is believed to be less than 10 ft below ground surface. The O/WS and the leach well remain in place though the unit has been inactive since 1988.	
Types of Waste: O/WS 5120 received washwater from aircraft maintenance operations in Building 5120. Potential contaminants include JP-4 fuel, petroleum and synthetic lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Fate and transport modeling for SWMU 92 indicated that contamination from soil would not migrate to groundwater in sufficient quantities to pose risk.	Based on these modeled concentrations, the groundwater pathway has been determined to be insignificant.
Soil: A Baseline Risk Assessment (Woodward-Clyde, 1994) for this SWMU indicated that no significant risks are expected from contamination related to this SWMU. The SWMU was not carried forward to Phase II.	
Surface Water: There are no surface water bodies on or associated with this SWMU. There is no discernible gradient and evidence of grading and reseeded are visible on the surface.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial. This SWMU is located in an industrial area in close proximity to the flightline.	
Ecological Factors: An ecological assessment at this site indicated that no unacceptable ecological risks due to chemical releases are expected at this site.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume IA, February 1994.

Woodward-Clyde. Baseline Risk Assessment for Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico, Volume II, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator



NC0036 05/22/1995

Figure E-26. SWMU 92-Oil/Water Separator 5120 Conceptual Site Model, Cannon AFB

Table E-27

**Cannon Air Force Base
SWMU 93 - Oil/Water Separator No. 5121**

Management Action Plan

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October 1996

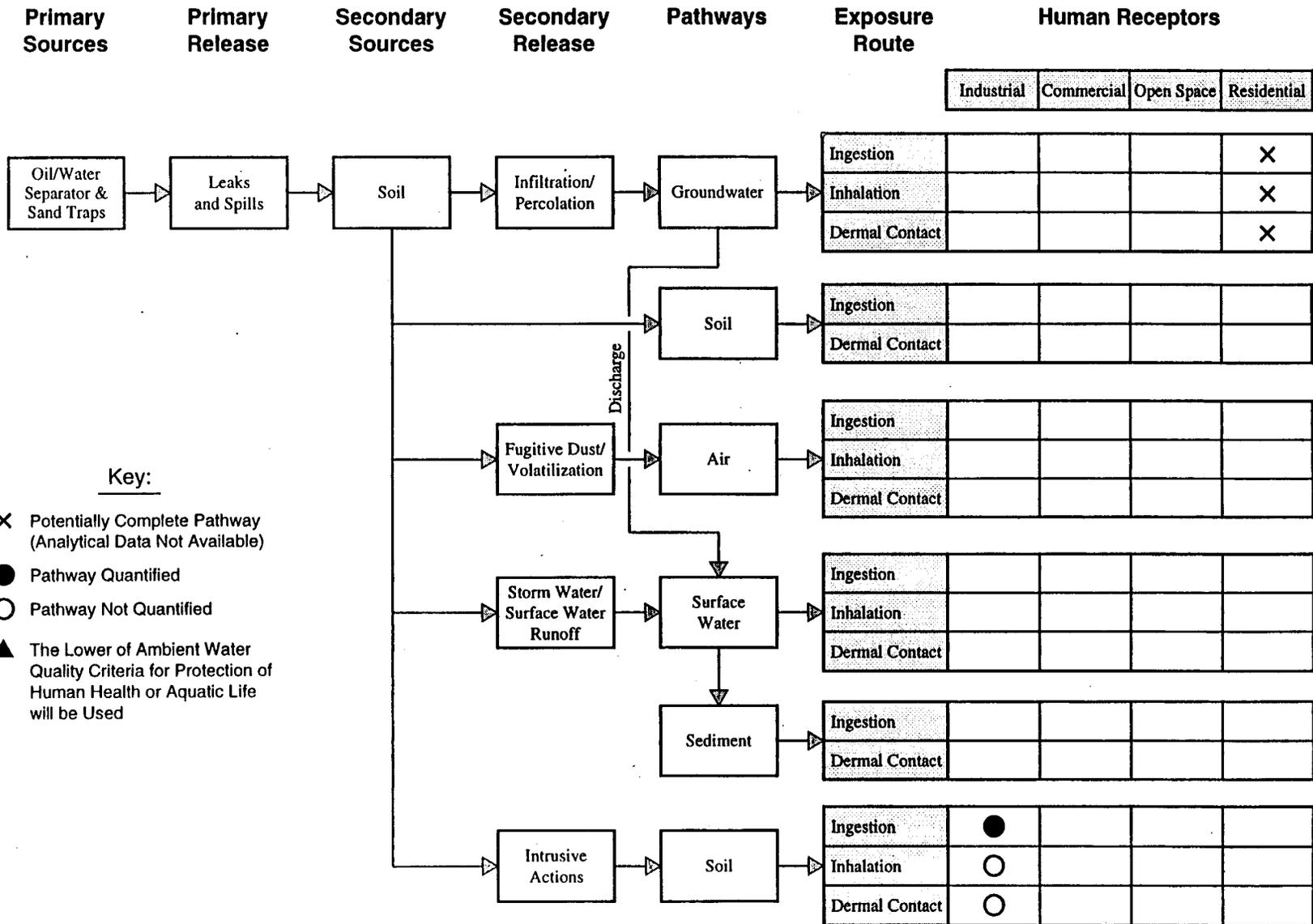
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: O/WS 5121 was formerly located under the hush house portion of Building 5123, a jet engine testing facility. The O/WS and the leach well it discharged to were both removed in 1988 in conjunction with the demolition of the building. A new building was constructed and covers the site.	
Types of Waste: JP-4, petroleum and synthetic lubricating oils, greases, solvents, and metals.	
Groundwater: Fate and transport modeling for the Phase 1 investigation showed migration of contaminants to groundwater (200-300 ft below ground surface) to be an insignificant pathway. In addition, only low levels of contamination were found in the subsurface soils.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Silty clay fill material predominates from the surface to approximately 4 ft below the site with traces of caliche and fine sand. Silty sand was found below the fill material. No visual signs of contamination were encountered.	Building 5123 now covers this site greatly reducing the possibility of exposure to contaminated soil. Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: Storm water runoff is considered to be an insignificant pathway due to the fact that the O/WS is primarily below ground and surface spills would be minimal.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: An ecological risk assessment conducted in conjunction with the Phase I investigation showed a low potential for risk to predatory birds. It is unlikely that this risk is significant because of the relatively small size of the SWMU in comparison to the hunting range of the birds.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico, Draft, Volume 1A, April 1995.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

SWMU 93-Oil/Water Separator 5121, Conceptual Site Model Proposed Future Land Use: Industrial



- Key:**
- X Potentially Complete Pathway (Analytical Data Not Available)
 - Pathway Quantified
 - Pathway Not Quantified
 - ▲ The Lower of Ambient Water Quality Criteria for Protection of Human Health or Aquatic Life will be Used

NC2299 05/27/1995

Figure E-27. SWMU 93-Oil/Water Separator 5121 Conceptual Site Model, Cannon AFB

Table E-28

**Cannon Air Force Base
SWMU 94 - Oil/Water Separator 5144**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: Facility 5144 is a two-bay vehicle washrack used for personal vehicle washing operations. The SWMU consists of two sand traps within the confines of the washrack and an additional sand trap located in a grassy area northwest of the washrack. This sand trap was mistakenly identified as an O/WS, but continues to be referred to as O/WS 5144. The units are believed to be less than 10 ft below ground surface. Facility 5144 has been dismantled and has not been used since 1988. The wash bays and sand traps remain intact. Their present contents are unknown.	
Types of Waste: The sand traps received washwater from personal vehicle washing operations. Potential contaminants include lubricating oils, fuels, greases, solvents, and metals.	
Groundwater: Fate and transport modeling for SWMU 94 indicated that contamination from soil would not migrate to groundwater in sufficient quantities to pose risk.	Based on modeled concentrations, the groundwater pathway has been determined to be insignificant.
Soil: Soil sampling indicated the presence of contaminants at levels above screening criteria. A Baseline Risk Assessment (Woodward-Clyde, 1994) for this SWMU indicated that no significant risks are expected from contamination related to this SWMU.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities occur because the site is covered with asphalt.
Surface Water: There are no surface water bodies on or associated with this SWMU. The uncovered washrack drains into the sand trap. Runoff from the grassy area containing the additional sand trap grades to the east toward a northwest trending surface ditch.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial. This SWMU is located in an industrial area in close proximity to the flightline.	

Table E-28

(Continued)

Site Specific Factors	Other Considerations
Ecological Factors: An ecological assessment of this site indicated that no unacceptable ecological risks due to chemical releases are expected at this site.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume IA, February 1994.

Woodward-Clyde. Baseline Risk Assessment for Appendix III SWMUs-Phase I, Cannon Air Force Base, New Mexico. Volume II, February 1994.

SWMU = Solid Waste Management Unit

O/WS = Oil/Water Separator

Table E-29

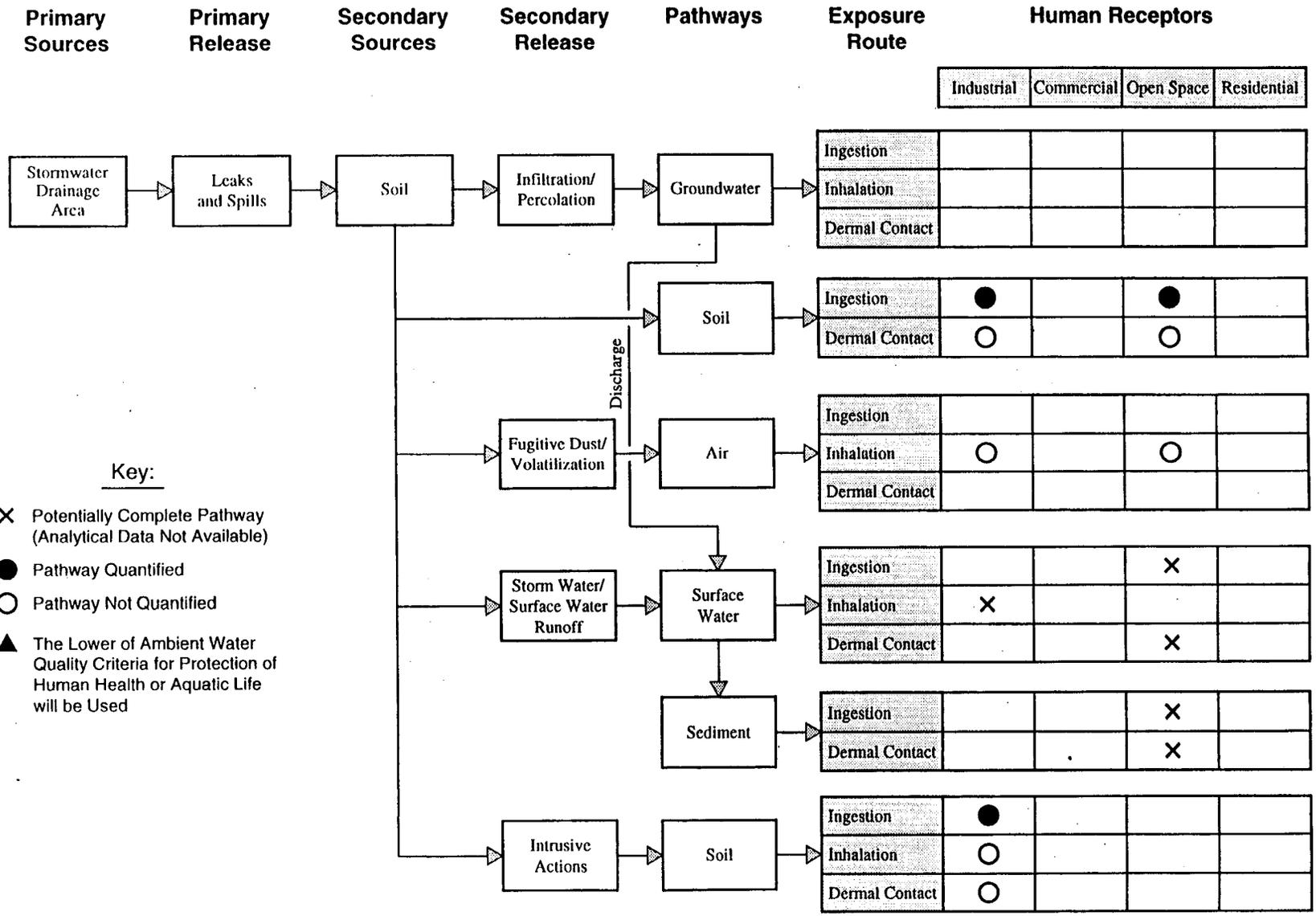
**Cannon Air Force Base
SWMU 95 (SD-20) - NE Stormwater Drainage Area**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial and Open Space (Restricted access)	
Site: This area is a natural depression which receives water from several O/WS, runoff water from runways and storm water drains in the east-central portion of the base. The ditch is approximately 40 ft wide and extends under a road to a field. The northeast end of the ditch is marked by a concrete culvert and is surrounded by heavy vegetation.	
Types of Waste: Oil and grease, fuels, solvents, and aircraft cleaning compounds have been identified in the O/WS effluent.	
Groundwater: The Ogallala Aquifer is approximately 265 ft below ground surface. Groundwater was not investigated at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: Two distinct sand units (Ogallala fluvial deposits) are present beneath this site. The upper unit consists of very fine grained pale brown sands. The lower unit is composed of fine grained light to medium orange sands. Long chain organics common to JP-4 were found at low concentrations.	
Surface Water: Stormwater and surface runoff from the central part of the flight services area collects in the ditch at this site.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Open space	
Ecological Factors: This area becomes flooded for a portion of the year and may serve as habitat for migratory birds.	
Data Availability: Soil data are available for this site.	

Source: Remedial Investigation Report for 18 Solid Waste Management Units, Woodward-Clyde and Consultants, 1992.

O/WS = Oil/Water Separator

SWMU 95 (SD-20)-NE Stormwater Drainage Area, Conceptual Site Model Proposed Future Land Use: Industrial/Open Space



NC3301 05/22/1995

Figure E-29. SWMU 95 (SD-20)-NE Stormwater Drainage Area Conceptual Site Model, Cannon AFB

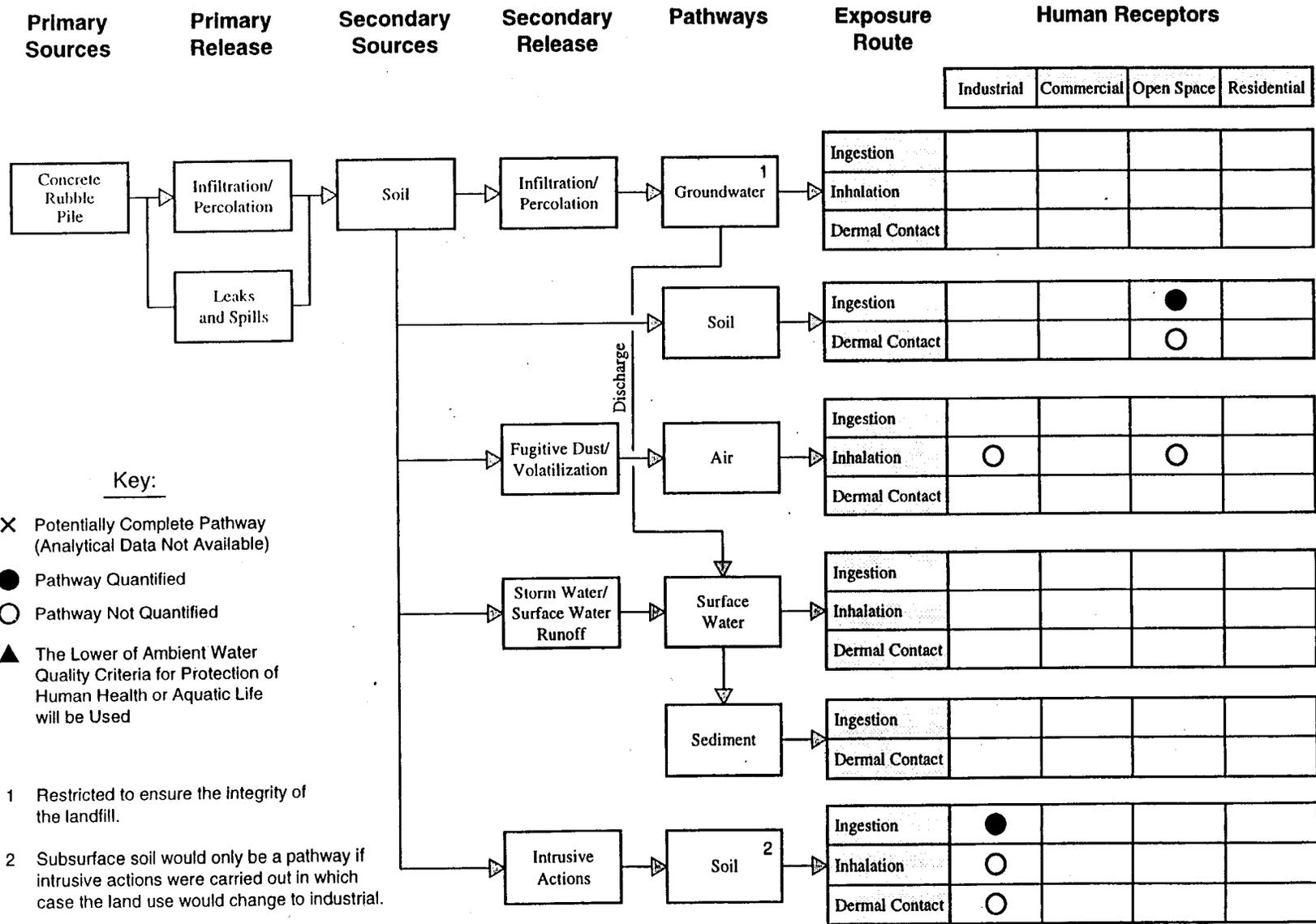
Table E-30
Cannon Air Force Base
SWMU 97 (LF-25) - Concrete Rubble Pile

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: SWMU 97 is a landfill occupying approximately 29 acres within the Base boundary in the east-central portion of the base. Disposal was discontinued in 1992. Surface rubble covers the SWMU.	
Types of Waste: Temporary buildings and runways were demolished and disposed of following World War II. Rubble includes concrete, wood, metal, asbestos tile and pipe, and asphalt mixed with soil. Potential contaminants include VOCs, SVOCs, pesticides, herbicides, TPH, and metals.	
Groundwater: Depth to groundwater at Cannon AFB is approximately 250 ft or greater. Groundwater were taken from a monitoring well downgradient from the landfill. Carbon disulfide was detected at levels that exceeded the residential screening criteria used in the RFI. However, it was determined that this constituent was a laboratory contaminant.	No groundwater sampling was conducted for this investigation. However, monitoring wells have been installed in the area around this SWMU. Sampling results from these wells will be evaluated if such data becomes available.
Soil: No information is available on the lithology of the site. Trenches have been excavated in the landfill but the geological profile is not available.	
Surface Water: Surface water from the site enters the base storm water drainage system and flows to the Stormwater Collection Point (SWMU 85). SWMU 85 is an ephemeral lake basin located in the southwest corner of the base.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	The eastern Base boundary is approximately 600 ft to the east of the lake. Dairy cattle were seen grazing during the site visit immediately adjacent to the Base boundary fence and agricultural crops are irrigated with the water from the Playa Lake.
Ecological Factors: The landfill is wooded and relatively undisturbed. It is likely a habitat for many different types of wildlife.	
Data Availability: Groundwater and soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico. Draft, Volume 1, April 1995.

SWMU = Solid Waste Management Unit

SWMU 97 (LF-25)-Concrete Rubble Pile, Conceptual Site Model Proposed Future Land Use: Open Space



NC0302 05/22/1995

Figure E-30. SWMU 97 (LF-25)-Concrete Rubble Pile Conceptual Site Model, Cannon AFB

Table E-31

**Cannon Air Force Base
SWMUs 101 and 102 (SD-21) - Wastewater Treatment System-Lagoons and Effluent Discharge**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: SWMU 101 consists of two unlined surface impoundments which have been in use since 1966. The lagoons operate in series and have a total surface area of 32 acres. They are constructed with unlined earth bottoms and have concrete lined banks. SWMU 102 is the effluent discharge for the lagoons.	
Types of Waste: Combined sanitary and industrial wastewater is treated in the lagoons.	
Groundwater: Saturated zones were detected at approximately 275 ft below ground surface. Groundwater flow direction is to the southeast. Samples taken from four wells at SWMU 101 showed groundwater had not been impacted by the SWMU.	
Soil: Soils below the sludge/sediment layer were not sampled.	
Surface Water: The lagoons are surface water bodies, with an average depth of 3.5 ft. The maximum depth is 4.5 ft. The two lagoons are separated by a 12.5 ft levee and discharge via SWMU 102 to the playa lake, SWMU 103. Cu, Cn, Pb, Hg, Ag, Zn, and sulfides were detected.	
Sediment: Sludge samples from SWMU 101 were collected from approximately 3-4 ft. This sediment consists of greenish black silt and clay sized particles which have settled out of suspension from the wastewater. Low levels of PCBs, pesticides, and phthalates were detected.	
Surrounding Land Use: Industrial. This site is just south of the ordnance area.	
Ecological Factors: This site discharges to the playa (SWMU 103) lake. Both areas may provide habitat for dabbling ducks, which possibly feed on aquatic organisms. Potential risks exist for the ducks and other biota.	
Data Availability: Sediment and surface water data are available for these sites.	

Source: Remedial Investigation Report for 18 Solid Waste Management Units, Woodward-Clyde and Consultants, 1992.

Table E-32

**Cannon Air Force Base
SWMU 103 - Wastewater Playa Lake**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: The Playa Lake is a shallow surface water body occupying approximately 13 acres near the eastern boundary of the Base. The water level is maintained at about two-thirds capacity by influent from the wastewater treatment lagoons and discharge for irrigation purposes to a local farmer.	
Types of Waste: Industrial and sanitary wastewater effluent specifically VOCs, SVOCs, PCBs, pesticides, and metals.	
Groundwater: Groundwater was not addressed in the Phase I investigation. Phase II soil borings were designed to evaluate the potential for soil contaminants to leach to groundwater. These borings were not able to be completed to the planned depth of 60 ft. Based on 5-ft deep soil samples, the RFI states that impacts to groundwater are unlikely. However, monitoring wells have been installed in the area around this SWMU. Sampling results from these wells will be evaluated if such data becomes available.	It is unlikely that groundwater is a complete exposure pathway due to its depth and small chance of contamination from soils. A groundwater monitoring well is in place downgradient of this site.
Soil: The subsurface soil under and around the lake consists mainly of fine-grained fill material and Ogallala Formation sediments. No visual contamination or odors were observed during sampling.	
Surface Water: Surface water samples were taken in the Phase I investigation at 3 locations within the lake. The surface water is pumped out off-site for irrigation purposes.	
Sediment: Sediment/sludge samples were collected in the Phase I and the Phase II investigations. It was noted that these samples had a putrid smell. Low levels of VOCs, SVOCs, Pesticides, and PCB 1254 were detected.	
Surrounding Land Use: Industrial/Open space. An aircraft maintenance operations area borders the northwest edge of the Playa Lake. The rest of the lake is surrounded by open space land use. The eastern Base boundary is approximately 600 ft to the east of the lake. Dairy cattle were seen grazing during the site visit immediately adjacent to the Base boundary fence and agricultural crops are irrigated with the water from the Playa Lake.	Consumption of dairy or meat products from potentially contaminated cows needs to be considered; consumption of potentially contaminated crops needs to be considered.

Table E-32

(Continued)

Site Specific Factors	Other Considerations
Ecological Factors: An ecological assessment has been performed at this site. The results of this assessment showed potential risks to predatory birds. The report sites significant uncertainties regarding assumptions that may decrease risk. Thus, the actual level of risk is unknown.	
Data Availability: Phase I and Phase II soil boring data are available for both surface and subsurface soil. Sediment and surface water data are also available. No groundwater sampling was done as a part of this RFI. However, monitoring wells have been installed in the area. The availability of this data is not currently known, but will be evaluated if it becomes available.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico, Draft, Volume 1A, April 1995.

VOCs = Volatile Organic Compounds
SVOCs = Semivolatile Organic Compounds
PCBs = Poly Chlorinated Biphenyls

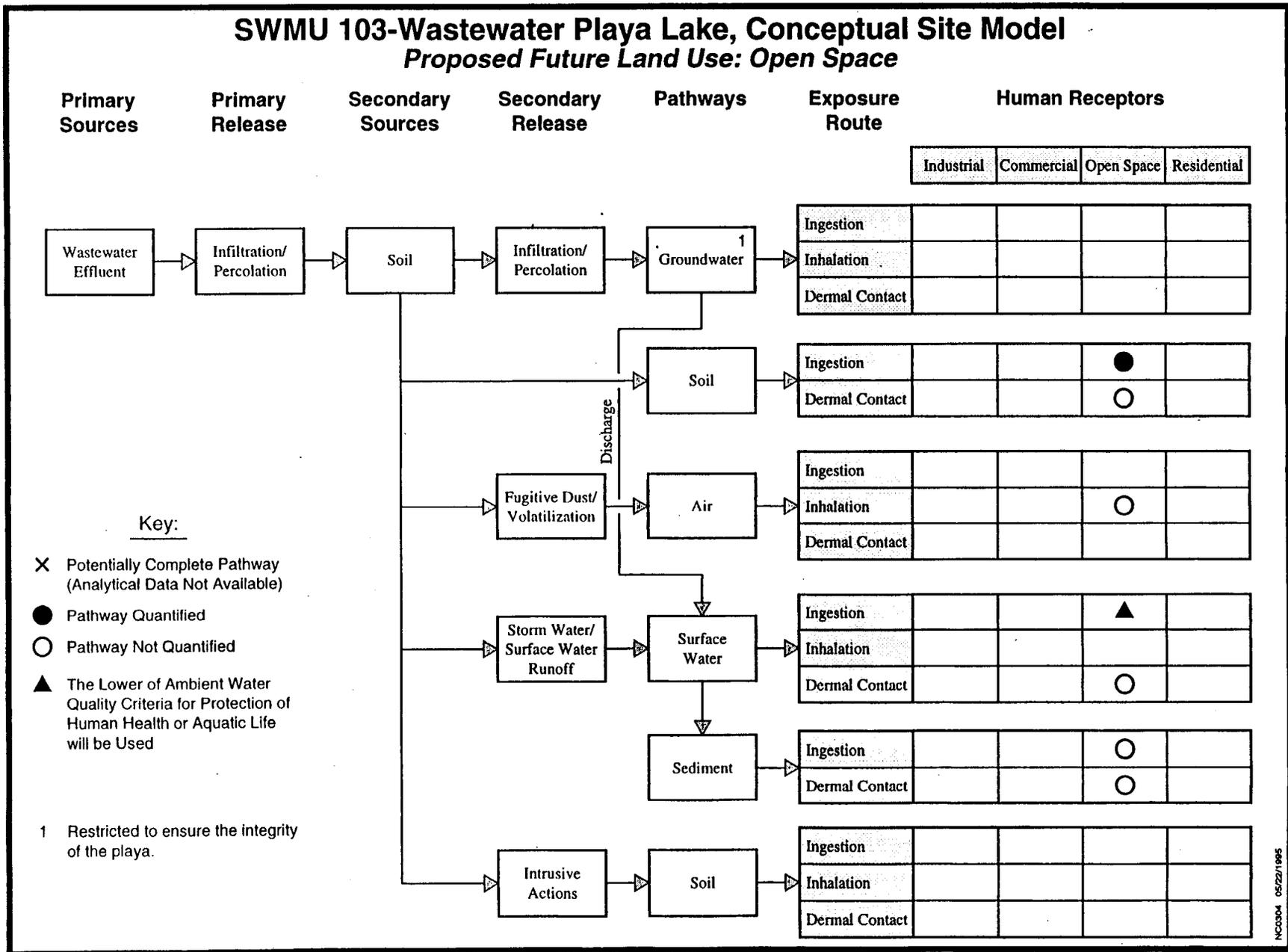


Figure E-32. SWMU 103-Wastewater Playa Lake Conceptual Site Model, Cannon AFB

Table E-33

**Cannon Air Force Base
SWMU 104 (LF-04) - Landfill No. 4**

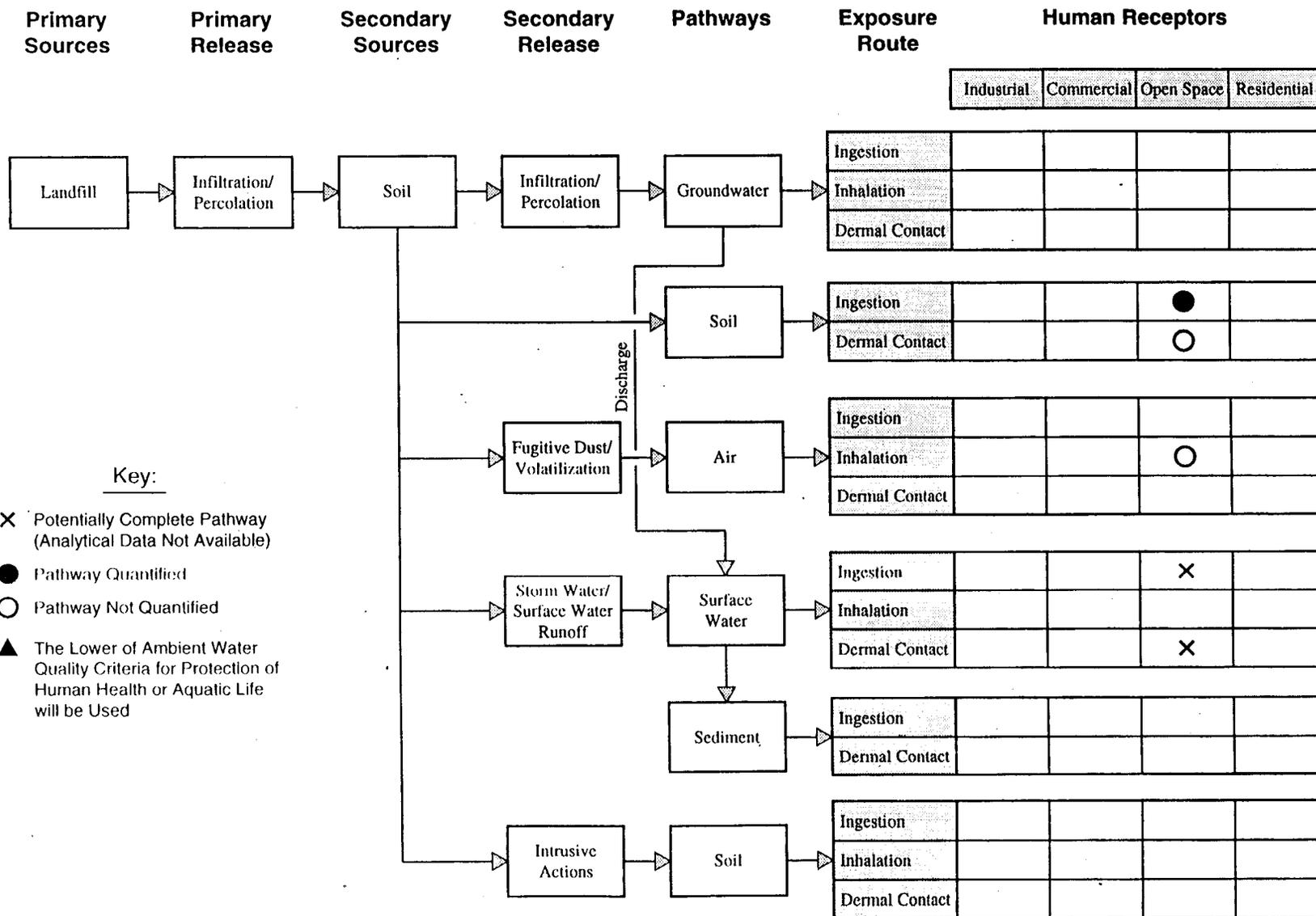
Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: Landfill No. 4 is an unlined 6.3-acre landfill located on the east side of CAFB immediately north of the Playa Lake. This landfill was operated from 1964 to 1968, then abandoned in 1968. It presently exists as a vegetated, mostly flat area with remnant depressions of the former trenches.	
Types of Waste: Domestic and industrial wastes including waste oil and solvents, paints, paint thinners, pesticide containers, and empty cans and drums. Accumulated wastes were placed in trenches and burned.	
Groundwater: Ogallala fluvial deposits, consisting of well to moderately sorted sand, underlies this SWMU. The first water bearing zone occurs from 325 to 340 ft below ground surface across the site. The hydraulic gradient beneath this SWMU is approximately 0.0025 ft/ft. Evaluation of the chemical quality of the groundwater indicates that the groundwater has not been impacted.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils. A groundwater monitoring well is in place downgradient of this site.
Soil: Only TICs (tentatively identified compounds), potential laboratory contaminants and trace amounts of pesticides have been identified in the soil below the base of the landfill.	
Surface Water: Although surface water may collect in some areas of the landfill for short periods of time, surface water data is not available for this site. Results from surface water modeling indicated that contaminants associated with runoff from the site may potentially contaminate the playa lake located just south of the landfill.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Open Space	
Ecological Factors: Results of the environmental evaluation indicate the level of exposure of wildlife known to inhabit the landfill and surrounding areas to contaminants present at the site is likely to be low. Therefore, potential adverse impacts of contamination from Landfill No. 4 on critical habitats and endangered species in the area is judged to be insignificant.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. Remedial Investigation Report, Landfill No. 4, Radian Corporation, 1993.

SWMU = Solid Waste Management Unit

CAFB = Cannon Air Force Base

SWMU 104 (LF-04)-Landfill No. 4, Conceptual Site Model Proposed Future Land Use: Open Space



NC0305 05/22/1995

Figure E-33. SWMU 104 (LF-04)-Landfill No. 4 Conceptual Site Model, Cannon AFB

Table E-34

**Cannon Air Force Base
SWMU 105 (LF-03) - Landfill No. 3**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
<p>Site: Landfill No. 3 is a 13.5-acre inactive landfill located on the east side of CAFB just south of the Ordnance Area and east of Perimeter Road. Landfill No. 3 received wastes between the years of 1959 and 1967. While active, this unlined, 13.5-acre cut-out-fill area received domestic and industrial solid wastes. After being abandoned in 1967, the site was not investigated until the U.S. Air Force (USAF) Installation Restoration Program (IRP), Phase I, was conducted at CAFB in 1982 and 1983.</p>	
<p>Types of Waste: Domestic solid wastes, waste oils, solvents, paints, paint thinners and strippers, pesticide containers and various empty cans and drums were burned in trenches and buried at Landfill No. 3. As trenches became filled, other trenches were excavated nearby and likewise filled.</p>	
<p>Groundwater: A previous risk assessment demonstrated that the risk to groundwater from this site is insignificant. Groundwater exists at approximately 273 ft. below ground surface.</p>	
<p>Soil: This investigation addressed the 20- to 60-ft depth interval. The vertical extent of organics in the soil has not been delineated beyond this interval. A previous risk assessment demonstrated that the risks from deep soil contamination are insignificant.</p>	
<p>Surface Water: Although surface water may collect in some areas of the landfill for short periods of time, surface water data is not available for this site.</p>	
<p>Sediment: Sediment data are not applicable to this site.</p>	
<p>Surrounding Land Use: Open space</p>	

Table E-34

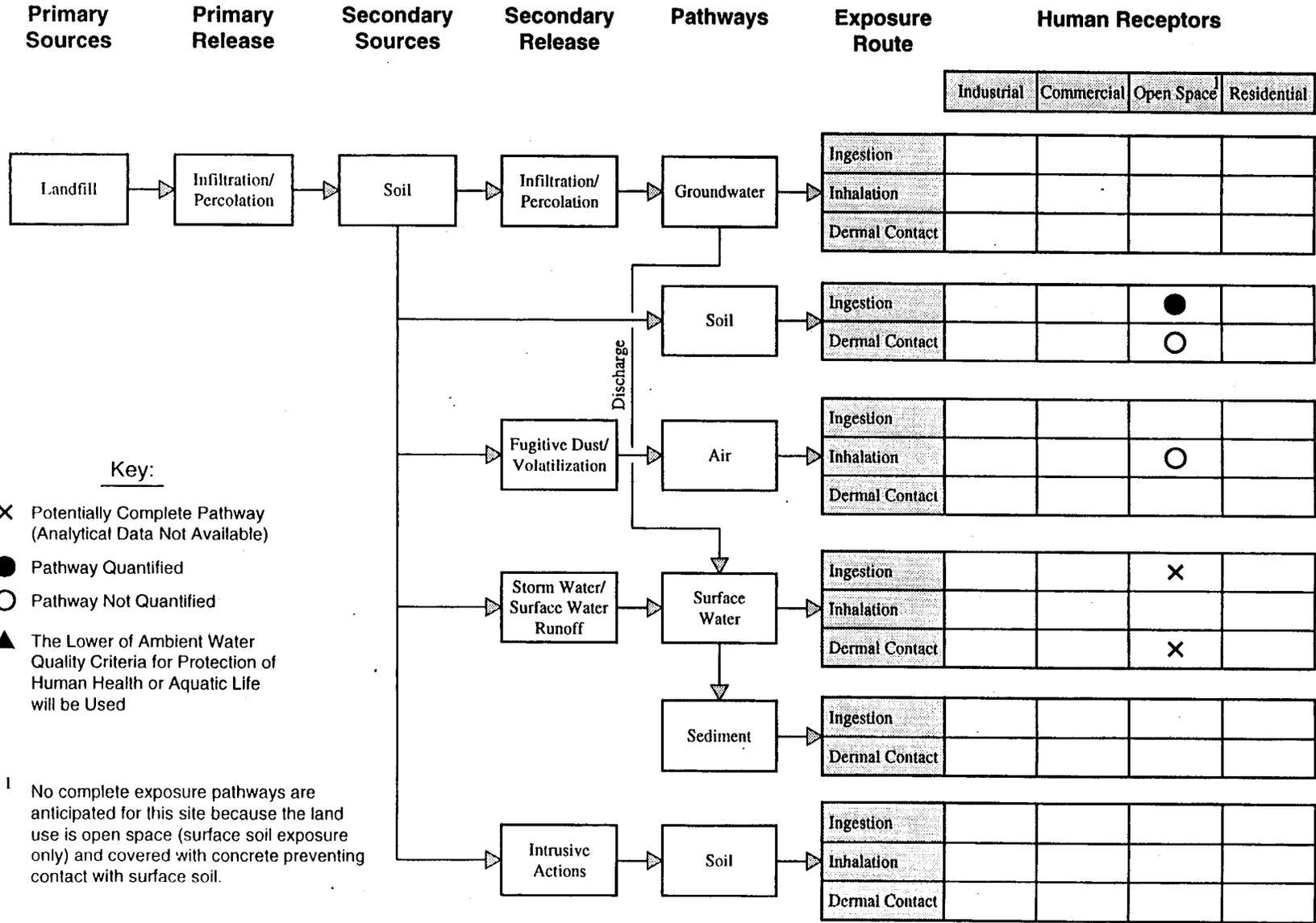
(Continued)

Site Specific Factors	Other Considerations
<p>Ecological Factors: Landfill; No. 3 is vegetated with a variety of grasses. The area is not maintained in any manner and the grass is tall. Grainfields lie east and south of the landfill separated by a narrow fence-line corridor. A playa lake is located 465 ft to the north on a downgradient (surface) slope from the landfill. The pocket gopher and the deer mouse are two common small mammals found at CAFB. Both animals inhabit areas covered with small shrubs and grasses similar to Landfill No. 3. Pheasant, quail, and migratory waterfowl feed on waste grains in the fields adjacent to the landfill. Waterfowl, mostly dabbling ducks, utilize the playa lake as a resting and feeding area during migration. The primary predators in the area are several species of raptors. Mated pairs of Mississippi Kite, recently removed from New Mexico's protected species list, have been seen on the base defending territory near the golf course. Occasionally a big game animal, such as the pronghorn antelope, has been seen in the vicinity.</p>	
<p>Data Availability: Soil data are available for this site.</p>	

Source: Remedial Investigation Report, Landfill No. 3, Radian Corporation, 1993.

CAFB = Cannon Air Force Base

SWMU 105 (LF-03)-Landfill No. 3, Conceptual Site Model Proposed Future Land Use: Open Space



NC0306 05/22/1995

Figure E-34. SWMU 105 (LF-03)-Landfill No. 3 Conceptual Site Model, Cannon AFB

Table E-35

**Cannon Air Force Base
SWMU 108 - EOD Activities Area**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: This SWMU is located on the southeast corner of the Base, directly west of the Fire Department Training Area. The area is circular with a circumference of about 200 ft. This area has been active since the early 1970s and is used for training base personnel in the safe use of ordnance.	
Types of Waste: Potential contaminants include organic compounds, high explosive compounds, and metals.	
Groundwater: Groundwater was not sampled at this SWMU. The soil contamination does not pose a risk to the groundwater.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: A reddish brown, low plastic, dry silty clay exists in the top 6 inches underlain by a reddish brown, loose silty clay with some caliche. Toluene, 2-butanone, Sn, Ba, Mn, Ni, Se, Vn, and Zn were detected. Barium was the only constituent detected above residential screening criteria.	
Surface Water: Surface water is not present at this SWMU.	
Sediment: Sediments are not applicable to this site.	
Surrounding Land Use: Open Space	
Ecological Factors: This site has no vegetation or notable surface feature that would serve as refuge for ecological receptors. The area is routinely regraded to remove surface vegetation and debris.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix II SWMUs-Phase II, Cannon Air Force Base, New Mexico. April 1993.

SWMU = Solid Waste Management Unit

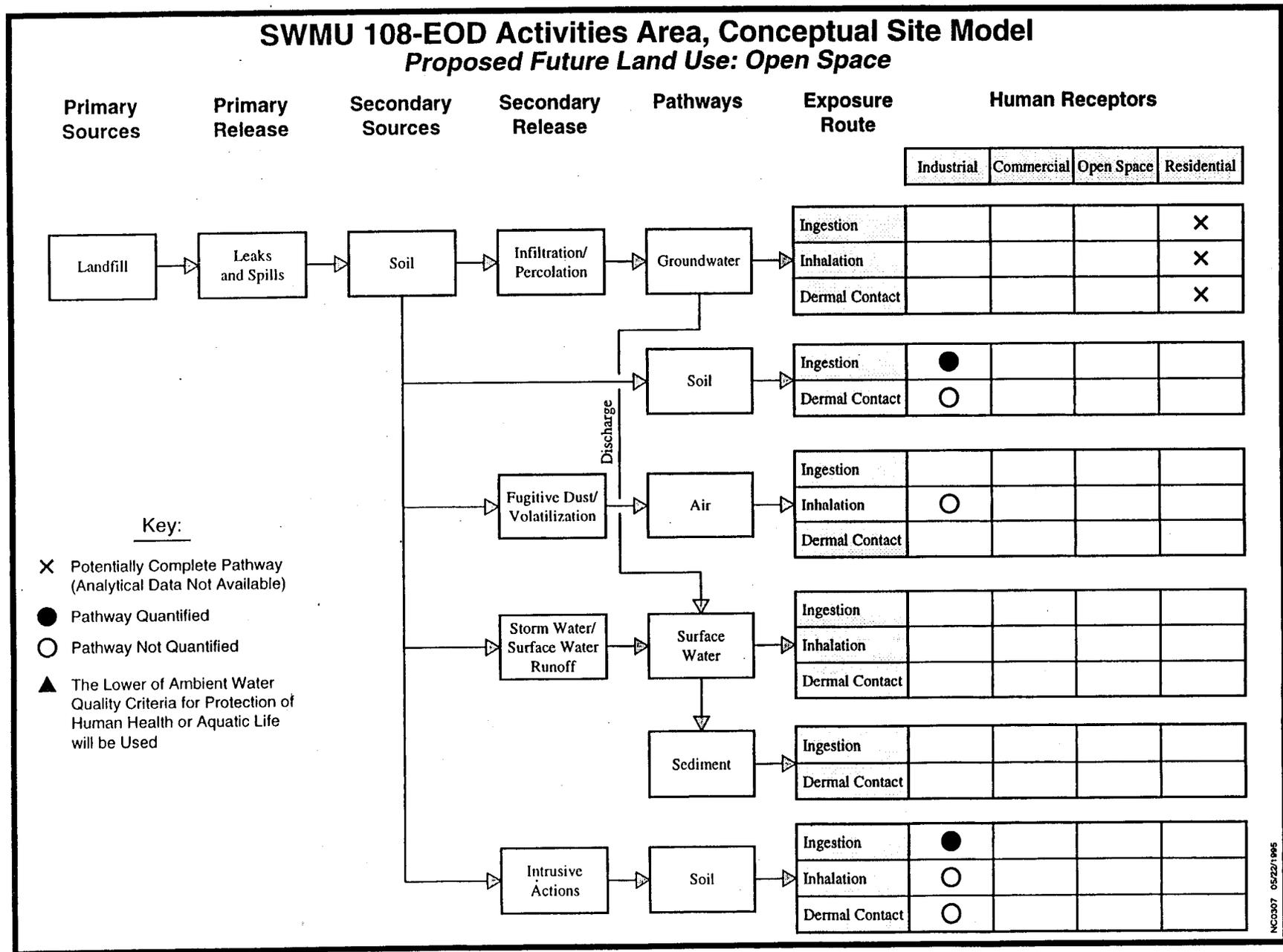


Figure E-35. SWMU 108-EOD Activities Area Conceptual Site Model, Cannon AFB

Table E-36

**Cannon Air Force Base
SWMU 109 (FT-09) - Fire Department Training Area No. 4**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: This site was used as a fuel truck cleaning area between 1961 and 1974 and then converted to a fire training area. It consists of mock aircraft, an automobile chassis, and an aboveground fuel storage tank.	
Types of Waste: Reclaimed JP-4 (contaminated with water and solvents) was used as fuel.	
Groundwater: The Ogallala Aquifer occurs at approximately 265 ft.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: 35 subsurface soil samples were collected from four soil borings. Silty, calcareous sand (with caliche present in the upper horizon) was found and was underlain by sand. Distinct caliche layers were present in the upper 40 ft. Xylenes and ethylbenzene occur from near the ground surface to 12 ft in the area surrounding the former mock aircraft. Four surface samples were collected for chemical analysis. Hydrocarbons are present in the surface soil.	
Surface Water: Surface water is not present at this site.	
Sediment: Sediments are not applicable to this site.	
Surrounding Land Use: Open Space	
Ecological Factors: Because of the industrial nature of this area and the area surrounding the site, this SWMU is not considered to be a suitable ecological habitat.	
Data Availability: Soil data are available for this site. An RFI is ongoing.	

Source: Remedial Investigation Report for 18 Solid Waste Management Units, Woodward-Clyde and Consultants, 1992.

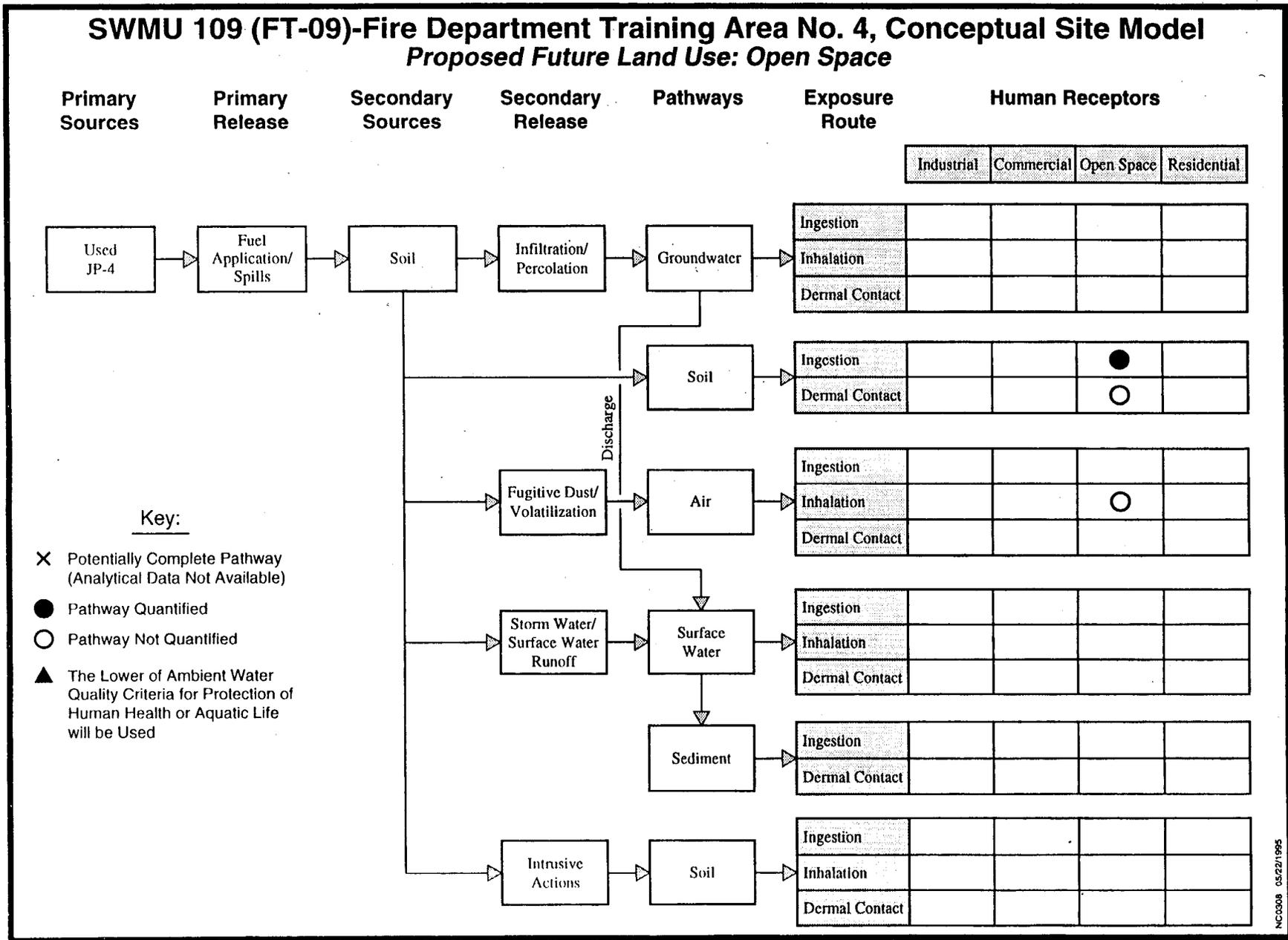


Figure E-36. SWMU 109 (FT-09)-Fire Department Training Area No. 4 Conceptual Site Model, Cannon AFB

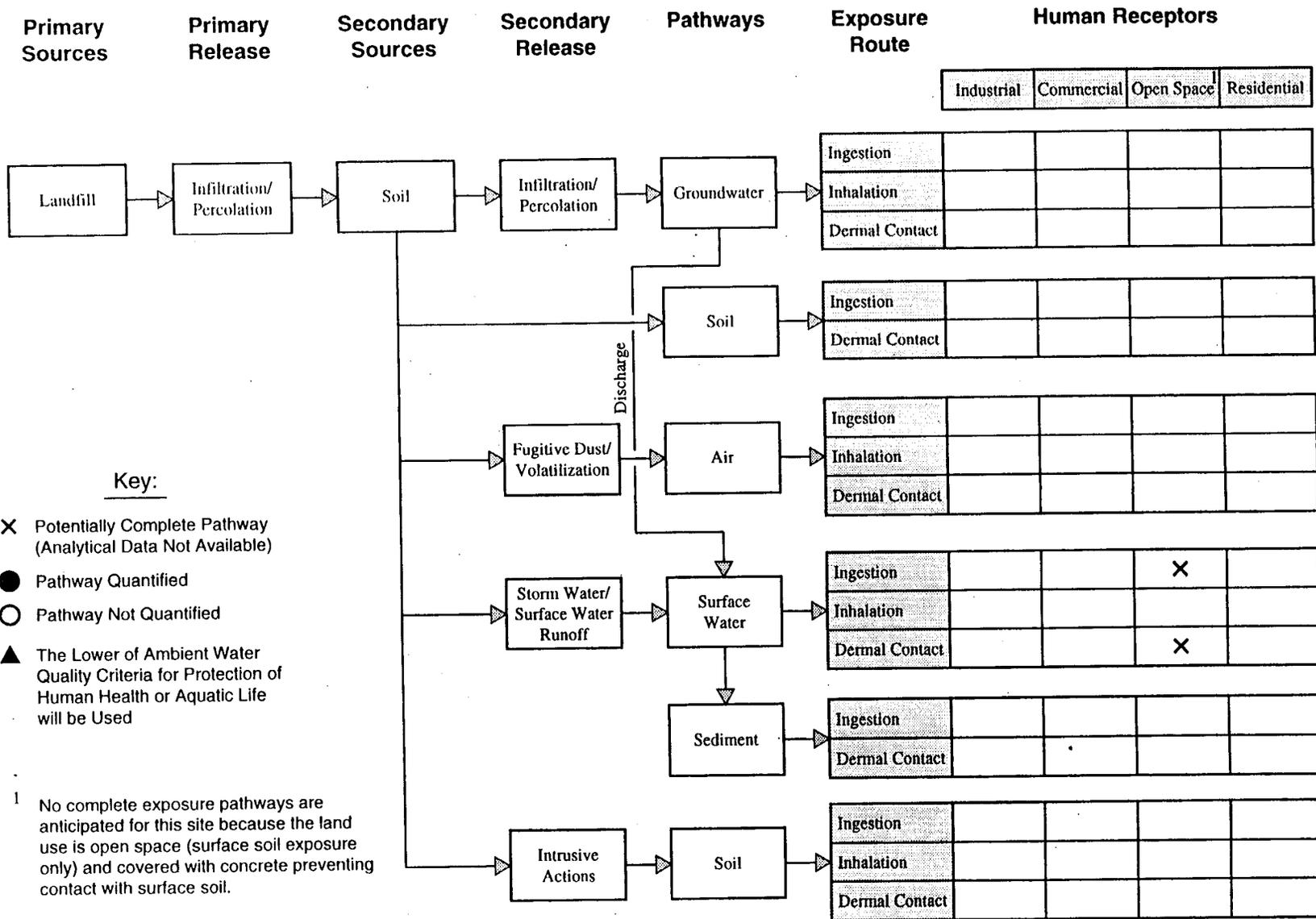
Table E-37

**Cannon Air Force Base
SWMU 113 (LF-5) - Landfill No. 5**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial/Open Space	
Site: This site is an active landfill in the southeastern corner of the base, occupying approximately 30 acres. The unit began operation in 1986 and Cell No. 3 (now closed) received hazardous wastes.	
Types of Waste: Domestic solid wastes, paint, paint removers and thinners, pesticide containers, and various empty cans and drums. Approximately 5-10 drums per month were disposed of at this site.	
Groundwater: Ogallala fluvial deposits, consisting of well to moderately sorted sand, underlie this SWMU. The first water bearing zone occurs from 325 to 340 ft below ground surface across the site. The hydraulic gradient beneath this SWMU is approximately 0.0025 ft/ft. Evaluation of the chemical quality of the groundwater indicates that the groundwater has not been impacted. Groundwater monitoring is ongoing at this site.	Groundwater is not considered a potential route of exposure due to its depth and small chance of contamination from soils.
Soil: The soil horizons consist of four or five fairly distinct sand, gravel, or sand/caliche units to a depth of 365 ft. The area of contaminated soil, Cell No. 3, is closed with an impermeable cap and is not considered a risk.	Inhalation of fugitive dusts and ingestion or dermal contact with contaminated soil are not considered potential exposure pathways unless construction activities or intrusive actions occur at Cell No. 3.
Surface Water: Although surface water may collect in some areas of the landfill for short periods of time, surface water data is not available.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial/Open Space	
Ecological Factors: This site is disturbed, but contains grasses, shrubs, and weeds, which may provide habitat for ecological receptors such as rodents, jackrabbits, and hawks.	
Data Availability: Groundwater and soil data are available for this site. An RFI is ongoing.	

Source: Remedial Investigation Report for 18 Solid Waste Management Units, Woodward-Clyde and Consultants, 1992.
SWMU = Solid Waste Management Unit

SWMU 113 (LF-5)-Landfill No. 5, Conceptual Site Model Proposed Future Land Use: Open Space



NC0309 05/22/1996

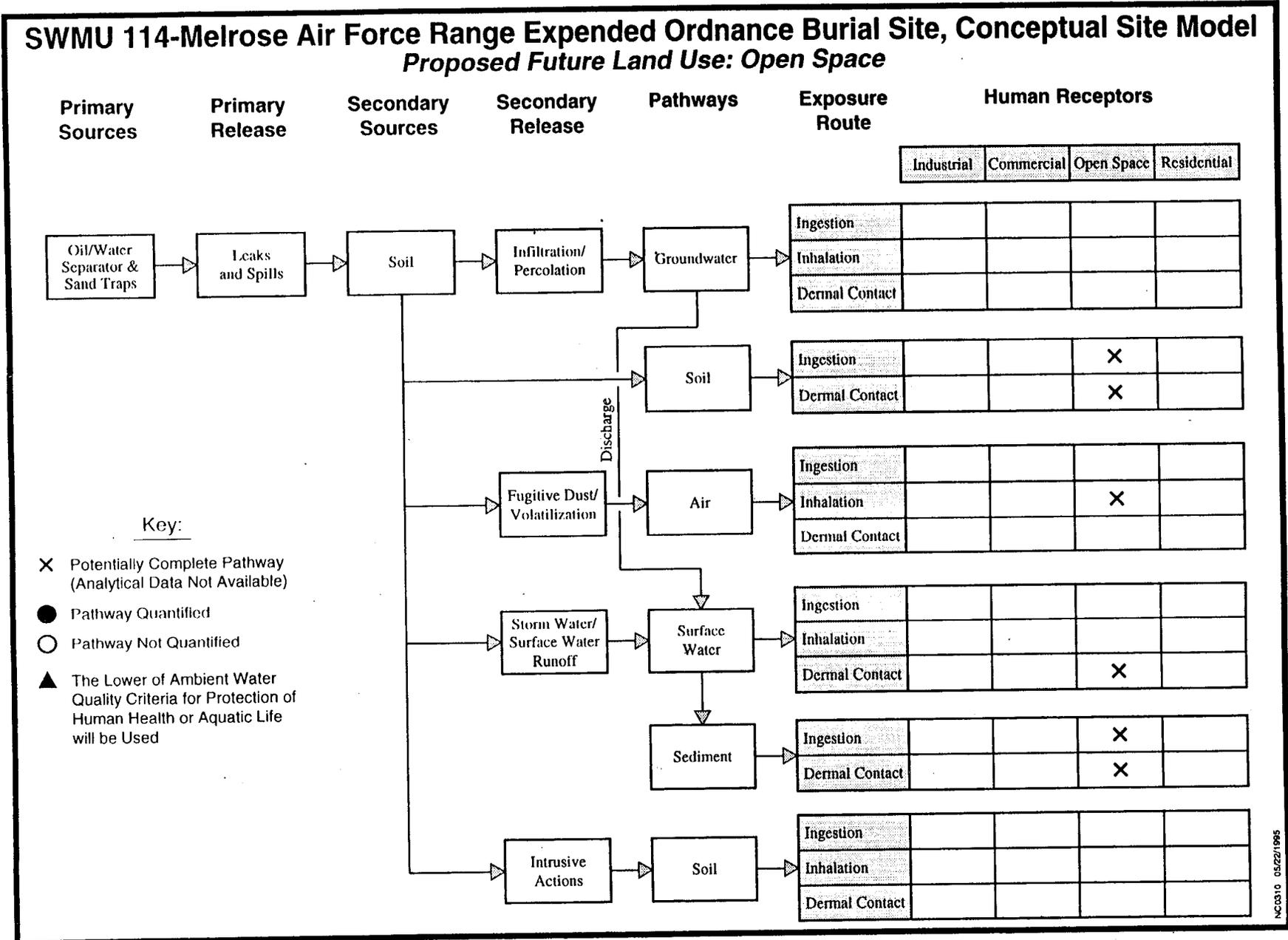
Figure E-37. SWMU 113 (LF-5)-Landfill No. 5 Conceptual Site Model, Cannon AFB

Table E-38

**Cannon Air Force Base
SWMU 114 - Melrose Air Force Range Expended Ordnance Burial Site**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: Melrose Bombing Range consists of 30,000 acres approximately 25 miles west of Cannon AFB and was first activated in 1952. This site consists of 8-9 pits (approximately 50 yds long) that were used to deposit scrap metal from exploded ordnance. Waste drums were possibly disposed here.	
Types of Waste: Residue high explosives from exploded/unexploded ordnance. Waste oils and waste solvents.	
Groundwater: No groundwater sampling has been performed.	
Soil: No subsurface soil sampling has been performed.	
Surface Water: Surface water may periodically collect in the pits, but does not travel off-site.	
Sediment: No sediment sampling has been performed.	
Surrounding Land Use: Open space (rangeland with grazing cattle)	
Ecological Factors: A golden eagle nesting site is located nearby.	
Data Availability: Not data is available at this time. An RFI is underway.	

Source: 2 March 1995 site visit; Radian Corporation under the direction of Mr. John Constantine, Cannon AFB RPM.



NC0310 05/20/1996

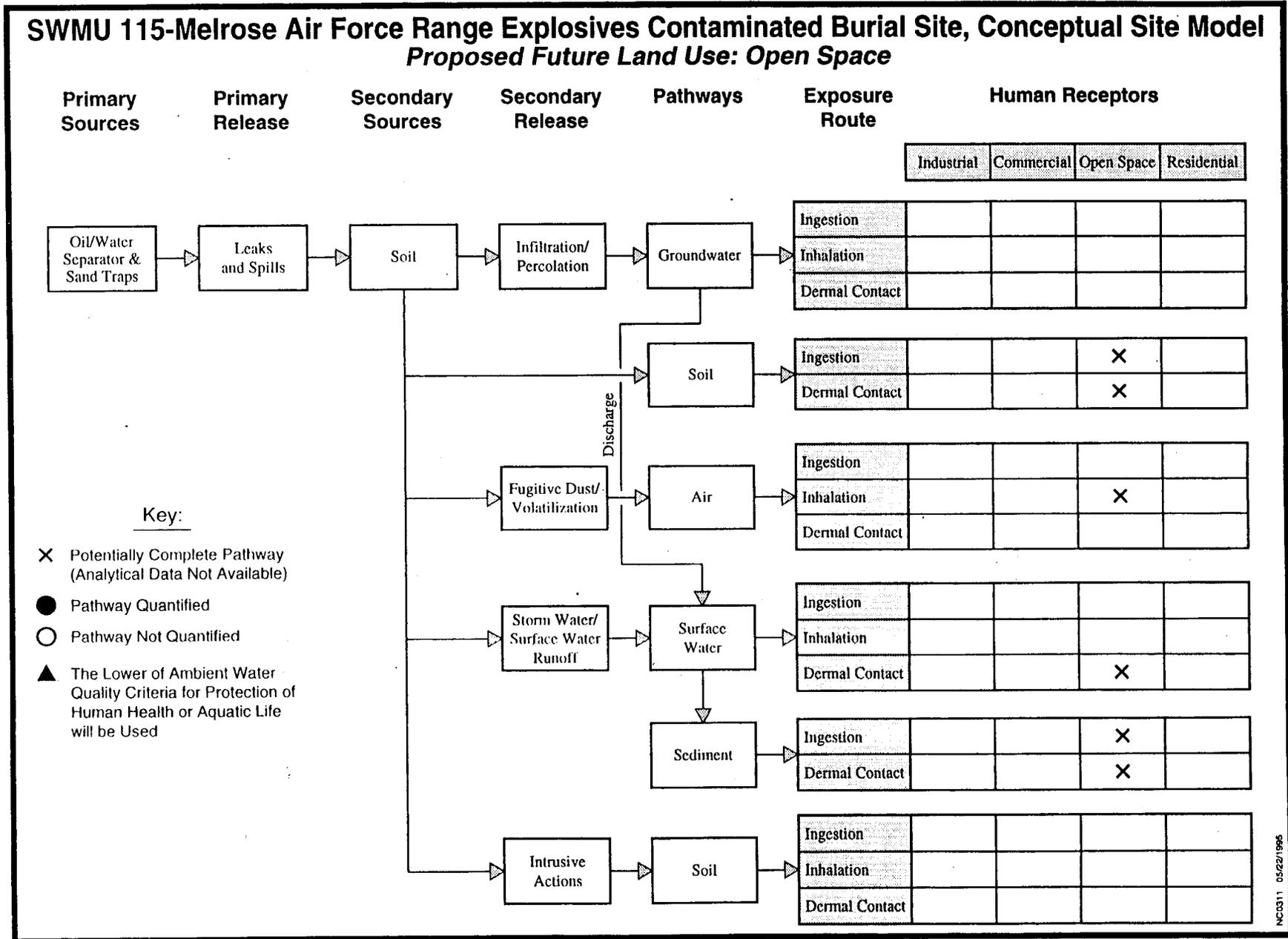
Figure E-38. SWMU 114-Melrose Air Force Range Expanded Ordnance Burial Site Conceptual Site Model, Cannon AFB

Table E-39

**Cannon Air Force Base
SWMU 115 - Melrose Air Force Range Explosives Contaminated Burial Site**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: Melrose Bombing Range consists of 30,000 acres approximately 25 miles west of Cannon AFB and was first activated in 1952. This site is a semi-arroyo that is suspected of receiving unexploded ammunition.	
Types of Waste: Unexploded ammunition.	
Groundwater: No groundwater sampling has been performed.	
Soil: No subsurface soil sampling has been performed.	
Surface Water: Surface water flows through this site and leads to a reservoir approximately 50 yds away. The water from the reservoir is not used for human consumption.	
Sediment: No sediment sampling has been performed.	
Surrounding Land Use: Open space (rangeland with grazing cattle)	
Ecological Factors: None identified.	
Data Availability: No data is available at this time. An RFI is underway.	

Source: 2 March 1995 site visit; Radian Corporation under the direction of Mr. John Constantine, Cannon AFB RPM.



NC0311 05/22/1995

Figure E-39. SWMU 115-Melrose Explosives Contaminated Burial Site Conceptual Site Model, Cannon AFB

Table E-40

**Cannon Air Force Base
SWMU 117 - Melrose Air Force Range Domestic Waste Pile**

Site Specific Factors	Other Considerations
Proposed Future Land Use: Open Space	
Site: Melrose Bombing Range consists of 30,000 acres approximately 25 miles west of Cannon AFB and was first activated in 1952. This former landfill received domestic wastes and is visible only by a slight change in vegetation where the cells are located.	
Types of Waste: Domestic wastes from range support activities.	
Groundwater: No groundwater sampling has been performed.	
Soil: No subsurface soil sampling has been performed.	
Surface Water: No surface water sampling has been performed. There is no obvious migration potential for surface water.	
Sediment: No sediment sampling has been performed.	
Surrounding Land Use: Commercial or Industrial (compound area) and Open space (rangeland with grazing cattle).	
Ecological Factors: None identified.	
Data Availability: No data is available at this time. An RFI is underway. .	

Source: 2 March 1995 site visit; Radian Corporation under the direction of Mr. John Constantine, Cannon AFB RPM.

Table E-41

**Cannon Air Force Base
SWMU 127 - Oil/Water Separator Near Tank 4095 and Leach Fields**

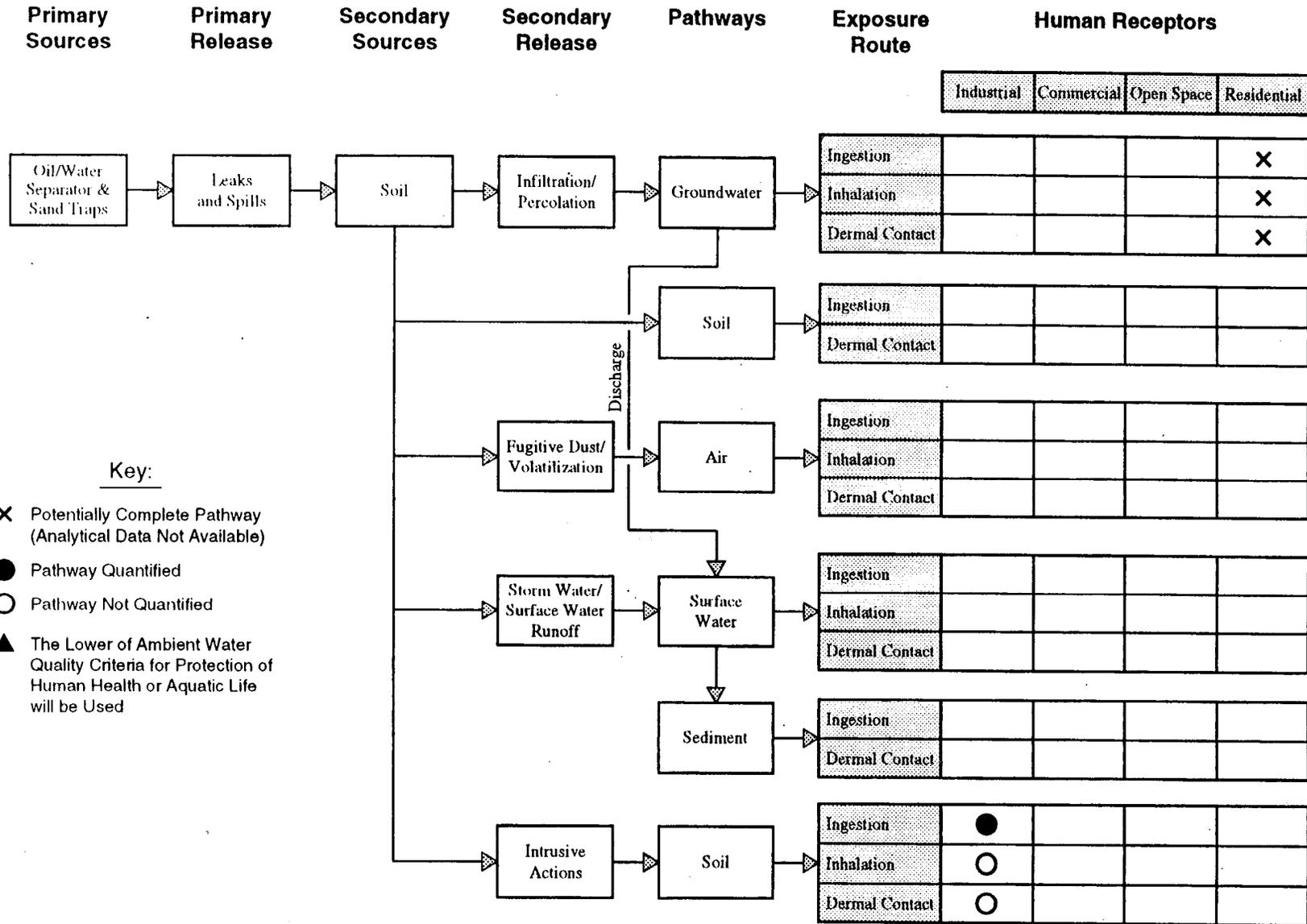
Site Specific Factors	Other Considerations
Proposed Future Land Use: Industrial	
Site: SWMU 127 is a 135-gallon concrete sand trap and 2 leach fields that receive washwater from the POL refueling truck washrack at Facility 4095. The second leach field was installed in 1991 to replace the original leach field that reportedly ceased to function in the late 1980s. The original leach field remains intact but is bypassed and is no longer used. An O/WS is also present at this site but was not investigated in the Appendix III RFI based on a lack of evidence of spillage or leakage during a visual inspection.	
Types of Waste: JP-4, grease, motor oil.	
Groundwater: Most of the chemicals of concern were detected only in the upper 5 ft of soil indicating that infiltration to the groundwater is unlikely. Fate and transport modeling indicated that transport to groundwater is not expected. Uncertainty exists concerning TRPH constituents that appear to have been released and migrated vertically to a depth of at least 50 ft. These constituents are not expected to impact groundwater, but there is concern about the possibility of future migration. Vertical distribution of TRPH has not been fully defined.	
Soil: Borings through the leach field area encountered silty clay from the surface to approximately 18 ft. Sandy silt, silt and sand were encountered at lower depths. No visual contamination or odors were noted during drilling or sampling events.	
Surface Water: Storm water runoff is considered to be an insignificant pathway due to the fact that the surface area is small and surface spills would be minimal. The leach fields are designed to contain any surface water runoff.	
Sediment: Sediment data are not applicable to this site.	
Surrounding Land Use: Industrial	
Ecological Factors: An ecological risk assessment has shown that no unacceptable risks due to chemical releases are expected at this SMWU.	
Data Availability: Soil data are available for this site.	

Source: Woodward-Clyde. RCRA Facility Investigation, Appendix III SWMUs-Phase II, Cannon Air Force Base, New Mexico, Draft. Volume 1A, April 1995.

O/WS = Oil/Water Separator

TRPH = Total Recoverable Petroleum Hydrocarbons

SWMU 127-Oil/Water Separator Near Tank 4095 and Leach Fields, Conceptual Site Model Proposed Future Land Use: Industrial



NC0296A 05/22/1995

Figure E-41. SWMU 127-Oil/Water Separator Near Tank 4095 and Leach Fields Conceptual Site Model, Cannon AFB

APPENDIX K

**SCREENING LEVELS BASED ON
FUTURE LAND USE CONSIDERATIONS**

**CANNON AIR FORCE BASE
NEW MEXICO**

OCTOBER 1996

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K.1 SCREENING LEVELS BASED ON FUTURE LAND USE CONSIDERATIONS

This appendix presents the screening levels derived for soil and groundwater land use options at Cannon AFB. The equations used to calculate screening levels for each land use are also presented. The equations are presented before the screening level tables.

The tables displaying the soil screening levels also include RCRA Subpart S levels for each constituent for comparison.

The table displaying the groundwater screening levels also include RCRA Subpart S, MCLs, and State of New Mexico cleanup standards for each constituent for comparison.

For several constituents, the soil screening levels calculated were greater than one million mg/kg (parts per million, ppm). For these cases, the screening level was set to 1,000,000 mg/kg. A soil screening level of 1,000,000 mg/kg means that no amount of the contaminant in soil will cause a receptor to exceed the oral reference dose by incidental ingestion of soil.

No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). This lead soil screening level was used for all future land use scenarios. The action level for lead, 0.015 mg/L, was used for all future groundwater use scenarios.

To identify those land uses for which a remedial cost should be evaluated (i.e., the maximum detected concentration exceeds the screening

level), the screening level has been shaded in the tables in this appendix. However, in some cases, the screening level for a given land use may be lower than the maximum detected concentration and the screening level has not been shaded. This is the case for essential minerals and metal contaminants whose concentrations are less than the maximum concentration found in background samples.

For each site, only one type of open space land use, restricted or recreational, was chosen to be costed. All open space sites at Cannon AFB are considered to be restricted. Therefore, on some tables, the open space recreational screening level may be lower than the maximum detection, but the screening level is not shaded because this screening level was not used for calculating cost estimates for future land use for Cannon AFB.

RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, RESIDENTIAL

Carcinogen Formula: $(risk * 365 * lt) / (ef * (sif / 1000000) * m.sfo)$

Non-carc. Formula: $(hq * m.rfdo * bwc * 365 * at) / (ef * ed * intc / 1000)$

Comments: January 1993

DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	114.29000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	50000000.00	cm ²
Exposure Duration (m.ed)	6	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	350	days/year	True Soil Porosity (m.tsp)	0.50000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.10000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.20000	g/day	Mean Annual Wind Speed (m.maw)	4.50000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	12.80000	m/s
Class A,B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.04970	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	1.50000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00200	
Averaging Time (m.at)	6	years	Fraction Water Content (OSWER) (m.wf)	0.30000	

Management Action Plan

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October 1996

RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, COMMERCIAL ADULT

Management Action Plan

Carcinogen Formula: $(risk * bw * lt * 365) / (ef * ed * inta * 0.5 / 1000 * m.sfo)$

Non-carc. Formula: $(hq * rfdo * bw * at * 365) / (ef * ed * inta * 0.5 / 1000)$

Comments: October 15, 1993

DEFAULT PARAMETERS

K-4

October 1996

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	0.00000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	50000000.00	cm ²
Exposure Duration (m.ed)	25	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	250	days/year	True Soil Porosity (m.tsp)	0.00000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.05000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.00000	g/day	Mean Annual Wind Speed (m.maw)	0.00000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	0.00000	m/s
Class A, B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.00000	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	0.00000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00000	
Averaging Time (m.at)	25	years	Fraction Water Content (OSWER) (m.wf)	0.00000	

RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, COMMERCIAL CHILD

Carcinogen Formula: $(risk * bwc * lt * 365) / (ef * ed * intc * 0.5 / 1000 * m.sfo)$

Non-carc. Formula: $(hq * rfdo * bwc * at * 365) / (ef * ed * intc * 0.5 / 1000)$

Comments: October 15, 1993

DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	0.00000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	5000000.00	cm ²
Exposure Duration (m.ed)	6	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	250	days/year	True Soil Porosity (m.tsp)	0.00000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.05000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.20000	g/day	Mean Annual Wind Speed (m.maw)	0.00000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	0.00000	m/s
Class A,B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.00000	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	0.00000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00000	
Averaging Time (m.at)	6	years	Fraction Water Content (OSWER) (m.wf)	0.00000	

Management Action Plan

K-5

October 1996

RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, INDUSTRIAL

Management Action Plan

Carcinogen Formula: $(risk * bw * lt * 365) / (ef * ed * inta * 0.5 / 1000 * m.sfo)$

Non-carc. Formula: $(hq * rfdo * bw * at * 365) / (ef * ed * inta * 0.5 / 1000)$

Comments: March 7, 1995

DEFAULT PARAMETERS

K-6

October 1996

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	0.00000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	50000000.00	cm ²
Exposure Duration (m.ed)	25	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	250	days/year	True Soil Porosity (m.tsp)	0.00000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.10000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.00000	g/day	Mean Annual Wind Speed (m.maw)	0.00000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	0.00000	m/s
Class A, B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.00000	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	0.00000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00000	
Averaging Time (m.at)	25	years	Fraction Water Content (OSWER) (m.wf)	0.00000	

RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, OPEN SPACE (REC)

Carcinogen Formula: $(risk * lt * 365) / (ef * sif / 1000000 * m.sfo)$

Non-carc. Formula: $(hq * m.rfdo * bwc * ed * 365) / (ef * ed * intc / 1000)$

Comments: January 1993

Management Action Plan

DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	114.29000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	50000000.00	cm ²
Exposure Duration (m.ed)	6	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	14	days/year	True Soil Porosity (m.tsp)	0.00000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.10000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.20000	g/day	Mean Annual Wind Speed (m.maw)	4.50000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	12.80000	m/s
Class A, B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.04970	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	0.00000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00000	
Averaging Time (m.at)	70	years	Fraction Water Content (OSWER) (m.wf)	0.00000	

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RISCREEN SOIL REGULATIONS

Regulation: EPA REGION III, OPEN SPACE (REST)

Carcinogen Formula: $(risk * bw * lt * 365) / (ef * ed * inta * 0.5 / 1000 * m.sfo)$

Non-carc. Formula: $(hq * rfdo * bw * at * 365) / (ef * ed * inta * 0.5 / 1000)$

Comments: October 15, 1993

DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Age-Adjusted Soil Ingestion Factor (m.sif)	0.00000	mg-yr/kg-day
Body Weight, Child (m.bwc)	15.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Lifetime (m.lt)	70	years	Area of Contamination (m.ca)	50000000.00	cm ²
Exposure Duration (m.ed)	30	years	Diffusion Height (m.df)	0.00000	m
Exposure Frequency (m.ef)	14	days/year	True Soil Porosity (m.tsp)	0.00000	
Exposure Interval (m.ei)	0.00	seconds	True Soil/Particulate Density (m.tsd)	0.00000	g/cm ³
Absorption Factor (m.abf)	1.00000		Vegetative Cover (m.veg)	0.00000	
Intake Assumption, adult (m.inta)	0.10000	g/day	Wind Speed in Mixing Zone (m.ws)	0.00000	m/s
Intake Assumption, child (m.intc)	0.20000	g/day	Mean Annual Wind Speed (m.maw)	0.00000	m/s
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day	Equiv. Thres. Wind Speed (m.etw)	0.00000	m/s
Class A,B Cancer Risk (m.rab)	0.00000100		Um/Ut Function (m.fx)	0.00000	
Class C Cancer Risk (m.rc)	0.00000100		Soil Bulk Density (OSWER) (m.sbd)	0.00000	kg/L
Hazard Quotient (m.hq)	0.10000		Fraction OC in Soil (OSWER) (m.foc)	0.00000	
Averaging Time (m.at)	30	years	Fraction Water Content (OSWER) (m.wf)	0.00000	

Management Action Plan

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RISCREEN SOIL REGULATIONS

Regulation: RCRA SUBPART S

Management Action Plan

Carcinogen Formula: $(m.risk * m.bw * m.lt) / (m.sfo * m.inta * 0.001 * m.abf * m.ed)$

Non-carc. Formula: $(m.rfdo * m.bwc) / (m.intc * m.abf * 0.001)$

Comments: From Federal Register 30798-30884, July 27, 1990

DEFAULT PARAMETERS

K-9

Body Weight, Adult (m.bw) 70.00000 kg
 Body Weight, Child (m.bwc) 16.00000 kg
 Lifetime (m.lt) 70 years
 Exposure Duration (m.ed) 70 years
 Exposure Frequency (m.ef) 350 days/year
 Exposure Interval (m.ei) 0.00 seconds
 Absorption Factor (m.abf) 1.00000
 Intake Assumption, adult (m.inta) 0.10000 g/day
 Intake Assumption, child (m.intc) 0.20000 g/day
 Daily Indoor Inhalation Rate (m.ir) 0.00000 m³/day
 Class A,B Cancer Risk (m.rab) 0.00000100
 Class C Cancer Risk (m.rc) 0.00001000
 Hazard Quotient (m.hq) 1.00000
 Averaging Time (m.at) 70 years

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Age-Adjusted Soil Ingestion Factor (m.sif) 0.00000 mg-yr/kg-day
 Side Length of Contaminated Area (m.sl) 0.00000 m
 Area of Contamination (m.ca) 0.00 cm²
 Diffusion Height (m.df) 0.00000 m
 True Soil Porosity (m.tsp) 0.00000
 True Soil/Particulate Density (m.tsd) 0.00000 g/cm³
 Vegetative Cover (m.veg) 0.00000
 Wind Speed in Mixing Zone (m.ws) 0.00000 m/s
 Mean Annual Wind Speed (m.maw) 0.00000 m/s
 Equiv. Thres. Wind Speed (m.etw) 0.00000 m/s
 Um/Ut Function (m.fx) 0.00000
 Soil Bulk Density (OSWER) (m.sbd) 0.00000 kg/L
 Fraction OC in Soil (OSWER) (m.foc) 0.00000
 Fraction Water Content (OSWER) (m.wf) 0.00000

RISCREEN WATER REGULATIONS

Regulation: EPA REGION III, RESIDENTIAL

Management Action Plan

Carcinogen Formula: $(risk * lt * 365) / (ef * ((vk * ira * m.sfi) + (dwia * m.sfo)))$

Non-carc. Formula: $(hq * bw * at * 365) / (ef * ed * (((vk * ir)/m.rfdi) + (dwi / m.rfdo)))$

Comments: October 15, 1993

DEFAULT PARAMETERS

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Body Weight, Adult (m.bw)	70.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Body Weight, Child (m.bwc)	15.00000	kg	Area of Contamination (m.ca)	0.00	cm ³
Lifetime (m.lt)	70	years	Diffusion Height (m.df)	0.00000	m
Exposure Duration (m.ed)	30	years	Averaging Time (m.at)	30	years
Exposure Frequency (m.ef)	350	days/year	Volitialization Factor (m.vk)	0.50000	L/m ³
Exposure Interval (m.ei)	0.00	seconds	Age-Adjusted Water Ingestion (m.dwia)	1.09000	L-y/kg-day
Absorption Factor (m.abf)	1.00000		Age-Adjusted Inhalation Factor (m.ira)	11.66000	m ³ -y/kg-day
Drinking Water Ingestion (m.dwi)	2.00000	L/day			
Daily Indoor Inhalation Rate (m.ir)	20.00000	m ³ /day			
Hazard Quotient (m.hq)	0.10000				
Class A,B Cancer Risk (m.rab)	0.00000100				
Class C Cancer Risk (m.rc)	0.00000100				

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RISCREEN WATER REGULATIONS

Regulation: INDUSTRIAL DERMAL EXPOSURE

Carcinogen Formula: $(bw * 365.0 * at * risk / (SfO / abfa)) / (pc * 1980.0 * 0.5 * ed * ef / 1000.0)$

Non-carc. Formula: $(hq * RfDo * abfa * bw * 365.0) / (pc * 1980 * 0.5 * ef / 1000.0)$

Comments:

DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Body Weight, Child (m.bwc)	0.00000	kg	Area of Contamination (m.ca)	0.00	cm ³
Lifetime (m.lt)	0	years	Diffusion Height (m.df)	0.00000	m
Exposure Duration (m.ed)	25	years	Averaging Time (m.at)	70	years
Exposure Frequency (m.ef)	250	days/year	Volatilization Factor (m.vk)	0.00000	L/m ³
Exposure Interval (m.ei)	0.00	seconds	Age-Adjusted Water Ingestion (m.dwia)	0.00000	L-y/kg-day
Absorption Factor (m.abf)	0.00000		Age-Adjusted Inhalation Factor (m.ira)	0.00000	m ³ -y/kg-day
Drinking Water Ingestion (m.dwi)	0.00000	L/day			
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day			
Hazard Quotient (m.hq)	0.10000				
Class A,B Cancer Risk (m.rab)	0.00000100				
Class C Cancer Risk (m.rc)	0.00000100				

Management Action Plan

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October 1996

RISCREEN WATER REGULATIONS

Regulation: RCRA SUBPART S

Carcinogen Formula: $(m.risk * m.bw * m.lt) / (m.sfo * m.dwi * m.abf * m.ed)$

Non-carc. Formula: $(m.rfdo * m.bw) / (m.dwi * m.abf)$

Comments: From Federal Register 30798-30884, July 27, 1990

Management Action Plan

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DEFAULT PARAMETERS

Body Weight, Adult (m.bw)	70.00000	kg	Side Length of Contaminated Area (m.sl)	0.00000	m
Body Weight, Child (m.bwc)	16.00000	kg	Area of Contamination (m.ca)	0.00	cm ³
Lifetime (m.lt)	70	years	Diffusion Height (m.df)	0.00000	m
Exposure Duration (m.ed)	70	years	Averaging Time (m.at)	70	years
Exposure Frequency (m.ef)	350	days/year	VolitIALIZATION Factor (m.vk)	0.00000	L/m ³
Exposure Interval (m.ei)	0.00	seconds	Age-Adjusted Water Ingestion (m.dwia)	0.00000	L-y/kg-day
Absorption Factor (m.abf)	1.00000		Age-Adjusted Inhalation Factor (m.ira)	0.00000	m ³ -y/kg-day
Drinking Water Ingestion (m.dwi)	2.00000	L/day			
Daily Indoor Inhalation Rate (m.ir)	0.00000	m ³ /day			
Hazard Quotient (m.hq)	0.10000				
Class A,B Cancer Risk (m.rab)	0.00000100				
Class C Cancer Risk (m.rc)	0.00001000				

Table K-1
Soil Screening Levels for COPCs at Cannon AFB SWMU 3

SITE ID: CANNON AFB SWMU 3	BRIEF DESCRIPTION: SWMU 3 was either an oil/water separator or a grease trap located on the west side of former Hangar 125. SWMU 3 was active from 1943 until about 1990 when it was removed. The exact location and depth of the former unit is unknown, but it is believed to be near the northwest corner of Building 108 and is covered with asphalt pavement. The unit received wastewater from Building 102 and wash water from aircraft maintenance operations in Building 121. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Barium	1,530.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Benzo(a)pyrene	0.220	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Manganese	625.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH	1,120.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
Acetone	0.011	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Benzo(a)anthracene	0.130	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(b)fluoranthene	0.140	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
bis(2-Ethylhexyl)phthalate	0.540	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Chromium	9.100	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	0.470	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	4.700	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	7.800	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Di-n-octylphthalate	0.540	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Dibenzo(a,h)anthracene	0.058	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Fluoranthene	0.071	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Methylene chloride	0.004	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	8.800	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	0.190	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Toluene	0.011	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	25.300	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	24.400	24,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-

**Table K-1
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Aluminum	10,500.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Arsenic	4.800	0.426	.56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.630	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Benzo(g,h,i)perylene	0.039	NV	NV	NV	NV	NV	NV	NV	-
Calcium	301,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	9,660.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	22,500.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	0.052	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,060.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	8.800	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-2
Soil Screening Levels for COPCs at Cannon AFB SWMU 5

SITE ID: CANNON AFB SWMU 5	BRIEF DESCRIPTION: SWMU 5 was either an oil/water separator or a grease trap located on the west side of former Hangar 121. SWMU 5 was active from 1943 until about 1990 when it was removed. The exact location and depth of the unit is unknown, but it is covered with asphalt pavement. The unit received wastewater from Building 102 and Building 125 and wash water from aircraft maintenance operations in former Hangar 121. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ¹ (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	14,300.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	1,170.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Manganese ³	277.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Constituents Whose Maximum Concentration is Below Future Screening Levels									
Acetone	0.013	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Chromium	11.400	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Cobalt	4.600	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	9.400	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Methylene chloride	0.003	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	10.400	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Thallium	0.130	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.003	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
TPH	507.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Vanadium	21.600	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	26.600	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Arsenic	2.700	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.670	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Calcium	217,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	11,200.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	6,000.000	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,570.000	NV	NV	NV	NV	NV	NV	NV	-

**Table K-2
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)			
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)				
Constituents Whose Maximum Concentration is Below Regulatory Standards										
Lead	20.400	400.000	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Manganese was not identified as a constituent driving remedy selection for the commercial scenario because detections were near the background upper tolerance limit (UTL), and the site is paved.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-3

Soil Screening Levels for COPCs at Cannon AFB SWMU 31

SITE ID: CANNON AFB SWMU 31	BRIEF DESCRIPTION: The AGE Maintenance Shop Pad (SWMU 31), used since 1971, is an open concrete area adjacent to the southeast side of the AGE Maintenance Shop, located in Building 186. The pad is approximately 70 feet wide and 240 feet long. Wash water and surface or storm waters, (potentially contaminated with JP-4, oils, and diesel), flow off the pad to the southeast toward the AGE Drainage Ditch (SWMU 34) which collects and transports the water in a northeasterly direction.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Barium	716.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Benzo(a)anthracene	1.800	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene	1.900	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	1.200	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Dibenzo(a,h)anthracene	0.630	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Indeno(1,2,3-cd)pyrene	1.100	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Manganese	280.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH ³	2,500.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
4-Methylphenol	1.100	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Acenaphthene	0.089	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Acetone	0.210	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Anthracene	0.820	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Benzo(k)fluoranthene	3.800	8.750	1,166.667	218.742	156.800	35.000	78.400	9.589	-
bis(2-Ethylhexyl)phthalate	2.500	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Butylbenzylphthalate	0.073	1,546.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Cadmium (soil)	5.200	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Carbazole	0.370	31.936	4,258.333	798.408	572.320	127.750	286.160	35.000	-
Chromium	26.500	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	2.000	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	22.200	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	22.500	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Dibenzofuran	0.049	31.286	14,600.000	782.143	1,635.200	87.600	817.600	320.000	-

**Table K-3
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Fluoranthene	4.800	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Fluorene	0.096	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Naphthalene	3.100	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Nickel	15.800	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	3.500	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Thallium	0.130	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.006	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	23.700	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Xylenes	0.130	15,642.857	1,000,000.000	391,071.429	817,600.000	43,800.000	408,800.000	160,000.000	-
Zinc	139.000	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Aluminum	10,500.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Arsenic	3.700	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.470	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Benzo(g,h,i)perylene	1.100	NV	NV	NV	NV	NV	NV	NV	-
Calcium	289,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	10,600.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	5,230.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	1.900	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,200.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	138.000	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-4

Soil Screening Levels for COPCs at Cannon AFB SWMU 48A

SITE ID: CANNON AFB SWMU 48A	BRIEF DESCRIPTION: SWMU 48A is the former location of a 20,000-gallon underground storage tank, about 125 feet east of the intersection of Argentia Ave and Torch Blvd. The area is presently paved and used as a parking lot. The site was active from 1941 to 1985, and during that time was used as a gas station (1941 to 1965) and for storage of liquid waste products including petroleum products, waste oils, spent solvents, paint thinners, and recovered fuels (1965 to 1985). The tank and associated piping were removed in 1988.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹					RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Open Space		Commercial				Industrial (mg/kg)
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	15,300.000	7,821.429	3,650,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Antimony	14.000	3.129	1,460.000	78.214	163.520	8.760	81.760	32.000	-
Arsenic	3.400	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Barium	2,390.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Manganese	245.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH	17,300.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
1,2-Dichlorobenzene	7.500	703.929	328,500.000	17,598.214	36,792.000	1,971.000	18,396.000	7,200.000	-
1,3-Dichlorobenzene	0.700	696.107	324,850.000	17,402.679	36,383.200	1,949.100	18,191.600	7,120.000	-
1,4-Dichlorobenzene	1.800	26.614	3,548.611	665.340	476.933	106.458	238.467	291.667	-
2-Butanone	1.200	4,692.857	2,190,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
4-Chloroaniline	7.900	31.286	14,600.000	782.143	1,635.200	87.600	817.600	320.000	-
Acenaphthene	0.088	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Acetone	0.410	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
bis(2-Ethylhexyl) phthalate	9.100	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Chlorobenzene	0.003	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Chromium	13.800	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Cobalt	5.900	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	14.500	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Di-n-butylphthalate	0.410	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Dibenzofuran	0.220	31.286	14,600.000	782.143	1,635.200	87.600	817.600	320.000	-
Ethylbenzene	0.890	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Fluoranthene	1.200	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-

**Table K-4
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Fluorene	0.190	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Methylene chloride	0.041	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
N-Nitrosodiphenylamine	0.400	130.352	17,380.952	3,258.806	2,336.000	521.429	1,168.000	142.857	-
Naphthalene	5.200	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Nickel	13.500	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Phenol	0.038	4,692.857	2,190,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
Toluene	0.006	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	23.400	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Xylenes	12.000	15,642.857	7,300,000.000	391,071.429	817,600.000	43,800.000	408,800.000	160,000.000	-
Zinc	33.100	2,346.429	1,095,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
2-Methylnaphthalene	12.000	NV	NV	NV	NV	NV	NV	NV	-
Beryllium	0.710	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Calcium	250,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	13,300.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	17,700.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	0.400	NV	NV	NV	NV	NV	NV	NV	-
Potassium	3,110.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	25.700	400.000	400.000	400.000	400.000	400.000	400.000	400.000	NV

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-5
Soil Screening Levels for COPCs at Cannon AFB SWMU 48B

SITE ID: CANNON AFB SWMU 48B	BRIEF DESCRIPTION: SWMU 48B is the former location of a 2000-gallon aboveground storage tank, about 125 feet east of the intersection of Argentia Ave and Torch Blvd. The area is presently paved and used as a parking lot. The site was active from 1941 to 1985, and during that time was used as a gas station (1941 to 1965) and for storage of liquid waste products including waste oils, spent solvents, paint thinners, and recovered fuels (1965 to 1985). The tank and associated piping were removed in 1992.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	16,300.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	2,350.000	547.500	255,500.000	13,687.500	28,616.000	1,539.000	14,308.000	5,600.000	-
Manganese	184.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Constituents Whose Maximum Concentration is Below Future Screening Levels									
Acetone	0.014	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
bis(2-Ethylhexyl)phthalate	0.780	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Carbon disulfide	0.001	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Chromium	12.200	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Cobalt	4.700	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	8.700	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Fluoranthene	0.210	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Mercury	0.600	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	-
Methylene chloride	0.005	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	14.500	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Thallium	0.280	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.003	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
TPH	594.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Vanadium	23.800	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	28.600	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Arsenic	3.900	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.650	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Calcium	335,000.000	NV	NV	NV	NV	NV	NV	NV	-

**Table K-5
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Iron	11,500.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	17,100.000	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,390.000	NV	NV	NV	NV	NV	NV	NV	-
Sodium	348.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	7.500	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-6
Soil Screening Levels for COPCs at Cannon AFB SWMU 55

SITE ID: CANNON AFB SWMU 55	BRIEF DESCRIPTION: The lead-acid battery accumulation point (SWMU 55) is located about 100 feet north of the Vehicle Maintenance Shop, Building 379. The lead-acid battery accumulation point has been in operation since 1965 and consists of asphalt pavement measuring 8 feet square. Used lead-acid motor vehicle batteries are stored "wet" on pallets on the asphalt pad until a sufficient number are accumulated for sale to a battery recycling company.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	13,300.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Antimony	7.100	3.129	1,460.000	78.214	163.520	8.760	81.760	32.000	-
Barium	1,120.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Benzo(a)anthracene	2.700	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene ¹	4.000	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	3.600	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Beryllium	0.760	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Dibenz(a,h)anthracene ¹	1.100	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Indeno(1,2,3-cd)pyrene	2.600	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Manganese	336.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH ¹	11,500.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
Acetone	0.018	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Anthracene	0.800	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Benzo(k)fluoranthene	3.900	8.750	1,166.667	218.742	156.800	35.000	78.400	9.589	-
bis(2-Ethylhexyl) phthalate	0.860	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Cadmium (soil)	0.820	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Carbazole	0.400	31.936	4,258.333	798.408	572.320	127.750	286.160	35.000	-
Chromium	9.900	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	3.100	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	4.400	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	7.000	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Diethylphthalate	0.038	6,257.143	1,000,000.000	156,428.571	327,040.000	17,520.000	163,520.000	64,000.000	-

**Table K-6
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Fluoranthene	5.700	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Methylene chloride	0.004	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	9.300	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	6.200	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Toluene	0.028	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	24.900	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	27.300	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Arsenic	4.500	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Benzo(g,h,i)perylene	3.000	NV	NV	NV	NV	NV	NV	NV	-
Calcium	275,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	10,500.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	11,900.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	3.200	NV	NV	NV	NV	NV	NV	NV	-
Potassium	3,340.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	17.300	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - The RFI report determined that benzo(a)pyrene and dibenz(a,h)anthracene would not pose a significant risk under the open space and industrial scenarios because the site is covered by asphalt, and there are no daily activities at the site.

4 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-7

Soil Screening Levels for COPCs at Cannon AFB SWMU 77

SITE ID: CANNON AFB SWMU 77 BRIEF DESCRIPTION: SWMU 77 serves as the Civil Engineering Container Storage Area (Facility # 4038). It is located along the northern border of the base (just east of Building 252) and consists of an open concrete pad measuring approximately 150 by 250 feet. The pad is the remaining floor of the old Portair Airfield Hangar constructed in the 1930s. The hangar was demolished in 1942 and the pad remained unused until about 1970 when it became a storage area for 55-gallon drums containing water, oil, solvents, and asphaltic material.

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	11,600.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	2,840.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Manganese	440.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
PCB-1260	0.140	0.083	11.061	2.074	1.487	0.332	0.743	0.091	-
TPH ³	1,320.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
1,2-Dichloropropane	0.002	9.393	1,252.451	234.826	168.329	37.574	84.165	10.294	-
4,4'-DDT	0.010	1.879	250.490	46.965	33.666	7.515	16.833	2.059	-
4,4'-DDE	0.014	24.566	3,275.641	614.160	440.246	98.269	220.123	269.231	-
Acenaphthene	0.980	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Acetone	0.021	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Benzo(a)anthracene	0.054	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene	0.056	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	0.110	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(k)fluoranthene	3.900	8.750	1,166.667	218.742	156.800	35.000	78.400	9.589	-
Cadmium (soil)	0.570	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Carbazole	7.200	31.936	4,258.333	798.408	572.320	127.750	286.160	35.000	-
Chromium	25.400	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	0.076	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	4.600	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	14.500	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Di-n-butylphthalate	0.910	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Dibenzofuran	1.200	31.286	14,600.000	782.143	1,635.200	87.600	817.600	320.000	-

**Table K-7
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Endrin ketone	0.120	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	-
Fluoranthene	0.100	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Fluorene	1.200	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Methylene chloride	0.004	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Naphthalene	1.500	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Nickel	13.900	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	0.100	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Thallium	0.250	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.004	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	27.500	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	64.800	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
2-Methylnaphthalene	3.200	NV	NV	NV	NV	NV	NV	NV	-
Arsenic	3.600	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.690	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Calcium	294,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	10,300.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	9,840.000	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,500.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	48.500	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg.

for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-8

Soil Screening Levels for COPCs at Cannon AFB SWMU 83

SITE ID: CANNON AFB SWMU 83	BRIEF DESCRIPTION: SWMU 83 is the former location of a sump located about 90 feet northwest of Building 120. The sump was constructed in a 12- by 14-foot concrete slab, but the actual depth is unknown. The installation date of the sump is unknown but it was removed in 1993. Historically, the sump received rain water, wash water, and dilute waste oil generated from flight line activities. Potential contaminants include petroleum and synthetic lube oils, fuels, greases, solvents, and metals.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels					RCRA Subpart S ¹ (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Open Space		Commercial				Industrial (mg/kg)
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Benzo(a)pyrene	0.120	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Constituents Whose Maximum Concentration is Below Future Screening Levels									
2-Butanone	0.002	4,692.857	1,000,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
Acetone	0.003	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Cadmium (soil)	0.460	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Chromium	11.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	0.099	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	4.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	8.100	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Fluoranthene	0.160	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Indeno(1,2,3-cd)pyrene	0.068	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Methylene chloride	0.005	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	9.000	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Phenol	1.700	4,692.857	1,000,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
Pyrene	0.130	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Toluene	0.001	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	19.800	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	23.300	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Aluminum ³	10,800.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Arsenic	3.200	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Barium	633.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Benzo(g,h,i)perylene	0.075	NV	NV	NV	NV	NV	NV	NV	-
Beryllium ¹	0.620	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-

**Table K-8
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)			
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)				
Calcium	233,000.000	NV	NV	NV	NV	NV	NV	NV	-	
Iron	10,200.000	NV	NV	NV	NV	NV	NV	NV	-	
Magnesium	16,400.000	NV	NV	NV	NV	NV	NV	NV	-	
Manganese ³	157.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-	
Phenanthrene	0.073	NV	NV	NV	NV	NV	NV	NV	-	
Potassium	1,840.000	NV	NV	NV	NV	NV	NV	NV	-	
Constituents Whose Maximum Concentration is Below Regulatory Standards										
Lead	12.900	400.000	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Aluminum, beryllium, and manganese were eliminated because all detections were at or below the background upper tolerance limit (UTL).

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-9

Soil Screening Levels for COPCs at Cannon AFB SWMU 93

SITE ID: CANNON AFB SWMU 93	BRIEF DESCRIPTION: Oil Water Separator(OWS) No. 5121 (SWMU 93) was active from approximately 1957 to 1988 when the OWS and the associated leach well were removed during demolition of Building 5121. The hush house portion of Building 1523 covers the location of the former OWS. The OWS was a two-compartment underground unit with a detached 100-gallon oil storage tank, which received engine maintenance waste wash water. Potential residual contaminants include JP-4 fuel, petroleum and synthetic lube oils, solvents, and metals.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹					RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Open Space		Commercial				
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			Industrial (mg/kg)
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	15,400.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	1,890.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Manganese	209.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH ³	1,760.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
Benzo(a)anthracene	0.049	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene	0.069	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	0.050	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(k)fluoranthene	0.160	8.750	1,166.667	218.742	156.800	35.000	78.400	9.589	-
bis(2-Ethylhexyl)phthalate	0.120	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Cadmium (soil)	0.680	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Chromium	12.500	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	0.078	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	4.500	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	17.800	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Fluoranthene	0.130	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Nickel	11.500	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	0.090	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Thallium	0.150	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.005	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	22.300	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	46.700	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-

**Table K-9
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Arsenic	2.900	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Beryllium	0.730	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Calcium	158,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	12,000.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	4,070.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	0.038	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,460.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	11.900	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-10

Groundwater Screening Levels for COPCs at Cannon AFB SWMU 97

SITE ID: CANNON AFB SWMU 97		BRIEF DESCRIPTION: SWMU 97 is a landfill occupying approximately 29 acres within the boundary of Cannon AFB. The landfill is nearly rectangular in shape with overall dimensions of about 650 feet by 1,950 feet. Disposal activities at the landfill began in about 1943. Potential contaminants include PCBs, herbicides, pesticides, organics, VOCs, and metals. The landfill has not been active since 1992. Presently, the site consists of piles of rubble ranging in height from 4 to 15 feet above grade and covered with vegetation.				
Contaminant	Maximum Concentration (mg/L)	Future Use Screening Levels		RCRA Subpart S ² (mg/L)	MCL ³ (mg/L)	State Regs (mg/L)
		Residential (mg/L)	Industrial (Dermal) (mg/L)			
Constituents Driving Remedy Selection and Cost Estimates						
None						
Constituents Whose Maximum Concentration is Below Future Screening Levels						
2-Methylphenol	0.001	0.183	NV	1.750	-	-
Copper	0.011	0.135	19.098	1.295	-	-
Methylene chloride	0.002	0.004	8.393	0.005	0.005	-
Selenium	0.005	0.018	2.581	0.175	0.050	-
Toluene	0.017	0.075	1.961	7.000	1.000	-
Zinc	0.013	1.095	247.758	10.500	-	-
Constituents Whose Maximum Concentration is Below Regulatory Standards						
Arsenic	0.001	0.00004	0.118	0.00002	0.050	-
Barium	0.290	0.256	672.042	2.450	2.000	-
Vanadium	0.026	0.026	3.613	0.245	-	-
Lead	0.003	NV	NV	NV	0.015	-
Constituents Eliminated Based on Current Environmental Reports						
Carbon disulfide ⁴	0.036	0.002	1.301	3.500	-	-

1 - Industrial groundwater screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1 based on dermal exposure only.
 2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for oncarninogens.
 3 - MCL - Maximum Contaminant Level.
 4 - The RFI determined that this constituent was a laboratory contaminant.
 NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.
 - = No regulatory level available.
 Note: Cell shading indicates screening levels used for calculating cost estimates. If the state regulatory level (or MCL) is higher than the future use screening level(s), the regulatory standard is shaded instead of the screening level(s) that it exceeds.

Table K-11
Soil Screening Levels for COPCs at Cannon AFB Site SWMU 101

SITE ID: CANNON AFB SWMU 101	BRIEF DESCRIPTION: SWMU 101 consists of two surface impoundments that have been in use since 1966. Combined sanitary and industrial wastewater is treated in the sewage lagoons which are constructed with bentonite clay-lined bottoms and concrete-lined banks. The average depth of water is 3.5 feet with a maximum of 4.5 feet. The treated is wastewater is discharged to an on-base playa (SWMU 103); no NPDES permit is required.
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Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	17,700.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
bis(2-Ethylhexyl)phthalate	340.000	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Cadmium (soil)	11.750	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	--
Chromium	51.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Copper	346.000	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Mercury	8.100	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	-
PCB-1221	0.320	0.083	11.061	2.074	1.487	0.332	0.743	0.091	--
PCB-1232	0.160	0.083	11.061	2.074	1.487	0.332	0.743	0.091	--
PCB-1242	0.160	0.083	11.061	2.074	1.487	0.332	0.743	0.091	--
PCB-1254	0.490	0.156	73.000	3.911	8.176	0.438	4.088	1.600	-
PCB-1260	0.160	0.083	11.061	2.074	1.487	0.332	0.743	0.091	--
Silver	96.900	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Toxaphene	0.820	0.581	77.424	14.517	10.406	2.323	5.203	0.636	--
Vanadium	97.900	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	--
Constituents Whose Maximum Concentration is Below Future Screening Levels									
4,4'-DDD	0.053	2.661	354.861	66.534	47.693	10.646	23.847	2.917	--
4,4'-DDE	0.090	1.879	250.490	46.965	33.666	7.515	16.833	2.059	--
Aldrin	0.008	0.038	5.010	0.939	0.673	0.150	0.337	0.041	--
alpha BHC	0.008	0.101	13.519	2.535	1.817	0.406	0.908	0.111	--
alpha Chlordane	0.031	0.469	65.513	11.732	8.805	1.314	4.402	0.538	--
gamma-Chlordane	0.045	0.469	65.513	11.732	8.805	1.314	4.402	0.538	-
beta BHC	0.008	0.355	47.315	8.871	6.359	1.419	3.180	3.889	--
Cobalt	14.700	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	--
delta BHC	0.008	3.520	1,642.500	87.991	183.960	9.855	91.980	36.000	--
Dieldrin	0.016	0.040	5.323	0.998	0.715	0.160	0.358	0.044	--

**Table K-11
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Endosulfan	0.008	46.929	21,900.000	1,173.214	2,452.800	131.400	1,226.400	480.000	--
Endosulfan I	0.016	46.929	21,900.000	1,173.214	2,452.800	131.400	1,226.400	480.000	--
Endosulfan Sulfate	0.016	46.929	21,900.000	1,173.214	2,452.800	131.400	1,226.400	480.000	--
Endrin	0.016	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	--
Endrin Aldehyde	0.016	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	--
gamma BHC	0.008	0.491	65.513	12.283	8.805	1.965	4.402	0.538	--
gamma Chlordane	0.023	0.469	65.513	11.732	8.805	1.314	4.402	0.538	--
Heptachlor	0.082	0.142	18.926	3.548	2.544	0.568	1.272	0.156	--
Methoxychlor	0.082	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	--
Nickel	27.600	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	--
PCB-1016	0.160	0.548	255.500	13.688	28.616	1.533	14.308	5.600	--
Selenium	35.300	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	--
Zinc	672.000	2,346.429	1,095,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	--
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Arsenic	14.700	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Barium	635.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Endrin Ketone	0.016	NV	NV	NV	NV	NV	NV	--	--
Iron	13,200.000	NV	NV	NV	NV	NV	NV	NV	-
Manganese	155.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Magnesium	6,690.000	NV	NV	NV	NV	NV	NV	NV	-
PCB-1248	0.160	NV	NV	NV	NV	NV	NV	--	--
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	157.000	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg.

for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-12
Groundwater Screening Levels for COPCs at Cannon AFB SWMU 101

SITE ID: CANNON AFB SWMU 101		BRIEF DESCRIPTION: SWMU 101 consists of two surface impoundments that have been in use since 1966. Combined sanitary and industrial wastewater is treated in the sewage lagoons which are constructed with bentonite clay-lined bottoms and concrete-lined banks. The average depth of water is 3.5 feet with a maximum of 4.5 feet. The treated wastewater is discharged to an on-base playa (SWMU 103); no NPDES permit is required.				
Contaminant	Maximum Concentration (mg/L)	Future Use Screening Levels		RCRA Subpart S ² (mg/L)	MCL ³ (mg/L)	State Regs (mg/L)
		Residential (mg/L)	Industrial (Dermal) (mg/L)			
Constituents Driving Remedy Selection and Cost Estimates						
None						
Constituents Whose Maximum Concentration is Below Future Screening Levels						
Barium	0.075	0.256	672.042	2.450	2.000	-
Copper	0.029	0.135	19.098	1.295	-	-
Vanadium	0.020	0.026	3.613	0.245	-	-
Zinc	0.013	1.095	247.758	10.500	-	-
Constituents Whose Maximum Concentration is Below Regulatory Standards						
Selenium	0.024	0.018	2.581	0.175	0.050	-

- 1 - Industrial groundwater screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1 based on dermal exposure only.
- 2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.
- 3 - MCL - Maximum Contaminant Level.
- NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.
- = No regulatory level available.
- Note: Cell shading indicates screening levels used for calculating cost estimates. If the state regulatory level (or MCL) is higher than the future use screening level(s), the regulatory standard is shaded instead of the screening level(s) that it exceeds.

Table K-13

Soil Screening Levels for COPCs at Cannon AFB SWMU 103

SITE ID: CANNON AFB SWMU 103

BRIEF DESCRIPTION: The Wastewater Playa Lake, SWMU 103, occupies approximately 13 acres near the east-central edge of the Base. The playa received all of the Base sanitary and industrial wastewater from 1943 to 1966. The playa has received treated sanitary and industrial wastewater effluent from the wastewater treatment lagoons from 1966 to the present. The playa is maintained at approximately two-thirds total capacity by inflow from the wastewater treatment lagoons. Potential contaminants include organics, PCBs, pesticides, and metals.

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	24,700.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	1,300.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Beryllium	1.600	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Manganese	902.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Constituents Whose Maximum Concentration is Below Future Screening Levels									
2-Butanone	0.021	4,692.857	1,000,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
4,4'-DDT	0.240	1.879	250.490	46.965	33.666	7.515	16.833	2.059	-
4,4-DDE	0.200	24.566	3,275.641	614.160	440.246	98.269	220.123	269.231	-
Acetone	0.100	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Benzo(a)anthracene	0.053	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene	0.061	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	0.095	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
bis(2-Ethylhexyl)phthalate	5.800	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Butylbenzylphthalate	0.071	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Cadmium (soil)	0.720	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Carbon disulfide	0.013	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Chromium	22.700	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	0.067	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	11.300	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	18.900	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Di-n-octylphthalate	0.430	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Dieldrin	0.002	0.040	5.323	0.998	0.715	0.160	0.358	0.044	-
Endrin	0.003	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	-

**Table K-13
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Fluoranthene	0.069	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
gamma-Chlordane	0.002	0.469	65.513	11.732	8.805	1.314	4.402	0.538	-
Mercury	0.140	2.346	1,095.000	58.661	122.640	6.570	61.320	24.000	-
Methylene chloride	0.006	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	17.000	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	0.071	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Selenium	0.180	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Silver	4.600	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Thallium	0.340	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.004	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
TPH	734.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Vanadium	32.100	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	61.800	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Antimony	4.900	3.129	1,460.000	78.214	163.520	8.760	81.760	32.000	-
Arsenic	4.600	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Calcium	329,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	20,800.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	9,160.000	NV	NV	NV	NV	NV	NV	NV	-
PCB-1248	0.750	NV	NV	NV	NV	NV	NV	NV	-
Potassium	4,750.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	19.600	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-14
Groundwater Screening Levels for COPCs at Cannon AFB SWMU 104

SITE ID: CANNON AFB SWMU 104	BRIEF DESCRIPTION: SWMU 104 is a landfill occupying approximately 6.3 acres within the boundary of Cannon AFB. The landfill is a rectangular area approximately 573 feet by 479 feet and is currently covered by native vegetation. The landfill was active in 1967 and 1968. Domestic solid wastes, waste oils, solvents, paints, paint thinners and strippers, pesticide containers, and various empty cans and drums were burned and buried in the trenches. As the trenches were filled they were covered and new trenches were opened.
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Contaminant	Maximum Concentration (mg/L)	Future Use Screening Levels		RCRA Subpart S ² (mg/L)	MCL ³ (mg/L)	State Regs (mg/L)
		Residential (mg/L)	Industrial (Dermal) (mg/L)			
Constituents Driving Remedy Selection and Cost Estimates						
None						
Constituents Whose Maximum Concentration is Below Future Screening Levels						
Acetone	0.025	0.061	1,342.564	3.500	-	-
Barium	0.049	0.256	672.042	2.450	2.000	-
Copper	0.006	0.135	19.098	1.295	-	-
Methylene chloride	0.002	0.004	8.393	0.005	0.005	-
Selenium	0.007	0.018	2.581	0.175	0.050	-
Tin	0.032	2.190	309.697	21.000	-	-
Toluene	0.006	0.075	1.961	7.000	1.000	-
TPH	0.017	0.035	NV	2.100	-	-
Vanadium	0.021	0.026	3.613	0.245	-	-
Zinc	0.015	1.095	247.758	10.500	-	-
Constituents Whose Maximum Concentration is Below Regulatory Standards						
Arsenic	0.003	0.00004	0.118	0.00002	0.050	-

1 - Industrial groundwater screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1 based on dermal exposure only.
 2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.
 3 - MCL - Maximum Contaminant Level.
 NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.
 - = No regulatory level available.
 Note: Cell shading indicates screening levels used for calculating cost estimates. If the state regulatory level (or MCL) is higher than the future use screening level(s), the regulatory standard is shaded instead of the screening level(s) that it exceeds.

Table K-15

Groundwater Screening Levels for COPCs at Cannon AFB SWMU 105

SITE ID: CANNON AFB SWMU 105	BRIEF DESCRIPTION: SWMU 105 is a landfill occupying approximately 13.5 acres within the boundary of Cannon AFB. The landfill is a rectangular area approximately 1,960 feet by 300 feet and is covered by native vegetation. The landfill was active between 1959 and 1967. Domestic solid wastes, pesticide containers, solvents, paints, paint thinners and strippers, waste oils, and various empty cans and drums were buried in the trenches. As the trenches were filled, they were covered and new trenches were opened.
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Contaminant	Maximum Concentration (mg/L)	Future Use Screening Levels		RCRA Subpart S ² (mg/L)	MCL ³ (mg/L)	State Regs (mg/L)
		Residential (mg/L)	Industrial ¹ (Dermal) (mg/L)			
Constituents Driving Remedy Selection and Cost Estimates						
None						
Constituents Whose Maximum Concentration is Below Future Screening Levels						
Barium	0.064	0.256	672.042	2.450	2.000	-
Selenium	0.003	0.018	2.581	0.175	0.050	-
Toluene	0.007	0.075	1.961	7.000	1.000	-
TPH	0.016	0.035	NV	2.100	-	-
Vanadium	0.018	0.026	3.613	0.245	-	-
Constituents Whose Maximum Concentration is Below Regulatory Standards						
Arsenic	0.002	0.00004	0.118	0.00002	0.050	-
Carbon tetrachloride	0.002	0.0002	0.086	0.0003	0.005	-

1 - Industrial groundwater screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1 based on dermal exposure only.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - MCL - Maximum Contaminant Level.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates. If the state regulatory level (or MCL) is higher than the future use screening level(s), the regulatory standard is shaded instead of the screening level(s) that it exceeds.

Table K-16

Soil Screening Levels for COPCs at Cannon AFB Site SWMU 108

SITE ID: CANNON AFB SWMU 108 BRIEF DESCRIPTION: SWMU 108 is the Explosive Ordnance Disposal Training Area located on the southeast corner of the Base, directly west of the Fire Department Training Area. The circular area has a diameter of about 200 feet, is about 2 to 3 feet below grade, and slopes downward toward the center. The area has been active since the early 1970s. Potential contaminants include organic compounds, explosives, and metals.

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels					RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)	
		Residential (mg/kg)	Restricted (mg/kg)	Open Space (mg/kg)	Commercial (mg/kg)	Industrial (mg/kg)			
				Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	14,200.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	5,940.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Beryllium	0.740	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Manganese	257.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Constituents Whose Maximum Concentration is Below Future Screening Levels									
2-Butanone	0.002	4,692.857	1,000,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
Acetone	0.009	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Chromium	12.800	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Cobalt	5.200	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	9.700	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Methylene chloride	0.004	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	60.800	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Selenium	1.100	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Silver	0.490	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Thallium	0.190	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	0.001	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	36.400	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Zinc	32.400	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
Antimony	5.100	3.129	1,460.000	78.214	163.520	8.760	81.760	32.000	-
Arsenic	3.700	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Calcium	263,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	13,000.000	NV	NV	NV	NV	NV	NV	NV	-

**Table K-16
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels						RCRA Subpart S ² (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Magnesium	6,220.000	NV	NV	NV	NV	NV	NV	NV	-
Potassium	2,930.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	11.700	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg. for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).

Table K-17

Soil Screening Levels for COPCs at Cannon AFB SWMU 127

SITE ID: CANNON AFB SWMU 127

SWMU 127 is a 135-gallon sand trap that serves the POL refueling truck washrack at Facility 4095. The sand trap, which previously discharged to a 300-sf rectangular leach field east of the washrack, has been used since 1977. The use of the leach field (which remains in place) was ceased in the late 1980s. An oil/water separator enclosed in a concrete vault was installed downstream of the sand trap in 1991. The wastewater now drains to a new leach field southeast of the washrack.

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹						RCRA Subpart S (mg/kg)	State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)		
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Constituents Driving Remedy Selection and Cost Estimates									
Aluminum	14,700.000	7,821.429	1,000,000.000	195,535.714	408,800.000	21,900.000	204,400.000	80,000.000	-
Barium	1,540.000	547.500	255,500.000	13,687.500	28,616.000	1,533.000	14,308.000	5,600.000	-
Benzo(a)anthracene	0.910	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Benzo(a)pyrene ³	1.100	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Benzo(b)fluoranthene	1.600	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Beryllium	0.760	0.149	19.806	3.714	2.662	0.594	1.331	0.163	-
Dibenzo(a,h)anthracene	0.280	0.087	11.667	2.187	1.568	0.350	0.784	0.096	-
Manganese	340.000	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
TPH ⁴	11,600.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	1,000.000
Constituents Whose Maximum Concentration is Below Future Screening Levels									
2-Butanone	0.006	4,692.857	1,000,000.000	117,321.429	245,280.000	13,140.000	122,640.000	48,000.000	-
Acetone	7.500	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Anthracene	0.068	2,346.429	1,095,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Benzene	3.800	22.025	2,936.782	550.626	394.703	88.103	197.352	24.138	-
Benzo(k)fluoranthene	1.600	8.750	1,166.667	218.742	156.800	35.000	78.400	9.589	-
Benzoic acid	0.048	31,285.714	1,000,000.000	782,142.857	1,000,000.000	87,600.000	817,600.000	320,000.000	-
bis(2-Ethylhexyl)phthalate	4.700	45.623	6,083.333	1,140.582	817.600	182.500	408.800	50.000	-
Cadmium (soil)	0.770	7.821	3,650.000	195.536	408.800	21.900	204.400	80.000	-
Carbazole	0.170	31.936	4,258.333	798.408	572.320	127.750	286.160	35.000	-
Chromium	21.400	39.107	18,250.000	977.679	2,044.000	109.500	1,022.000	400.000	-
Chrysene	1.500	87.497	11,666.667	2,187.418	1,568.000	350.000	784.000	95.890	-
Cobalt	8.000	469.286	219,000.000	11,732.143	24,528.000	1,314.000	12,264.000	4,800.000	-
Copper	45.800	289.393	135,050.000	7,234.821	15,125.600	810.300	7,562.800	2,960.000	-
Di-n-butylphthalate	0.190	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Di-n-octylphthalate	0.310	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-

**Table K-17
(Continued)**

Contaminant	Maximum Concentration (mg/kg)	Future Use Screening Levels ¹							State Regs (mg/kg)
		Residential (mg/kg)	Open Space		Commercial		Industrial (mg/kg)	RCRA Subpart S (mg/kg)	
			Restricted (mg/kg)	Recreational (mg/kg)	Adult (mg/kg)	Child (mg/kg)			
Diethylphthalate	0.046	6,257.143	1,000,000.000	156,428.571	327,040.000	17,520.000	163,520.000	64,000.000	-
Ethylbenzene	54.000	782.143	365,000.000	19,553.571	40,880.000	2,190.000	20,440.000	8,000.000	-
Fluoranthene	2.800	312.857	146,000.000	7,821.429	16,352.000	876.000	8,176.000	3,200.000	-
Indeno(1,2,3-cd)pyrene	0.700	0.875	116.667	21.874	15.680	3.500	7.840	0.959	-
Methylene chloride	0.007	85.163	11,355.556	2,129.087	1,526.187	340.667	763.093	93.333	-
Nickel	10.500	156.429	73,000.000	3,910.714	8,176.000	438.000	4,088.000	1,600.000	-
Pyrene	2.300	234.643	109,500.000	5,866.071	12,264.000	657.000	6,132.000	2,400.000	-
Thallium	0.380	0.626	292.000	15.643	32.704	1.752	16.352	6.400	-
Toluene	82.000	1,564.286	730,000.000	39,107.143	81,760.000	4,380.000	40,880.000	16,000.000	-
Vanadium	23.200	54.750	25,550.000	1,368.750	2,861.600	153.300	1,430.800	560.000	-
Xylenes	260.000	15,642.857	1,000,000.000	391,071.429	817,600.000	43,800.000	408,800.000	160,000.000	-
Zinc	41.100	2,346.429	1,000,000.000	58,660.714	122,640.000	6,570.000	61,320.000	24,000.000	-
Constituents Eliminated Based on Current Environmental Reports: Results and Recommendations									
2-Methylnaphthalene	40.000	NV	NV	NV	NV	NV	NV	NV	-
Arsenic	3.000	0.426	56.778	10.645	7.631	1.703	3.815	0.467	-
Benzo(g,h,i)perylene	0.700	NV	NV	NV	NV	NV	NV	NV	-
Calcium	254,000.000	NV	NV	NV	NV	NV	NV	NV	-
Iron	11,500.000	NV	NV	NV	NV	NV	NV	NV	-
Magnesium	15,000.000	NV	NV	NV	NV	NV	NV	NV	-
Phenanthrene	1.100	NV	NV	NV	NV	NV	NV	NV	-
Potassium	3,230.000	NV	NV	NV	NV	NV	NV	NV	-
Constituents Whose Maximum Concentration is Below Regulatory Standards									
Lead	83.900	400.000	400.000	400.000	400.000	400.000	400.000	NV	-

1 - All screening levels are calculated to obtain a cancer risk of 1E-6 or a noncarcinogenic hazard quotient of 0.1.

2 - RCRA Subpart S concentrations are calculated to obtain risk of 1E-6 for Class A and B carcinogens, 1E-5 for Class C carcinogens, or a hazard quotient of 1.0 for noncarcinogens.

3 - The RFI report determined that benzo(a)pyrene does not pose a significant risk under the industrial scenario.

4 - Although the maximum TPH concentration exceeded the state standard, it did not exceed the health-based criteria for the open space and industrial scenarios. Also, the hazardous constituents of TPH, primarily the BTEX constituents, were below their respective screening levels.

NV - No Value. No toxicity value exists for this constituent. No screening level can be calculated.

- = No regulatory level available.

Note: Cell shading indicates screening levels used for calculating cost estimates.

Note: No toxicity values currently exist for lead. OSWER directive number 9355.4-12 dated August 1994 established a residential soil screening level of 400 mg/kg.

for corrective action units covered under RCRA section 3004(u) or 3008(h). The 400 mg/kg value is based on the Integrated Exposure Uptake Biokinetic Model (IEUBK).