DEPARTMENT OF THE AIR FORCE

MELR 04-001

HEADQUARTERS 27TH FIGHTER WING (ACC)
CANNON AIR FORCE BASE NEW MEXICO

Colonel John D. Posner
Commander
100 S DL Ingram Blvd Suite 100
Cannon AFB NM 88103-5214

RECEIVED
DEC 2004
NMED Hazardous Waste Bureau

Mr. John E. Kieling
Manager of Permits Management Program
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling,

This letter and certification is in response to your March 12, 2004 letter stating that Cannon Air Force Base need not implement the Melrose Air Force Range closure plan specified in RCRA permit NM5572124456-1. Cannon never constructed the concrete berm required by the permit; therefore, never operated the open detonation unit. For this reason, I request a clean closure of the permit which expires December 15, 2004. Please find enclosed our submittal of a Part A permit application for corrective action of the remaining Solid Waste Management Units and Areas of Concern.

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

Thank you for the opportunity to work with your staff to ensure our mutual commitments to environmental stewardship. If questions arise, please contact Mr. Don White of my Civil Engineering Environmental Flight at (505) 784-2739.

Sincerely

JOHN D. POSNER, Colonel, USAF

Attachment:
Part A Permit Application for Corrective Actions

cc:
Mr. Glenn von Gonten, NMED

MAIL THE COMPLETED FORM TO: Appropriate EPA ional or State Office.	United States Environmental Protection Agency **RCRA SUBTITLE C SITE IDENTIFICATION FORM**	
1. Reason for Submittal (See instructions on page 25) CHECK CORRECT BOX(ES)	**Reason for Submittal:** ☐ To provide initial notification (to obtain an EPA ID Number for hazardous waste, universal waste, or used oil activities). ☐ To provide subsequent notification (to update site identification information). ☒ As a component of a First RCRA Hazardous Waste Part A Permit Application. ☐ As a component of a Revised RCRA Hazardous Waste Part A Permit Application (Amendment #_____). ☐ As a component of the Hazardous Waste Report.	
2. Site EPA ID Number (See instructions on page 26)	**EPA ID Number:** N M 5 5 7 2 1 2 4 4 5 6	
3. Site Name (See instructions on page 26)	**Name:** Melrose Air Force Range	
4. Site Location Information (See instructions on page 26)	**Street Address:** 5 miles South and 6 miles West	
	City, Town, or Village: Melrose	**State:** NM
	County Name: Curry/Roosevelt	**Zip Code:** 88124
5. Site Land Type (See instructions on page 26)	**Site Land Type:** ☐ Private ☐ County ☐ District ☒ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	
6. North American Industry Classification System (NAICS) Code(s) for the Site (See instructions on page 26)	**A.** 92811 National Security	**B.**
	C.	**D.**
7. Site Mailing Address (See instructions on page 27)	**Street or P. O. Box:** 100 S. DL Ingram Blvd	
	City, Town, or Village: Cannon AFB	
	State: NM	
	Country: Curry	**Zip Code:** 88103
8. Site Contact Person (See instructions on pages 27)	**First Name:** Peter **MI:** P.	**Last Name:** Zamie
	Phone Number: 505-784-2739	**Phone Number Extension:** N/A
9. Legal Owner and Operator of the Site (See instructions on pages 27 and 28)	**A. Name of Site's Legal Owner:** 27th Fighter Wing	**Date Became Owner (mm/dd/yyyy):** 01/01/1967
	Owner Type: ☐ Private ☐ County ☐ District ☒ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	
	B. Name of Site's Operator: 27th Civil Engineer Squadron	**Date Became Operator (mm/dd/yyyy):** 01/01/1967
	Operator Type: ☐ Private ☐ County ☐ District ☒ Federal ☐ Indian ☐ Municipal ☐ State ☐ Other	

EPA ID No. N M 5 5 7 2 1 2 4 4 5 6

10. Type of Regulated Waste Activity (Mark 'X' in the appropriate boxes. See instructions on pages 28 to 32)

lazardous Waste Activities

1. Generator of Hazardous Waste
(choose only one of the following three categories)

- ☐ a. LQG: Greater than 1,000 kg/mo (2,200 lbs./mo.) of non-acute hazardous waste; or
- ☐ b. SQG: 100 to 1,000 kg/mo (220 - 2,200 lbs./mo.) of non-acute hazardous waste; or
- ☒ c. CESQG: Less than 100 kg/mo (220 lbs./mo.) of non-acute hazardous waste

In addition, indicate other generator activities (check all that apply)

- ☐ d. United States Importer of Hazardous Waste
- ☐ e. Mixed Waste (hazardous and radioactive) Generator

For Items 2 through 6, check all that apply:

- ☐ **2. Transporter of Hazardous Waste**
- ☐ **3. Treater, Storer, or Disposer of Hazardous Waste (at your site)** Note: A hazardous waste permit is required for this activity.
- ☐ **4. Recycler of Hazardous Waste (at your site)** Note: A hazardous waste permit may be required for this activity.
- **5. Exempt Boiler and/or Industrial Furnace**
  - ☐ a. Small Quantity On-site Burner Exemption
  - ☐ b. Smelting, Melting, and Refining Furnace Exemption
- ☐ **6. Underground Injection Control**

B. Universal Waste Activities

1. Large Quantity Handler of Universal Waste (accumulate 5,000 kg or more) [refer to your State regulations to determine what is regulated]. Indicate types of universal waste generated and/or accumulated at your site. (check all boxes that apply):

	Generated	Accumulated
a. Batteries	☐	☐
b. Pesticides	☐	☐
c. Thermostats	☐	☐
d. Lamps	☐	☐
e. Other (specify) _____	☐	☐
f. Other (specify) _____	☐	☐
g. Other (specify) _____	☐	☐

☐ **2. Destination Facility for Universal Waste**
Note: A hazardous waste permit may be required for this activity.

C. Used Oil Activities

1. Used Oil Transporter - Indicate Type(s) of Activity(ies)
- ☐ a. Transporter
- ☐ b. Transfer Facility

2. Used Oil Processor and/or Re-refiner - Indicate Type(s) of Activity(ies)
- ☐ a. Processor
- ☐ b. Re-refiner

☐ **3. Off-Specification Used Oil Burner**

4. Used Oil Fuel Marketer - Indicate Type(s) of Activity(ies)
- ☐ a. Marketer Who Directs Shipment of Off-Specification Used Oil to Off-Specification Used Oil Burner
- ☐ b. Marketer Who First Claims the Used Oil Meets the Specifications

11. Description of Hazardous Wastes (See instructions on page 33)

A. Waste Codes for Federally Regulated Hazardous Wastes. Please list the waste codes of the Federal hazardous wastes handled at your site. List them in the order they are presented in the regulations (e.g., D001, D003, F007, U112). Use an additional page if more spaces are needed.

EPA ID No. N M 5 5 7 2 1 2 4 4 5 6

B. Waste Codes for State-Regulated (i.e., non-Federal) Hazardous Wastes. Please list the waste codes of the State-regulated hazardous wastes handled your site. List them in the order they are presented in the regulations. Use an additional page if more spaces are needed for waste codes.

12. Comments (See instructions on page 33)

13. Certification. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. **(See instructions on page 33)**

Signature of owner, operator, or an authorized representative	Name and Official Title (type or print)	Date Signed (mm/dd/yyyy)
John D. Posner	John D. Posner, Commander, 27th Fighter Wing	10 DEC 2004

OMB #: 2050-0034 Expires 10/31/02

United States Environmental Protection Agency

HAZARDOUS WASTE PERMIT INFORMATION FORM

1. Facility Permit Contact (See instructions on page 35)	**First Name:** Peter	**MI:** P.	**Last Name:** Zamie
	Phone Number: 505-784-1092		**Phone Number Extension:** N/A
2. Facility Permit Contact Mailing Address (See instructions on page 35)	**Street or P.O. Box:** 506 N DL Ingram Blvd		
	City, Town, or Village: Cannon AFB		
	State: NM		
	Country: USA		**Zip Code:** 88103
3. Legal Owner Mailing Address and Telephone Number (See instructions on page 36)	**Street or P.O. Box:** 100 S DL Ingram Blvd		
	City, Town, or Village: Cannon AFB		
	State: NM		
	Country: USA	**Zip Code:** 88103	**Phone Number** 505-784-2727
4. Operator Mailing Address and Telephone Number (See instructions on page 36)	**Street or P.O. Box:** 506 N DL Ingram Blvd		
	City, Town, or Village: Cannon AFB		
	State: NM		
	Country: USA	**Zip Code:** 88103	**Phone Number** 505-784-2008
5. Facility Existence Date (See instructions on page 36)	**Facility Existence Date (mm/dd/yyyy):** 01/01/1967		

6. Other Environmental Permits (See instructions on page 36)

A. Permit Type (Enter code)	B. Permit Number	C. Description
AIR	15170-MA-01	Clean Air Act; Synthetic Minor Permit
NPDES	NMR05-12	NPDES Multi-sector storm water general permit

7. Nature of Business (Provide a brief description; see instructions on page 37)

The primary mission of the 27th Fighter Wing is to support and employ "superior combat power" by developing and maintaining aircraft fighter wing capable of day and night and all weather combat operations.

Process Codes and Design Capacities (See instructions on page 37)

PROCESS CODE - *Enter the code from the list of process codes below that best describes each process to be used at the facility. Thirteen lines are provided for entering codes. If more lines are needed, attach a separate sheet of paper with the additional information. For "other" processes (i.e., D99, S99, T04 and X99), describe the process (including its design capacity) in the space provided in Item 9.*

B. PROCESS DESIGN CAPACITY- *For each code entered in column A, enter the capacity of the process.*

1. **AMOUNT** - *Enter the amount. In a case where design capacity is not applicable (such as in a closure/post-closure or enforcement action) enter the total amount of waste for that process.*
2. **UNIT OF MEASURE** - *For each amount entered in column B(1), enter the code in column B(2) from the list of unit of measure codes below that describes the unit of measure used. Select only from the units of measure in this list.*

C. PROCESS TOTAL NUMBER OF UNITS - *Enter the total number of units for each corresponding process code.*

PROCESS CODE	PROCESS	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
	Disposal:	
D79	Underground Injection Well Disposal	Gallons; Liters; Gallons Per Day; or Liters Per Day
D80	Landfill	Acre-feet; Hectare-meter; Acres; Cubic Meters; Hectares; Cubic Yards
D81	Land Treatment	Acres or Hectares
D82	Ocean Disposal	Gallons Per Day or Liters Per Day
D83	Surface Impoundment Disposal	Gallons; Liters; Cubic Meters; or Cubic Yards
D99	Other Disposal	Any Unit of Measure Listed Below
	Storage:	
S01	Container	Gallons; Liters; Cubic Meters; or Cubic Yards
S02	Tank Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S03	Waste Pile	Cubic Yards or Cubic Meters
S04	Surface Impoundment Storage	Gallons; Liters; Cubic Meters; or Cubic Yards
S05	Drip Pad	Gallons; Liters; Acres; Cubic Meters; Hectares; or Cubic Yards
	Containment Building Storage	Cubic Yards or Cubic Meters
	Other Storage	Any Unit of Measure Listed Below
	Treatment:	
T01	Tank Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T02	Surface Impoundment Treatment	Gallons Per Day; Liters Per Day; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Pounds Per Hour; Short Tons per Day; Kilograms Per Hour; Metric Tons Per Day; or Metric Tons Per Hour
T03	Incinerator	Short Tons Per Hour; Metric Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
T04	Other Treatment	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Day; Liters Per Hour; or Million Btu Per Hour
T80	Boiler	Gallons; Liters; Gallons Per Hour; Liters Per Hour; Btu Per Hour; or Million Btu Per Hour
T81	Cement Kiln	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Liters Per Hour; Kilograms Per Hour; or Million Btu Per Hour
T82	Lime Kiln	
T83	Aggregate Kiln	
T84	Phosphate Kiln	
T85	Coke Oven	
T86	Blast Furnace	
T87	Smelting, Melting, or Refining Furnace	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; Gallons Per Hour; Liters Per Hour; or Million Btu Per Hour
T88	Titanium Dioxide Chloride Oxidation Reactor	
T89	Methane Reforming Furnace	
T90	Pulping Liquor Recovery Furnace	
T91	Combustion Device Used In The Recovery Of Sulfur Values From Spent Sulfuric Acid	
T92	Halogen Acid Furnaces Other Industrial Furnaces Listed In 40 CFR §260.10	
T93		
T94	Containment Building - Treatment	Cubic Yards; Cubic Meters; Short Tons Per Hour; Gallons Per Hour; Liters Per Hour; Btu Per Hour; Pounds Per Hour; Short Tons Per Day; Kilograms Per Hour; Metric Tons Per Day; Gallons Per Day; Liters Per Day; Metric Tons Per Hour; or Million Btu Per Hour
	Miscellaneous (Subpart X):	
X01	Open Burning/Open Detonation	Any Unit of Measure Listed Below
X02	Mechanical Processing	Short Tons Per Hour; Metric Tons Per Hour; Short Tons Per Day; Metric Tons Per Day; Pounds Per Hour; Kilograms Per Hour; Gallons Per Hour; Liters Per Hour; or Gallons Per Day
X03	Thermal Unit	Gallons Per Day; Liters Per Day; Pounds Per Hour; Short Tons Per Hour; Kilograms Per Hour; Metric Tons Per Day; Metric Tons Per Hour; Short Tons Per Day; Btu Per Hour; or Million Btu Per Hour
X04	Geologic Repository	Cubic Yards; Cubic Meters; Acre-feet; Hectare-meter; Gallons; or Liters
X99	Other Subpart X	Any Unit of Measure Listed Below

UNIT OF MEASURE	UNIT OF MEASURE CODE
Gallons	G
Gallons Per Hour	E
Gallons Per Day	U
Liters	L
Liters Per Hour	H
Liters Per Day	V

UNIT OF MEASURE	UNIT OF MEASURE CODE
Short Tons Per Hour	D
Metric Tons Per Hour	W
Short Tons Per Day	N
Metric Tons Per Day	S
Pounds Per Hour	J
Kilograms Per Hour	R
Million Btu Per Hour	X

UNIT OF MEASURE	UNIT OF MEASURE CODE
Cubic Yards	Y
Cubic Meters	C
Acres	B
Acre-feet	A
Hectares	Q
Hectare-meter	F
Btu Per Hour	I

·ocess Codes and Design Capacities (*Continued*)

EXAMPLE FOR COMPLETING Item 8 (shown in line number X-1 below): A facility has a storage tank, which can hold 533.788 gallons.

Line Number		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. (2) Unit of Measure (Enter code)	C. Process Total Number of Units	For Official Use Only
X	1	S	0	2	5 3 3 . 7 8 8	G	0 0 1	
	1	D	N	A	.			
	2				.			
	3				.			
	4				.			
	5				.			
	6				.			
	7				.			
	8				.			
	9				.			
1	0				.			
1	1				.			
1	2				.			
1	3				.			

NOTE: If you need to list more than 13 process codes, attach an additional sheet(s) with the information in the same format as above. Number the lines sequentially, taking into account any lines that will be used for "other" processes (i.e., D99, S99, T04 and X99) in Item 9.

·her Processes (*See instructions on page 37 and follow instructions from Item 8 for D99, S99, T04 and X99 process codes*)

Line Number (Enter #s in sequence with Item 8)		A. Process Code (From list above)			B. PROCESS DESIGN CAPACITY (1) Amount (Specify)	B. (2) Unit of Measure (Enter code)	C. Process Total Number of Units	D. Description of Process
X	1	T	0	4	Not Applicable .			In-situ Vitrification
	1				.			
	2				.			
	3				.			
	4				.			

Description of Hazardous Wastes (See instructions on page 37)

A. **EPA HAZARDOUS WASTE NUMBER** - *Enter the four-digit number from 40 CFR, Part 261 Subpart D of each listed hazardous waste you will handle. For hazardous wastes which are not listed in 40 CFR, Part 261 Subpart D, enter the four-digit number(s) from 40 CFR Part 261, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.*

B. **ESTIMATED ANNUAL QUANTITY** - *For each listed waste entered in column A, estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A, estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.*

C. **UNIT OF MEASURE** - *For each quantity entered in column B, enter the unit of measure code. Units of measure which must be used and the appropriate codes are:*

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure, taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. **PROCESS CODES:**

For listed hazardous waste: For each listed hazardous waste entered in column A select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate the waste will be stored, treated, and/or disposed at the facility.

For non-listed hazardous waste: For each characteristic or toxic contaminant entered in column A, select the code(s) from the list of process codes contained in Items 8A and 9A on page 3 to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed hazardous wastes that possess that characteristic or toxic contaminant.

NOTE: THREE SPACES ARE PROVIDED FOR ENTERING PROCESS CODES. IF MORE ARE NEEDED:

1. *Enter the first two as described above.*
2. *Enter "000" in the extreme right box of Item 10.D(1).*
3. *Use additional sheet, enter line number from previous sheet, and enter additional code(s) in Item 10.E.*

2. **PROCESS DESCRIPTION:** *If a code is not listed for a process that will be used, describe the process in Item 10.D(2) or in Item 10.E(2).*

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER - Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. *Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B, C and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.*
2. *In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.*
3. *Repeat step 2 for each EPA Hazardous Waste Number that can be used to describe the hazardous waste.*

EXAMPLE FOR COMPLETING Item 10 (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operations. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

Line Number		A. EPA Hazardous Waste No. (Enter code)				B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)									(2) PROCESS DESCRIPTION (If a code is not entered in D(1))
X	1	K	0	5	4	900	P	T	0	3	D	8	0				
X	2	D	0	0	2	400	P	T	0	3	D	8	0				
X	3	D	0	0	1	100	P	T	0	3	D	8	0				
X	4	D	0	0	2												Included With Above

Description of Hazardous Wastes (*Continued; use additional sheets as necessary*)

Line Number	A. EPA Hazardous Waste No. (Enter code)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (Enter code)	D. PROCESSES (1) PROCESS CODES (Enter code)	D. PROCESSES (2) PROCESS DESCRIPTION (If a code is not entered in D(1))
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					

Map (See instructions on page 38)

Attach to this application a topographic map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in this map area. See instructions for precise requirements.

12. Facility Drawing (See instructions on page 39)

All existing facilities must include a scale drawing of the facility (see instructions for more detail).

13. Photographs (See instructions on page 39)

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

14. Comments (See instructions on page 39)

Item 8: Does not Apply. This Part "A" Permit Application is for a RCRA HSWA module and there is no process code.

CANNON AIR FORCE BASE
RCRA PERMIT APPLICATION – PART "A" ATTACHMENT

Prepared for

New Mexico Environment Department
Hazardous Waste Bureau

December 2004

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AOC	Area of Concern
bgs	below ground surface
C	Celsius
CESQ	cumulative ecological screening quotient
COC	contaminant of concern
COPEC	chemical of potential ecological concern
DCQAP	Data Collection Quality Assurance Plan
DQO	data quality objective
Ebasco	Ebasco Services Incorporated
EEL	estimated exposure level
EPA	U.S. Environmental Protection Agency
ESQ	ecological screening quotient
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
ft	foot or feet
MDL	method detection limit
Melrose	Melrose Bombing Range
mg/kg	milligrams per kilogram
NMED	New Mexico Environment Department
NOAEL	no-observable-adverse-effects-level
NTU	nephelometric turbidity units
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyls
PCOPEC	preliminary chemical of potential ecological concern
PPE	personal protective equipment
PPM	parts per million
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

SLERA	screening-level ecological risk assessment
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TOC	total organic carbon
TRPH	total recoverable petroleum hydrocarbons
TRV	toxicity reference value
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance
VOC	volatile organic compound
WQCC	Water Quality Control Commission

1. SITE DESCRIPTION AND EXISTING CONDITION

Melrose Air Force Range (MAFR) is an active U.S. Air Force bombing and air-to-ground gunnery range located in Roosevelt and Curry counties, approximately 8 miles southwest of Melrose, New Mexico, and 25 miles southwest of Cannon AFB. The U.S. Army Air Corps used the area for training during World War II. In 1952, the U.S. Air Force leased 7,771 acres of grassland for use as a bombing and air-to-ground gunnery range to support Clovis AFB (Kearney 1987). Clovis AFB was renamed Cannon AFB in 1957 in honor of the late General John K. Cannon, former commander of the Tactical Air Command. Melrose was expanded between 1968 and 1972 with the purchase of both the leased land and an additional 14,369 acres (Kearney 1987). The total area of Melrose, including Cannon AFB-owned, public domain, and restricted easement land, is 87,925 acres (USACE 1995). Melrose is a composite day-and-night simulated special and conventional weapons delivery range and a day-only tactical range. Live high explosive filled ordnance has not been used at the range since approximately 1969. Currently practice ordnance is used at the range, these ordnance items though designated "practice" can contain small explosive or pyrotechnic spotting charges.

MAFR does not lay within a political jurisdiction requiring evaluation of the area's seismicity per 40 CFR 264 Appendix VI.

There are no flood plain designation maps available for MAFR.

The following site descriptions were taken from the Final Phase 1 RFI Work Plan (Ebasco 1995).

1.1 SWMU 114—Expended Ordnance and Industrial Waste Burial Site (Motor Pool Trenches)

SWMU 114 is located in the southeast quarter of the southwest quarter of Section 15 and the northeast quarter of the northwest quarter of Section 22, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-2). SWMU 114 is sparsely vegetated and the surrounding area is flat with mixed desert scrub that consists of prairie grass and cactus. A Melrose production well is located approximately one-half mile from SWMU 114, where the depth to groundwater was approximately 100 feet below ground surface (bgs) in 1995. The SWMU consists of eight unlined burial trenches that have been closed. These trenches were used to dispose of a variety of military and industrial waste from Melrose and Cannon AFB. The exact dates of operation and types of waste disposed of at SWMU 114 are not clearly defined. From approximately 1952 to 1962, drummed liquids were poured into the trenches and burned. Full drums of liquid may also have been placed in the trenches. Drummed liquids may have included unusable fuels, paints, sludge, and solvents. Approximately 12,000 to 15,000 pounds of scrap metal from

practice bombs and munitions were disposed of in trenches every month. During the 1995 RFI soil was analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), explosives, total metals, total mercury, total recoverable petroleum hydrocarbons (TRPH), and total organic carbon (TOC). Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide. Groundwater sampling was accomplished during the 2000 RFI and is discussed in Section 4, Groundwater Evaluation.

1.2 SWMU 115—Explosives-Contaminated Burial Site (Arroyo Burial Site)

SWMU 115 is located in the southeast quarter of the southeast quarter of Section 28 and the northeast quarter of the northeast quarter of Section 33, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-3). The site lies within a small arroyo located in the south-central portion of Melrose. Surface water flows intermittently down an unfilled part of the arroyo during heavy rains. The SWMU was used for the burial and disposal of unexploded ordnance (UXO) and has since been backfilled. The contents of SWMU 115 are believed to consist entirely of UXO. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide.

1.3 SWMU 117—Domestic Waste Burial Site (Southeast of Main Building)

SWMU 117 is located south of the range entrance road in the northeast quarter of the southwest quarter of Section 22, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-4). This is a low-lying area with a slight topographic depression that is most likely a semi-permanent playa, which receives surface runoff from surrounding areas. Domestic waste from the control building and possibly UXO (as suggested by personnel during the September 1994 site visit) were disposed of at the site. Domestic wastes disposed at the site included food waste, solid waste, common household items, and possibly paints, solvents, batteries, pesticides, and herbicides. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide.

1.4 AOC-1—World War II Cantonment Disposal Site

The area investigated as AOC-1 is located in the northwest quarter of Section 17, Township 1 North, Range 30 East in Roosevelt County, New Mexico, but the exact location is unknown (Figure 2-5). During World War II, this area was used as a cantonment (temporary housing area for troops) dump/sanitary

landfill site. The types of wastes and quantities of waste disposed at the site are unknown. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide. Groundwater sampling was accomplished during the 2000 RFI and is discussed in Section 4, Groundwater Evaluation.

1.5 AOC-2—Domestic Waste Burial Site (East of Fire Station)

The domestic waste burial site is located to the east of the Melrose fire station in the northwest quarter of the southwest quarter of Section 22, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-6). This site was used for the disposal and/or burning of wastes. The type and volume of disposed waste is unconfirmed. The site was expected to contain domestic waste and possibly spent fuels, motor oil, batteries, paints, pesticides, and metals, but the geophysical survey and field sampling activities during the 1995 RFI field program did not confirm disposal. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide. Groundwater sampling was accomplished during the 2000 RFI and is discussed in Section 4, Groundwater Evaluation.

1.6 AOC-3—Disposal/Burn Site (North Helicopter Pad)

AOC-3 is located north of the former helicopter pad at the Melrose operations area in the northeast quarter of the southwest quarter of Section 22, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-7). This site was used for burning and/or disposal of waste of unknown type and quantity. Possible wastes include garbage, residue from burning, motor oil, and metals, although the geophysical survey and field sampling activities during the 1995 RFI field program did not confirm disposal took place. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide.

1.7 AOC-4—Northwest Munitions Disposal Site (Northwest Corner of Impact Area)

The site is located in the east-central part of Section 17 with some overlap into Section 16, Township 1 North, Range 30 East in Roosevelt County, New Mexico (Figure 2-8). The site is flat with native scrub vegetation that alternates with areas free of vegetation. AOC-4 was used from 1952 to 1960 for disposal

of exploded ordnance and UXO. During the 1995 RFI soil was analyzed for VOCs, SVOCs, pesticides/PCBs, explosives, total metals, total mercury, TRPH, and TOC. Also, Groundwater was analyzed for VOCs, SVOCs, pesticides/PCBs, herbicides, explosives, dioxins/furans, total metals, total mercury, anions, alkalinity, TRPH, cyanide, and sulfide.

2. FACILITY SECURITY

This section has been prepared in accordance with 40 CFR 264.14 and 270.14(b) (4).

2.1 Prevention of Unknowing or Unauthorized Entry

There are two levels of security at Melrose AFR and the SWMU's and AOC's to prevent unknowing and unauthorized contact with hazardous wastes.

- First, there is one entry point to the range cantonment area and range control facility. Individuals desiring access to the range must sign in at the range control facility and be escorted at all times when they are on the range. Proper identification is required of all persons for entry onto the range. This main entry gate is closed and locked when the range is not in operation.
- Second, access to target areas and other portions of the range is controlled by fences and locked gates. During normal duty hours, entry to these areas is by escort only. These gates are locked except when personnel are moving from one portion of the range to another.

2.2 Physical Barriers

The range is surrounded by a four strand barbed wire fence and this along with the gates and locks constitutes the physical barrier around the range.

2.3 Entry Control

Range contractor personnel control entry to the area during regular duty hours. Visitors are required to sign into a logbook. Doors to the range control facility are locked during non-duty hours.

2.4 Security Procedures

The range contractor has established written procedures for physical security. This document describes uniform security standards including barriers, lock and key control, and entry control to be implemented in range facilities.

3. SUMMARY OF INVESTIGATIONS

3.1 Phase 1 RFI—1995

The initial RFI focused on results of a soil and groundwater investigation at the seven sites, as well as the results of a screening-level human heath risk assessment. Table 3-1 details the sampling locations for each site. Geophysical and soil gas surveys were performed and the results were used to select locations for soil and groundwater sampling. Surface and subsurface soil samples were collected from all seven sites and were analyzed for the following parameters:

- VOCs—EPA Method 8260
- SVOCs—EPA Methods 8270
- Pesticides/PCBs—EPA Methods 8080
- Explosives—EPA Method 8330
- Target analyte list total metals—EPA Method 6010
- Total mercury—EPA Method 7471
- TRPH—EPA Methods 9071/418.1
- TOC—EPA Method 9060

Groundwater samples were collected from monitoring wells or open boreholes at five sites (SWMUs 114, 115, AOC-1, AOC-2, and AOC-4) were analyzed for the following parameters:

- VOCs—EPA Method 8260
- SVOCs—EPA Methods 8270
- Pesticides/PCBs—EPA Method 8080
- Herbicides—EPA Method 8150
- Explosives—EPA Method 8330
- Dioxins/furans—EPA Method 8280

- Target analyte list total metals—EPA Method 6010
- Total mercury—EPA Method 7470
- Anions—EPA Methods 300.0 and 353.2
- Alkalinity—EPA Method 310.1
- TRPH—EPA Methods 9071/418.1
- Cyanide—EPA Method 9010
- Sulfide—EPA Method 376.1

Soil and groundwater samples were also collected from background locations throughout Melrose.

Results of the 1995 Phase 1 RFI indicated minor detections of metals in soils at concentrations above background and minor detections of metals in groundwater above the maximum contaminant levels. The results of the screening-level human heath risk assessment indicted no significant risk under either residential or industrial worker land-use scenarios (Ebasco 1996).

3.2 Supplemental Groundwater Data—2000

The purpose of the May 2000 field program was to sample the 15 existing monitoring wells at Melrose to supplement the 1995 RFI data. Fifteen wells were gauged and only nine wells contained enough water to permit sampling. Samples were collected from wells at SWMU 114, AOC-1, and AOC-2. Samples were analyzed by Applied Physics and Chemistry Laboratory (APCL), Chino, California, for the following parameters:

- VOCs—EPA Method 8260
- Explosives—EPA Method 8330
- Target analyte list total metals—EPA Method 6010
- Total mercury—EPA Method 7040
- Anions (nitrate nitrogen, chloride, fluoride, sulfate)—EPA Method 300.0
- Cyanide—EPA Method 9010A

No groundwater samples were collected at SWMU 117, as only wet sediments were present at the bottom of the wells. Monitoring wells M117MW001, M117MW002, M117MW003, and M117MW004 were dry. The groundwater monitoring well at AOC-3 was dry at the time of installation/development and sampling in 1995 and it was dry in May 2000. At SWMU 115 and AOC-4, no groundwater samples were collected because the open boreholes sampled for groundwater in 1995 were backfilled with grout and abandoned during the RFI field program.

Analytical data were presented to Melrose on July 20, 2000 (Foster Wheeler Environmental 2000) for the purposes of purge water waste characterization. The results of this supplemental groundwater sampling are discussed in Section 4 of this RFI Addendum.

3.3 Supplemental Soil Data—2002

The objectives of the June 2002 field program, which involved additional soil sampling at seven sites, were to supplement existing data generated during the 1995 RFI field program and to support the facility-wide SLERA. Surface (0- to 6-inch depth interval) and near-surface soil (1- to 2-foot depth interval) samples were collected at 15 locations distributed across the seven sites. Soil samples were analyzed by APCL for the following parameters:

- VOCs (subsurface samples only—EPA Method 8260B
- SVOCs—EPA Method 8270D
- Target analyte list metals—EPA Method 6010B
- Total mercury—EPA Method 7471
- Explosives—EPA Method 8330

The results of this sampling event are discussed in Section 3 of this RFI Addendum.

4. GROUNDWATER EVALUATION

In 1995, groundwater sampling was conducted at 15 wells during the initial RFI (SWMUs 114 and 115, and AOC-1 and AOC-4) in accordance with the Final Phase 1 RFI Work Plan (Ebasco 1995). The supplemental groundwater sampling that took place in 2000 was conducted at nine wells (SWMU 114 and AOC-1 and AOC-2). The 2000 sampling was conducted in accordance with the Work Plan Addendum Field Sampling and Analysis Plan and Quality Assurance Project Plan (Foster Wheeler Environmental 2000). The following sections describe the sample results for groundwater samples collected at the seven sites under investigation.

4.1 SWMU 114

Groundwater monitoring wells (M114MW001, M114MW002, M114MW003, and M114MW004) were installed and sampled at each borehole that was drilled during the 1995 Phase 1 RFI. Analytical results for the groundwater samples collected in 1995 are presented in Table 4-1. Well locations are shown on Figure 2-2. During the 1995 field program, location M114MW001 was sampled through the drill casing and had a very slow recovery. A well was installed in this borehole after the sample was collected. Samples for total metals were collected and an aliquot was filtered in the field for analysis of dissolved metals. Results of this sampling event indicate some exceedances of New Mexico Water Quality Control Commission (WQCC) Groundwater Standards (NMED 2002). The following metals and anions were detected above WQCC Groundwater Standards during the 1995 RFI:

- Aluminum (10 milligrams per liter [mg/L] with a WQCC standard of 5.0 mg/L)
- Iron (7.111 mg/L with a WQCC standard of 1 mg/L)
- Manganese (0.223 mg/L with a WQCC standard of 0.2 mg/L)
- Chloride (ranging from 250 to 3900 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (ranging from 2000 to 2100 mg/L with a WQCC standard of 600 mg/L)

These elevated concentrations were most likely the result of high turbidity (12 to 383 nephelometric turbidity units [NTU] [Appendix E]).

In 2000, the four monitoring wells were sampled to supplement the existing data and to respond to comments received from NMED. The following metals and anions were detected above WQCC Groundwater Standards during the supplemental sampling in 2000:

- Aluminum (22.6 mg/L with a WQCC standard of 5.0 mg/L)
- Iron (ranging from 1.52 to 18.1 mg/L with a WQCC standard of 1 mg/L)
- Manganese (0.244 mg/L with a WQCC standard of 0.2 mg/L)
- Chloride (ranging from 4000 to 4230 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (ranging from 2000 to 2500 mg/L with a WQCC standard of 600 mg/L)

These elevated concentrations are likely due to highly turbid water characterized as slightly cloudy at the time of sampling in 2000. Analytical results for the groundwater samples collected in 2000 are presented in Table 4-1.

4.2 SWMU 115

Groundwater samples were collected from each of the boreholes drilled during the 1995 RFI (M115SB001, M115SB002, M115SB003, and M115SB004) using a direct-push sampling method. The analytical results of this sampling event are presented in Table 4-2 and well locations are shown on Figure 2-3. Organic analytes were not detected in groundwater samples that were collected at SWMU 115 during the 1995 RFI field program. The following metals exceeded WQCC Groundwater Standards from the 1995 RFI sampling:

- Aluminum (ranging from 51.08 to 189.2 mg/L with a WQCC standard of 5.0 mg/L)
- Barium (ranging from 1.3 to 31 mg/L with a WQCC standard of 1 mg/L)
- Cadmium (0.014 mg/L with a WQCC standard of 0.01 mg/L)
- Chromium (ranging from 0.18 to 0.42 mg/L with a WQCC standard of 0.05 mg/L)
- Cobalt (ranging from 0.12 to 0.18 mg/L with a WQCC standard of 0.05 mg/L)
- Iron (ranging from 139.6 to 191.6 mg/L with a WQCC standard of 1 mg/L)
- Manganese (ranging from 6 to 29.3 mg/L with a WQCC standard of 0.2 mg/L)
- Nickel (ranging from 0.23 to 0.45 mg/L with a WQCC standard of 0.2 mg/L)

No groundwater sampling was conducted in 2000 as the boreholes were backfilled with grout and abandoned during the 1995 investigation, because they were located in an active target area. If monitoring wells were installed in the borehole there was a potential for seriously damaged if they were hit by a practice bomb. The damage could result in contamination migrating to groundwater if it existed in the area.

4.3 SWMU 117

Groundwater was not encountered at this site during the 1995 investigation. Boreholes were drilled to a maximum depth of 182 feet and only a few tenths of a foot of water was present in the silt traps of any wells at SWMU 117 in 1995 and 2000. No groundwater samples were collected in 1995 or 2000. SWMU 117 is shown on Figure 2-4.

4.4 AOC-1

Four groundwater monitoring wells were installed and sampled during the 1995 RFI. The results of groundwater sampling in 1995 are shown in Table 4-3 and well locations are shown on Figure 2-5. No organic compounds were detected above WQCC Groundwater Standards during the 1995 RFI. The following metals and anions were detected above WQCC Groundwater Standards during the 1995 RFI:

- Aluminum (5.035 mg/L with a WQCC standard of 5.0 mg/L)
- Chromium (0.056 mg/L with a WQCC standard of 0.05 mg/L)
- Iron (3.468 mg/L with a WQCC standard of 1 mg/L)
- Chloride (ranging from 490 to 600 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (ranging from 640 to 700 mg/L with a WQCC standard of 600 mg/L)

The four monitoring wells at AOC-1 were also sampled during the 2000 supplemental investigation. The results of groundwater sampling in 2000 are shown in Table 4-3. The following metals and anions were detected above WQCC Groundwater Standards during the 2000 supplemental sampling:

- Aluminum (ranging from 17.8 to 18.6 mg/L with a WQCC standard of 5.0 mg/L)
- Chromium (ranging from 0.0663 to 0.114 mg/L with a WQCC standard of 0.05 mg/L)
- Iron (ranging from 1.68 to 17.3 mg/L with a WQCC standard of 1 mg/L)

- Manganese (ranging from 0.356 to 0.966 mg/L with a WQCC standard of 0.2 mg/L)
- Chloride (ranging from 316 to 639 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (ranging from 670 to 690 mg/L with a WQCC standard of 600 mg/L)

These elevated concentrations are likely due to highly turbid water (20 to 453 NTU [Appendix E]) characterized as slightly cloudy to cloudy at the time of sampling in 2000.

4.5 AOC-2

One shallow (MA02MW001S) and one deep (MA02MW001D) well were installed in 1995. The shallow well was dry at the time of installation/development and sampling. The deep well was sampled in 1995, and sampling results are provided in Table 4-4 and well locations are shown on Figure 2-6. The deep well location was sampled through the drill casing prior to installation of the well due to slow recharge. The sample was very turbid, and filtered and unfiltered samples were collected for analyses of dissolved and total metals, respectively. No organic compounds were detected above WQCC Groundwater Standards. The following metals and anions were detected above WQCC Groundwater Standards during the 1995 RFI:

- Aluminum (15.22 mg/L with a WQCC standard of 5.0 mg/L)
- Iron (10.15 mg/L with a WQCC standard of 1 mg/L)
- Manganese (0.2697 mg/L with a WQCC standard of 0.2 mg/L)
- Selenium (ranging from 0.082 to 0.088 mg/L with a WQCC standard of 0.05 mg/L)
- Chloride (1800 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (2300 mg/L with a WQCC standard of 600 mg/L)

These elevated concentrations are likely due to the highly turbid water sampled in 1995.

The deep well was sampled again in 2000 and the results are detailed in Table 4-4. The following metals and anions were detected above WQCC Groundwater Standards during the supplemental sampling in 2000:

- Aluminum (32.6 mg/L with a WQCC standard of 5.0 mg/L)

- Iron (23 mg/L with a WQCC standard of 1 mg/L)
- Manganese (0.754 mg/L with a WQCC standard of 0.2 mg/L)
- Chloride (3100 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (2500 mg/L with a WQCC standard of 600 mg/L)

These elevated concentrations are likely due to highly turbid water (65 to 695 NTU [Appendix E]) characterized as cloudy to very cloudy at the time of sampling in 2000.

4.6 AOC-3

During the 1995 RFI, no water was encountered during the drilling of MA03SB001. The boring was drilled to 182 ft bgs and no water has been observed in the well since that time. No groundwater samples were collected in 1995 or 2000. The site is shown on Figure 2-7.

4.7 AOC-4

Groundwater samples were collected from three of the four boreholes during drilling operations in 1995 through the open casing. Samples were collected using a stainless steal bailer. No groundwater was encountered at MA04SB002. The results of the 1995 groundwater sampling are presented in Table 4-5 and well locations are shown on Figure 2-8. Organic analytes were not detected in the groundwater samples collected at AOC-4. The following metals and anions were detected above WQCC Groundwater Standards during the 1995 RFI:

- Aluminum (ranging from 20.94 to 532.4 mg/L with a WQCC standard of 5.0 mg/L)
- Barium (2.5 mg/L with a WQCC standard of 1 mg/L)
- Cadmium (96.01 mg/L with a WQCC standard of 0.01 mg/L)
- Chromium (0.36 mg/L with a WQCC standard of 0.05 mg/L)
- Cobalt (0.27 mg/L with a WQCC standard of 0.05 mg/L)
- Iron (ranging from 74.75 to 320.3 mg/L with a WQCC standard of 1 mg/L)
- Manganese (ranging from 2.024 to 17.6 mg/L with a WQCC standard of 0.2 mg/L)
- Nickel (0.69 mg/L with a WQCC standard of 0.2 mg/L)

- Chloride (ranging from 440 to 450 mg/L with a WQCC standard of 250 mg/L)
- Sulfate (ranging from 1300 to 1400 mg/L with a WQCC standard of 600 mg/L)

These elevated levels of metals and anions are likely due to highly turbid water sampled in 1995.

No groundwater sampling was conducted in 2000 as the boreholes were backfilled with grout and abandoned during the 1995 investigation, because they were located in an active target area. If monitoring wells were installed in the borehole there was a potential for seriously damaged if they were hit by a practice bomb. The damage could result in contamination migrating to groundwater if it existed in the area.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Groundwater Quality

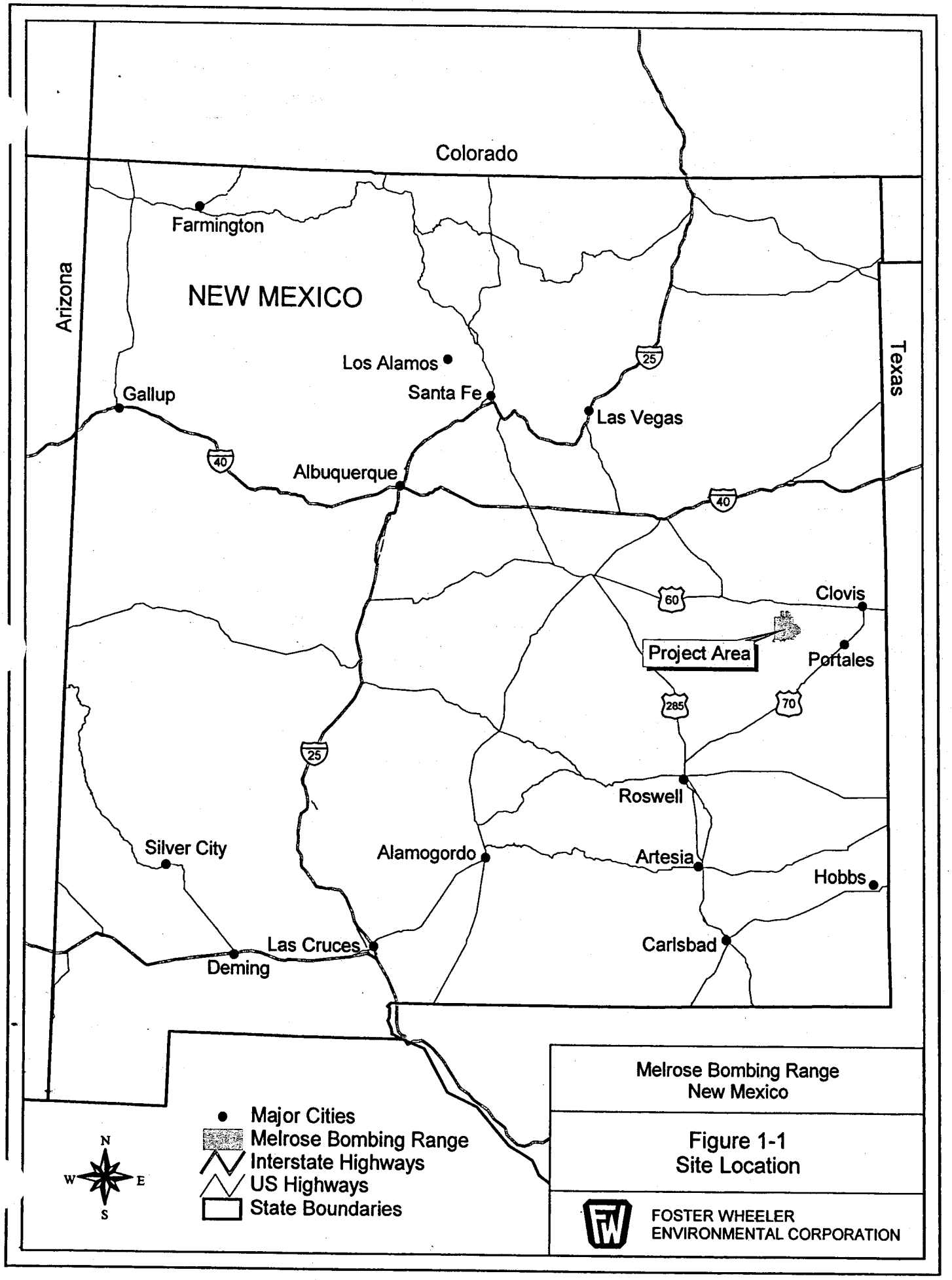
No organic compounds were detected at concentrations above WQCC Groundwater Standards during the 1995 or 2000 sampling events. Of the metals detected in groundwater only aluminum, barium, cadmium, chromium, cobalt, iron, manganese, nickel, and selenium were detected above WQCC Groundwater Standards. Due to the cation-exchange capacity of the surface and near surface soil in the area, the alkaline nature of deeper subsurface calcareous bedrock, and the low solubility of metals, migration of metals from the disposal site to groundwater is unlikely. The occurrences of metals detected in the turbid groundwater sampled at Melrose probably reflect natural conditions. Anions detected above the WQCC Groundwater Standard include chloride and sulfate, and, like metals, probably reflect natural conditions.

5.2 Recommendations

No further action is recommended for the seven sites at Melrose based on the following results:

- Evaluation of groundwater quality from sampling during the RFI field program in 1995 and supplemental sampling in 2000 show that groundwater has not been impacted by disposal activities at any of the sites.

Figures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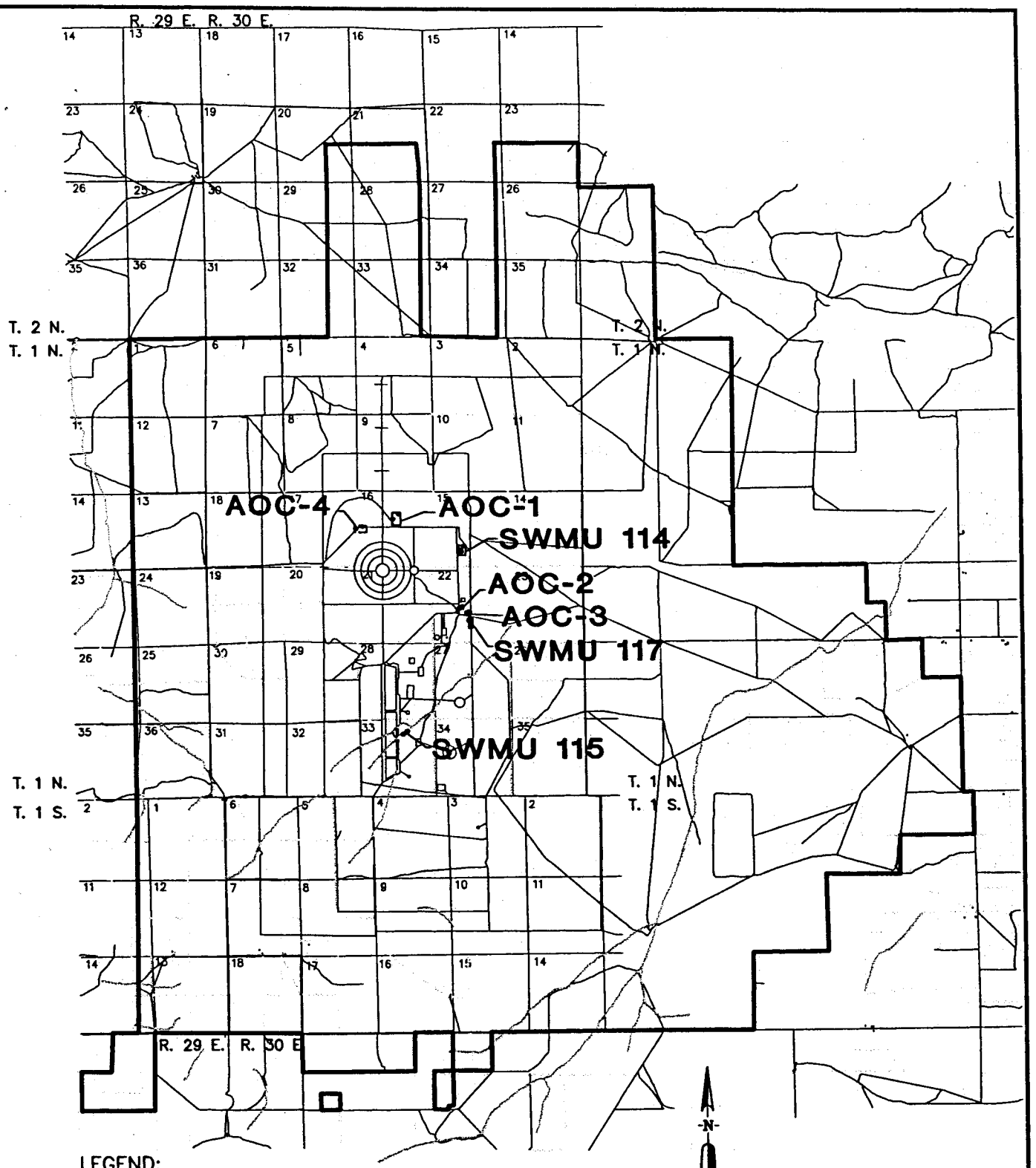
Texas
NEW MEXICO
Farmington
Los Alamos
Santa Fe
Gallup
Las Vegas
Albuquerque
Clovis
Project Area
Portales
Roswell
Silver City
Alamogordo
Artesia
Hobbs
Las Cruces
Deming
Carlsbad
25
40
60
285
70
N
W
E
S
Major Cities
Melrose Bombing Range
Interstate Highways
US Highways
State Boundaries
Melrose Bombing Range
New Mexico
Figure 1-1
Site Location
FOSTER WHEELER
ENVIRONMENTAL CORPORATION



LEGEND:

- AOC-2 — Site Investigated
- Section Lines
- Melrose Bombing Range Boundary
- Elevation Contour
- Road
- Drainage
- Trail

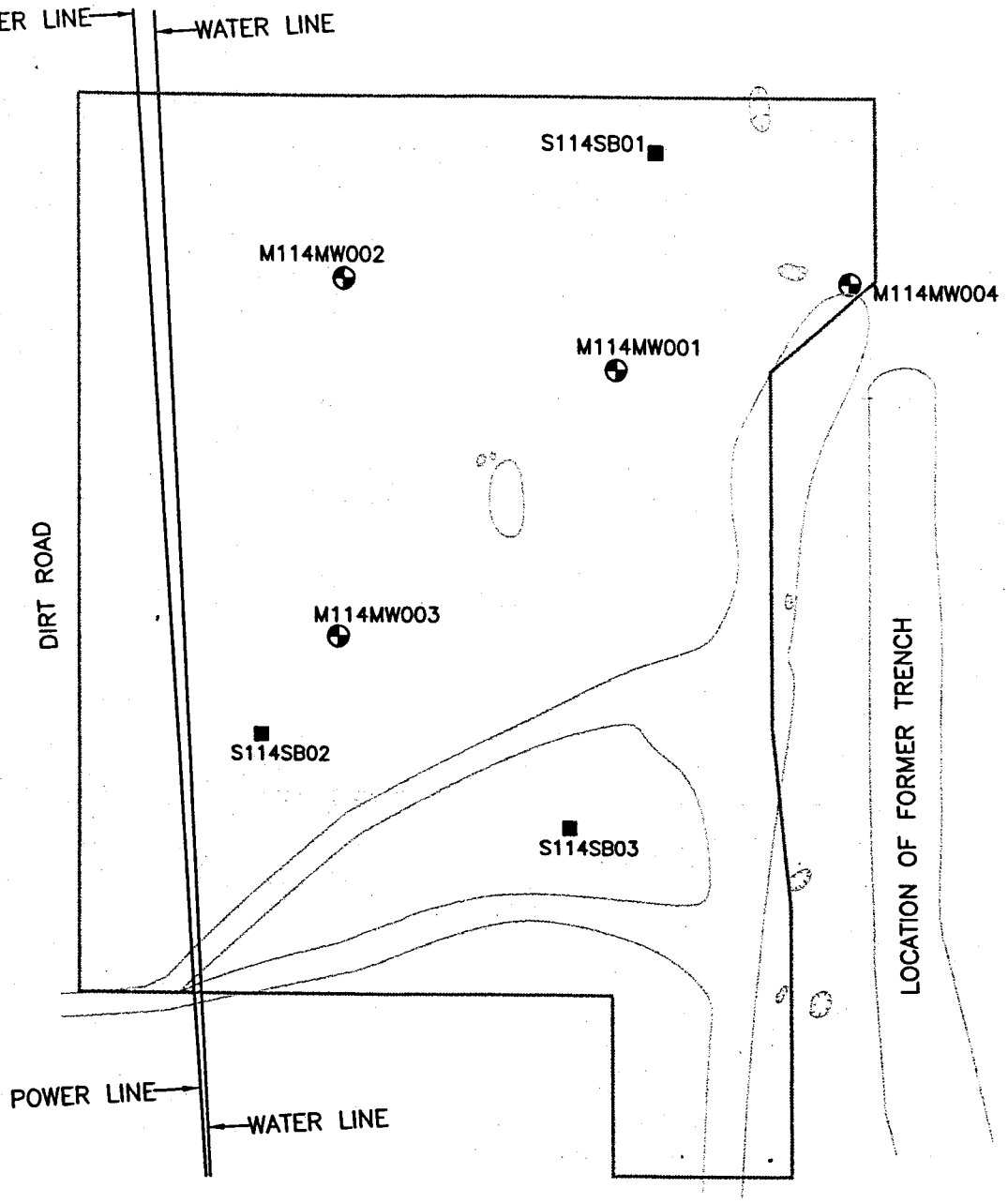
0 3000
Scale in Feet

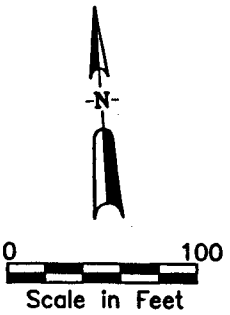
FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:3000
DRAWN: REP

FIGURE 2-1
MELROSE BOMBING RANGE SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE





LEGEND:

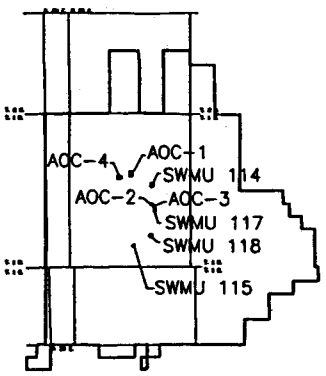
RFI Investigation Area

Depression

M114MW001 Monitoring Well Location

S114SB01 Soil Sample Location (2002)

INDEX MAP

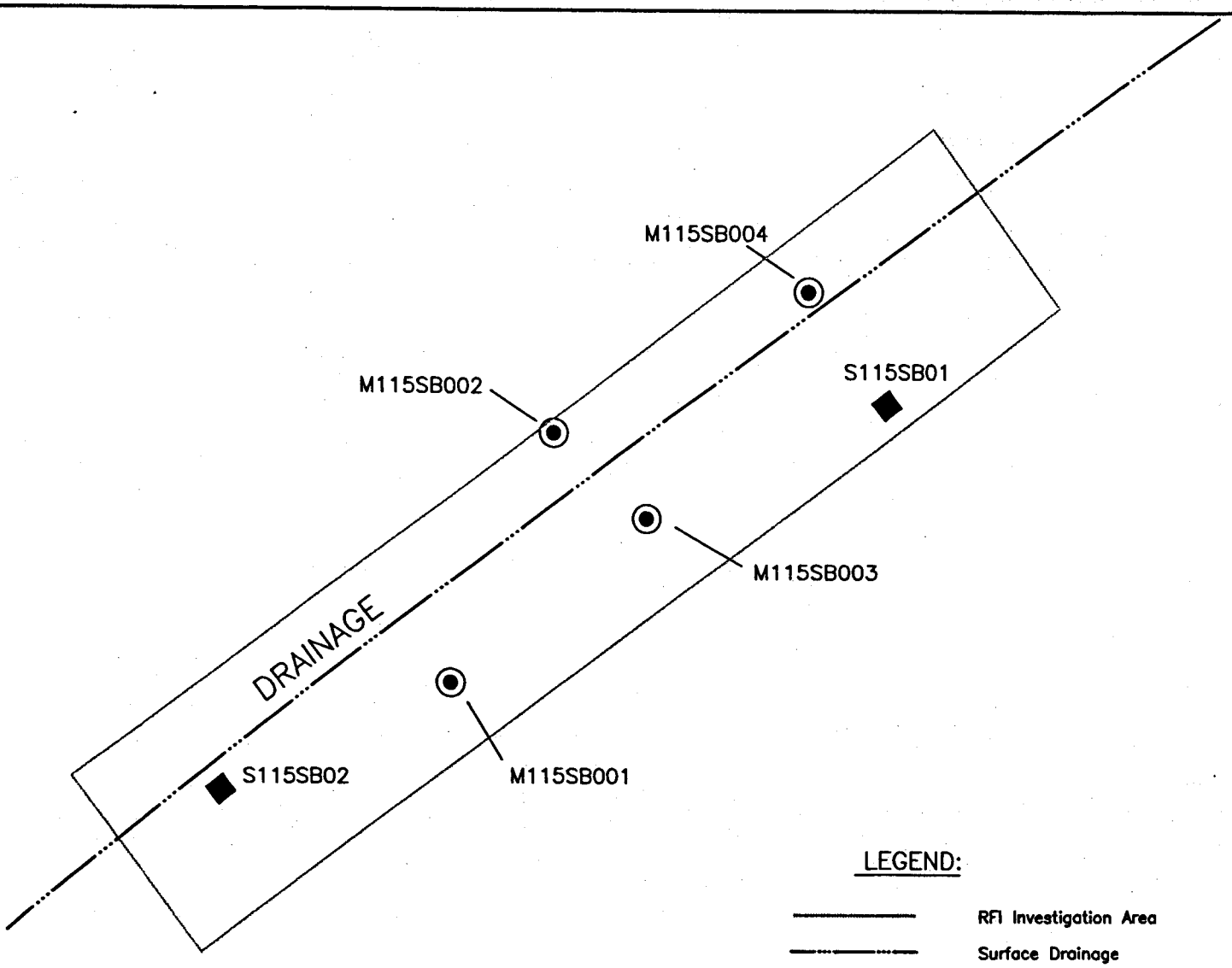


FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:100
DRAWN: REP

FIGURE 2-2
SWMU 114 SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MCCLOUD DOMINICAN RANGE
CANNON AIR FORCE BASE



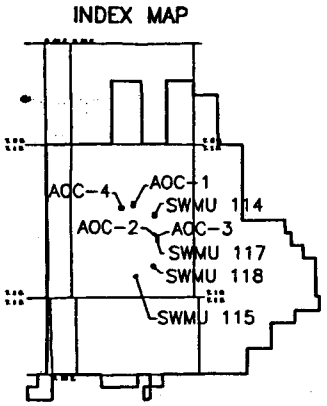
LEGEND:

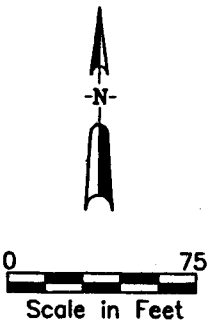
RFI Investigation Area

Surface Drainage

M115SB003 Borehole Location (1995)

S115SB01 Soil Sample Location (2002)



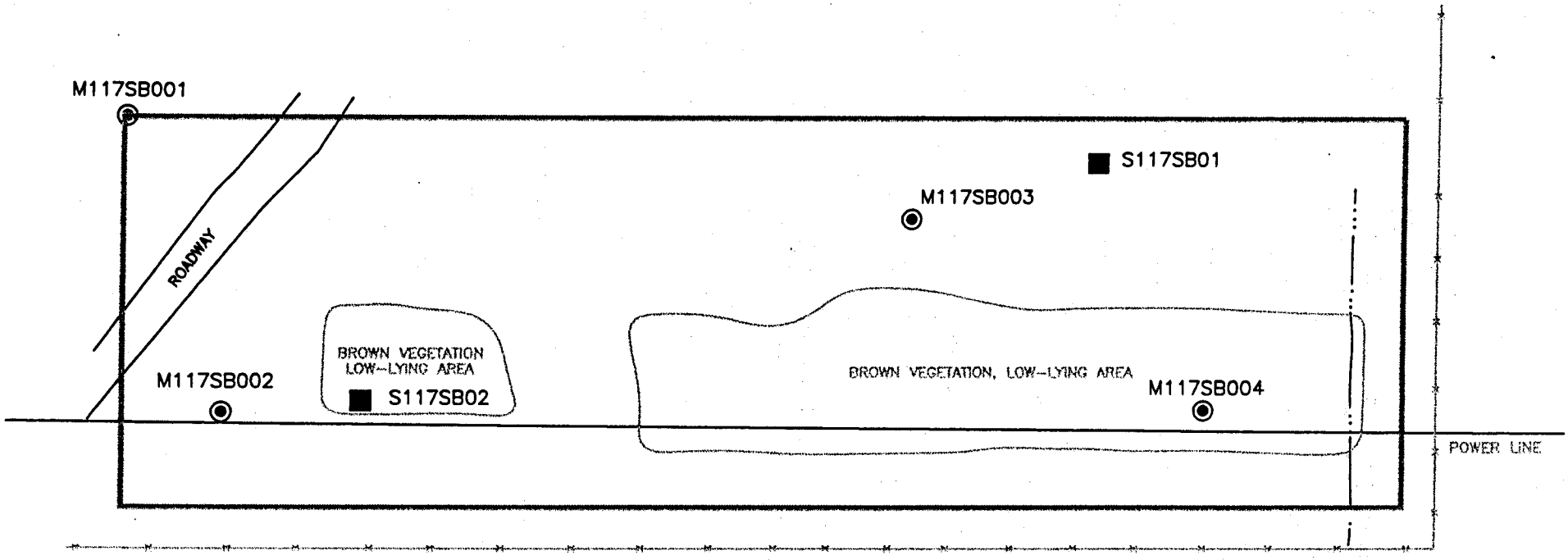


FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:75
DRAWN: REP

FIGURE 2-3
SWMU 115 SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE



LEGEND:

RFI Investigation Area

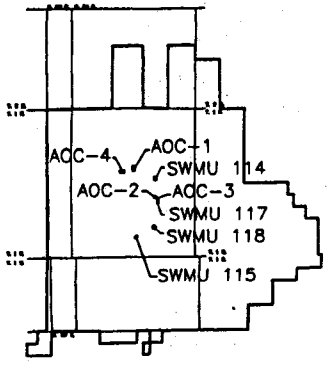
Fence

Surface Drainage

M117SB001 Borehole Location (1995)

S117SB01 Soil Sample Location (2002)

INDEX MAP



0 80
Scale in Feet

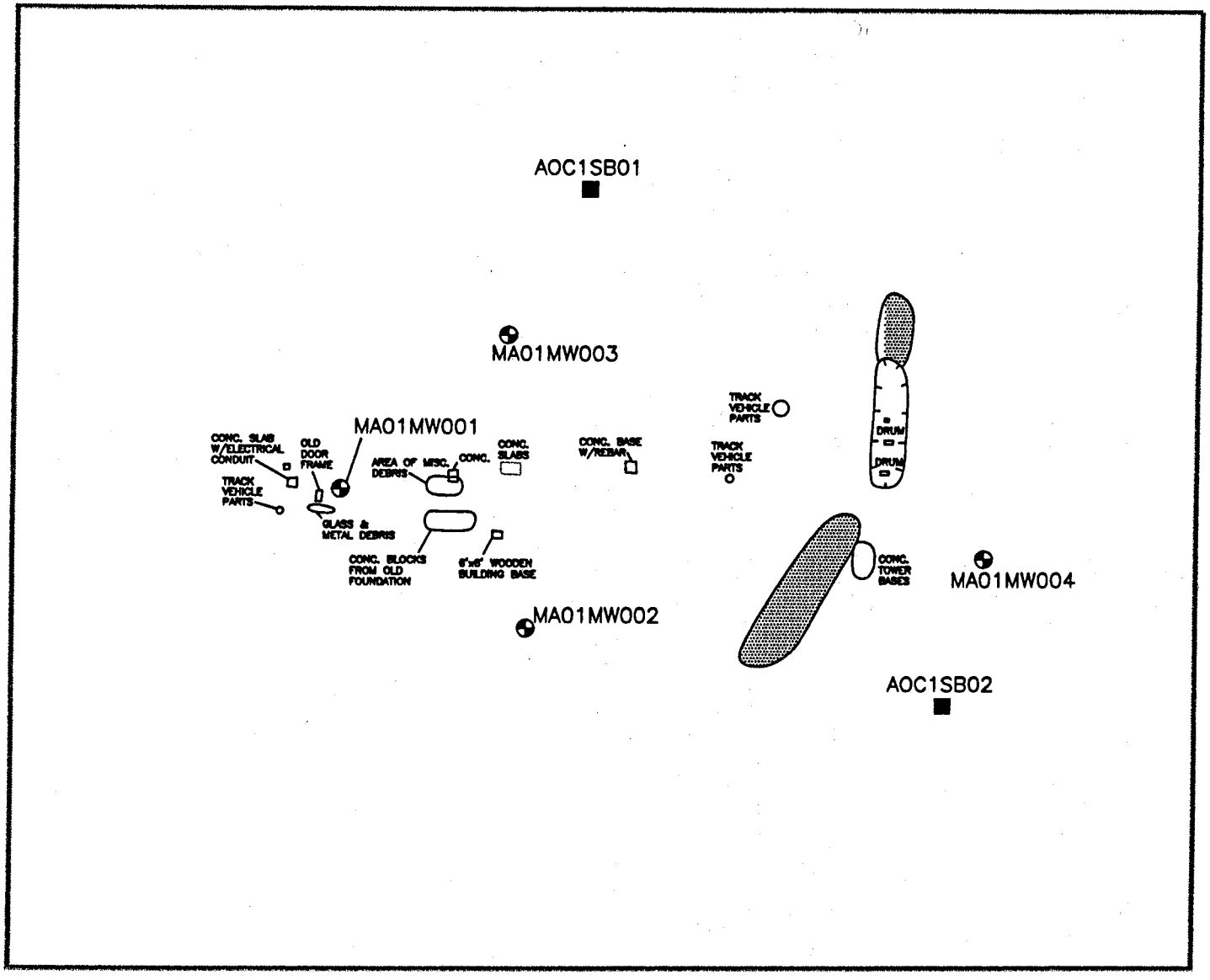
FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:80
DRAWN: REP

FIGURE 2-4
SWMU 117 SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE

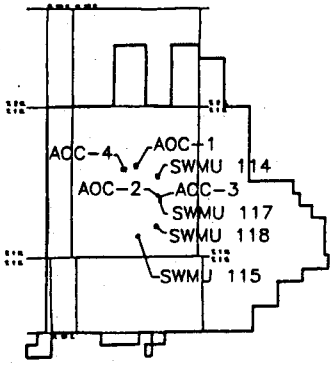
PLOT/UPDATE: OCT 02 2002 13:54:23



LEGEND

- RFI Investigation Area
- Depression
- Mound
- MA01MW004 Monitoring Well Location
- AOC1SB01 Soil Sample Location (2002)

INDEX MAP

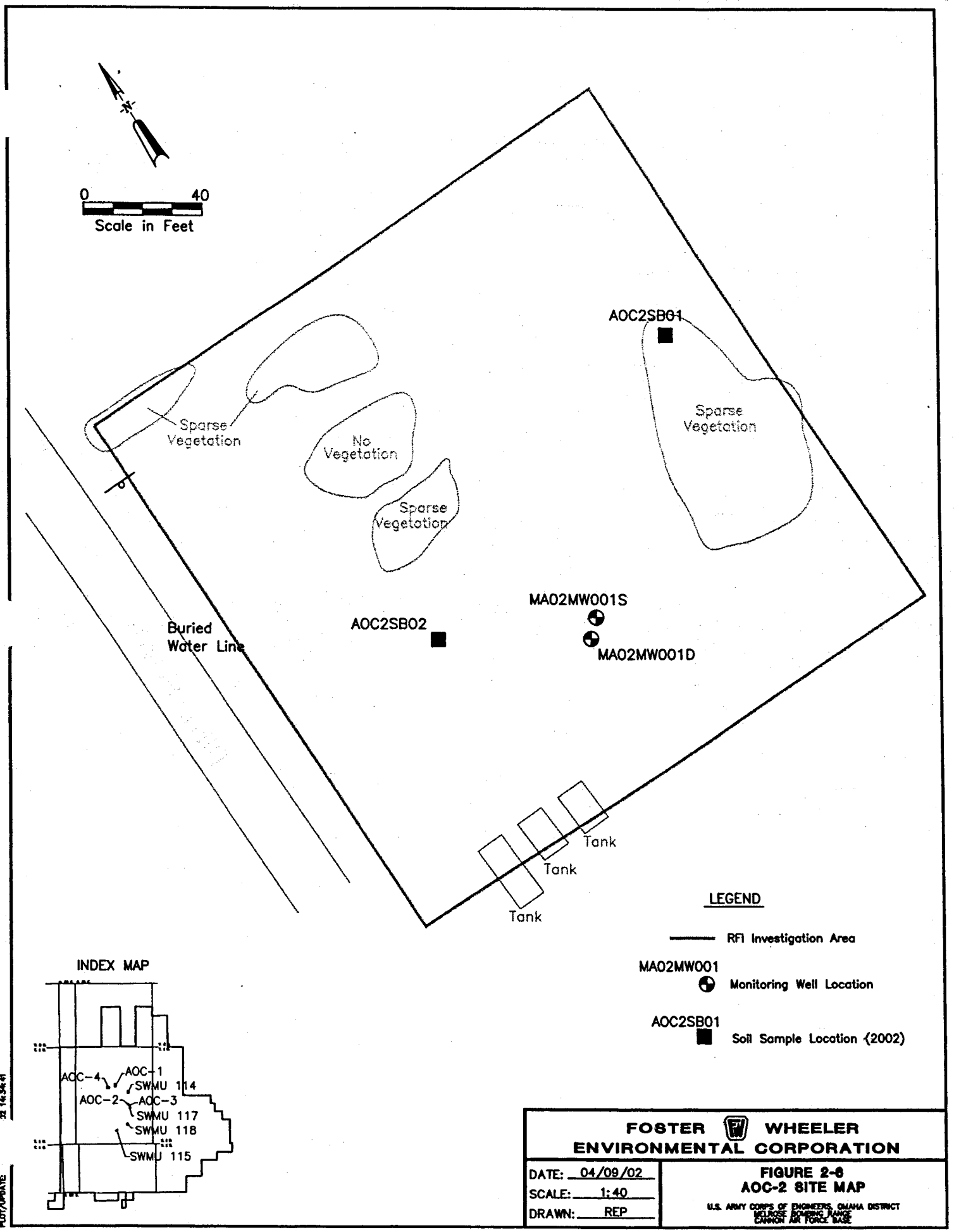


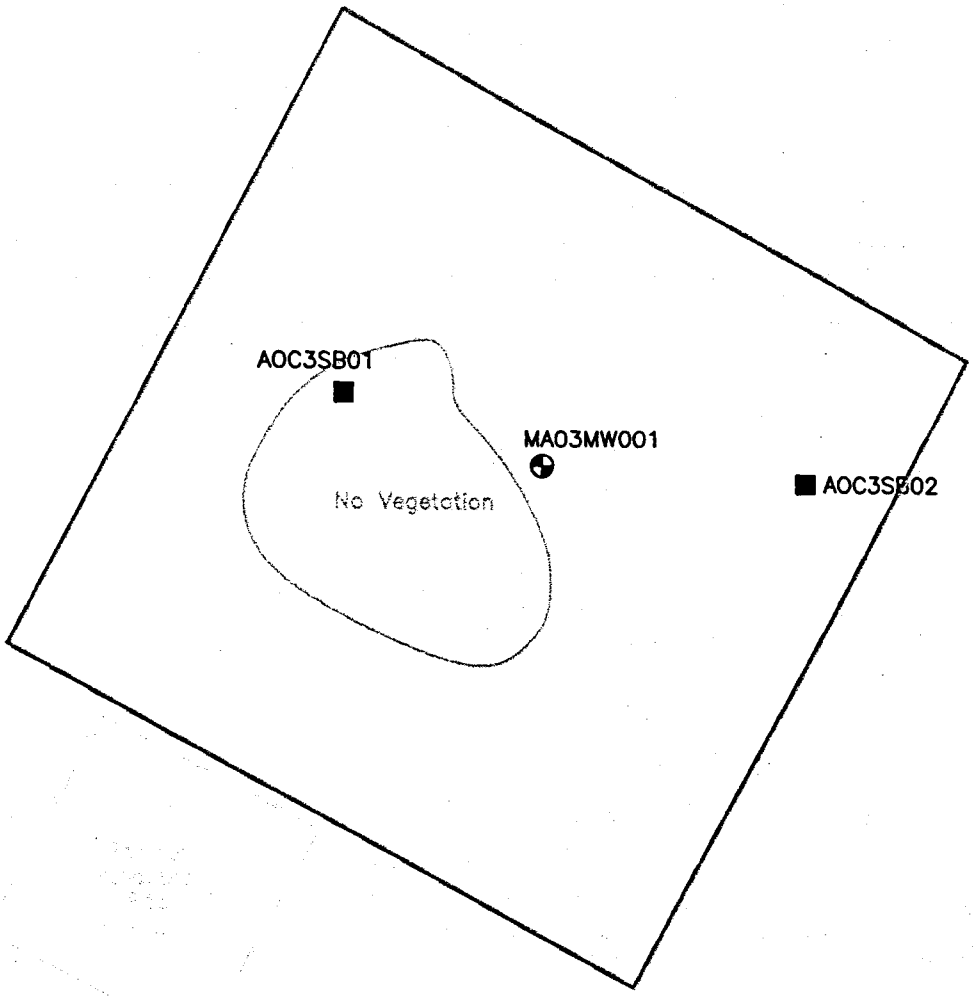
FOSTER WHEELER ENVIRONMENTAL CORPORATION

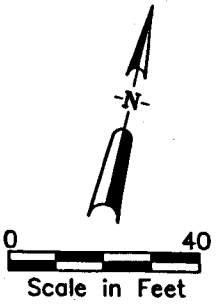
DATE: 04/09/02
SCALE: 1:150
DRAWN: REP

FIGURE 2-5
AOC-1 SITE MAP

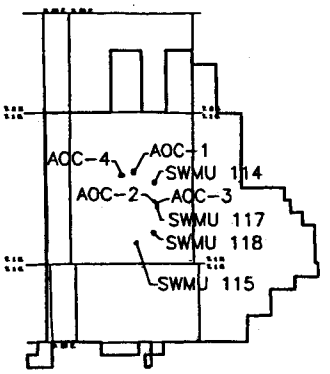
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MILROSE BOMBING RANGE
CANNON AIR FORCE BASE


0
40
Scale in Feet
AOC2SB01
Sparse Vegetation
No Vegetation
Sparse Vegetation
Sparse Vegetation
MA02MW001S
AOC2SB02
MA02MW001D
Buried Water Line
Tank
Tank
Tank
LEGEND
RFI Investigation Area
MA02MW001
Monitoring Well Location
AOC2SB01
Soil Sample Location (2002)
INDEX MAP
AOC-4
AOC-1
SWMU 114
AOC-2
AOC-3
SWMU 117
SWMU 118
SWMU 115
FOSTER WHEELER ENVIRONMENTAL CORPORATION
DATE: 04/09/02
SCALE: 1:40
DRAWN: REP
FIGURE 2-6
AOC-2 SITE MAP
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE





INDEX MAP



LEGEND:

RFI Investigation Area

MA03MW001 Monitoring Well Location

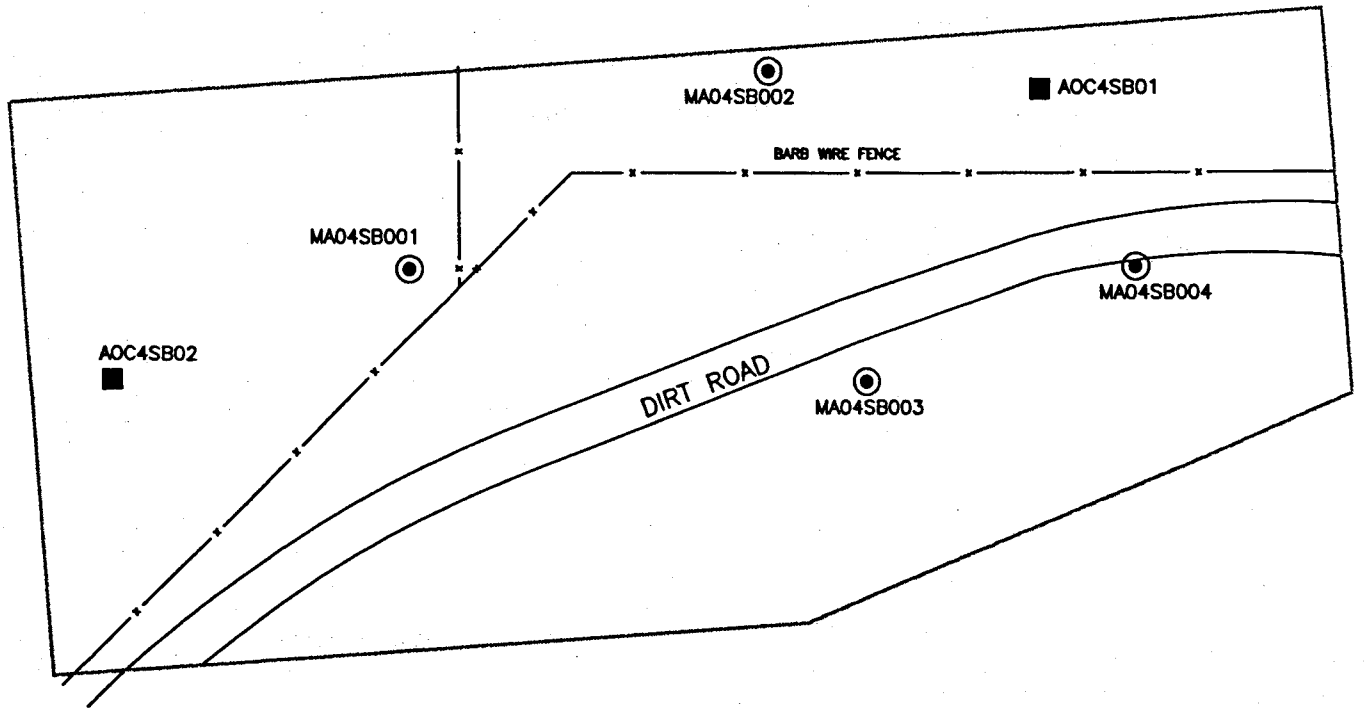
AOC3SB01 Soil Sample Location (2002)

FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:40
DRAWN: REP

FIGURE 2-7
AOC-3 SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MELROSE BOMBING RANGE
CANNON AIR FORCE BASE



0 100

Scale in Feet

LEGEND:

RFI Investigation Area

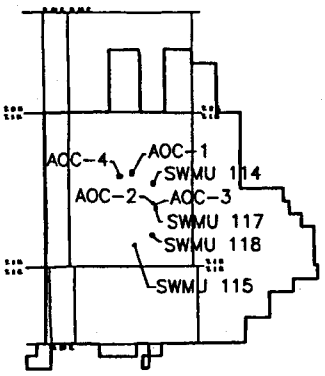
Fence

Road

MA04SB003 Borehole Location (1995)

AOC4SB01 Soil Sample Location (2002)

INDEX MAP



FOSTER WHEELER ENVIRONMENTAL CORPORATION

DATE: 04/09/02
SCALE: 1:100
DRAWN: REP

FIGURE 2-8
AOC-4 SITE MAP

U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MCLAUGHLIN BOMBING RANGE
CANNON AIR FORCE BASE

Tables

Table 3-1. 1995 RFI Sampling Locations

Site	Soil Gas Samples	Boreholes [a]	Groundwater Wells
SWMU 114	107	4	4
SWMU 115	0	4	4 [b]
SWMU 117	70	4	0
AOC-1	83	4	4
AOC-2	23	2	1 [c]
AOC-3	16	1	0 [d]
AOC-4	0	4	3 [e]

Notes:

[a] Used for surface and subsurface soil sampling.

[b] Boreholes were backfilled with grout to the ground surface and abandoned.

[c] The shallow well was dry at the time of installation/development and sampling.

[d] Dry at the time of installation/development and sampling.

[e] No groundwater was encountered in one borehole. After sampling was complete, boreholes were backfilled with grout to the ground surface and abandoned.

AOC - Area of Concern

SWMU - Solid Waste Management Unit

Table 4-1. Groundwater Analytical Results for SWMU 114

Analyte	PQL		M114MW001		M114MW002		M114MW003		M114MW004		NMWQCC Groundwater Standard
	1995	2000	February-96	May-00	December-95	May-00	December-95	May-00	December-95	May-00	
Total Metals (mg/L)											
Aluminum	0.2	0.1	10	3.05	0.6377	23.6	0.786	1.52	0.629	4.44	5.0
Arsenic	0.05	0.005	0.0028 J	ND	ND	ND	ND	ND	ND	ND	0.1
Barium	0.2	0.01	0.28	0.101	0.031	0.401	0.03	ND	0.027	0.0886	1.0
Calcium	5	0.2	282.8	369	315.6	352	359.9	372	363.5	377	--
Chromium	0.01	0.005	0.014	ND	0.0088	0.047	0.0097	ND	0.016	ND	0.05
Cobalt	0.05	0.005	ND	ND	ND	ND	0.014	ND	0.046	ND	0.05
Copper	0.025	0.01	0.018	ND	0.0038	ND	0.0077	ND	0.012	ND	--
Iron	0.1	0.05	7.11	2.61	0.6128	18.1	0.52	1.52 J	0.488	3.4	1.0
Lead	0.003	0.005	ND	ND	ND	ND	0.0014 J	ND	0.0011 J	ND	0.05
Magnesium	5	0.1	248	307	309	315	292.6	286	326.6	311	--
Manganese	0.015	0.005	0.223	0.0873	0.0224	0.244	0.0546	0.036	0.0175	0.0794	0.2
Nickel	0.04	0.005	0.017	ND	ND	0.0376	ND	ND	ND	ND	0.2
Potassium	5	0.4	16.53	28.6 J	16.99	34.5 J	17.23	26.7 J	18.34	28.4 J	--
Selenium	0.025	0.01	0.032 J	ND	0.0048 J	ND	0.022 J	ND	0.0087 J	ND	0.05
Silver	0.01	0.01	ND	ND	0.0035	ND	ND	ND	ND	ND	0.05
Sodium	5	2	4684 J	2430	2062 J	2450	2081 J	2610	2081 J	2450	--
Tin	0.02	NA	ND	NA	0.045	NA	ND	NA	ND	NA	--
Vanadium	0.05	0.01	0.012	ND	0.013	ND	0.013	ND	0.012	ND	--
Zinc	0.02	0.01	0.064	ND	0.012	0.0603 J	0.036	ND	0.047	ND	10.0
Dissolved Metals (mg/L)											
Arsenic	0.05	0.005	0.0021	*	*	*	*	*	*	*	0.1
Barium	0.2	0.01	0.034	*	*	*	*	*	*	*	1.0
Copper	0.025	0.01	0.0032	*	*	*	*	*	*	*	--
Selenium		0.01	0.025	*	*	*	*	*	*	*	0.05
Zinc	0.02	0.01	0.023	*	*	*	*	*	*	*	10.0
Anions (mg/L)											
Bicarbonate	3	NA	100	NA	53	NA	49	NA	54	NA	--
Chloride	0.02	0.2	3400	2110	3900	4230	250	4090	3900	4000	250
Nitrogen (as nitrate+nitrite)	0.05	0.1	0.27	ND	0.35	ND	1.2	ND	1.1	ND	--
Sulfate	0.1	0.5	2100	2100	2000	2000	350	2000	2100	2500	600
Organic Compounds (mg/L)											
Trichloroethene	5	0.005	ND	ND	0.0013	ND	ND	ND	ND	ND	0.1

Notes:

Highlighting indicates analyte is detected above the WQCC Groundwater Standard.

-- No WQCC Standard.

* No dissolved metals samples were collected.

J - Validation qualifier that indicated an estimated detection

mg/L - milligrams per liter

NA - not analyzed

ND - nondetect

PQL - practical quantitiation liimit

SWMU - Solid Waste Management Unit

Table 4-2. Groundwater Analytical Results for SWMU 115

Analyte	PQL 1995	M115SB001 September-95	M115SB002 September-95	M115SB003 September-95	M115SB004 September-95	WQCC Groundwater Standard
Total Metals (mg/L)						
Aluminum	0.2	6108	1892	1576	0.2353	5.0
Arsenic	0.05	0.012	ND	ND	0.017 J	0.1
Barium	0.2	13	8.9	31	7.4	1.0
Beryllium	0.005	0.0015	ND	ND	ND	--
Cadmium	0.005	ND	0.0054	0.0087	0.014	0.01
Calcium	5	502	2817 J	2828 J	776.1	--
Chromium	0.01	0.25 J	0.181	0.42 J	ND	0.05
Cobalt	0.05	0.04	0.12	0.18	ND	0.05
Copper	0.025	0.54	0.21	0.51	0.034	--
Iron	0.1	1396	1414	1916	ND	1.0
Magnesium	5	86.35	198.7	191.5	287.9	--
Manganese	0.015	6	11.12	12.05	29.3	0.2
Mercury	0.0002	0.0002	0.0003	0.0005	0.0017	0.002
Nickel	0.04	0.23	0.31	0.45	0.058	0.2
Potassium	5	19.26	41.45	32.61	28	--
Selenium	0.025	0.0088 J	0.027 J	0.016 J	0.024 J	0.05
Sodium	5	167.3	79.59	90.31	185.7	--
Tin	0.02	0.05 J	0.094 J	0.15 J	ND	--
Vanadium	0.05	0.21 J	0.55 J	0.83 J	0.069 J	--
Zinc	0.02	1 J	0.67 J	1.3 J	ND	10.0
Anions (mg/L)						
Bicarbonate	3	540	7300	8500	26000	--
Chloride	0.02	120	21	39	120	250
Nitrogen (as nitrate+nitrite)	0.05	1.9	0.027	0.3	2.9	--
Sulfate	0.1	280	49	78	280	600
Cyanide and Sulfate (mg/L)						
Cyanide	0.02	0.033	ND	ND	ND	0.2
Sulfate	3	ND	ND	ND	0.8 J	--

Notes:

In 1995, four boreholes were drilled, sampled, and then backfilled with grout to the ground surface and abandoned.

Highlighting indicates analyte is detected above the WQCC Groundwater Standard.

-- No WQCC Standard.

J - Validation qualifier that indicated an estimated detection.

mg/L - milligrams per liter

ND - nondetect

PQL - practical quantitiation liimit

SWMU - Solid Waste Management Unit

WQCC - New Mexico Water Quality Control Commission

Table 4-3. Groundwater Analytical Results for AOC-1

Analyte	PQL 1995	PQL 2000	MA01GW001 November-95	MA01GW001 May-00	MA01GW002 November-95	MA01GW002 May-00	MA01GW003 November-95	MA01GW003 May-00	MA01GW004 December-95	MA01GW004 May-00	WQCC Groundwater Standard
Total Metals (mg/L)											
Aluminum	0.2	0.1	0.682	18.6	0.035	2.33	0.4435	3.2	0.5791	17.6	5.0
Barium	0.2	0.01	0.0551	0.447	0.094	0.0602	0.057	0.0844	0.052	0.153	1.0
Calcium	5	0.2	55.3	97.6	57.09	45.9	68.29	66.9	37.34	59.5	--
Chromium	0.01	0.005	0.022	0.0363	0.056	0.0188	0.012	0.0172	0.013	0.0141	0.05
Cobalt	0.05	0.005	ND	0.0133	0.024	ND	0.013	ND	0.0092	0.0128	0.05
Copper	0.025	0.01	0.016	0.0215	0.028	ND	0.0099	ND	0.012	0.0179	--
Iron	0.1	0.05	0.548	14.35	3.488	1.68 J	0.3531	52.64	0.457	14.7 J	1.0
Lead	0.003	0.005	ND	0.009	0.0027	ND	0.0013 J	ND	0.0018	0.0079	0.05
Magnesium	5	0.1	48.3	55	43.41	38.1	63.64	54.8	32.99	42	--
Manganese	0.015	0.005	0.0385	0.986	0.162	0.083	0.022	0.155	0.0185	0.356	0.2
Mercury	0.0002	0.0005	ND	0.00059	ND	0.00053	ND	ND	ND	0.00057	0.002
Molybdenum	NA	0.005	NA	0.0109	ND	0.0115	ND	0.0078	ND	0.16	1.0
Nickel	0.04	0.005	0.018	0.049	0.054	0.0152	ND	0.0179	ND	0.078	0.2
Potassium	5	0.4	7.34	13.8 J	8.671	11.1 J	8.052	11.7 J	6.224	11.6 J	--
Selenium	0.025	0.01	ND	ND	0.0047 J	ND	ND	ND	0.0055 J	ND	0.05
Silver	0.01	0.01	ND	ND	0.0045	ND	0.0042	ND	ND	ND	0.05
Sodium	5	2	631	601	564.1	535	551.7	565	355	336	--
Thallium	0.05	0.01	0.0039 J	ND	ND	ND	ND	ND	ND	ND	--
Tin	0.02	NA	ND	NA	ND	NA	ND	NA	0.039	NA	--
Vanadium	0.05	0.01	0.006	0.0695	0.02	0.0142	0.012	0.0162	0.021	0.053	--
Zinc	0.02	0.01	0.0676	ND	0.031	0.0133	0.13	0.0318 J	0.052	0.0582 J	10.0
Anions (mg/L)											
Bicarbonate	3	NA	180	NA	170	NA	160	NA	190	NA	--
Chloride	0.02	0.2	800	610	480	615	560	639	250	316	250
Nitrogen (as nitrate+nitrite)	0.05	0.1	0.32	ND	0.44	ND	0.25	ND	0.37	ND	--
Sulfate	0.1	0.5	700	890	570	560	640	670	350	390	600
Organic Compounds (mg/L)											
Trichloroethene	5	0.005	ND	0.0457	ND	ND	ND	ND	0.0022	ND	0.1

Notes:
Highlighting indicates analyte is detected above the WQCC Groundwater Standard.
-- No WQCC Standard.
AOC - Area of Concern
J - Validation qualifier that indicated an estimated detection.
mg/L - milligrams per liter
NA - not analyzed
ND - nondetect
PQL - practical quantitiation limit
WQCC - New Mexico Water Qulaity Control Commission

Table 4-4. Groundwater Analytical Results for AOC-2

Analyte	PQL 1995	PQL 2000	MA02GW001D January-96	MA02GW001D May-00	WQCC Groundwater Standard
Total Metals (mg/L)					
Aluminum	0.2	0.1	5.22	32.6	5.0
Barium	0.2	0.01	0.057	0.264	1.0
Calcium	5	0.2	112.7	223	--
Chromium	0.01	0.005	0.0037	0.0471	0.05
Cobalt	0.05	0.005	0.008	ND	0.05
Copper	0.025	0.01	0.011	ND	--
Iron	0.1	0.05	10.15	23 J	1.0
Magnesium	5	0.1	53.73	97.3	--
Manganese	0.015	0.005	0.269	0.754	0.2
Mercury	0.0002	0.0005	ND	0.00054	0.002
Nickel	0.04	0.005	ND	0.0431	0.2
Potassium	5	0.4	10.22	25.3 J	--
Selenium	0.025	0.01	0.082 J	ND	0.05
Sodium	5	2	4557 J	2650	--
Thallium	0.05	0.01	0.0047	ND	--
Vanadium	0.05	0.01	0.027	0.0536	--
Zinc	0.02	0.01	0.034	0.0632 J	10.0
Dissolved Metals (mg/L)					
Antimony	0.06	0.01	0.0065	*	--
Calcium	5	0.2	110	*	--
Copper	0.025	0.01	0.0056	*	--
Magnesium	5	0.1	52	*	--
Manganese	0.015	0.005	0.14	*	0.2
Potassium	5	0.4	8.5	*	--
Selenium	0.025	0.01	0.088	*	0.05
Sodium	5	2	2000	*	--
Zinc	0.02	0.01	0.013	*	10.0
Anions (mg/L)					
Bicarbonate	3	NA	140	NA	--
Chloride	0.02	0.2	1800	3100	250
Nitrogen (as nitrate+nitrite)	0.05	0.1	3	ND	--
Sulfate	0.1	0.5	2300	2500	600
Cyanide and Sulfate (mg/L)					
Cyanide	0.02	0.05	0.016 J	ND	0.2

Notes:

Well MAO2MW001S was dry at the time of installation/devlopment and sampling in 1995.

Highlighting indicates analyte is detected above the WQCC Groundwater Standard.

-- No WQCC Standard.

* No disolved metals were collected.

AOC - Area of Concern

J - Validation qualifier that indicated an estimated detection.

mg/L - milligrams per liter

NA - not analyzed

ND - nondetect

PQL - practical quantitiation limit

WQCC - New Mexico Water Quality Control Commission

Table 4-5. Groundwater Analytical Results for AOC-4

Analyte	PQL 1995	MA04SB001 October-95	MA04SB003 October-95	MA04SB004 September-95	WQCC Groundwater Standard
Total Metals (mg/L)					
Aluminum	0.2	20.94	74.65	532	5.0
Arsenic	0.05	ND	0.023	0.0067	0.1
Barium	0.2	0.14	0.27	2.51	1.0
Beryllium	0.005	ND	0.0063	0.03	--
Cadmium	0.005	96.01	0.0053	0.0077	0.01
Calcium	5	460	204.4	2839 J	--
Chromium	0.01	0.048	0.045 J	0.361 J	0.05
Cobalt	0.05	0.021	0.038	0.27	0.05
Copper	0.025	0.54	0.037	0.48	--
Iron	0.1	2389	7475	3203	1.0
Lead	0.003	0.014 J	ND	ND	0.05
Magnesium	5	48.86	82.67	378.2	--
Manganese	0.015	3.003	2.024	176	0.2
Nickel	0.04	0.06	0.098	0.69	0.2
Potassium	5	10.8	23.65	137	--
Sodium	5	899.5	1893 J	1893 J	--
Tin	0.02	ND	0.074 J	0.13 J	--
Vanadium	0.05	0.053	0.041 J	0.27 J	--
Zinc	0.02	0.1	0.2 J	1.4 J	10.0
Anions (mg/L)					
Bicarbonate	3	250	340	2100	--
Chloride	0.02	ND	450	840	250
Nitrogen (as nitrate+nitrite)	0.05	0.03	0.041	0.11	--
Sulfate	0.1	1300	1400	1400	600
Organic Compounds (mg/L)					
Acetone	0.1	0.022	0.023	ND	--

Notes:

In 1995, four boreholes were drilled. MA04SB002 was dry and not sampled.

All wells were backfilled with grout to the ground surface and abandoned in 1995.

Highlighting indicates analyte is detected above the WQCC Groundwater Standard.

-- No WQCC Standard.

AOC - Area of Concern

J - validation qualifier that indicated an estimated detection

ND - nondetect

PPM - parts per million

PQL - practical quantitiation limit

WQCC - New Mexico Water Quality Control Commission